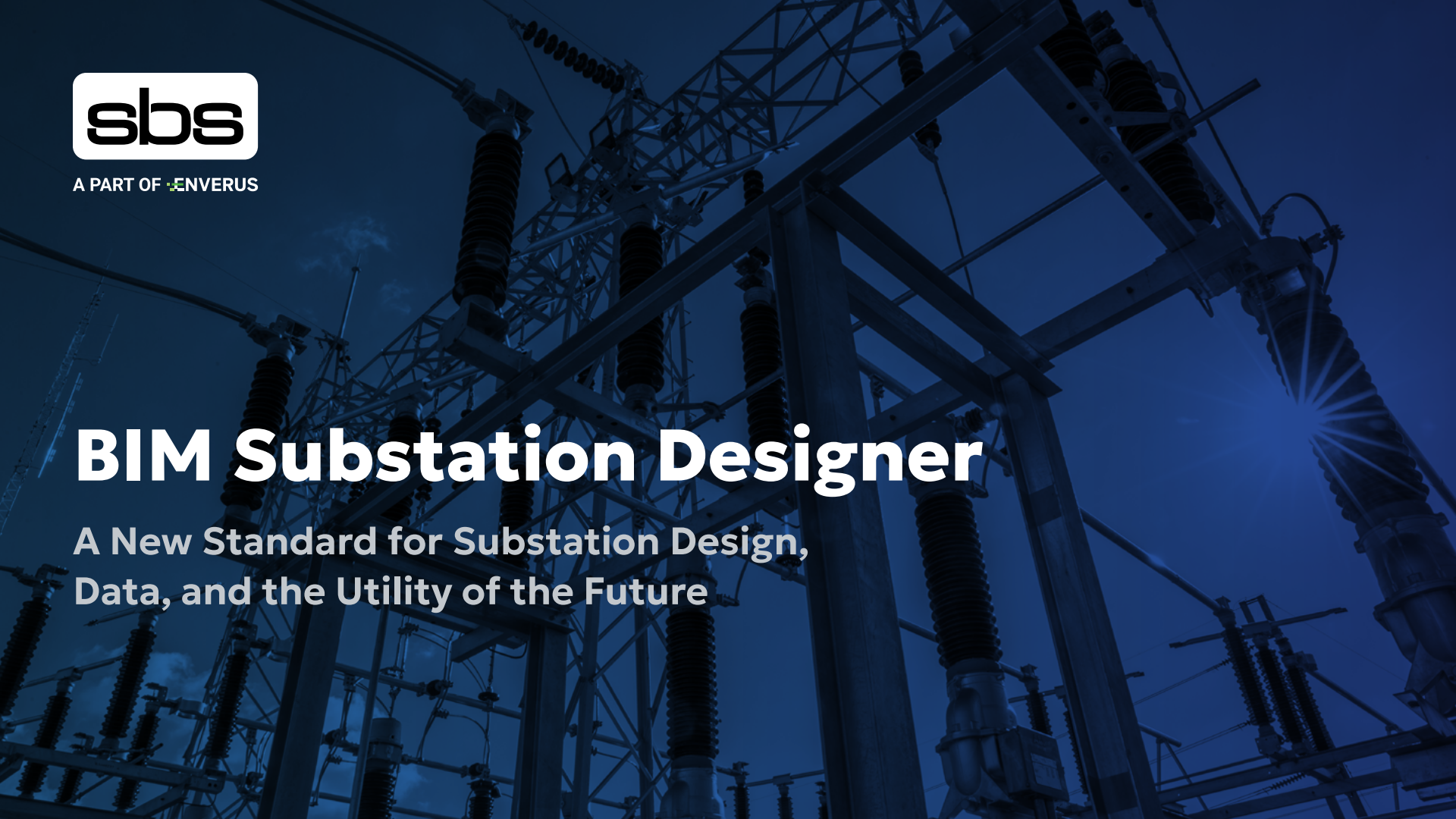
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BIM Substation Designer
A New Standard for Substation Design,
Data, and the Utility of the Future

# Contents

# The Substation Industry Is at a Turning Point

Driven by the energy transition, surging demand from data centers and electrification, and the urgent need to replace aging infrastructure, utilities are executing substation programs at an unprecedented scale and pace. But the tools currently used to design and manage those substations were largely built for a different era.

SBS has spent two decades pushing design automation forward. The next frontier is what happens to the data created with the drawings. That data could flow downstream into asset management systems, inform capital planning, and serve as the foundation for AI-driven insights. Instead, it mostly sits in a file, and the broader organization works around it.

BIM Substation Designer (BSD), developed by SBS, is built on the conviction that this gap is both unnecessary and increasingly costly. BSD is a purpose-built, Revit-native substation design platform that delivers immediate, measurable productivity gains. Underneath those gains lies a data architecture designed to serve utilities for decades to come.

