

The Owner's Playbook for Predictable, Scalable Data Center Delivery

From capital projects to operational performance in the age of AI





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Data center delivery is entering a new phase. What used to be a series of standalone builds is now a continuous, high-stakes pipeline tied directly to business performance.

In this resource, we break down what that shift means for owners and how to build a delivery model that enables owners to meet the demands of today's data center construction landscape.



01

Why data center owners need a new playbook

We live in a world where digital infrastructure is no longer optional. AI, cloud computing, and real-time applications are driving constant demand for capacity, and data centers sit at the center of it all. The scale, speed, and complexity of delivery are being pushed to new limits.

What sets data center delivery apart is the intensity of its constraints. Speed to delivery and, critically, speed to power often determine whether capacity comes online when it's needed or misses the window entirely. Furthermore, complex systems like power, cooling, and network infrastructure are deeply interdependent, leaving little room for error. At the same time, growth depends on repeatability and the ability to scale across portfolios. That reality is driving greater reliance on prefabrication and industrialized construction approaches that support faster timelines and predictable performance.

That pressure is only accelerating. Electricity demand from AI-optimized data centers is projected to more than quadruple by 2030, while capital investment, sustainability scrutiny, and community expectations continue to rise. Moody's projects \$3 trillion in global spending over the next five years to keep pace with rapid data center expansion and AI capacity demand.

It's not just that demand is rising. Each facility comes with massive capital requirements, energy needs, and operational complexity that extend far beyond the build itself. For owners, success is no longer defined by building a single facility faster; these days, it's more about delivering predictable outcomes across an entire portfolio.

Getting there is harder than it sounds. Owners are navigating cost pressure, longer timelines, and growing expectations from investors, regulators, and end users.





Rising project costs and schedule risk

Even before ground breaks, timelines can stretch longer than expected.

As [McKinsey](#) points out, it can take anywhere from one to three years to move from initial request to construction start. Improving execution could shorten timelines by up to 20% and reduce capital costs by a similar margin, saving billions across the industry.

Those delays don't just push schedules. They drive up costs, tie up capital, and create ripple effects across the entire portfolio. Teams end up reacting instead of planning, with less room to course correct once work is underway. For owners managing multiple projects, that lack of predictability becomes a real constraint on growth.

Investor and regulatory scrutiny around transparency and sustainability

It's not just about speed and scale. With growing ethical and sustainability concerns around AI, owners are under increasing pressure to show how facilities are built, powered, and operated.

According to the [International Energy Agency](#), data centers already account for roughly 1% to 1.5% of global electricity consumption, with AI expected to significantly increase that share. Governments and investors are paying closer attention to emissions, water usage, and long-term energy sourcing.

Operational readiness becoming as critical as construction completion

Efficient data center construction is only part of the picture. Owners must also ensure facilities are ready to perform from day one, with systems, teams, and processes aligned for live operations. Solutions that span the full project and operations lifecycle, like [Autodesk Forma](#), paired with digital twin products like [Autodesk Tandem](#), help teams make that transition with less risk and greater confidence.

As noted by [Uptime Institute](#), more than 60% of data center outages cost over \$100,000, and many are tied to operational issues rather than build quality. In other words, finishing construction is not the finish line. If operations are not ready, the risk and cost don't go away, they just show up later.

02

The owner's challenge: Why traditional delivery models break down

From planning to operations, teams still using manual or traditional delivery models are much more susceptible to these challenges. Not addressing the issues above leads to higher costs and risks that can be felt throughout the entire portfolio.

Cost overruns and delays driven by uncertainty and poor coordination

Large capital projects rarely fail because of one big issue. It's usually a series of small disconnects. Missed handoffs, late design changes, and misaligned teams all add up. Those gaps create friction at every stage of the project. Small issues get missed early, then surface later as costly rework, delays, and budget overruns that are much harder to fix.

Limited visibility into progress, scope changes, and risk

Owners are expected to make high-stakes decisions, but the data they need is often delayed, incomplete, or buried in reports. By the time an issue shows up, it's already impacting cost or schedule. This lack of real-time visibility makes it difficult to proactively manage risk or keep projects on track.

Disconnected data across planners, designers, contractors, and operators

Every stakeholder works in their own system. Planners, designers, contractors, and operators each generate valuable data, but it rarely connects. This creates gaps between phases and makes it harder to carry insights forward. The result is rework, duplicated effort, and missed opportunities to improve outcomes.

