

ENGINEERING
TOMORROW

Danfoss

Case story

VLT® drives **control** **energy** consumption at **LEGOLAND®**

190,000

**kWh of electricity
saved per season**

by installing Danfoss VLT®
drives on the Vikings River
Splash attraction at
LEGOLAND®

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VLT®
THE REAL DRIVE



“By installing Danfoss VLT® frequency converters on the two pumps of the ride we have reduced energy consumption. At the same time it is now easier to regulate the water volume because the frequency converter ensures that the pumps only circulate the necessary volumes of water”

Anders Christensen,
electrical technician,
LEGOLAND



VLT® drives control energy consumption at LEGOLAND®



The Vikings River Splash is popular in LEGOLAND®. It also consumes more energy than nearly everything else in the amusement park. However, by installing Danfoss VLT® frequency converters, electricity consumption has been reduced by 190,000 kWh per annum, and at the same time it has become easier to regulate water flow.

Something within the region of 1800 litres of water per second are pumped round the channels so that children and adults can have fun at LEGOLAND. This requires energy and energy consumption is now higher on the agenda than ever before. This is why regulating the water flow in the

attraction is of supreme importance. The goal here is to use only the necessary amount of water to send the guests on a wild ride in the tub-shaped boats. A band hauls these up onto a higher level. Here we find 125 kW propeller pumps which send the water out in a long vessel with curves, fish ladders and small bumps, all of which create the rafting effect.

Using only the required water volumes

“By installing Danfoss VLT® 6172 132 kW frequency converters on the two pumps of the ride we have reduced energy consumption. At the same time it is now easier to regulate the water volume because the frequency

converter ensures that the pumps only circulate the necessary volumes of water”, says Anders Christensen who works as an electrical technician at LEGOLAND. Previously we used wood shutters and gates to regulate water volume. We would then send the surplus water back to its starting point. The pumps operated at the same speed irrespective of how much water was required. Installation of the frequency converters means that it is possible to close all shutters so there is no longer any waterfall. At the same time it is possible to control and regulate the water volume as required at any given moment. “We can also send the boats off much faster, and the more we can send off in one hour, the more we reduce the

waiting time for our guests”, says Anders Christensen.

Proven reliability

Safety is always uppermost in our minds, and here energy optimisation has also brought with it excellent results. “We did have a problem with boats banging against the timbers when they departed and returned because we could not control the flow of water. We have now solved this problem by adjusting the frequency converters on the two pumps to 43.0 and 46.0 HZ respectively - so now there is a bit of difference between them. This makes the ride more pleasant for the children”, says Anders Christensen. According to Anders

pleased that frequency converters mean less wear and tear on mechanical parts, which means the attractions last longer.

LEGOLAND has worked with Danfoss for many years. “We chose the frequency converters from Danfoss because we know that we can depend on them. They are also quite straightforward for technicians to handle. Once you have learnt to program them, the rest is easy, so it is an advantage to have the same type available throughout the park. Complete familiarity with Danfoss frequency converters means that when on a rare occasion a frequency converter does go down, we can get it up and running again in no time. It is very important from

the point of view of the guests at LEGOLAND that no attraction is out of service more than is absolutely necessary. Here the frequency converters have been such a great asset”, says Anders Christensen. Improved energy efficiency of River Rafting and other activities such as the installation of light-emitting diodes has meant that LEGOLAND’s green accounts continue to look better. This famous amusement park is on its way to becoming a truly climate-friendly organisation.

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The Vikings River Splash attraction at LEGOLAND

Christensen, adjusting the water ride with Danfoss frequency converters has both improved this attraction and made it more reliable.

Many frequency converters at LEGOLAND

The amusement park makes use of 65 Danfoss VLT® frequency converters in various places and they all contribute to making the park more energy efficient. “The technical team, which I belong to, is always looking for new ways to reduce energy consumption. This is an easy way to save money, and the frequency converters pay for themselves in no time,” says Anders Christensen. As a technician he is really

Facts

Electricity consumption per season on the Vikings River Splash attraction prior to installation of the frequency converters: 440,000 kWh.

After installation: 250,000 kWh.

Savings: 190,000 kWh per season.

Two 132 kW Danfoss VLT® 6172 frequency converters connected to two 125 kW propeller pumps control the water flow in the Vikings River Splash attraction.

What VLT[®] is all about

Danfoss VLT Drives is the world leader among dedicated drives providers – and still gaining market share.

Environmentally responsible

VLT[®] products are manufactured with respect for the safety and well-being of people and the environment.

All activities are planned and performed taking into account the individual employee, the work environment and the external environment. Production takes place with a minimum of noise, smoke or other pollution and environmentally safe disposal of the products is pre-prepared.

UN Global Compact

Danfoss has signed the UN Global Compact on social and environmental responsibility and our companies act responsibly towards local societies.

EU Directives

All factories are certified according to ISO 14001 standard. All products fulfil the EU Directives for General Product Safety and the Machinery directive. Danfoss VLT Drives is, in all product series, implementing the EU Directive concerning Hazardous Substances in Electrical and Electrical Equipment (RoHS) and is designing all new product series according to the EU Directive on Waste Electrical and Electronic Equipment (WEEE).

Impact on energy savings

One year's energy savings from our annual production of VLT[®] drives will save the energy equivalent to the energy production from a major power plant. Better process control at the same time improves product quality and reduces waste and wear on equipment.

Dedicated to drives

Dedication has been a key word since 1968, when Danfoss introduced the world's first mass produced variable speed drive for AC motors – and named it VLT[®].

Twenty five hundred employees develop, manufacture, sell and service drives and soft starters in more than one hundred countries, focused only on drives and soft starters.

Intelligent and innovative

Developers at Danfoss VLT Drives have fully adopted modular principles in development as well as design, production and configuration.

Tomorrow's features are developed in parallel using dedicated technology platforms. This allows the development of all elements to take place in parallel, at the same time reducing time to market and ensuring that customers always enjoy the benefits of the latest features.

Rely on the experts

We take responsibility for every element of our products. The fact that we develop and produce our own features, hardware, software, power modules, printed circuit boards, and accessories is your guarantee of reliable products.

Local backup – globally

VLT[®] motor controllers are operating in applications all over the world and Danfoss VLT Drives' experts located in more than 100 countries are ready to support our customers with application advice and service wherever they may be.

Danfoss VLT Drives experts don't stop until the customer's drive challenges are solved.

