



# Offshore Wind Farm Monitoring

Kriegers Flak, Denmark

Kriegers Flak is Denmark's largest offshore wind farm with a production capacity of just over 600 MW. The transmission network operators required a reliable, high-performance solution for protecting and monitoring cable loads and immediately detecting cable faults. AP Sensing is monitoring a total of 300 km of this asset, using 6 Distributed Temperature Sensing (DTS) units and 9 Distributed Acoustic Sensing (DAS) units.

The new Kriegers Flak wind farm is located off the Danish coast in the Baltic Sea and will be used to exchange power in a combined grid solution between Denmark and Germany, a project that is unprecedented worldwide.

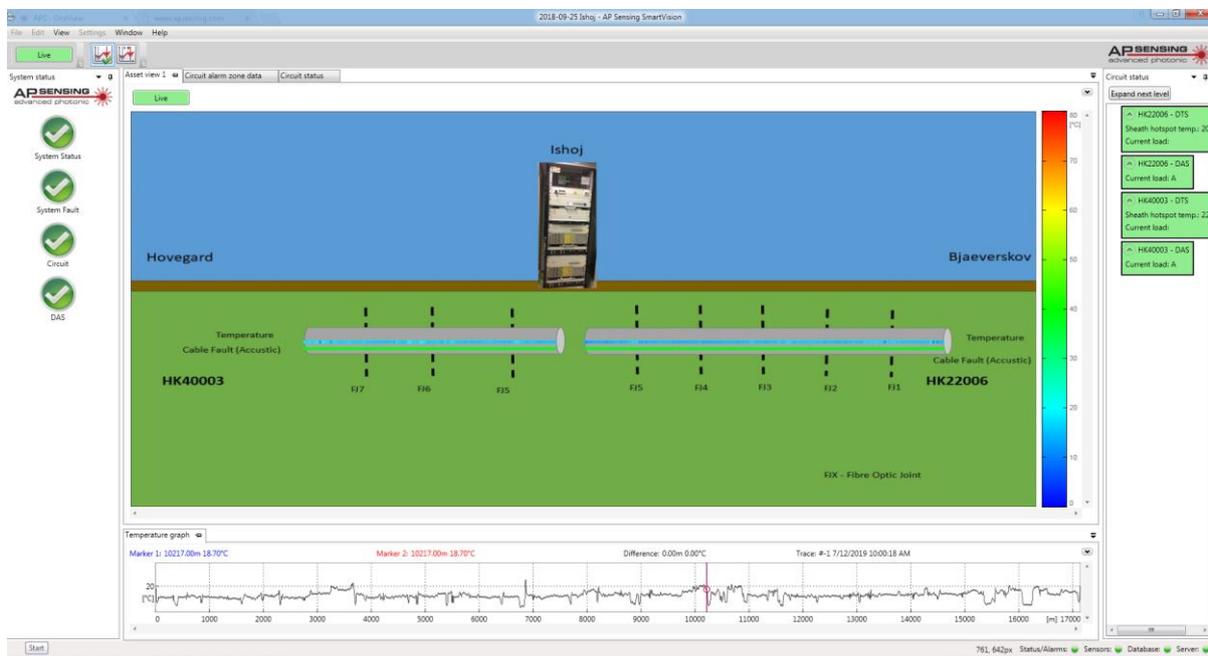


*Kriegers Flak offshore wind farm ©Energinet*

AP Sensing was selected by Danish transmission operator Energinet to monitor its networks; our solution enables the Danish and German network operators to protect and optimize their network performance. Our equipment is in use on the two offshore platforms of Kriegers Flak (A and B), as well as on the onshore substations Bjaeverskov and Ishøj. For the 300 km that we are monitoring, 6 DTS units with a range of 30-50 km and 1-4 channels are in use for thermal profiling and to detect thermal abnormalities. Additionally, our monitoring solution for Kriegers Flak utilizes 9 DAS units with ranges from 25-50 km and 1 channel each for fault location.