This whitepaper examines why the substation industry is at an inflection point, what it means to design software for that moment, and how BSD is positioning utilities and the AEC firms that serve them to meet it.

# The Challenge: Substation Design at an Inflection Point

## A Grid Under Transformation

The modern electric grid is being reimagined from the ground up. Renewable generation is reshaping where power comes from and how it flows. Electrification of transportation, buildings, and industrial processes is driving demand to levels legacy infrastructure was never designed to meet. And data centers, the physical backbone of the digital economy, are connecting to the grid at a pace that has become one of the most consequential planning challenges utilities face today.

At the center of this transformation is the substation. Every megawatt of new renewable capacity connects through one. Every new data center load requires one. Every grid modernization project runs through them. The substation program has become, for many utilities, the most critical and most constrained variable in their capital plans.

The pressure is not only external. Utilities are simultaneously managing an aging workforce transition, as decades of institutional knowledge held by veteran engineers are lost to retirement. The systems and tools used to capture, organize, and transfer that knowledge matter more now than at any previous point in the industry's history.

## The Limits of the Tools the Industry Has Used

Against this backdrop, the substation design workflow has remained surprisingly unchanged. Most projects follow a familiar sequence: preliminary layout, general arrangement and foundation design, physical wiring, protection and controls. Each phase produces a deliverable (e.g., a drawing set, a document package, a schematic) that is passed sequentially to the next team. The process is well understood, but it is also slow, labor-intensive, and prone to the rising costs of rework when something changes upstream.

More fundamentally, the tools built around this workflow were designed to produce drawings, not data. But a completed substation design package must provide extraordinarily precise information about every component in the facility: its specifications, its relationships to adjacent equipment, its alignment with engineering standards, its physical location within the structure. In most workflows today, that information does not flow anywhere. It is created by engineers, captured in a file, and left behind when the project closes.

The result is a structural disconnect between the design process and the operational reality of the asset being designed. Operations teams work from their own systems. Maintenance records live elsewhere. Financial forecasts are built on data that may or may not reflect what was actually installed. The substation exists as a physical asset and as a collection of disconnected records, but rarely as an integrated, queryable whole.

## Two Converging Problems

The industry faces two distinct but deeply related problems that are converging as the pace of grid buildout accelerates.

The first is workflow efficiency. Substation design projects take longer than they need to, not because engineers lack skill, but because the tools they use require sequential handoffs, manual reconciliation between systems, and repeated re-entry of information already captured elsewhere. In a capital environment where schedule delays translate directly to project cost overruns — and where utilities are managing more projects simultaneously than ever before — the efficiency gap is becoming harder to absorb.

The second is data fragmentation. The information generated during substation design, construction, and operation is distributed across systems that do not communicate with each other, is formatted inconsistently, and is tagged with different vocabularies. When a capital planning team needs to make a multi-million-dollar investment decision, or when an operations team needs to understand the maintenance history of a piece of equipment, the data they need exists somewhere in the organization. But today, accessing it requires manual effort that should not be necessary.

These two problems share a common origin: substation design tools have historically optimized for the deliverable rather than the data. BSD was built to change that equation.

***"The market is moving toward Revit. That's not a threat to what we've built. It's an opportunity to extend it. We wanted to make sure that when utilities and AEC firms start making that transition, SBS is already there with something purpose-built for them."***

***— Kevin Whyte, VP Substations, SBS***

## The BIM Opportunity

Building Information Modeling (BIM) has spent the last two decades reshaping construction and infrastructure design across virtually every discipline adjacent to substation work. Civil engineers, structural engineers, mechanical and electrical systems designers, and construction project managers have all adapted to BIM-native workflows built around a simple but powerful premise: the model is the source of truth, and the data embedded in that model is as valuable as the geometry it represents.

Substation design has been slower to make this transition, in part because the available tools did not support it. Engineers who wanted to work in Revit, the dominant BIM platform across the Autodesk ecosystem, found themselves making substitutions. They were using generic MEP families where substation-specific components were needed, building workarounds that worked on screen but degraded the underlying data, and ultimately producing models that could not carry the semantic meaning that makes BIM valuable.

That reality is changing rapidly. The BIM standard is arriving in substation design whether the industry is ready or not. Project teams at utilities and AEC firms are beginning to evaluate what BIM-native substation workflows would look like, driven by both organizational transitions already underway in adjacent disciplines and by the recognition that the data problem is no longer tolerable at the scale required to meet grid buildout goals.

The question for decision-makers at utilities and engineering firms is not whether this transition happens. It is whether they are positioned when it does.

