

The role of electrical design in the new energy landscape

How data and digitalization will lead to greater
efficiencies in high-performance buildings



CONTENTS

01 Introduction 3

02 The changing landscape

Industry innovation timeline 4

Traditional workflow challenges 5

Modern workflow efficiencies 6

03 Planning for what comes next

Taking action today to build for tomorrow 7

Solutions built by industry leaders 8

Meeting the demands of the new energy landscape

The building and construction industry stands at a unique moment in its history. As the climate change crisis comes into greater focus with each passing day, the need for streamlined high-performance building design has never been more urgent. High-performance design allows building owners and operators to address critical variables, including indoor air quality, indoor environment quality, lighting and daylighting, water and wastewater, acoustics sustainability, security, and energy procurement and management.

Why high-performance design matters

The United States Green Building Council names five leading reasons to adopt a high-performance strategy:

- Lower design and construction costs
- Increased marketability and overall asset (building) value
- Reduced operating costs
- Better workplace health and productivity
- Sustainability and regulatory risk mitigation

Electrical systems hold the key to a greener future

To meet the expectations of the new energy landscape, project partners must make use of new technologies and modern workflows to reduce waste, minimize errors, and allow for more effective collaboration and monitoring throughout the design, building, operation, and maintenance of commercial and residential buildings. One of the most important adjustments to existing workflows is a shift to involve energy, sustainability, and carbon reduction strategies for electrical considerations at the earliest stages of a project.

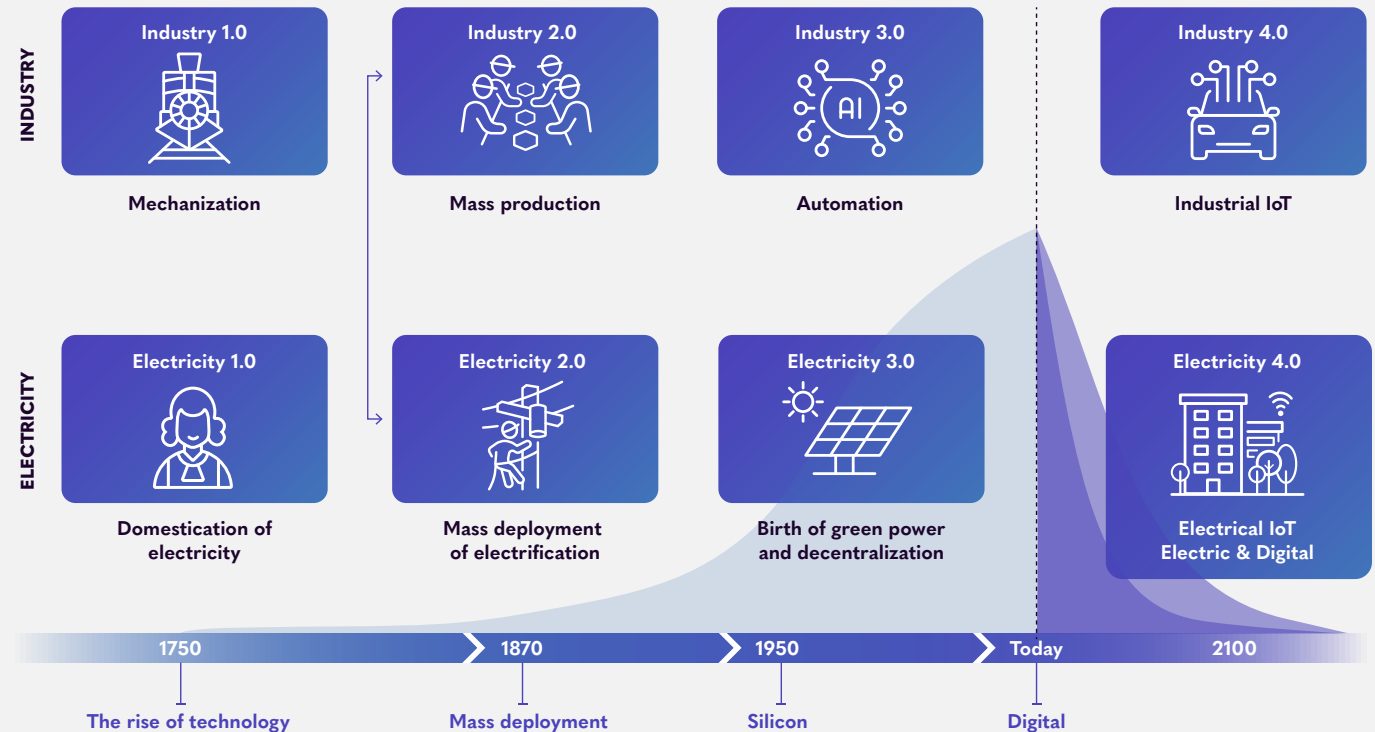
“ Building systems are the biggest consumers of energy in a building, but too often electrical consultants and energy assessments are not involved in the initial stages. By prioritizing energy insights at the beginning of projects, partners can better understand the downstream effects of how these buildings will operate. ”

