

Autodesk® model-based solutions for utilities

# Smart grids start with smart design.



Rendering of overhead and underground utility networks, including smart grid elements. Designed in AutoCAD® Utility Design software. Rendered in Autodesk® 3ds Max® Design software.

# Intelligent Models for Electric and Gas Utilities



Image courtesy of Swissgrid

It's easier for us to apply business rules based on power transmission standards to our data. The software can help spot and address errors intelligently. The software allows us to edit the data models to better match our preferences and regional requirements.

—Zoran Brankovi  
GIS Manager  
Swissgrid

Learn more about Autodesk in utilities at  
[www.autodesk.com/electric-gas](http://www.autodesk.com/electric-gas)

Autodesk comprehensive model-based solutions help utility professionals gain valuable insight to improve how they plan, design, build, and manage utility infrastructure.

## Smart Grids Need Smart Design

Now is the time to make a change that can enhance your design processes and improve the quality and accessibility of your asset data — helping you to meet the complex needs of the growing smart grid effort and your other capital projects.

- Design in a familiar AutoCAD® environment.
- Minimize project backlogs and rework by helping to capture GIS information and real world conditions at the start of the design process.
- Help incorporate rapidly changing smart grid standards.
- Design more efficiently with rules-based, intelligent work flows and 3D modeling.
- More quickly and easily evaluate alternatives, and generate construction drawings and bills of material (BOMs).

## Deliver Intelligent Design and As-Built Data

Integrate with existing systems and processes to better collaborate and share information across the plan-design-build-manage lifecycle. This can help you reduce the amount of duplicate work, enhance availability and usability of asset information, and improve the overall quality and accuracy of the data.

- Integrate designs with asset, inventory, and work order systems to automate the design process.
- Minimize as-built backlogs by making design models available to GIS and records management in an open data format.
- Manage project documentation and collaborate using detailed design data.

## Change What Is Possible

Discover how intelligent 3D modeling can transform planning, design, and management processes to support your smart grid operations.

- Engage and train the next generation of utility designers with Autodesk® model-based, 3D, and cloud-based technologies.
- Help improve stakeholder engagement and speed approvals with compelling visualizations and conceptual design.

- Extend the value of models created with Autodesk utility solutions with specific tools from partners, such as data capture technology and mobile workforce applications.

## Improve Planning

Evaluate existing conditions before replacing or building new assets or networks. Gather and analyze data from multiple formats and sources—including aerial and raster imagery, GIS, CAD, GPS, LiDAR, civil engineering data—to make better design decisions before a project begins.

## Design Intelligent Models

Design and document more productively and consistently with intelligent model-based solutions that help to streamline design tasks and deliver coordinated and consistent construction documentation.

## Help Accelerate the Design-to-Construction Process

Build your projects more reliably by integrating design data with work order and materials systems which helps to improve workflows and make engineering and design data available to a greater number of stakeholders.

## Manage and Share More Accurate Information

Help standardize the as-built data collection process with configurable industry models.

- Better capture existing and newly installed utility and street furniture locations.
- Better capture and share relevant attributes needed to support future decision making for operations, maintenance, and capital planning.
- Manage and share intelligent models with customer care, ERP, outage and work and asset management systems.
- Support decision analysis with easier access to more accurate data for reporting, compliance and responding to requests for information.

### Autodesk Design and Creation Suites

Autodesk, Inc. is a leader in 3D design, engineering and entertainment software with customers across the manufacturing, architecture, infrastructure, utilities, construction, and media and entertainment industries. Autodesk® Design and Creation Suites provide compatible sets of software tools and cloud services, offering interoperability and capabilities that utilize the familiarity of Autodesk's design and visualization solutions, in economical and convenient packages.