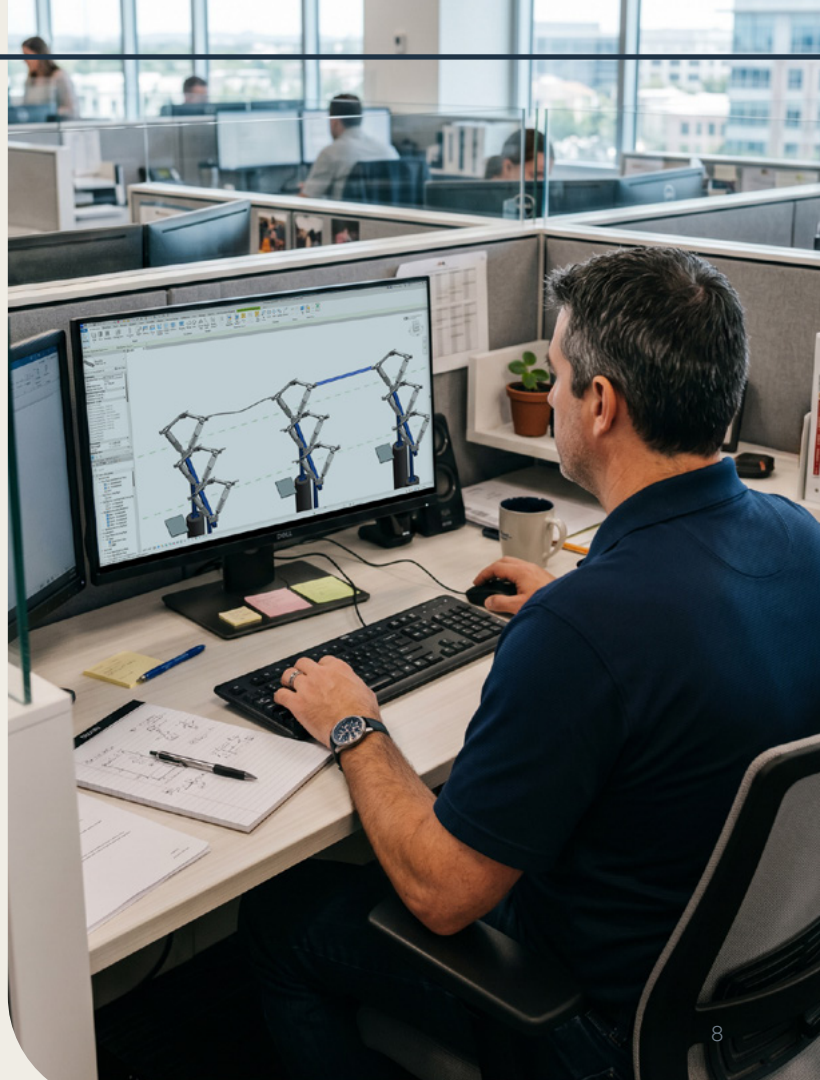
# A BIM-Native Platform Built for Substation Work

## Why Revit, and Why Now

SBS has been the production standard for substation design software across hundreds of utilities and engineering firms for more than two decades. The SBS Substation Design Suite, which runs on AutoCAD and Inventor, represents years of accumulated engineering depth, workflow automation, and customer-informed development. That installed base is one of the most significant in the industry, and it did not happen by accident.

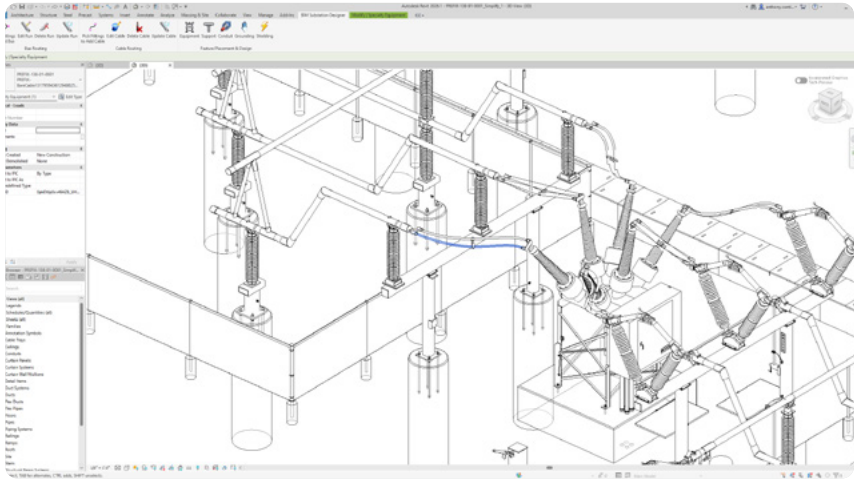
The decision to create BIM Substation Designer as a purpose-built, Revit-native platform was not made because the existing tools had failed. Instead, it was developed because the industry is entering a new phase, and SBS recognized the importance of being ready for it. The SBS portfolio now provides complete coverage of the substation design workflow across AutoCAD, Inventor, and Revit, all from a single vendor, all within the Autodesk ecosystem. This carefully crafted set of solutions allows SBS to serve organizations wherever they are in their BIM transition journey.