Knowledge is lost with retirements and disconnected systems

A significant portion of the construction workforce is nearing retirement, and much of their knowledge is not documented in a way that can be reused. At the same time, project data lives in siloed systems that don't carry forward from one job to the next.



Manual reviews and spreadsheets slow approvals and introduce errors

Despite the scale of modern projects, many workflows still rely on spreadsheets, emails, and manual reviews. These processes take time, increase the chance of errors, and make it harder to maintain consistency across projects. As complexity grows, these inefficiencies become harder to manage and more costly to fix.

Owner takeaway: A single source of truth is needed

To move faster and reduce risk, owners need a reliable way to see what's happening across every phase of delivery. A single source of truth creates alignment, improves decision-making, and helps teams stay accountable. Without it, even the most experienced teams are forced to operate with blind spots.



03

Digital project delivery: A lifecycle mindset for owners

In order to avoid the challenges we outlined in the previous chapter, owners need to rethink how projects are delivered. That starts with *digital project delivery*.

What is digital project delivery?

Digital project delivery is a more connected way of working across the full lifecycle of a project. It brings planning, design, construction, and operations into a shared environment where people, data, and workflows stay aligned from start to finish.

Instead of passing information from one phase to the next, teams work from a common data environment. That means everyone can access the same information, in the right format, at the right time. It also means fewer version control issues, less rework, and faster decisions.

Platforms like [Autodesk Forma Industry Cloud](#) help make this possible by giving teams a centralized hub for documents, models, RFIs, and field data. Instead of chasing information, teams can focus on execution.

From handoffs to continuity

Traditional delivery models rely on handoffs. One team finishes their work, passes it along, and the next team picks it up. Each transition creates risk.

Digital project delivery replaces that with continuity.

Planning data feeds directly into design. Design intent carries through to construction. And construction data becomes the foundation for operations. Nothing gets lost along the way.

This matters more than ever for data centers. Owners are not just delivering one facility. They are building repeatable programs across multiple sites. That requires consistency, not just speed.

With connected data, teams can reuse designs, standardize workflows, and apply lessons learned across projects. Over time, that reduces variability and improves outcomes.



Aligning projects with lifecycle outcomes

One of the biggest shifts with digital project delivery is how success is measured.

It's no longer just about finishing construction on time. It is about how the asset performs over its entire lifecycle.

This is where digital delivery starts to pay off. When project data is structured and connected, it does not stop being useful at handover. It carries forward into operations.

According to [McKinsey & Company](#), an end-to-end delivery approach can improve schedules by up to 20% compared to traditional methods. Standardized design technology tools like generative scheduling also reduce learning curves and accelerate delivery timelines.

Early collaboration plays a big role here. When owners, designers, and contractors align earlier in the process, teams can identify risks and opportunities sooner. In one example, a North American energy developer partnered closely with contractors and reduced capital costs by 3% to 5% per project over two years.

Data as a long-term asset

Owners are starting to treat project data differently. Instead of seeing it as a byproduct of delivery, they are recognizing it as an asset with long-term value. The data created during planning, design, and construction can directly support operations, maintenance, and future builds.

That shift is driving new behaviors upstream. Owners are setting clearer data requirements from the start, making sure information is structured, consistent, and usable later on. Rather than asking for documents alone, they are defining expectations around model attributes, equipment metadata, room and rack layouts, energy modeling outputs, and commissioning data. When captured consistently, this data can be reused to accelerate design validation on future sites, benchmark performance across projects and regions, and inform expansion decisions.

Solutions like **Autodesk Forma Industry Cloud** help connect feasibility studies, design intent, and delivery data into a continuous lifecycle view. This makes it easier to carry insights forward and improve performance across a portfolio.

BIM-enabled workflows also play a key role. When models are built with operations in mind, they become more than design tools. They become living assets that support facility management long after construction ends. Asset-level BIM data can enable faster troubleshooting by linking equipment locations to maintenance history, support more accurate retrofit planning as technology evolves, and reduce risk during expansions by clarifying what was actually installed versus what was originally designed.

Up to
20%

schedule improvements can be achieved through an end-to-end delivery approach compared to traditional methods.



Enabling better decisions, faster

Digital project delivery also optimizes decision-making.