### Solutions for Electric and Gas Distribution

Autodesk® Infrastructure Design Suite Ultimate combines tools for planning, designing, building, and managing utility infrastructure. More efficiently explore design options, better analyze project performance, and use visualization to help communicate with project stakeholders. The suite includes:

AutoCAD®—design, documentation, and communication software

AutoCAD® Raster Design—raster image editing and raster-to-vector conversion tools

AutoCAD® Map 3D—model-based GIS mapping software for planning electric and gas distribution networks, with specific tools for creating maps and accessing, analyzing, and editing CAD and GIS data

Autodesk® Infrastructure Modeler—3D conceptual design software that helps communicate utility infrastructure design proposals in the context of the natural and built environment

AutoCAD® Utility Design—model-based, rules-driven electric distribution design software with design productivity tools, built-in engineering analysis, and more complete documentation

AutoCAD® Civil 3D®—the BIM solution for civil engineering design and documentation, for surveying, alignment and profile layout, corridor modeling, earthworks, and quantity takeoff

Autodesk® Revit® Structure—model and document civil structures

Autodesk® 3ds Max® Design—visualization tools for creating near-photorealistic renderings and animations to help validate and better communicate project intent to stakeholders



KCBPU construction of trench, conduit, and manhole structures. Image courtesy of Kansas City Board of Public Utilities

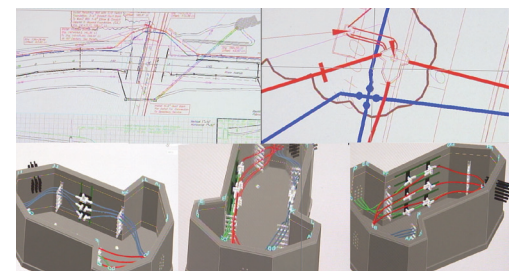
Autodesk® Navisworks® Manage—tools that support the review and coordination of project information, 4D simulation and clash detection in order to facilitate construction and preconstruction planning

### Solutions for Transmission, Substation, and Generation Facilities

Autodesk model-based design, visualization, and Building Information Modeling solutions help to address challenges and improve workflows across multiple discipline areas for utilities including transmission, substation, and generation facilities.

Autodesk® Inventor®—model-based software for equipment and documentation of substations, windmills, solar panels, transformers, breakers and gas equipment

AutoCAD® Electrical—the version of AutoCAD for electrical controls designers



KCBPU 3D manhole layout shown in AutoCAD Map 3D. Image courtesy of Kansas City Board of Public Utilities

# Deliver Intelligent Design and As-Built Data

Take advantage of the data-rich intelligent models on all jobs, from transmission and distribution networks to generation, transmission, and substation facilities.

By integrating engineering and construction standards with the design process, it's now possible to promote improved consistency, quality, and accuracy in the design and construction documents. Utilizing a user-friendly graphical tool optimizes our ability to develop qualified designers, planners, and estimators.

—Debra Brooks  
M/E Application Manager  
Southern California Edison

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Autodesk® Plant Design Suite—design, model, and review plant projects more effectively. The Premium edition enables more streamlined 2D drafting and P&ID design, integrated modeling functionality, projectwide model aggregation, and advanced visualization and construction simulation tools. The Ultimate edition adds Digital Prototyping technology for plant equipment, and skids for documentation of substations, windmills, solar panels, transformers, breakers and gas equipment.

#### Complementary Solutions

Autodesk® Infrastructure Map Server—web-based mapping software for delivering electric and gas network maps and related information such as location, status of planned work and operating conditions

Autodesk® Vault Collaboration AEC®— helps provide management of project data across extended teams and external partners

Autodesk® 360—cloud service that helps customers dramatically improve the way they design, visualize, simulate, and share their work. With Autodesk 360, users can securely access their work anytime via a mobile phone, tablet, or computer, take advantage of virtually infinite computing for compute intensive activities, collaborate on projects, and access a broad range of services including file storage and sync

Autodesk BIM 360—delivers a broad range of cloud-based offerings within the Autodesk 360 platform that extend your BIM workflows by driving intelligence across building and infrastructure projects with services that support design, visualization, simulation and collaboration

#### Customer Success

**Anchorage Municipal Light & Power** improves processes and adds more automated quality control steps for overhead and underground

networks. ML&P will be able to visualize every service connection without having to refer to tabular data; to calculate loads on individual transformers more easily and reliably; and to help field crews know exact equipment types and locations of underground assets.