For organizations already embedded in AutoCAD, SDS-Physical and SDS-P&C remain the production-proven standard. For organizations evaluating or already pursuing BIM-native workflows, BSD extends that same depth of utility industry expertise into the Revit environment. Wherever an organization is in that journey, the tools available for that transition make all the difference.



## The Revit Problem (Without BSD)

Engineers have been attempting substation work in Revit for years. The challenge has not been Revit itself. It's a powerful, capable platform that project teams across multiple disciplines already know well. The challenge has been the lack of substation-specific tooling designed for the way substation engineering actually works.



Without BSD, an engineer working in Revit on a substation project faces a set of painful tradeoffs. Generic MEP or structural families get pressed into service as substation component substitutes. They may look correct on screen, but the metadata embedded in those families does not carry the semantic meaning of a properly classified substation component. That means the intelligent model that BIM promises begins to degrade the moment it is built.

***"Engineers were already trying to use Revit for substation work, but without substation-specific tools, they were making substitutions that looked okay on screen but broke the underlying data. The metadata was wrong, and you'd lose functionality you didn't even know you were losing."***

**— Anthony Contino, Director of Substations, SBS**

The answer was not to steer substation engineers away from Revit. It was to build tools that make Revit work the way substation design actually requires. BSD delivers native Revit families for substation components, automated workflows built for substation-specific engineering tasks, and a unified model environment designed to bring physical and P&C design together in a single, intelligent model for the first time.

## Collapsing the 30/60/90 Sequence

Traditional substation design follows a phased delivery structure that reflects the limitations of the tools used to execute it. The 30% milestone typically covers general arrangement and foundations. The 60% milestone adds physical wiring. The 90% milestone completes protection and controls. Each phase is sequential because the tools that handle each discipline are separate, and the handoffs between them require reconciliation.

The introduction of BSD changes this reality significantly. Because physical and P&C design share a single, unified model, the rigid sequencing of the 30/60/90 process begins to dissolve. Phases can overlap. Changes propagate automatically rather than requiring manual reconciliation. Drafting standards are applied automatically, aligning documentation to engineering requirements earlier in the process and reducing the friction at each milestone review.

The productivity impact is significant and measurable. Beta customer testing showed that a standard substation design task requiring approximately one hour in a typical Revit environment was completed in just 18 minutes using BIM Substation Designer. That's more than a threefold improvement on a single task, before even factoring in the additional benefits of reduced rework and faster change management.

***You're not just blurring the line between 30/60/90 deliverables. You're speeding up design and reducing cost. By automatically applying drafting standards, the tool helps ensure designs are aligned with documentation requirements earlier, streamlining the handoff between engineering and drafting."***

**— Anthony Contino, Director of Substations, SBS**

# More Than a Design Tool: Solving the Data Problem

## Where the Real Friction Lives

Ask a substation engineer where they experience the most friction in their work, and the answer is rarely the design itself. It is far more likely to be the time spent chasing information that should already be available: equipment histories scattered across maintenance records and tribal knowledge, site constraints buried in correspondence, operational data that exists somewhere in the organization but has never been connected to the design environment where it would be useful.

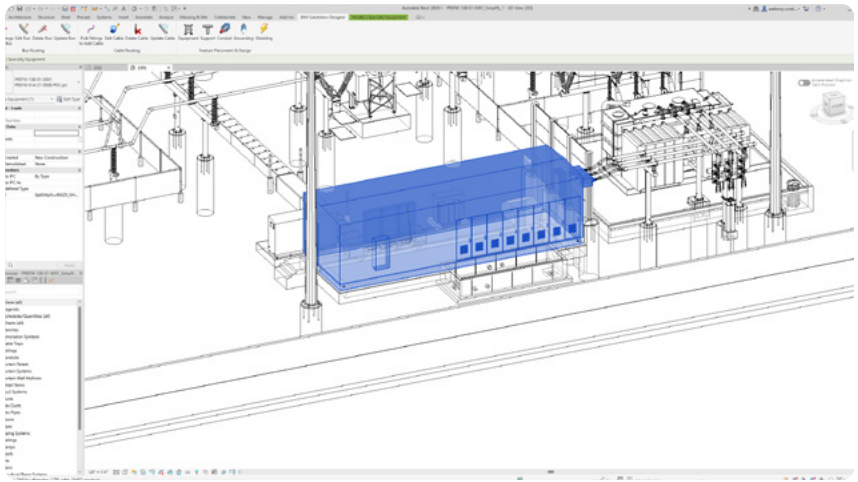
***"Let's say someone from operations tells you a breaker needs to be replaced. The crew goes out to the site, and they notice that the switches on either side also need attention, and the neighboring breaker has the same issues. It just wasn't reported correctly. That information goes into a system somewhere, but by the time the next job comes through, no one has connected the dots. It leads to making decisions without the full picture."***

**— Kevin Whyte, VP Substations, SBS**

The costs of this fragmentation are real and specific: truck rolls that could have been combined, equipment ordered too late or incorrectly, construction change orders that trace back to a design that did not have access to all of the known information. In a capital-intensive industry where complex substation projects run into the millions of dollars, those gaps are expensive.