Instead of waiting for reports, owners can see what is happening in real time. Costs, schedules, and risks are easier to track because the data is already connected.

This level of visibility makes it easier to stay proactive. Teams can catch issues earlier, adjust plans faster, and avoid costly surprises later in the project.

It also reduces the reliance on manual processes. Automated workflows help streamline approvals, reduce errors, and keep projects moving.

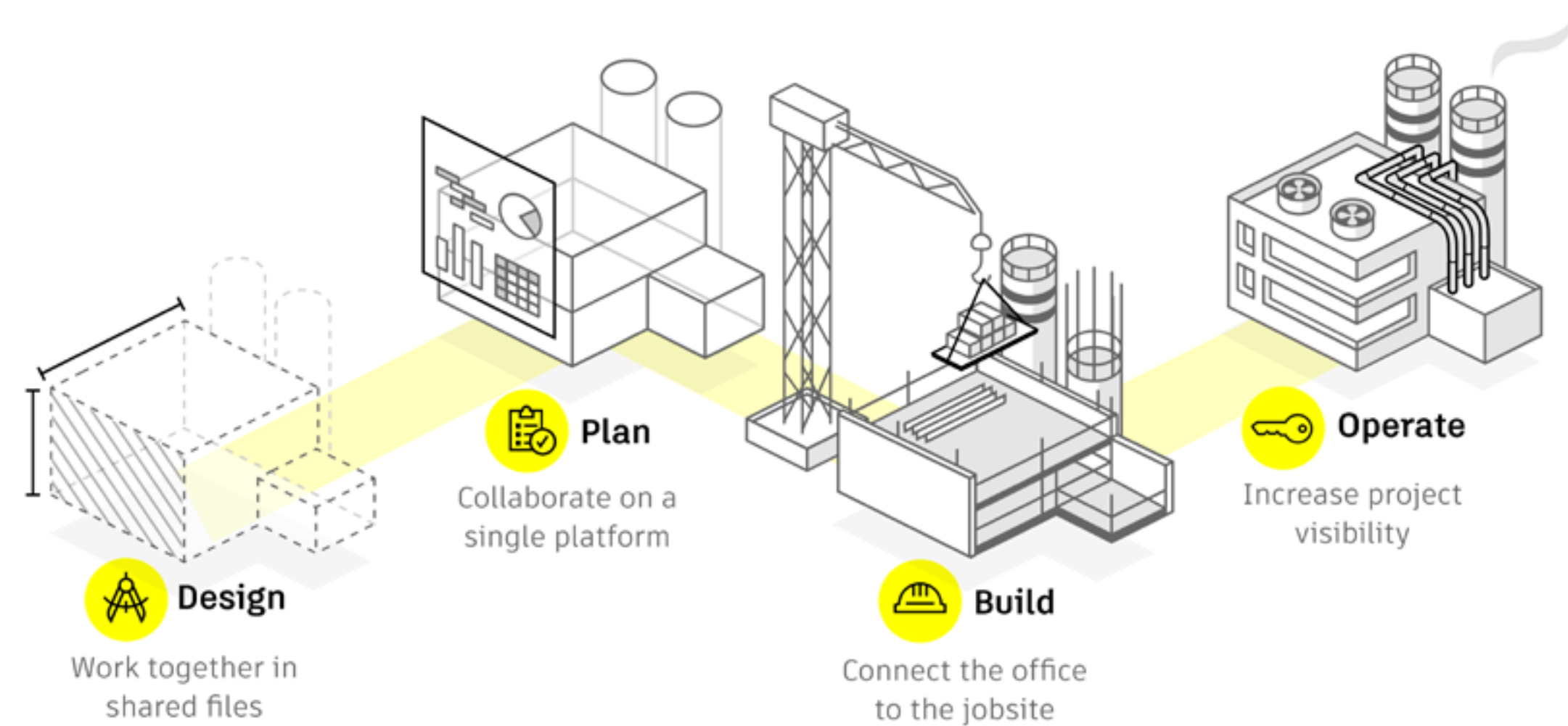
Setting the foundation for scale

For owners managing multiple data center projects, the real value of digital project delivery shows up at scale.

When every project runs on the same data foundation, it becomes easier to standardize processes, compare performance, and continuously improve.

That consistency supports better forecasting, more reliable delivery, and stronger portfolio-level decision-making.

