Temperature Monitoring of Multiple Borehole Heat Exchangers
Hamburg, Germany

When the Hamburg Ministry of Urban Development and Environment moved into their new buildings they decided to make use of geothermal heat exchange pipes to heat the buildings in Winter and keep them cool in Summer. Over 1600 boreholes and borepiles were drilled and heat exchangers were installed in over 800 borepiles. In 27 boreholes fiber optic sensor cable was also installed to enable temperature monitoring with AP Sensing’s DTS (Distributed Temperature Sensing) solution.

The well-insulated buildings are among the most energy-efficient offices in Germany, requiring only 70 kWh per square meter per year.
The AP Sensing solution consists of a Linear Pro Series DTS instrument with 2 channels and a 2 km measurement range. The device itself is installed in a wall cabinet in a control room.

The thermal monitoring of the boreholes is important, because there is a heat limit set by the Ministry that should not be exceeded (e.g., during the warmer Summer months, when the systems acts to keep the buildings cooler). In addition, the temperature data is used to measure and optimize the system’s efficiency. The data is also used for a research project by the University of Harburg.

GTC Kappelmeyer was responsible for the planning, commissioning, and installation. They developed a project-specific program that provides real-time temperature profiles of the monitored boreholes, as well as the temperature histories for each since the system went live in September 2014. In the internal network of the Ministry live temperature data and graphs can be viewed online.

The AP Sensing Linear Pro Series