## Data Lives Everywhere, and Connects Nowhere

A typical substation project involves many stakeholder groups within a utility: engineering, operations, maintenance, construction, procurement, finance, real estate, environmental, and others. Each of those groups has data that is relevant to the substation. In most organizations, that data lives in separate systems that do not talk to each other.



The design process has historically made this worse rather than better. When a drawing set is issued, the data embedded in that design does not flow downstream into the systems where it would be useful. It sits in a file. Operations works from their system. Maintenance works from theirs. Finance builds forecasts from whatever data can be assembled manually. The connections that would make everyone's job easier simply do not exist.

***"There's a plethora of data in this industry, and it's all siloed. You have data spread across many different groups within a single utility, and it's all relevant. It all relates to the components in a substation, their relationships to each other, the metadata between them. The opportunity is bringing it together in a way that's actually useful."***

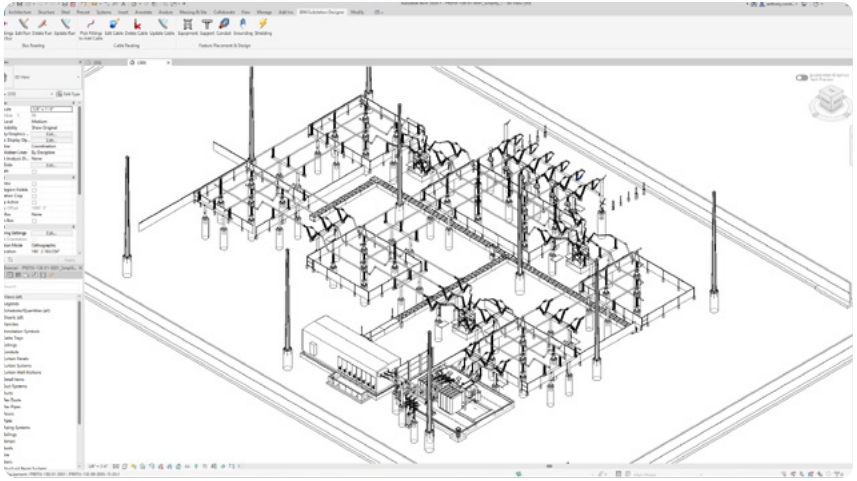
**— Anthony Contino, Director of Substations, SBS**

This isn't a technology gap in the sense that the industry lacks capable systems. It's a data problem, and it's a structural gap: the information produced during design is never formatted, structured, or positioned to move to where it is needed. BSD was designed, from its architectural foundation, to close that gap.

## A Common Language for Substation Data

In the early days of networked computing, every vendor built proprietary networking systems. Connecting those systems required custom integrations that were expensive to build and fragile to maintain. The introduction of TCP/IP changed everything by establishing a shared set of rules for how any machine communicates with any other. Once adopted, the energy that had gone into compatibility could go into capability instead.

The substation industry faces an analogous problem today. Every software platform has its own data model. Every system speaks its own language. Moving information between them requires custom integration work that consumes resources and introduces brittleness. The cost of this fragmentation falls on utilities and the engineering firms that serve them.



BSD is built on an open data standard aligned with the Common Information Model (CIM) — the framework the utility industry already uses as its reference point for grid data. It incorporates additional standards including IFC 4x3, IEC 61850, and IEEE C37 to add semantic depth and precision to the substation model. The end result is not a simple design file, but a structured, standards-aligned representation of a substation that can communicate with any system that speaks the same language.

***"Every vendor builds their own data model for their own software. What we're building is different. It's an interchange format that allows data to move between any application within an organization. We're defining the grammar of a substation: the meaning of each component, its relationship to other components, its alignment with industry standards. So instead of mapping word by word between systems, you're translating meaning."***

