

BIG DATA HYDRO Digital future for Hydroelectric management

Hydro fleet value creation by data gathering & big data analytics development and application on pilot plants data

Background

6 EGP Hydro plant: 5 in Italy, 1 in Spain

The condition monitoring and application of monitoring data in EGP hydro plants was mainly restricted to protection systems shutting down the plants when single monitoring signals exceed predefined thresholds.

Owner was facing difficult economic decisions between overhaul and replacement: the fleet of hydropower mechanical and electrical equipment was reaching its life expectancy. O&M practices such as regular inspections for cavitation damage on turbine blades, stator and rotor windings, bearings and excitation systems, are based on established guidelines and are generally carried out under a scheduled work program.

Challenge

The situation needed the development of an optimized asset management strategy to improve security and maximise unit availability: implementing remote operation at older facilities, installing a real-time asset monitoring system, adding on-site maintaining components to reduce break time and solutions to minimize O&M costs. i-EM had to work for **efficiency** improvement, reduction of **lost production, failure anticipation** system and increase **safety** and **sustainability**.

Actions in detail: predictive maintenance savings, exploitation of EGP data, identify data that add value to maintenance, verify the potential value EGP seen in big data by defining KPI parameters of interest that can both drive action planning and define the actions to solve (e.g. Decision Support System).



Solution

The **digitalization** implements sophisticated risk-based decision-making tools, to optimise near-term O&M asset management plants for maintaining, overhauling or replacing the most critical components of the fleets. i-EM has developed, customized and trained advanced algorithms able to perform deep, multivariate analysis on plants data, in order to allow EGP to take appropriate decisions and apply strategies to extract the value achievable by exploiting information contained in data themselves.

Executive Summary

Company

Enel Green Power

Industry

Hydroelectric plants management

Challenge

Exploitation of big data analysis for Optimisation of the Hydroelectric power plants asset management, with efficiency improvement and O&M costs reduction

Solution

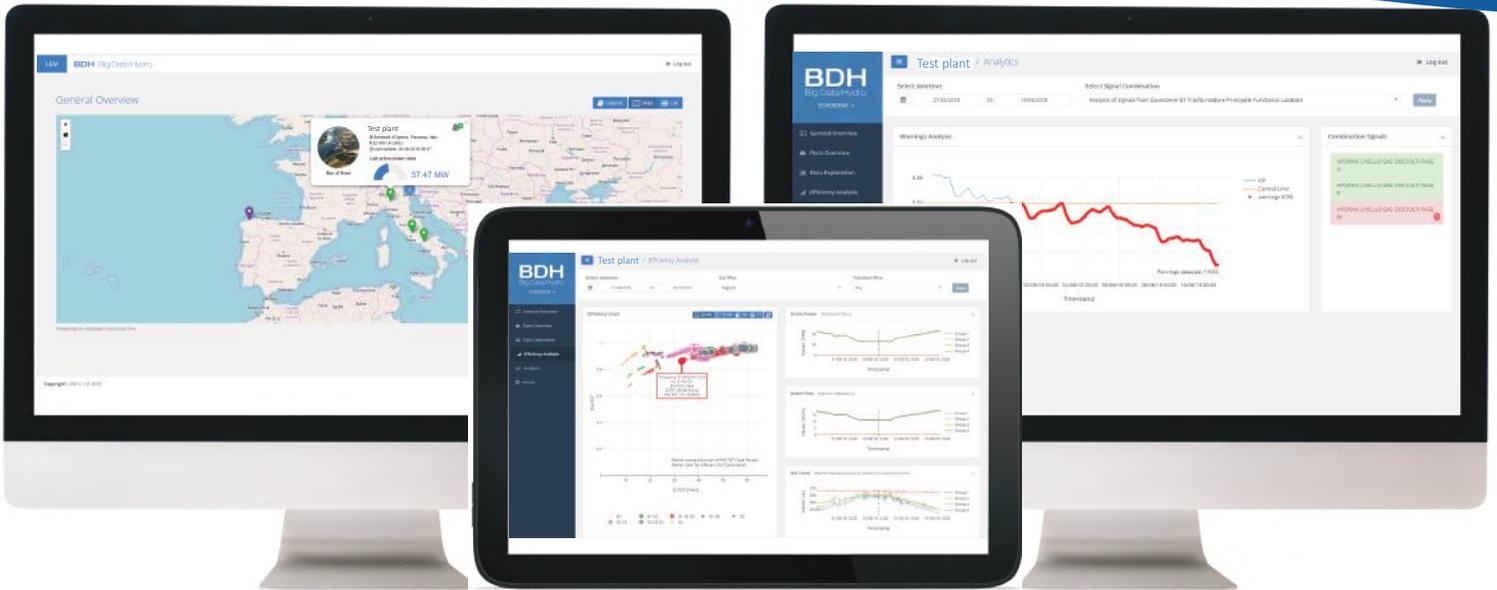
BIG DATA ANALYSIS:

- . Assessed the dataset quality, to enhanced robustness of data management chain
- . Innovative monitoring system daily running on 6 hydro power test plants.
- . Visualisation system for the test plants raw data, efficiencies and analytics results
- . Notification Service

Benefits

- . Modernisation of existing assets
- . Advanced and digital Condition monitoring
- . Savings in O&M resource
- . Improve synergy between hydro and other renewables

Case Study



Benefits

Through the **Big Data Hydro** architecture, data from operating plants are used to optimize their management and quickly identify potential malfunctions through the use of data analysis. Innovation goal is the value creation on RGC Hydroelectric fleet by asset management optimization, generation efficiency improvement, O&M costs reduction, all based on plant data analysis. The potential value of available data in hydro plants fleet can be evaluated through indexes that are revenues, unbalances and cash costs, safety and sustainability. New interfaces were built to allow access to plant monitoring also from a tablet or any mobile device to ease the work of plant O&M operators.

“We received benefits from i-EM monitoring platform and from their statistical analyses; in the next months we will evaluate how to expand this digitalization on other hydro plants and deploy the platform on them”
 Monica D’Aco, Head of Hydro Innovation - Enel Green Power