It also helps teams keep up with demand. As data center pipelines grow, owners need a delivery model that can scale without introducing more risk.



04

Common data environments (CDEs): The owner control plane

Owners need a better way to stay in control of their data. Not just during construction, but across the full lifecycle of an asset. That's where a common data environment comes in. A CDE is more than a document repository. It is the system that connects people, data, and workflows in one place. When done right, it becomes the control plane for how projects are delivered and how assets are managed long after handover.

Why owners are standardizing CDEs

At the center of digital project delivery is the ability to bring everything together. Models, drawings, RFIs, schedules, and field data all need to live in a shared environment that teams can trust.

A CDE makes that possible.

It gives owners a way to eliminate silos across multi-stakeholder teams. Instead of each partner working in isolation, everyone operates from the same source of truth. It also supports real-time collaboration. Teams can access the latest information without waiting for updates or digging through emails. Issues get identified earlier, and decisions can be made with more confidence.

Just as important, a CDE helps owners retain control of their data. Project information is no longer scattered across vendors or locked in disconnected systems. It stays centralized, structured, and accessible for future use.

Solutions like Autodesk Forma Data Management are designed with this in mind, giving owners a secure, scalable way to manage project data across the lifecycle.





Aligning multi-stakeholder teams around shared data

Data center projects involve a wide range of stakeholders. Planners, designers, contractors, suppliers, and operators all contribute critical information.

Without a shared environment, that information stays fragmented.

A CDE brings these groups together around a common set of data. Capital project teams and operations teams can collaborate using the same information, which helps ensure that what gets built aligns with how the asset will be used.

This also creates alignment across the supplier ecosystem. Owners can define information requirements upfront, making it clear how data should be structured, shared, and maintained. That consistency reduces friction and improves data quality across the board.

Connecting project data to core systems

For many owners, project data has traditionally lived outside of core business systems. Once construction ends, that data often gets archived or lost.

A CDE changes that.

With a CDE, teams can integrate project data with systems like ERP, asset management, and analytics platforms. That way, owners can carry insights forward into operations. Cost data, performance metrics, and asset information all remain connected.

This continuity supports better decision-making at both the project and portfolio level. Owners can compare performance across sites, identify trends, and make more informed investment decisions. It also reduces duplication. Instead of recreating data for operations, teams can build on what already exists.

Built for scale, security, and compliance

As data becomes more central to project delivery, security and compliance become critical.

Owners, especially those in regulated industries or the public sector, need to know where their data lives and how it is managed.

Modern CDE platforms support cloud regionalization and certifications that meet strict regulatory requirements. This allows owners to maintain control over data residency while still benefiting from cloud-based collaboration.

It also builds trust across stakeholders. When everyone knows the system is secure and compliant, adoption becomes easier and workflows run more smoothly.

Turning data into better decisions

At its core, a CDE is about making data usable.

When information is centralized, structured, and accessible, it becomes easier to act on. Owners can track progress in real time, spot risks earlier, and make decisions with a clearer view of the full picture.

More importantly, those decisions can scale. Insights from one project can inform the next, creating a feedback loop that continuously improves performance.



05

Closing the handover gap: From project delivery to operational readiness

Disconnects don't just happen during design and construction. They also take place at handover. Projects get delivered, but the data that should support operations often falls short. Files are scattered, models are incomplete, and key details are missing or hard to verify. Facility teams inherit the asset, but not the full picture of how it was built.

The problem: Data that doesn't carry forward

Facility management teams often struggle to locate, trust, and use project data after handover.

Information is incomplete, unstructured, or locked in disconnected systems. Documents may exist, but they are not always up to date. Models may be handed over, but they are not always usable for operations. Teams end up double-checking information or recreating it from scratch.

That slows down commissioning and introduces risk from day one. Instead of focusing on performance, operations teams are stuck chasing data.

The shift: Making digital handover a requirement

Owners are starting to change how handover is defined.

Instead of treating it as a final step, they are setting expectations early in the project. Digital handover becomes a requirement, not an afterthought.

That means defining what data needs to be delivered, how it should be structured, and how it will be validated before handover. It also means aligning teams upfront so that information is captured correctly throughout the project, not just compiled at the end.

Handover packages now include validated BIM data, asset information, and complete documentation that can be used immediately by operations teams.

