



Quanta Technology is an independent technology, consulting, and testing company providing business and technical expertise, along with advanced methodologies and processes, to utilities and others in the power and energy industries.

**Industry:** Energy & Utilities

**Region:** North America

**Website:** [quanta-technology.com](http://quanta-technology.com)

## Results

- Ability to streamline system planning process based on well-defined objectives and planning criteria, using network power flow models.
- Engage high performance computing and optimization solvers to solve for millions of decision variables in as little as 20 minutes, as machines empowered with optimization framework are far more efficient in solving such complex problems.
- Providing utilities with a robust and scalable approach to designing for resiliency, enabling them to scope optimal planning and operational solutions and enhance decision-making processes.

# Quanta Technology: Empowering Utilities by Optimizing Resilience and Reliability System Planning

Quanta Technology is delivering groundbreaking advancements in utility system resilience and reliability planning. Gurobi stands as a cornerstone of the solution design, tackling complexities of asset management, reliability planning, capacity planning, and customer care with unparalleled precision.

Utilities across the U.S. are working to modernize their systems and plan for long-term resilience and reliability. But many of the tools traditionally used for such planning are limited in their ability to go beyond forecasting—they aren't sufficient for analyzing the millions of potential solution options and providing optimal actions that account for the myriad constraints and variables that affect the system.

Quanta Technology's augmented intelligence (AI) solution redefines reliability and resilience planning—reducing System Average Interruption Duration/Frequency Index (SAIDI/SAIFI) or resilience curve, enhancing productivity, and unlocking unprecedented cost savings.

## Growing Complexity Calls for a More Sophisticated Approach

As a consulting partner to many utility companies, Quanta Technology often encounters scenarios where legacy systems fall short.

"The utility space is usually, for planning purposes, using legacy tools," said Andrija Sadikovic, Senior Director at Quanta Technology. "They are great tools, but when we talk about an optimal solution that encompasses a number of risk mitigation strategies, this is something that really cannot reside in those environments."

Faced with growing system complexity and the constraints of outdated tools, Quanta Technology knew it needed a new approach. Partnering with Gurobi gave them the optimization power to rethink what's possible, allowing utilities to define data-driven action plans validated by mathematical analysis of the system's digital twin.

## From Legacy Systems to Full-Scale Optimization

To overcome these limitations, Quanta Technology integrated Gurobi into their resiliency and reliability planning application. The application can consider options available to the utility for hardening, redundancy, and recovery as they relate to the cost of the modifications and their effects on

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restoration or outage avoidance, finding the optimal combination of cost and performance to achieve the objective.

The switch from legacy systems to advanced optimization provided measurable gains in speed, volume, and scope. Gurobi's performance enabled Quanta Technology to solve complex system models faster and more efficiently than ever before.

According to Zahra Soltani, Senior Engineer at Quanta, "It took about 20 minutes. So that's why we are using Gurobi. It's really efficient and fast." This level of performance has allowed Quanta to work with full-scale optimization models containing millions of variables, without needing to break problems down or simplify excessively.

For Quanta, speed wasn't the only benefit. When faced with problems that couldn't be solved in the usual time frame, the team could diagnose and refine their models or network assumptions without resorting to decomposing the problem.

"If the problem cannot be solved in two hours, we'll go back to check the network and see whether there's something specific about that feeder," added Shanshan Ma, Advisor at Quanta Technology. "We'll also go back to check our model again to see whether we can make the problem smaller."

Despite working with full optimization models containing millions of decision variables, Quanta Technology found that they didn't need advanced techniques like decomposition or network reduction.

"Currently, we do not consider [decomposition] because Gurobi already gives us a very good result. We do have network reduction approaches in our algorithm if needed, but so far, we have not seen that kind of problem," Ma went on to say.

## Empowering Smart, Scalable Planning for the Grid of Tomorrow

With Gurobi, Quanta Technology is helping utilities make a critical shift from static legacy tools to more dynamic, optimization-driven decision-making. The team supports planning projects across the U.S. and continues to guide utilities toward more robust and scalable approaches.

"We have really great relations with many utilities in the U.S. We're even helping them today to improve their processes with existing tools," Sadikovic stated. "But slowly, the gaps are becoming transparent, and they're converging toward using AI platforms like ours, powered by Gurobi."

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Together, Quanta and Gurobi are providing utilities with a modern framework to make faster, smarter planning decisions, bridging the gap between legacy infrastructure and the demands of the future grid.

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