INDIA, Weather Radar to Help Delhi With Urban Floods

The megalopolis of Delhi is extremely vulnerable to flooding, with annual monsoons bringing torrential rain and causing local flash floods. Floods regularly cause major damage to buildings, housing and roads, leading to substantial economic losses and human suffering. In 2011, Vaisala installed weather radar in Delhi which was taken into operational use in January 2012. With the help of the radar it is now possible to forecast and monitor approaching precipitation patterns. This helps local authorities prepare preventive actions against the urban flooding caused by heavy rain and storms.

BRAZIL, Hydropower Optimization Made Possible With the Help of Weather Radar Data

Hydropower companies need weather radar data to estimate the level of water in their reservoirs. The amount of water correlates directly with power production capacity, and can also therefore be expressed in strictly economic terms. Companhia Energética de Minas Gerais (CEMIG) is a Brazilian power company headquartered in the capital of
Minas Gerais, Belo Horizonte. The company is one of the largest power generators and distributors in Brazil, and is responsible for 12 percent of the energy distributed nationally. Vaisala has delivered a WRM200 turnkey weather radar installation to CEMIG which is used to forecast the availability of water resources near the Belo Horizonte hydropower dam. In addition, the radar is used to forecast and monitor severe weather in the area, giving local authorities advance warning of any approaching storms and letting them prepare accordingly.

**FINLAND, Weather Radar Data to Optimize Wastewater Treatment Processes**

HSY Water Services delivers water services in the Helsinki region, with municipal and industrial wastewater treated in the Viikinmäki wastewater treatment plant in Helsinki and the Suomenoja wastewater treatment plant in Espoo. HSY uses weather radar data from the Finnish Meteorological Institute (FMI) as input for the local rainfall-runoff model. The radar is manufactured by Vaisala. As an output from the model, HSY gets a forecast of stormwater inflow, and with this information it can optimize treatment plant capacity. “Due to the automated forecasting system, the operational efficiency of the plant is maximized without compromising the effluent quality. As the process performance is optimized, there has been no need for immediate investment,” explains Tommi Fred, director of HSY. As the capacity adjustment process is slow, proactive measures are crucial in critical situations, so having real-time weather radar data is an important asset in decision making and situational awareness.

**ESTONIA, Real-Time Forecasting System for Pärnu River**

In spring 2010, Vaisala released a pilot version of a coupled meteorological-hydrological forecasting system as part of a co-operation project with the Estonian Meteorological and Hydrological Institute (EMHI). EMHI will use the system both for research purposes and as a fully operational hydrological forecasting system. It complements the meteorological observation and forecasting networks already in place throughout Estonia, and enables EMHI to implement efficient flood prediction and warning practices. “The new system is especially beneficial in providing us with more specific information on the water level and flow in the Pärnu River. Real-time hydrological forecasting helps us predict possible flooding situations, and makes us better equipped overall to manage the whole water system in Estonia. The Pärnu River is a very popular tourist and recreation area, and these activities also benefit from timely water level forecasts. We already have plans to extend the system to other areas as well,” says Juta Kuik, head of the EMHI hydrology department.

The system uses real-time observations together with numerical weather prediction model data to forecast river discharge and water levels. The hydrological forecasts occur at 24 points along five primary tributaries in the Pärnu river basin, as well as at five points along the main river channel. The system also provides forecasts of soil moisture conditions throughout the model domain. The Pärnu river basin was chosen for the pilot because the area already has an extensive network of Vaisala-supplied meteorological and hydrological observation sites in operational use, including a weather radar at Surgavere. The opportunity to include weather radar data in the modeling was of significant importance as it provides superior spatial and temporal resolution of rainfall when compared to using rain gauges alone.