**In total, AP Sensing is monitoring:**

- the two 220kV export cables from the offshore platforms to Bjaeverskov,
- the 220kV interlink cable between the offshore platforms Kriegers Flak A and B,
- the two 150kV interlink cables between the offshore platforms Kriegers Flak B and the German Baltic 2,
- a 220kV onshore cable between Bjaeverskov and Ishoj,
- a 400kV onshore cable between Ishoj and Hovegard, and
- two 130kV interconnection cables in the Oresund between the onshore substation Teglstрупgard in Denmark and the onshore substation Larod in Sweden.



**SmartVision screenshot of one power substation**

**SmartVision**

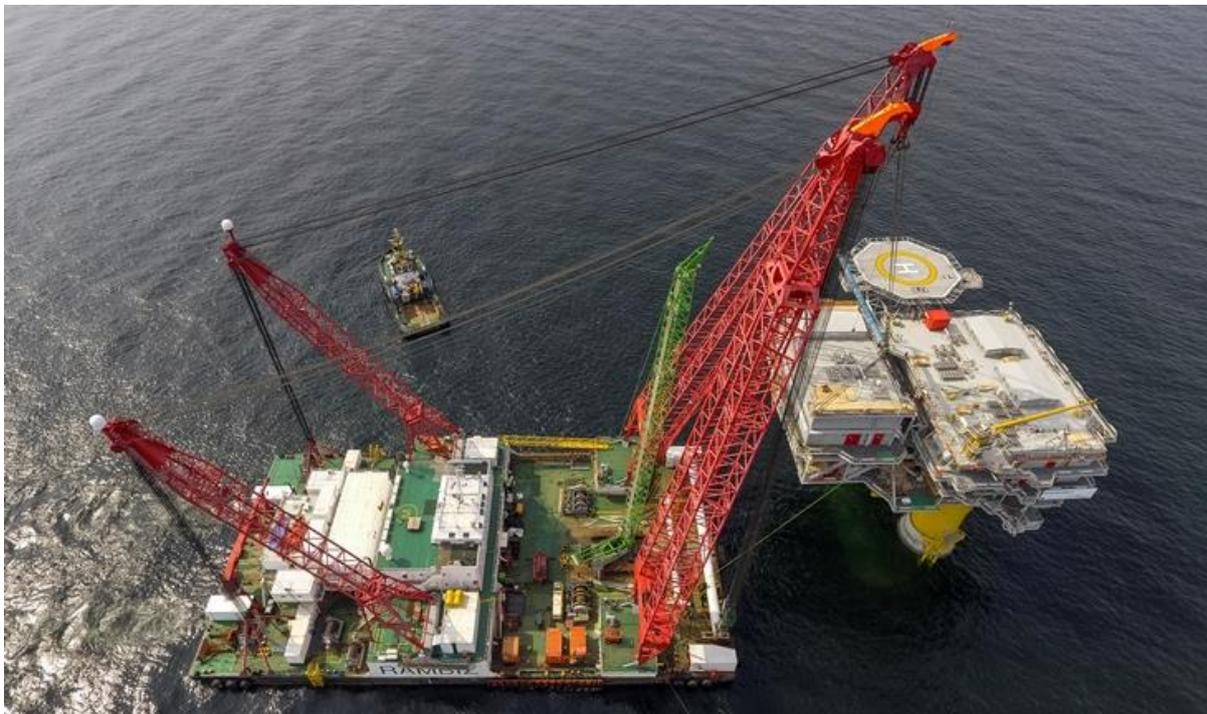
The power cable monitoring solution for Kriegers Flak utilizes our SmartVision™ asset visualization software, which provides a real-time graphic overview of all distributed temperature and acoustic information at each of the power substations. This provides at-a-glance information on the condition of the power cable circuits and pre-defined sections for alarming, as well as intelligent data analysis and storage.

For easy integration, each site has a connection to SCADA via two relay contacts and the protocol IEC60870-5-104. Additionally, all components and accessories of our system were delivered to the customer in fully pre-integrated rack systems.



*Bjaeverskov substation setup ©Energinet*

AP Sensing's project engineering team successfully commissioned and tested our systems at Kriegers Flak in the spring of 2019 and it is now in use. Further projects with Energinet are already underway and nearing completion.



*Kriegers Flak platform installation ©Energinet*