**— Anthony Contino, Director of Substations, SBS**

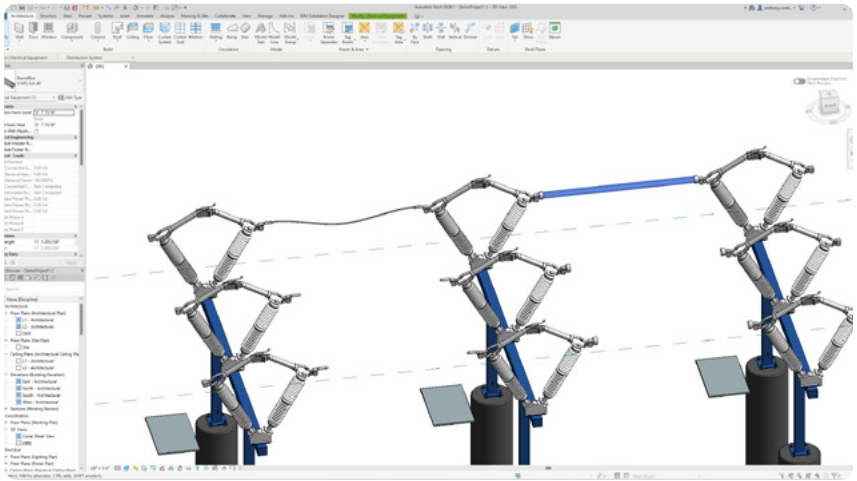
Critically, this standard is open. SBS recognizes that the value is not in owning the standard, but in building the most capable tools on top of it, backed by the depth of expertise the team brings to its implementation. Utilities and engineering firms that adopt BSD are building on a foundation controlled by the industry itself.

## Value From the First Project

One of the most important things to understand about BSD's data architecture is when the value begins. It does not require a multi-year implementation program or a data migration initiative before it starts delivering. The moment an engineer begins working in BSD, the data they produce is structured, connected, and ready to move.

The value compounds as more data accumulates, more projects are completed in BSD, more equipment histories get connected, and more of the organization's systems begin to speak the same language. Decisions that once depended on a veteran engineer's memory, or on manual reconciliation of data from multiple systems, begin to happen automatically, grounded in information that can be trusted.

The CFOs and financial planning teams at utilities are among the clearest beneficiaries of these changes. Capital planning for a substation program involves decisions worth hundreds of millions of dollars, made on data that is often incomplete, inconsistent, or hard to access in the form that decision-makers need. A data architecture that makes substation information structured, up to date, and queryable improves the quality of those decisions, delivering a greater return on each project completed in BSD.



*"The CFOs I've talked to about this would love to have all this information at their fingertips, to be able to get what they're looking for in the format they need, and to trust what it's giving them. That trust is the hard part, but good data infrastructure makes it possible."*

**— Kevin Whyte, VP Substations, SBS**

# Building for the Utility of the Future: AI, Digital Twins, and the Long Game

## Designing Toward a Destination, Not a Deadline

Most software gets built to solve the problem in front of it. A customer needs a tool for a specific platform; the vendor builds it. The market signals a need; the product responds. This is how most of the substation design software industry has operated, and for long stretches of time, it has worked well enough.

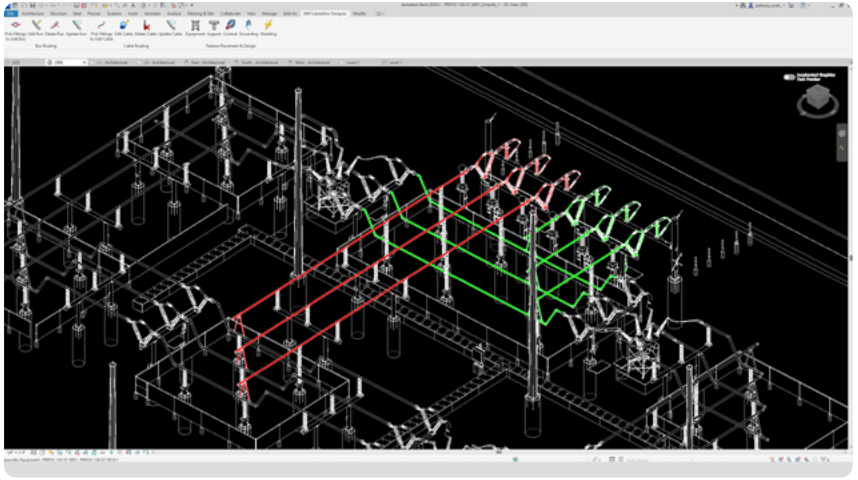
The SBS team building BSD started from a different premise. Rather than asking what customers need today, they asked what decisions a utility will need to make decades from now, and what data infrastructure those decisions will require.

That question led somewhere unexpected: away from the immediate features and workflows of substation design software, and toward the industries that had already solved the infrastructure problems the utility sector was still treating as unsolvable. The smartphone, for example, did not emerge because consumers asked for a pocket-sized computer. It emerged because someone looked at where technology was heading, built toward that destination, and then showed people the wants and needs they didn't even know about yet.

The utility industry is at a similar inflection point. The most forward-thinking organizations are beginning to ask the right questions about AI, data infrastructure, and digital operations. But asking the questions and having the infrastructure to act on the answers are two different things. BSD is designed to close that gap.

