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**DRIVE SOLUTIONS
FOR INNOVATIVE SOLAR TECHNOLOGY**

CASE STUDY: DHP TECHNOLOGY



**World's first solar folding
roof over a sewage
treatment plant**

**Automated retraction
and extension of the
folding roof groups**

**Intelligent NORD drives
with integrated PLC**

**Reliable, secure
and innovative**

**UNIVERSAL worm geared
motors with mounted
NORDAC FLEX**

NORD DRIVESYSTEMS Group

- Family business from Bargteheide near Hamburg with 4,000 employees
- Drive solutions for more than 100 branches of industry
- 7 production locations worldwide
- Present in 98 countries on 5 continents
- More information: www.nord.com

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In August 2018, dhp technology commissioned the world's first foldable solar roof at the ARA Chur sewage treatment plant. Using robust cableway technology, the flexible folding roofs can be moved to a secure position where they are protected against extreme weather.



"Cooperation with NORD DRIVESYSTEMS was very pleasant. Everything was a perfect fit – the product range as well as the personal contact."

Andreas Hügli, Co-Manager of dhp technology



RENEWABLE ENERGIES
Solar power plant/
sewage treatment plant



GEARED MOTORS
UNIVERSAL worm geared motors
with brake and magnetic encoder



FREQUENCY INVERTER
NORDAC FLEX SK 205E



APPLICATION VIDEO

PROJECT CHALLENGE

Sewage treatment plants consume large amounts of electrical energy and space. It is not possible to cover the area with conventional photovoltaic systems since the settling basins must be accessible from above at any given time for operational reasons.

Solar technology redefined. The HORIZON foldable solar roof by dhp technology is erected over already used areas and allows for an intelligent dual use of industrial sites. In August 2018, the world's first solar folding roof above a sewage treatment plant was commissioned at the ARA Chur sewage treatment plant (Switzerland). It covers an area of 5,800 m² and completely covers the pretreatment, secondary (biological) treatment, and tertiary treatment basins. The 2,120 modules produce 550,000 kWh of electrical power per year – equalling about 20% of the auxiliary power required by the plant.

Flexible and autonomous. The foldable solar roof operates completely autonomously and automatically adjusts to the ambient conditions, using the weather data of a local weather station and external sources. The sun controls the intelligent drive units with integrated PLC automatically: Using robust cableway technology, the solar panels unfold automatically as soon as the first sun rays are visible. They return to their protective garage position when the sun goes down in the evening. The foldable solar roof also returns to this position automatically in case of snow, hail or wind, and extreme situations – such as power or communication failures.

APPLICATION SOLUTION

The extension and retraction of the folding roof panels are handled by intelligent NORD drive units. The NORD drives – consisting of a UNIVERSAL worm geared motor with brake, magnetic encoder and motor-mounted NORDAC FLEX SK 205E frequency inverter – are mounted in a protected position on the supporting structure and can be individually controlled. This allows the maintenance personnel to retract individual folding roof groups into the garage and perform maintenance to specific basins.

Controlled by weather station and algorithm. Each of the 53 folding roof groups has a drive of its own and can be extended and retracted automatically, depending on the weather. For this purpose, the NORD frequency inverters read weather data and process this data using a custom

meteo algorithm that controls the plant and gives the appropriate commands for retracting and extending. Rotary encoders ensure that the position of the panels is known at any given time. Four drives each are electrically linked via the internal CAN bus, with one of the drives controlling the movement sequences as master.

Intelligent drives with integrated PLC. The control unit has been programmed to retract the solar panels into the secure garage position automatically in case of a power or communication failure. This means: Manual intervention via remote maintenance is possible but not necessary for secure operation. We use the ramp function to ensure we can retract the panels in an adequate period of time. The drive unit PLC controls this as well.



"Above all, the PLC integrated in the drive unit convinced us. Controlled via weather station and algorithm, it manages the sequences independently even in case of incidents. This maximises the plant's operational safety."

Philip Racine,
technology system engineer
at dhp technology

FOCUS ON THE CUSTOMER

dhp technology was founded in 2015 and develops solar power generation systems for a modern, renewable and decentralized power supply. Their centre is on sustainable local value creation, the conservation of scarce resources and the reduction of CO₂ emissions. With the HORIZON foldable roof, the Swiss company developed a new technology that equally meets environmental, sociological and economical needs.

www.dhp-technology.ch



FOCUS ON THE PROJECT

The NORD drives consisting of a UNIVERSAL worm geared motor with brake, magnetic encoder and motor-mounted NORDAC FLEX SK 205E frequency inverter are used for automatically retracting and extending the folding roof panels. Controlled by a weather station and suitable algorithms, the integrated PLC manages the sequences independently:

- individually addressable for easier maintenance,
- autonomous homerun function for increased operational safety,
- speed control.

