

KEEPING WIND TURBINES TURNING - AND IN GOOD SHAPE

CASE: NYSTED OFFSHORE WIND FARM

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Adsorption dehumidification keeps offshore wind turbines in good shape

The Nysted Offshore Wind Farm (Nysted Havmøllepark) lies about 10 km out to sea off the south-eastern tip of Denmark. It is one of the world's largest wind farms, and consists of eight rows of nine Siemens Wind Power 2.3CS MW turbines. As a rule of thumb, offshore wind turbines produce an average of 50% more power than similar land-based turbines – quite simply because winds out at sea are normally both stronger and more frequent.

The Nysted wind farm began commercial operations on 1 December 2003, and is operated by DONG Energy, one of the leading energy groups in Northern Europe.

CORROSION PREVENTION

If not tackled effectively, the high levels of moisture – often saturated with corrosive salts due to the offshore environment – in the air can have serious effects on structures, operating uptime and maintenance budgets of wind turbines mounted offshore. Studies have clearly shown that

old-fashioned approaches involving simple ventilation and/or heating have little real effect on relative humidity, because of the dew point of the air. In fact, corrosion in a wind turbine's metal structures can only take place if both oxygen and moisture are present – the salt just serves as a catalyst. Using modern dehumidifiers to remove the moisture from the air therefore eliminates both corrosion and condensation.

LOOKING AWFTER VALUABLE ASSETS

This is why two Cotes CR80B dehumidifiers were installed in each of these 72 large wind turbines (one each in the tower and the nacelle) to supplement standard corrosion-protection measures. Their purpose is to remove the moisture from the flow of air around the turbine machinery and transformer unit, and from the electrical cabinets containing sensitive electrical and electronic equipment.

According to Jesper Nielsen, the

DONG Energy Operations Manager assistant responsible for maintenance of the Nysted wind turbines, the results are remarkable. "There is no sign of corrosion, condensation or any problems of that kind. Inside, our wind turbines and the electrical installations are pretty much in as good a state as the day they were commissioned."

RELIABILITY COUNTS

DONG Energy took over the operation and maintenance of the Nysted facility in December 2008, after the 5-year Siemens service and guarantee period had expired. This gives DONG Energy a special interest in the reliability of each of these wind turbines – because sending technicians out to the site by boat is time-consuming and can be dangerous, and always involves considerable costs.

Despite now having been in service for 7 years, less than half of the dehumidifier units have ever been removed for inspection. According to Jesper Nielsen,



Installation inside wind turbine tower.



"There's no doubt that the Cotes dehumidifiers have proved to be a really good equipment choice"

the numbers of units his team have had to look at normally barely exceed the two-figure mark each year. "They're strongly built and service-friendly," he points out. "They just keep on working as intended, and we rarely see anything wrong."

LOW MAINTENANCE

With regard to the Cotes dehumidifiers, the only maintenance they normally require is the changing of the filters once a year. This is done in conjunction with the annual maintenance visit to the turbine.

"We have a clear policy about using the best, most cost-effective suppliers. Cotes equipment fits in well with this, because their dehumidifier units are based on standard, off-the-shelf components that are widely available. This, too, helps keep our service costs down," notes Jesper Nielsen.

BETTER RETURN ON INVESTMENT

The combination of low service and maintenance costs on the one hand, and extended service life for both the sensitive installations and the actual structures of the wind turbines in the Nysted facility on the other, adds up to a measurably better return on investment for DONG Energy.

"There's no doubt that the Cotes dehumidifiers have proved to be a really good equipment choice. They're straightforward and functional, and we can rely on them to get the job done, and extend the service life of DONG Energy's investment in this facility," states Jesper Nielsen.

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