Solutions like **Autodesk Forma Industry Cloud** support this approach by connecting project data from planning through delivery and into operations. Instead of starting over at handover, teams can build on a continuous data set.

Autodesk Tandem extends that value into operations by turning validated BIM and asset data into a connected digital twin that facility teams can use from day one.

06

Digital twins & BIM-based leadership for owners

As project data becomes more structured and connected, owners have an opportunity to do more with it. Not just store it, but use it to actively manage assets.

That's where digital twins come in.

A digital twin builds on BIM and project data to create a living view of an asset. It connects design intent, construction data, O&M manuals, operational records, and near real-time inputs in one environment. For owners, this shifts BIM from a project requirement to a long-term management tool.

Why digital twins matter

Digital twins are quickly becoming a standard part of handover expectations.

Owner BIM mandates are already generating large volumes of structured data. The difference now is that this data does not have to sit idle after construction. It can be used throughout the lifecycle to provide context to data supporting maintenance, operations, and future planning.

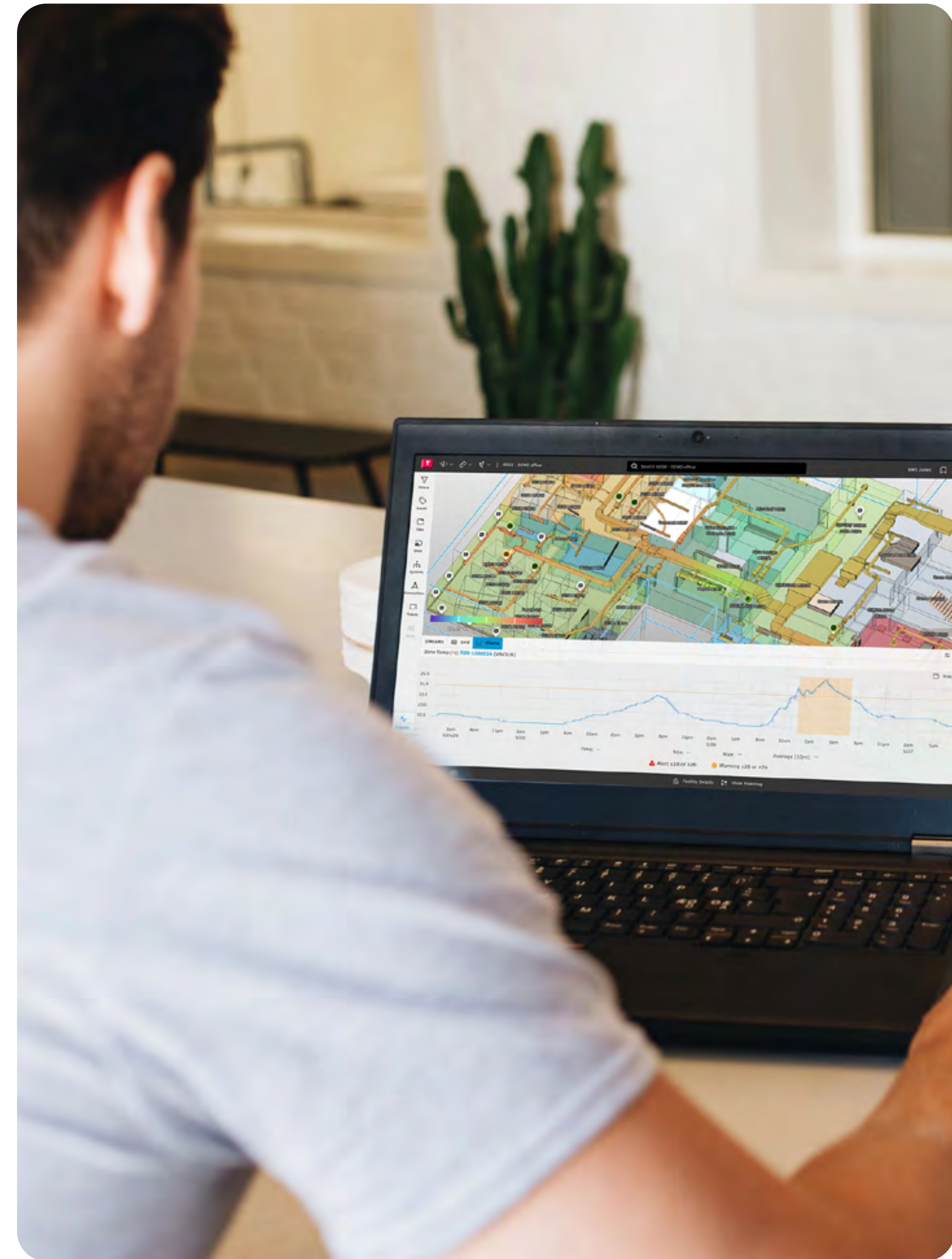
Facility teams can rely on a connected model that provides faster insights and context into how their facility is operating. This continuity improves faster access to critical information and better-informed decisions across teams.