—Daniel Stonecipher, Vice President and Chief Product Officer, Schneider Electric

Technology advances continue to reshape the building industry

Over the past 250 years, technology-driven revolutions have radically changed how the industry operates worldwide. Today, we understand new ways to lower emissions by making previously invisible waste visible—all thanks to the convergence of electricity with the modern digital world. We call this new era of electrification Electricity 4.0, and it puts a zero-waste, zero-emissions, and zero-carbon future well within our grasp.

Over the last 250 years, the world has gone through four technology-driven revolutions



The new electric & digital frontier

Sophisticated digital technology advances—such as metering and monitoring—make it possible to better understand how we are using our energy. Smart devices, apps, analytics, and software provide information and prompt action, making it possible to deploy energy more efficiently. Simply by better understanding how, when, and where waste is present means we can address massive amounts of untapped energy savings potential.

Traditional workflows pose many challenges and present more opportunities for error

Despite continual advances in technology and collaborative partnerships, the construction industry still relies heavily on siloed, document-based approaches that often result in expensive errors. Architects continue to produce documents that are handed off to engineers, then passed to detailers and fabricators, then to a primary contractor who relays information to subcontractors before the eventual hand-off to building operators.

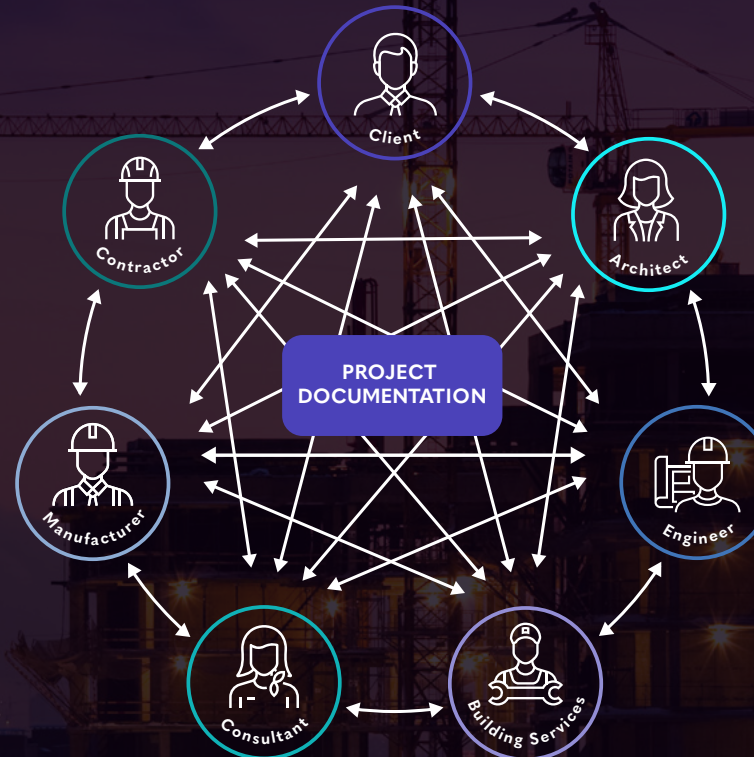


of construction work is rework



of construction projects are behind schedule and over budget

Traditional methods are inherently complex



This approach regularly leads to confusion and increased costs through inefficiency and waste. And while transitioning to digital deliveries and electronic file exchanges among stakeholders has been an important step forward, silos and broken workflows persist. Common challenges still include:

- Re-entering data across multiple analysis applications
- Electrical diagrams and 3D models living in different, disconnected platforms
- Difficulty using and maintaining calculation templates
- Time-consuming tracking and implementing of NEC code provisions as they relate to calculations

Furthermore, progress toward a modern workflow is hindered by the heavy regulations—and associated documentation—specific to each part of a project. However, increased emphasis on sustainability compliance is creating positive pressure toward efficient project execution.

