

# Optimizing Hydroelectric Power Generation Planning

Gurobi delivers a 10-day, fully feasible water routing schedule across multiple dams in less than 120 seconds.



The Energy Authority (TEA) provides public power utilities with access to advanced resources and technology systems so they can respond competitively in the changing energy markets. Through partnership with TEA, utilities benefit from an experienced organization that is singularly focused on deriving the maximum value of their assets from the market.

**Industry:** Power and Utilities

**Location:** Americas

**Use Cases:** Cost Reduction, Operations, Resource, Routing

**Website:** [www3.teainc.org](http://www3.teainc.org)

## Results

- Can model 30,000 variables and 70,000 hourly constraints across a 10-day time horizon, in less than 120 seconds
- Generate the right amount of power to meet demand
- Store the right amount of water for later use
- Strategically plan for the future

**A**t The Energy Authority (TEA) our business is conducting energy trading, scheduling, and risk management for public power utilities.

One of our key business challenges involves the routing of water through six serial hydroelectric dams on the Columbia River, the largest river in the Pacific Northwest region of North America. We need to ensure the optimal economic and operational management of these dams while fulfilling all the environmental, recreational, flood control, and technical constraints required by various Federal agencies.

## The Model: Columbia River Hydro Model

To address this challenge we created a Columbia River hydro model that has over 30,000 variables and 70,000 hourly constraints that span a 10-day time horizon. Since no human could possibly produce a feasible and optimal solution for our model, we needed a commercial solver that could not only optimize the solution, but provide timely solutions so that the hourly energy

traders could manage their entire trading and scheduling obligations in a 10 to 15 minute window every hour

## The Results: Both Economic and Operational Needs Optimized

By using the Gurobi Optimizer we are able to solve the entire system and produce a 10-day fully feasible water routing schedule in less than 120 seconds.

The results of the model allow us to meet our contractual requirements, economically generate the right amount of power to meet the public utility district load demand, store the right amount of water for later use, and strategically plan for the future to mitigate potential price and load changes. Because the model optimizes both economic and operational considerations, our utility customers not only meet the electricity needs of their residents and businesses, but can also maximize revenue by generating more electricity when market prices are high and then selling any surplus to the open energy market.

**“ Working with the Gurobi team is a very pleasant experience. They are professional, extremely knowledgeable, and offer unparalleled quality and service. We highly recommend Gurobi.”**

*The Energy Authority*





## The Deployment: Multiple Users Across the Organization

We deploy the Gurobi Optimizer as part of a multi-tier .Net framework on multi-core virtual servers with parallel processing of multiple simultaneous requests.

## The Strategic Partner for Public Power

The Energy Authority (TEA) is wholly-owned and directed by its 46 public power members and partners, representing more than 25,000 MW of

combined generation assets across all fuel types.

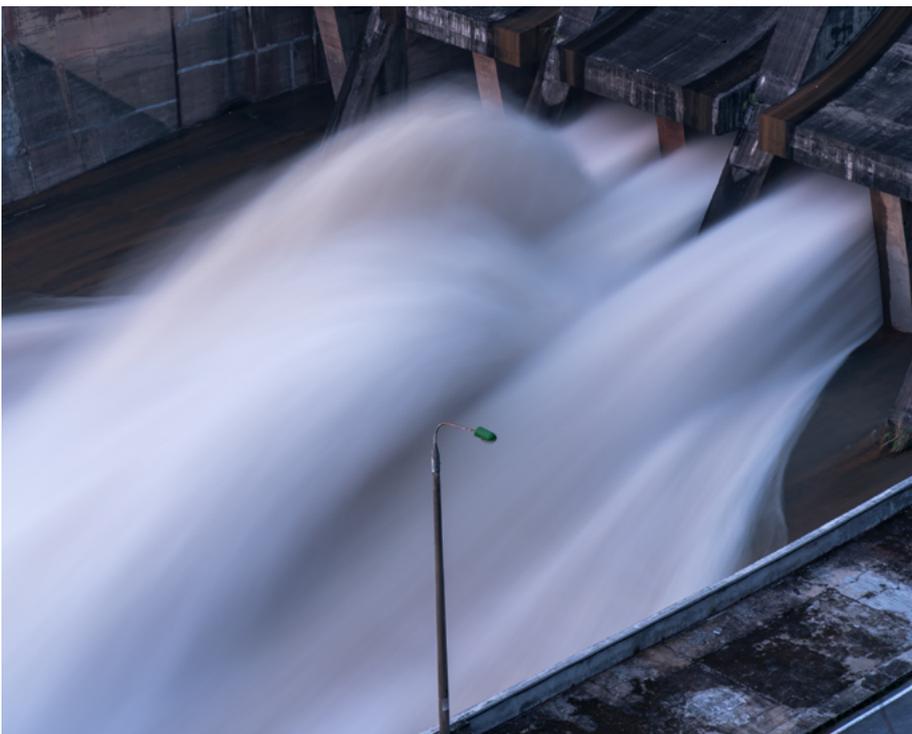
Just as deregulation and the wholesale OTC power market emerged in 1996, a group of public power utilities decided to pool their talent, assets and experience to prepare for the challenges ahead. This aggregation of resources formed The Energy Authority.

Today, TEA® is a vital part of our members' stability in the market—allowing public power utilities to efficiently maintain operations and benefit from state-of-the-art services at a fraction of the usual cost.

TEA assesses market changes, maintains price discoveries and evaluates overall risk with one hand while meeting the daily generation, transmission and natural gas requirements of our members with the other.

We help our members to:

- Obtain the best price when in the market
- Protect against market volatility
- Leverage their assets to transact over much greater distances
- Increase the number of possible trading partners, and consequently
- Realize greater market penetration



## 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
- Two free hours of one-on-one consulting services

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