*"We put ourselves in the position of someone running a 10-million customer utility and asked what decisions we would need to make not just today, but 10, 20, 30 years from now."*

— Kevin Whyte, VP Substations, SBS



## The AI Readiness Problem

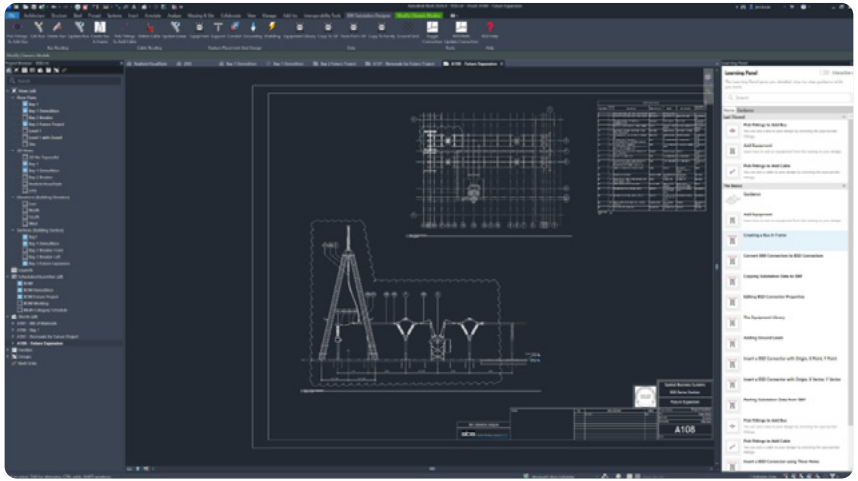
Conversations about artificial intelligence are happening across the utility industry. With digital twins, predictive maintenance, automated anomaly detection, and AI-assisted capital planning, the vision is clear, and the appetite among senior leaders is genuine. The gap, in most organizations, is the data.

AI does not work on disorganized information. It cannot surface reliable insights from data that lives in disconnected systems, formatted inconsistently, with no shared vocabulary for what anything means. Before a utility can genuinely benefit from AI, it needs clean, structured, and connected data. That is precisely what BSD's open data standard is designed to produce.

***"If you want to get into AI and digital twins, you need data structured in a way that's consumable. You can't just throw it in a database. It has to be formatted correctly, with the right semantic meaning, and extensible enough to grow. Most utilities don't have that yet. BSD starts building it from the first project."***

**— Anthony Contino, Director of Substations, SBS**

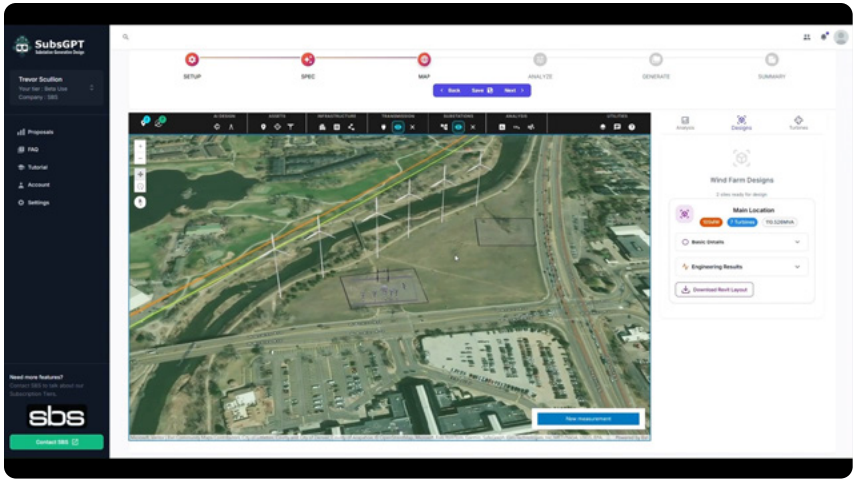
The open data standard underlying BSD assigns semantic meaning to every component in a substation model: not just what something is, but what it means, how it relates to other components, and how it aligns with established industry standards. This is the difference between data that can be searched and data that can drive real insight, between a system that can answer questions and one that can begin to anticipate them.



## SubsGPT: AI Built on the Same Foundation

SBS has developed SubsGPT, an AI solution for substation design built on the same open data standard that underlies BSD. Because SubsGPT and BSD share a common data architecture (designed together rather than integrated after the fact), the outputs of one connect directly to the workflows of the other.

This matters because the most common failure mode of enterprise AI initiatives is the integration gap: AI capabilities that are powerful in isolation but difficult to connect with the systems where decisions are made. When the AI and the data infrastructure are designed from the same foundation, that gap does not exist. The intelligence is native to the workflow, not bolted onto it.