Modern workflows can unlock massive gains in efficiency and accuracy

By making use of available technologies and breaking out of silos, project partners can be more efficient and accurate as they work together. Common Data Environments allow for real-time adjustments, improved visibility for collaborators, and a much better ability to forecast, budget, and monitor projects from the design phase all the way through to operation.

“Technology advances are saving time and money at every stage of a project, as well as highlighting opportunities to reduce embodied carbon and carbon emissions. Building information modeling provides robust data for digital twins, making it possible to measure and verify that a building is or is not functioning in the way it was intended. If the building and construction industry intends to meet ambitious and necessary sustainability goals, it’s critical to leverage every advantage offered by new and emerging technologies.”

—Daniel Stonecipher, Vice President and Chief Product Officer, Schneider Electric

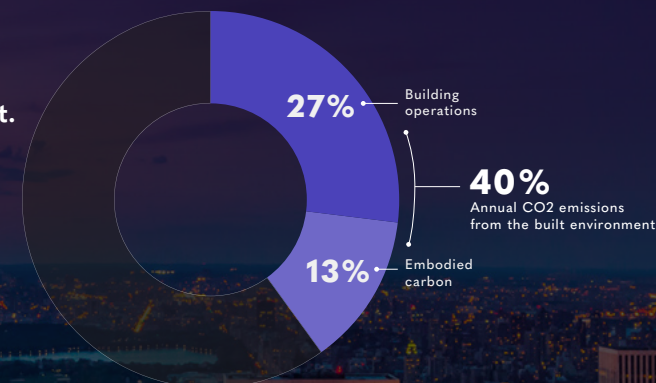
Building a more efficient, sustainable future

Although the industry has seen marked improvements in the approach to the design, building, smart commissioning, operations, and maintenance phases of a construction project, there are clear steps forward to take in the new energy landscape.

1. **REDUCE** energy waste through digitization. Connecting systems through digital technologies makes them smarter and more efficient. Those connected systems unlock the biggest opportunities for savings and help to pinpoint course corrections to cut out waste.
2. **REPLACE** fossil fuel energy with zero-carbon electricity. It is the most efficient form of energy, and it can be sourced locally.
3. **ENGAGE** the broader value chain. No single company can decarbonize alone. In fact, the supply chain is likely the largest part of a design and building team's carbon footprint.

Total annual CO2 emissions

40% of annual global CO2 emissions are generated by the built environment. Of those total emissions, building operations are responsible for **27%** annually, while building and infrastructure materials and construction (typically referred to as embodied carbon) are responsible for an additional **13%** annually.



“Despite extraordinary advances, most of the innovations continue to be powered by technology from the 20th century. More than 80% of energy demand is still met by fossil fuels, and more than 64% of power generation comes from fossil fuels. And more than 95% of electrical distribution remains passive and non-connected. That’s troubling, but these numbers also represent massive opportunities to gain efficiencies and work toward Net Zero goals.”

—Daniel Stonecipher, Vice President and Chief Product Officer, Schneider Electric

Partners working toward a common goal

INTRODUCING BIM ELECTRIC

Two industry leaders have joined forces to create BIM Electric. Schneider Electric's depth of experience and knowledge in manufacturing and R&D, paired with Autodesk's expertise in the design-and-make space, combines invaluable insights to better design systems for the new energy landscape.

Advanced Electrical Design™ for Autodesk® Revit® is a first-of-its-kind extension that allows electrical engineers and designers to plan, analyze, optimize, and document their electrical plans all in a single place. This makes it possible to keep diagrams in sync with the architectural model throughout the building process. From initial concept to detailed design, this cohesive, connected solution supports emerging industry demands and the new energy landscape. Most importantly, Advanced Electrical Design™ for Autodesk® Revit® makes it easier than ever to prioritize electrical considerations as early as possible in high-performance building design.

“Our expertise in the electrical distribution space is a natural complement to Autodesk’s expertise, allowing us to create a partnership that truly empowers electrical engineers and designers. Both Schneider Electric and Autodesk are among the top sustainable companies in the world, and sustainability is at the forefront all that we do. Together, through BIM Electric, we are driving long-term digital transformation solutions in the industry, providing greater value for companies and customers in the new energy landscape.”

—Daniel Stonecipher, Vice President and Chief Product Officer, Schneider Electric

Please visit bim-electric.com to learn more.