

# Electrical system design innovations unlock new opportunities for BIM

by Schneider Electric

## Executive summary

The latest innovations in electrical system digital design technology help bridge the inefficiency gap in BIM tools. They empower specifiers and contractors to detail an entire building project in a single BIM. The innovations provide speed, efficiency, accuracy, and risk mitigation, giving designers peace of mind and freedom to focus on the facets of design that matter most.

## Introduction

Building Information Modeling (BIM) is a lot like Artificial Intelligence, clean energy and many other disruptive innovations. The benefits are well established, but adoption remains slow. People talk about them a lot more than they actually use them.

It's difficult to get alignment across disciplines on changes in processes and technology. BIM is no different. The potential of BIM will be realized when it is put to use through the entire lifecycle of a project – plan, design, build, operation and maintenance. The good news for specifiers, electrical engineers, and designers is that BIM is about to get easier, thanks to significant breakthroughs in electrical system digital design.

The latest digital design tools improve the efficiency and reliability of electrical systems in the master project design model and lower the cost of implementing electrical BIM. Schneider Electric has updated and expanded its LayoutFAST toolset to enable specifiers, engineers, and contactors to quickly and easily custom design, generate, and share BIM objects.



This increases their value in the design-build process through speed, efficiency, accuracy, and risk mitigation. It makes more detailed information available from conception to completion, multiplying efficiencies and lowering potential risks.

How does the electrical system digital design capability deliver this value? It empowers designers to create busways and configure electrical panels and drives with exceptional accuracy. It automatically generates key documents, including one-line diagrams, riser diagrams, and a detailed Bill of Materials (BOM) with actual costs.

Digital design tools give BIM specialists, electrical design engineers, and mechanical, electrical and plumbing contractors (MEPs) more detailed and accurate plans — removing guesswork and helping specifiers get closer to the truth in cost estimates. This also sets up contractors for success in the build phase with clarity for materials and staffing.

New electrical system design software will help enable BIM throughout the life of a project and help stakeholders take the leap from developing efficient buildings to developing smart buildings.

## Closing the gap to detail an entire project in a BIM model

Early BIM design tools were quickly adopted by architects, and structural and mechanical engineers, but meeting the needs for electrical engineers has been more of a challenge. While other disciplines frequently use the popular Autodesk Revit modeling platform, electrical engineers often use other subscription-based vendor agnostic design tools. This creates a lot of uncertainty around BIM documents.

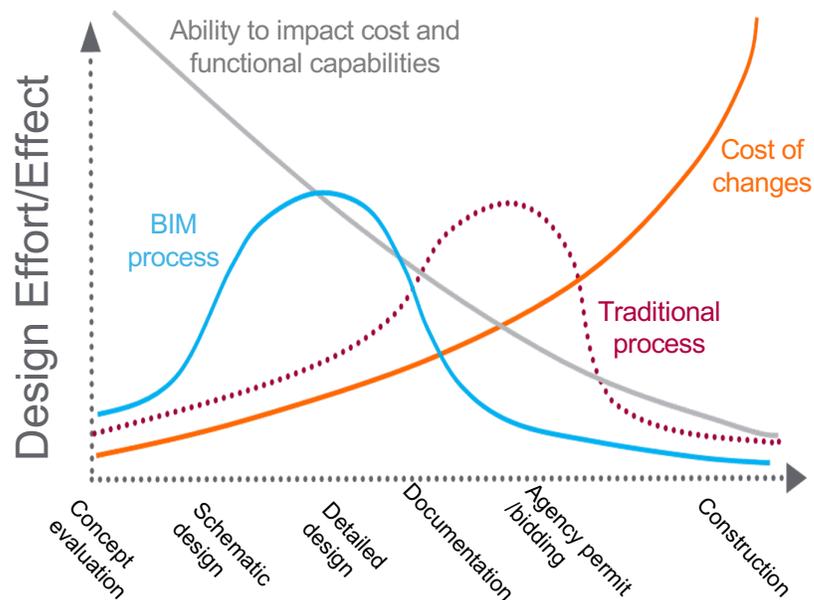
Electrical distribution systems are critical for making Revit models intelligent and producing a smart building. But in the construction world, electrical distribution systems often fly below the radar early in the design of a project. Electrical engineers and specifiers are tasked with creating one-line diagrams without knowing if their designs will integrate with other systems in the field. Electrical contractors are also often left out of the design conversation and without the visibility to know all of the details and parameters for their work.

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For example, compromises are made to electrical rooms or to control panels and data centers to accommodate a stakeholder goal, such as additional rentable space. These dynamics can lead to issues that derail construction deadlines and increase project risk.

The updates in LayoutFAST were done with electrical engineers in mind. LayoutFAST works as a Revit plug-in or within a web browser. Now, electrical engineers can include their designs in the same Revit plan with mechanical and plumbing. BIM tools provide elasticity in design, which allows people to test their hypotheses. If a stakeholder wants a smaller electrical equipment room, the Revit modeler can adjust the design to see if it is possible without changing equipment.

**Figure 1**  
Chart showing realization of BIM benefits



Source: Patrick MacLeamy, The American Institute of Architects, 2007

## Innovations enable BIM throughout the life of a building project

“Designers can turn minutes into seconds by easily configuring the required equipment into the plan and modifying the plan through the project lifecycle.”