**Chengdu Hydroelectric Investigation and Design Institute (China)** engineers performed site analysis and design using 3D models for the Jinpin project helping to dramatically improve the precision of the excavation planning and the efficiency of the design process for the world's tallest double-arched dam.

**City of Chur (Switzerland)** uses Autodesk utility software to improve how it manages and shares GIS, CAD and image data.

**Colorado Springs Utilities** engineers select the right equipment and materials for the job, helping to save money and time by preventing over-engineering, and helping crews bring the right material quantities to job sites.

**Duke Energy** uses the Substation Design Solution to help reduce overall design time by at least 50% on both greenfield and brownfield projects. With the time saved, the company believes that it will be better positioned to meet its customers' evolving capacity and service demands, including adding new substations to its network and completing the design work needed to enhance existing substations with smart grid technology.

**GDF SUEZ Energy (România)** built a location-aware asset management system in 10 months in order to improve the productivity of gas distribution operations. Their manual asset management processes are now automated with an open architecture to enable integration with SAP plant maintenance, SynerGEE network analysis, and other enterprise systems.

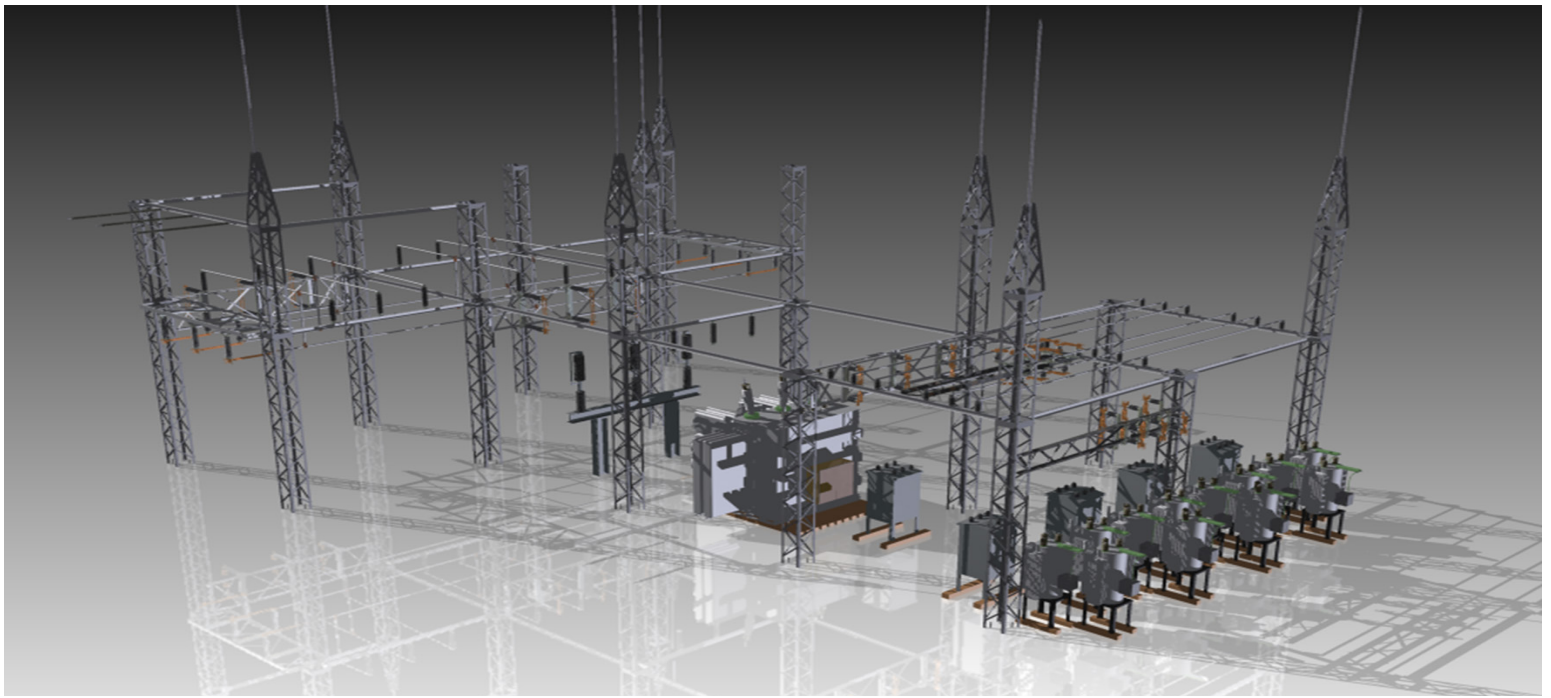


Image courtesy of Duke Energy

**Kansas Board of Public Utilities** improved its as-built data management system to help make it easier to report, plan, and make more strategic operational decisions. It even helps to improve system reliability and minimize outage duration. Now, KCBPU can more accurately model the system and track outages and disruptions.

**Nashville Electric Service** generates BOMs as much as 80 percent faster and with much greater accuracy than its prior process. The new process helps to reduce the multiple rounds of quality checks to ensure the correct materials made it to job sites.

**NV Energy** provides open, standardized and integrated spatial data resulting in time and material savings, better customer service, and improved operational efficiency.

**Okaloosa Gas** field personnel now access a secured website to better plan the day, find the job location, and access relevant gas system information. All of this helps to increase productivity and makes jobs easier.

**Renewable Energy Systems** harnesses the power of Civil 3D and halves the time taken to design wind farm access roads.