From static models to operational insight

Traditional models are often static. They represent a moment in time, usually at design or handover.

Operational digital twins go further.

They connect BIM data with IoT sensors, building systems, and operational platforms. This allows owners to monitor performance in near real time, track asset conditions, and identify issues before they escalate.





Connecting systems across the lifecycle

To make digital twins work, data needs to flow across systems. Platforms like **Autodesk Forma Industry Cloud** support BIM-based workflows that carry data from design through operations. This creates a consistent data backbone that digital twins can build on. Integrations also play a key role.

Tandem Connect helps extend that data flow by giving twin builders a low-code, drag-and-drop way to connect building, asset, and operational systems into **Autodesk Tandem**. Instead of managing complex APIs, teams can more easily bring disparate data sources into a connected digital twin environment.

Connections with tools like **Esri** add geographic context, helping owners understand how assets fit within broader infrastructure. Platforms like **Aurigo** support capital planning and program management, while solutions like **Eptura** connect asset data to day-to-day operations. Additionally, targeted extensions and partnerships are broadening platform value across specialized use cases, from the **Autodesk Forma and Podium extension** for data center configuration to **Eaton's** use of Tandem Connect to help create digital twins that support its collaboration with Autodesk on AI-powered digital energy twins and software.

Outcome: Insight that drives better performance

Digital twins change how facility teams work.

Instead of digging through documents or static models, teams can access a dynamic view of the asset. They can see what is happening, understand why it is happening, and act faster.

That leads to better maintenance decisions, improved efficiency, and fewer unexpected issues.

More importantly, it gives owners a way to continuously improve performance across their portfolio. Each asset becomes a source of insight that can inform the next project.

Digital twins turn data into something actionable. Not just information, but a tool for running better, more predictable operations.

07

Preparing for AI-driven operations and workforce constraints

Operations are getting more complex, but the teams running them are not growing at the same pace. Owners are being asked to do more with fewer people, while also keeping facilities running at a higher standard.

At the same time, expectations are shifting. AI is starting to move from experimentation to real use in operations. But without the right foundation, most teams are not in a position to take advantage of it.

The pressure: Doing more with less

Workforce shortages are already impacting facility management. Experienced workers are retiring, and it is getting harder to replace them at the same pace. That puts pressure on existing teams to cover more ground. Maintenance schedules get tighter, response times matter more, and there is less room for error.

At the same time, operational data is often fragmented. Information lives across building systems, spreadsheets, and disconnected platforms. Even when IoT devices are in place, the data they generate is not always easy to access or use.

The shift: Toward AI-driven and data-led operations

Owners are starting to look at AI as a way to improve maintenance, reduce downtime, and extend asset life. Predictive maintenance, automated alerts, and data-driven planning are becoming more common.

What's more, facilities management is becoming more data-driven. Decisions are increasingly based on performance data rather than static schedules or manual inspections.

But AI does not work in isolation. It depends on clean, connected, and reliable data. Without that, even the most advanced tools fall short.





Building the right data foundation

To prepare for AI-driven operations, owners need to start with their data.

That means centralizing operational data so it can be accessed and used across teams. It also means ensuring that data coming from design and construction is structured in a way that supports long-term use.

Cloud-based platforms like **Autodesk Forma Industry Cloud** help make this possible by connecting project and operational data in one place. Teams can access the information they need without jumping between systems, and data stays consistent across the lifecycle.

With a strong foundation in place, it becomes much easier to layer in AI capabilities. Predictive maintenance models, performance analytics, and automation tools all rely on that underlying data structure.

Setting the stage for AI-ready operations

AI-ready operations do not start with AI. They start with connected, trusted data.

