Gurobi® + edp

CASE STUDY



EDP: Maximizing Hydroelectric Dispatch Efficiency with Optimization

EDP's hydro dispatch models unlock real-time decisions, saving up to 76 working days per year.

Industry	Power & Utilities
Location	Global
Use Cases	Hydroelectric Dispatch
Website	https://edp.com

EDP is a global energy company with more than 9 million customers. They generate more than 90% of their energy from renewable sources, making them a leader in the clean energy transition.

Results

- Roughly **76 working days saved per year** with automated market nomination decisions

EDP is a vertically integrated utility company. Founded in Portugal, it has a global reach, operating across Europe, the Americas, and Asia-Pacific. The company is focused on the green energy transition, with renewables at the core of its operations across hydro, wind, and solar, alongside a growing focus on energy storage.

In Q1 2026, 91% of their energy generation came from renewable sources, and they aim to achieve Net Zero by 2040.

Part of EDP Global Energy Management (GEM), the Advanced Analytics and Trading Modeling teams develop optimization models and decision-support tools for energy assets and energy markets, including hydroelectric dispatch, battery dispatch, and risk management.

These models support commercial decision-making and help ensure that energy assets and natural resources are used efficiently, while also respecting operational, environmental, and regulatory constraints.

Optimizing in Real Time

Hydroelectric dispatch optimization is one of EDP's most complex operational challenges, and a key focus for the team. With roughly 50 dams spanning multiple river cascades and including reversible hydroelectric facilities with both generation and pumping capabilities, EDP must decide when and how to use available water across interconnected assets in a way that captures market value while making efficient use of a limited natural resource.

These decisions must account for reservoir levels, inflows, maintenance schedules, operational constraints, market data, environmental requirements, and regulatory restrictions. Because actions at one dam can affect conditions downstream, even small decisions can have system-wide impacts. Optimization is therefore essential for balancing economic opportunities with technical, environmental, and regulatory requirements.

Because energy markets and grid conditions are constantly changing, EDP needs constant, real-time optimization modeling to inform hydroelectric dispatch.

They need a reliable solver that manages a high volume of information and delivers optimal results in less than a minute.

Every Problem Is a MILP

The EDP team has developed mixed-integer linear optimization models (rather than more complex formulations, such as quadratic models), to respond effectively to rapidly evolving market conditions and real-time operational needs.

"What makes our problems so big," explains Ricardo Covas, EDP's Head of Advanced Analytics, "is not only the complexity of the objective function, but the sheer number and complexity of restrictions and variables required to represent our operations."

Open-source solvers can usually handle the variables and constraints EDP uses, when given sufficient runtime. But battery dispatch, hydroelectric dam dispatch, and other critical operational decisions require real-time monitoring. In these cases, minutes matter—which is why EDP needed a powerful solver like Gurobi.

Four Minutes That Can't Be Wasted

EDP has several very large functions that run every 15 minutes to deliver real-time modeling to the Advanced Analytics team. They need a solver that can move faster than that.

Covas was familiar with Gurobi from his university studies and had also heard positive feedback from his colleagues, so he decided to reach out.

"The thing that we can rely on [with Gurobi] is that it gives us good results, and it's very fast," says Covas.

The open-source solvers could solve the large functions, but they took about 15 minutes to do it. Not fast enough for EDP's operations.

© Gurobi Optimization, LLC. All rights reserved.



Gurobi solves the same programs in two minutes or less. That's what EDP needed for real-time decisions. For utility operations, the window between receiving the market program and the deadline for submitting the corresponding dispatch plan is typically only about four minutes. In such a time-constrained environment, solver performance is critical to maximizing operational and commercial outcomes.

EDP's hydroelectric dispatch application, powered by Gurobi and composed of five optimization models, supports short-term operators by automating market nomination decisions across the company's hydro portfolio. By reducing manual effort by up to three minutes per market across roughly 100 market rounds per day, the application can save an estimated 76 working days annually.

Future improvements to production models may explore the broader range of solver capabilities and model formulations enabled by Gurobi.

> "All of our support inquiries have been handled very well. I think that is something that differentiates Gurobi from other solvers"
>
> Ricardo Covas,
> EDP's Head of Advanced Analytics

Unlocking the Green Energy Transition

To reach net zero, EDP must continually balance renewable generation, energy storage, market conditions, and customer demand. Hydroelectric assets provide flexible generation and storage capabilities, while batteries help store energy for use when and where it is needed most.

As populations grow and energy systems become increasingly complex, EDP's optimization models must scale alongside the business. Gurobi delivers the speed needed for real-time decision-making, the performance required for increasingly sophisticated models, and the expert support needed when challenges arise.

Experience Gurobi for Yourself

Our 30-day evaluation license includes:

- Free benchmarking services
- Free model tuning services
- Free access to our world-class technical guidance and support

Visit **gurobi.com/free-trial** to get started!

Academics: You may qualify for a free, full-featured Gurobi license.

Explore our academic program at **gurobi.com/academia**.

© Gurobi Optimization, LLC. All rights reserved.