## The Digital Twin Vision

The digital twin — a continuously updated, data-rich virtual representation of a physical asset — has become the target architecture for forward-thinking utilities. A true substation digital twin would provide real-time visibility into equipment condition, maintenance history, operational performance, and remaining useful life. It would connect the engineering record to operational reality and surface the insights that capital planners, operations managers, and regulatory teams need, without requiring them to manually assemble data from multiple sources.

Getting there requires a starting point: structured, semantically meaningful data produced consistently from the design process forward. That starting point has not existed for substation assets before, but BSD creates it. Each project completed in BSD contributes to a growing asset record that becomes more valuable as more data accumulates, as more systems connect, and as AI capabilities mature to act on it.

## A Broader Universe of Users

Substations are not built by utilities alone. Data center developers, renewable energy companies, land developers, and engineering firms all design and build substations, often under significantly different time pressures than those familiar to a traditional utility.

A utility operates on a capital plan that may look a decade ahead. A data center developer operates on a timeline measured in months, sometimes weeks. The efficiency gains from using BSD matter for both, but the urgency and entry points are different. For engineering firms and commercial developers, the argument is particularly direct: BSD is built on Revit, the platform their broader project teams likely already use. Adding BSD means adding substation-specific intelligence to a familiar environment, without adding a new platform to manage or a new learning curve to climb.

***"There are a dozen or more different groups that go into a substation project, and months and months of work will happen before you even get to the design stage. All that data is related and relevant. We can start bringing it in and relating it to the substation equipment, then we can build tools for every aspect of a project, not just the design phase."***

**— Anthony Contino, Director of Substations, SBS**

For firms that win utility contracts by demonstrating delivery speed and design quality, BSD represents the opportunity for strong competitive differentiation.

# Why SBS: The Right Partner for What's Coming

## Built by People Who Have Lived the Problem

The most important thing to understand about BSD is the depth of insight that shaped every decision made in its development. SBS is led by engineers who spent years inside utilities, managing large-scale projects, navigating the organizational realities of capital programs, and experiencing firsthand the friction caused by tools never designed for the problems they were asked to solve.

That experience is embedded in BSD at the level of product architecture. The way the data model is structured reflects how substation engineers think about components and their relationships. The way workflows are automated reflects the specific sequences and standards that govern substation design practice. The way the platform is positioned within the broader SBS portfolio reflects a genuine understanding of where utilities are today and where they are heading.

## A Proven Portfolio, Extended

SBS's commitment to the substation market predates BSD by more than two decades. The SBS Substation Design Suite (SDS-Physical and SDS-P&C) is the production standard for substation design across hundreds of utilities and engineering firms in North America and beyond. That installed base represents accumulated trust: the confidence that comes from tools validated in production environments, at scale, across a wide range of project types and utility operating models.

BSD extends that portfolio. Organizations that rely on SDS today can continue to do so, with the same depth of support and the same pace of development they have come to expect. Organizations ready to move to BIM-native workflows have a purpose-built platform waiting for them, from the same vendor and the same team, without the risk of learning a new company's approach to the utility industry from scratch.

## An Open Strategy in a Vendor-Dependent Industry

One of the most consequential decisions SBS made in building BSD was the choice to build its data architecture on open, industry-controlled standards rather than a proprietary model. In an industry where vendor lock-in has historically been the default, this choice reflects a different philosophy: that the best way to earn long-term customer trust is to give customers long-term optionality.

The open data standard underlying BSD is based on frameworks controlled by the industry — CIM, IFC, IEC 61850, IEEE C37. SBS does not own these standards and does not intend to. The value SBS delivers is in building the most capable tools on top of them, in implementing them with the deepest possible understanding of substation engineering practice, and in committing to a roadmap that expands the connections between BSD and the broader ecosystem of systems utilities rely on.

## The Right Moment for the Right Commitment

The utility industry is at a genuine inflection point: a moment when the demands on the grid are growing faster than the tools designed to serve it, when the data infrastructure needed to operate intelligently at scale is moving from aspiration to operational requirement, and when the BIM transition that has reshaped every adjacent discipline is finally reaching substation design.

SBS occupies a unique position at this moment: a company with the depth of established relationships and proven tools to be trusted, and the focus and agility to move purposefully toward where the industry is heading.

*"This isn't just about software. This is about a programmatic approach to becoming a modern utility that makes decisions in a modern way, using data to justify what you do and why you did it."*

**— Kevin Whyte, VP Substations, SBS**

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# Take the Next Step

**The utilities and AEC design firms best positioned for the decade ahead won't just be the ones building more substations. They'll be the ones that built smarter, with data infrastructure that grows more valuable over time. BIM Substation Designer is where that advantage starts.**

**To learn more about BSD, explore the full SBS product portfolio, or schedule a demonstration for your team, contact us today.**

spatialbiz.com/solutions/bim-substation-designer