

# Case Study



## BIG DATA HYDRO The digital future for hydro power management



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

#### Background

##### 6 EGP hydro plants: 5 in Italy, 1 in Spain

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

Owner was facing a difficult economic decision 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

This situation needed the development of an optimized asset management strategy to improve security and maximise units availability: implementing remote operations 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 to reach efficiency improvement, to reduce loss production, to predict system failures and to increase both safety and sustainability.

Actions in detail: predictive maintenance savings, EGP data exploitation, maintenance developing data identification, potential value analysis on what EGP found out 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

Digitalization includes the implementation of sophisticated risk-based decision-making tools to optimise near-term O&M asset management plants, in order to maintain, overhaul or replace the most critical fleet's components. i-EM has developed, customized and trained advanced algorithms capable of performing deep and multivariate analysis on plants data, in order to allow EGP to take appropriate decisions and apply strategies to extract the achievable value by exploiting information contained in data themselves.

### Executive Summary

#### Company

Enel Green Power

#### Industry

Hydroelectric power plants management

#### Challenge

Exploitation of big data analysis for optimisation of the hydroelectric power plant assets management, with efficiency improvement and O&M costs reduction

#### Solution

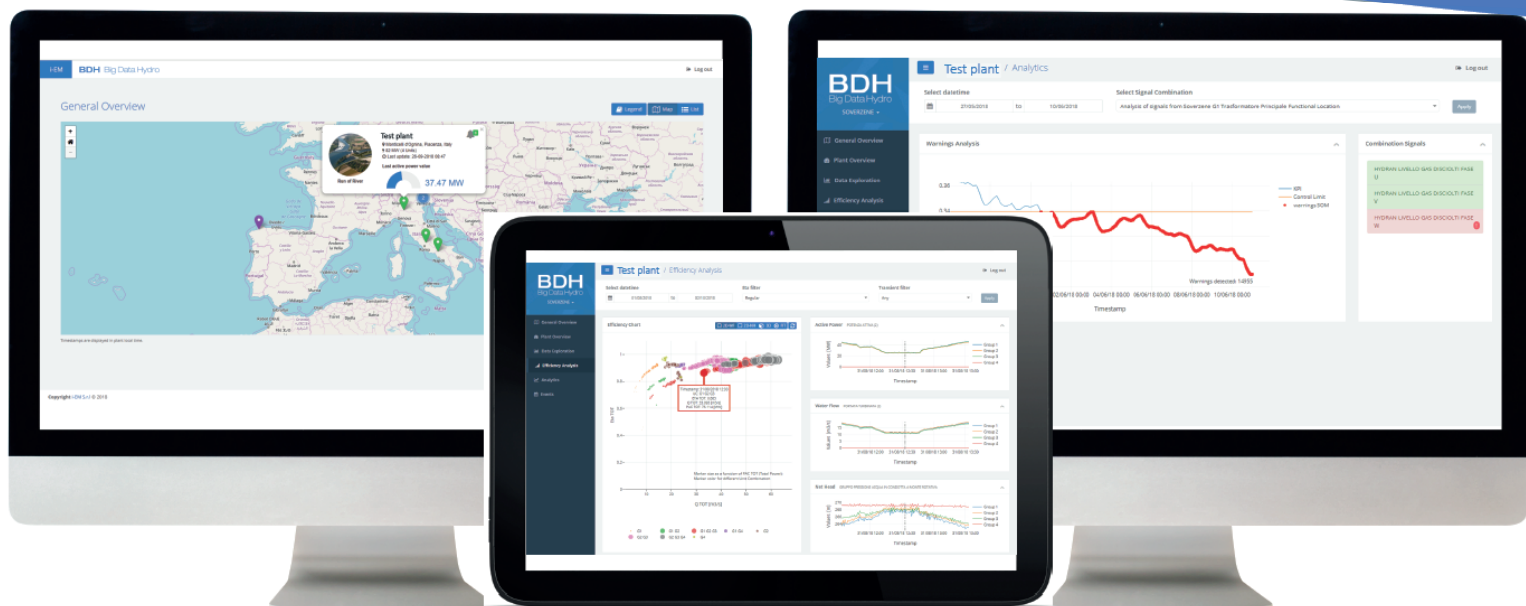
BIG DATA ANALYSIS:

- . Dataset quality assessment, to enhance data management chain robustness
- . 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

- . Existing assets modernisation
- . Advanced and digital condition monitoring
- . O&M resource savings
- . Improve synergy between hydro power and other renewable sources

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## 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, efficiency improvement generation, O&M costs reduction, all based on plant data analysis. The potential value of available data in hydro power 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 facilitate the work of plant O&M operators.

*"We received benefits from i-EM monitoring platform and from their statistical analysis; in the next months we will evaluate how to expand this digitalization on other hydro plants and how to deploy the platform on them"*  
**Monica D'Aco - Head of Hydro Innovation (Enel Green Power)**

## i-EM exploited skills

