

# COPEL Distribuição S.A. Establishes a Complete Digital Environment for Developing New Electrical Substations

Bentley Applications Automates Design  
and Leverages a Component Library,  
Speeding Development While Saving Money

## IMPROVING STATEWIDE ELECTRICAL DEVELOPMENT

Since it was founded in 1954, COPEL Distribuição S.A. has distributed power across the Brazilian state of Paraná. Its mission is to provide energy and solutions for sustainable development, generating value in a sustainable, ethical, and innovative way. Today, it manages more than 200,000 kilometers of distribution networks and serves over 5.1 million customers. Throughout its history, COPEL has incorporated leading-edge technologies to solve problems and improve processes, with a strong focus on sustainable practices.

As part of that vision, the company decided to switch to a complete BIM environment for modeling medium- and high-voltage power substations. Adopting digital design has helped them reduce rework, lower spending on materials, and develop bolder projects. "It also cut waste, common in projects developed using simple CAD software, by developing projects using the building information modeling (BIM) methodology," explained Jean Michell de Bona Mattos, a substation electromechanical designer with COPEL.

## ONE SOLUTION FOR MULTIPLE PROCESSES

The company wanted their digital initiative to cover all aspects of substation design, integrating civil, electro-mechanical, and electrical engineering processes. Additionally, COPEL needed to establish digital document management, as digital design could not succeed by itself without providing easy access to needed information. "Through this type of modeling, which focuses on integrating information and processes, COPEL aims to streamline the management of its projected assets until they are fully depreciated, focusing on the sustainability of its business and increasing the

productivity and efficiency of the design and construction teams," continued Michell de Bona Mattos.

However, for the project to be truly considered a success, it had to do much more than just transition design from 2D to 3D. "One of the requirements of the new system was to generate deliverables such as lists of materials, services, cables, and wiring in an automated way. It also needed to integrate the physical design of the substation with its respective electrical design, increasing the reliability of the information contained in our modeling and making construction work safer," said Michell de Bona Mattos. Finally, their solution had to fully integrate with the company's other tools and workflows, to prevent rebuilding their methods from the ground up.

## COLLABORATING IN 3D

After carefully analyzing available software, COPEL chose Bentley applications to assist with their BIM transition. OpenUtilities Substation became the heart of the company's new digital solution. "The main reason behind this choice was that this is the only tool on the market that allows the physical design of the substation to be fully integrated with the electrical design in the same software," said Michell de Bona Mattos. Design teams now leverage these applications to create detailed replicas of all new substations, ensuring that clashes and conflicts are resolved before construction.

The company combined Bentley design applications with ProjectWise, creating an integrated modeling environment. Now, all project teams can consult COPEL's engineering documentation, and design, construction, operations, and maintenance teams can easily track needed documents at any time. A unified environment helps teams check and correct errors and develop ways to automate various operations.

## PROJECT SUMMARY

**ORGANIZATION**  
COPEL Distribuição S.A.

**SOLUTION**  
Transmission and Distribution

**LOCATION**  
Curitiba, Paraná, Brazil

**PROJECT OBJECTIVES**

- ◆ To establish a BIM environment for designing electrical substations.

- ◆ To leverage automation and other digital techniques for improved, more efficient design.

**PROJECT PLAYBOOK**  
Bentley LumenRT™, MicroStation®, OpenRoads™, OpenUtilities®, ProjectWise®

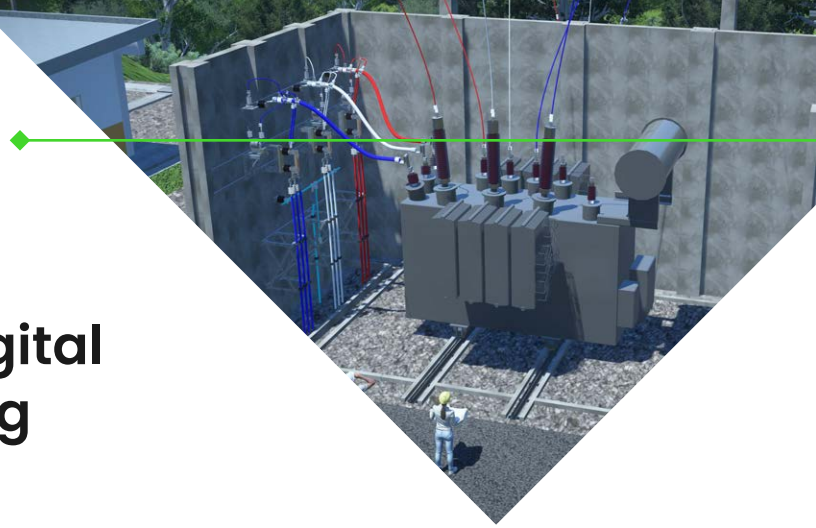
**FAST FACTS**

- ◆ COPEL Distribuição S.A. provides power across the Brazilian state of Paraná.
- ◆ They wanted to improve the design process for medium- to large-sized electrical substations by switching to a BIM environment.

- ◆ COPEL used Bentley applications to unify and accelerate design for all aspects of substation development.

**ROI**

- ◆ Switching to 3D design lowered development time for the mechanical elements of electrical substations by 50%, or 225 work hours.
- ◆ Development time for electrical elements has fallen by 30%, or 195 work hours.
- ◆ COPEL predicts digital design will save USD 630,000 per year.



“Bentley’s tools allow for better team integration, facilitating collaborative work and real-time updating of design information. OpenUtilities Substation also ensures greater quality and confidence in deliverables, generating reliable reports and quantitative data, culminating in more efficient, faster and cleaner project execution.”



– Jean Michell de Bona Mattos, Substation Electromechanical Designer, COPEL Distribuição S.A.

### DELIVERING FASTER WITH IMPROVED EFFICIENCY

COPEL designers now benefit from an intuitive design environment enhanced by a customized library of assets that can be quickly placed within designs. Overall, development time for the mechanical elements of electrical substations has fallen by 50%, or 225 work hours, and development time for electrical elements has fallen by 30%, or 195 work hours. “In total, adding up all the measurable gains to date, it is estimated that the company will save USD 630,000 per year in project execution alone,” concluded Michell de Bona Mattos. The significant time savings helps COPEL deliver electrical projects faster and at less materials and expense.

Designs have also become more accurate, as the design environment cross-references information from civil, electrical, and electro-mechanical designs in real time while minimizing errors caused by manual input. These enhancements prevent unnecessary use of resources and result in more sustainable designs. Since each of the digital designs contain information for maintenance and operations, COPEL can use them to improve asset management.



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