**Sichuan Kehong Oil and Gas Engineering Co., Ltd. (Sichuan Kehong)** an exploration and design company owned by CNPC Chuanqing Drilling Engineering Company is using AutoCAD Plant 3D and AutoCAD P&ID to help accelerate design on a major natural gas pipeline. The Zhongwei-Guiyang Natural Gas Connection Line Engineering Project encompasses three trunk lines, and will connect three major regions within China. This 1600-kilometer pipeline is going 3D.

**Southern California Edison** improves design productivity and efficiency by creating more streamlined workflows that adhere to engineering

and construction standards, providing more standardized design output throughout SCE service territory.

**Stadtwerke Augsburg (Germany)** streamlines asset management and improves customer service by 300 percent.

**Swissgrid (Switzerland)** realizes more secure, reliable, and cost-effective asset management. Now it is easier to apply business rules based on power transmission standards to their data, to spot and address errors, and to edit data models to better match preferences and regional requirements without a database specialist or programmer to proactively modify standards. And Swissgrid can deliver dynamically generated maps of assets to its 360 employees in the office or in the field on mobile devices.

**Tokyo Electric Power Services Company (Japan)** a consulting company specializing in civil engineering, architecture, electricity, and communications developed a system that supports facility planning operations for the Tokyo Electric Power Company to provide powerful support for electric power operations, such as creating and sharing electric power grid schematics and transmission line route maps.

**VTN Consulting** uses Autodesk design and visualization suites to study proposed land use, roadway projects and to transform 2D GIS utility data into 3D representations to study system expansions and upgrades.

**Üz Lülfsfeld (Germany)** adds thousands of renewable energy sources and completes tasks 50 times faster, resulting in annual savings of as much as €100,000.

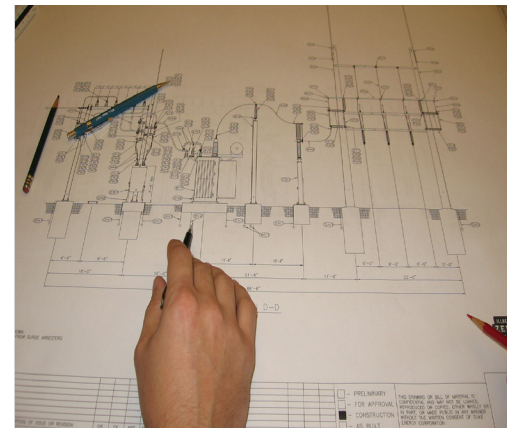


Image courtesy of Duke Energy



Image courtesy of Anchorage Municipal Light and Power

We'll be able to do things like visualize every service connection without having to refer to tabular data. How does that help? For one thing, you can calculate loads on individual transformers more easily and reliably. And field crews can know exact equipment types and locations. That's huge, especially when it comes to maintaining our underground network.

—Ray Pearce  
GIS Project Manager  
Anchorage Municipal Light and Power

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