LayoutFAST integrates into the BIM workflow, so designers can easily insert transformers, switches, breakers, meters, and relays into the plan without leaving the Revit environment. This saves significant time from the Revit insertion process by eliminating the need to scour catalogues and websites for assets.

Designers can turn minutes into seconds by easily configuring the required equipment into the plan and modifying the plan through the project lifecycle. The new process eliminates the guesswork that comes with vendor-agnostic tools that rely on generic dimensions and pricing. By selecting specific products, designers enhance and optimize electrical designs with the level of information that is truly utilizing the power of BIM.

One of the most significant innovations in LayoutFAST is the ability to create accurate busways, which clarifies work and costs for contractors and reduces work order changes. Designers create a 3D viewing, configure a digital model and then share it with other stakeholders. Specifiers for the first time can output a digital model that includes specifics for pipes, elbows, and end caps.



Now for the first time in the BIM process, designers can configure control panels and drives — clearing the way for panel builders to create a more accurate BOM.

New BIM tools provide collision detection to prevent incompatible electrical components from getting into the project plan. The ability to edit the BIM model accurately saves work during construction. The software generates catalogs, specifications, and commercial-ready documents, including one-line diagrams, riser diagrams, and a detailed BOM with actual costs.

## Innovations streamline manual processes for specifiers

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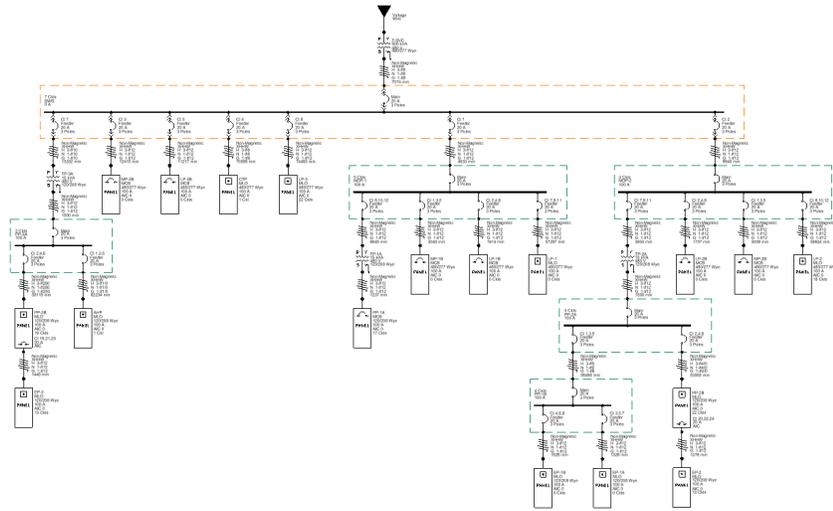
Consulting engineers face tremendous pressure from building owners and facility managers to find new ways to save energy, reduce expenses, and improve efficiency. LayoutFAST helps them provide more value to their stakeholders by adding the electrical system into the design phase.

One of the more significant innovations is the automatic one-line diagram generator. Electrical engineers and specifiers are used to drawing their own one-line diagrams to show how the components such as transformers, switches, and control center rooms are connected in an electrical distribution system. Drawing a one-line diagram is a time-consuming endeavor.

LayoutFAST now automatically generates one-line diagrams and updates those whenever changes are made in the plan or during construction. It also automatically generates riser diagrams, which shows how components are connected on multiple levels.

**Figure 2**

A one-line diagram



Designers reduce risk through collision detection, precise specs and a detailed BOM.

Ultimately, BIM tools improve accuracy and save time and money in the design phase by streamlining previously manual processes.

## Precise plans give contractors head start for materials, staffing

“Contractors can provide appropriate and efficient staffing, from getting prefab work done to knowing whether a supervisor or expert is needed on the site.”

The new digital design tools are accelerating the build phase through speed, efficiency, accuracy, and risk mitigation. Contractors are better equipped to get the job done faster without unexpected changes that may increase cost and compromise the integrity of the construction.

Contractors often lack real-time visibility into the BIM and design-build process, which leaves them with unanswered questions:

- What work can be done before they arrive at the construction site?
- Are the design elements – the busways and control panels – accurate?
- Will those elements fit together once workers install them on the job site?

With LayoutFAST, contractors are armed with accurate documentation. The detailed BOM provides a precise list of materials needed for on-site work, which saves time and interruptions and also reduces the liabilities that come with excess inventory at the work site or on a truck.

Contractors can provide appropriate and efficient staffing, from getting prefab work done to knowing whether a supervisor or expert is needed on the site.

The latest BIM tools bring efficiency to value engineering, when changes are made in the design during the build phase. With LayoutFAST, the contractor makes an adjustment in the masterplan, and the BIM model is automatically updated in Revit and all stakeholders have real-time visibility into the new plans.

## Conclusion

### Innovations enable designers to focus on what matters most

Improvements in the LayoutFAST toolset close the missing electrical system gap in Revit. Specifiers, engineers, and contractors can detail an entire project in a BIM. They can quickly and easily custom design, generate, and share comprehensive BIM objects, which enables BIM throughout the life of a project – plan, design, build, operation and maintenance.

LayoutFAST 7.0 will help align stakeholders in providing more value for a building project. The innovations are giving designers peace of mind and freedom to spend their energies on the facets of design that matter most.

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