When systems are integrated and information is reliable, teams can move faster and make better decisions.

They can shift from reactive maintenance to proactive strategies, reducing downtime and improving performance.



08

Cost certainty in volatile markets: Integrated estimating & bidding

Cost planning used to be about building a solid estimate and updating it as the project moved forward. Today, that approach falls short. Prices shift faster, supply chains are less predictable, and timelines are tighter.

For owners, cost certainty now depends on how quickly teams can adapt and how well data flows from estimating through execution.

The challenge: Volatility is the new normal

Market conditions are harder to predict.

Data center growth is driving demand for metals, electrical components, and power infrastructure. At the same time, supply chains are still catching up. While lead times have improved in recent years, developers continue to face challenges sourcing critical equipment like generators, switchgear, and transformers.

That uncertainty increases estimate risk. What looks accurate at the start of a project can quickly become outdated. It also raises the stakes when selecting partners. Choosing the right suppliers and contractors is no longer just about cost. It is about reliability, availability, and the ability to execute under changing conditions.

On top of that, investor scrutiny is increasing. Budgets need to be defensible, with clear assumptions and traceability from estimate to actuals.

Where traditional approaches break down

In many cases, estimating and bidding are still fragmented.

Bid data lives in spreadsheets or email threads. Comparisons between vendors are manual and inconsistent. It is difficult to see how one bid stacks up against another in a clear, structured way.

This lack of transparency makes it harder to make confident decisions. It also slows down approvals, especially when multiple stakeholders need to weigh in.





The shift: Connected estimating and bidding

To improve cost certainty, owners are moving toward more integrated approaches.

Estimating, bidding, and cost management are brought into a single workflow. Data flows from one stage to the next without being recreated or reinterpreted.

Autodesk Forma Build supports this by centralizing bid tracking and enabling side-by-side comparisons. Instead of piecing together information, teams can evaluate options in one place.

AI-enabled takeoff and estimate automation also help reduce manual work and improve consistency. Quantities can be generated faster, and estimates can be updated more easily as designs evolve.

Outcome: Faster decisions and more defensible budgets

When cost data is connected, decisions get easier.

Teams can move faster because the information they need is already structured and accessible. Approvals do not get held up by unclear assumptions or missing details.

Forecasts also improve. With better visibility into both estimates and actuals, owners can make more informed adjustments as projects progress.

Most importantly, budgets become more defensible. When every number is tied back to a clear source of data, it is easier to explain, justify, and stand behind financial decisions.

09

Sustainability in practice: Real-world examples from data center ecosystems

Sustainability is no longer a side initiative. For data center owners, it is directly tied to performance, scalability, and long-term viability.

Energy, water, and carbon efficiency all impact operating costs, site selection, and the ability to secure approvals. In many markets, sustainability is also tied to community acceptance. If a project cannot demonstrate responsible resource use, it may not move forward at all.

What's changing is how sustainability shows up in practice. It is not just about offsets or reporting. It is being built into how data centers are designed, constructed, and operated from the ground up.



NVIDIA: Designing AI infrastructure for performance per watt

NVIDIA is rethinking the data center from the inside out.

Instead of treating compute and facilities as separate decisions, NVIDIA is optimizing the entire stack to maximize performance per watt. GPU-accelerated architectures process AI workloads more efficiently than traditional CPU-based systems, which reduces wasted computation and energy use.

This shift is also driving changes in facility design. New GPU systems are built for liquid cooling, which supports higher density environments while reducing the energy required for cooling. It also improves water efficiency compared to traditional approaches.

These decisions are tightly connected. The way chips are designed influences rack density, which in turn impacts building layout, cooling systems, and overall energy consumption.



Owner takeaway

Infrastructure decisions at the compute level directly shape facility design, cooling strategy, and sustainability outcomes.

Arcadis: Reusing infrastructure to reduce water and energy impact

Arcadis is approaching sustainability through site strategy and infrastructure reuse.

In some projects, Arcadis is partnering with utilities to co-locate data centers with water reclamation facilities. Wastewater is recycled for cooling, while excess heat from the data center supports the treatment process.

This creates a system where both sides benefit. Data centers reduce their reliance on freshwater, and utilities improve energy efficiency.

The impact goes beyond the site itself. These types of projects can strengthen relationships with local communities and regulators, making it easier to move projects forward.

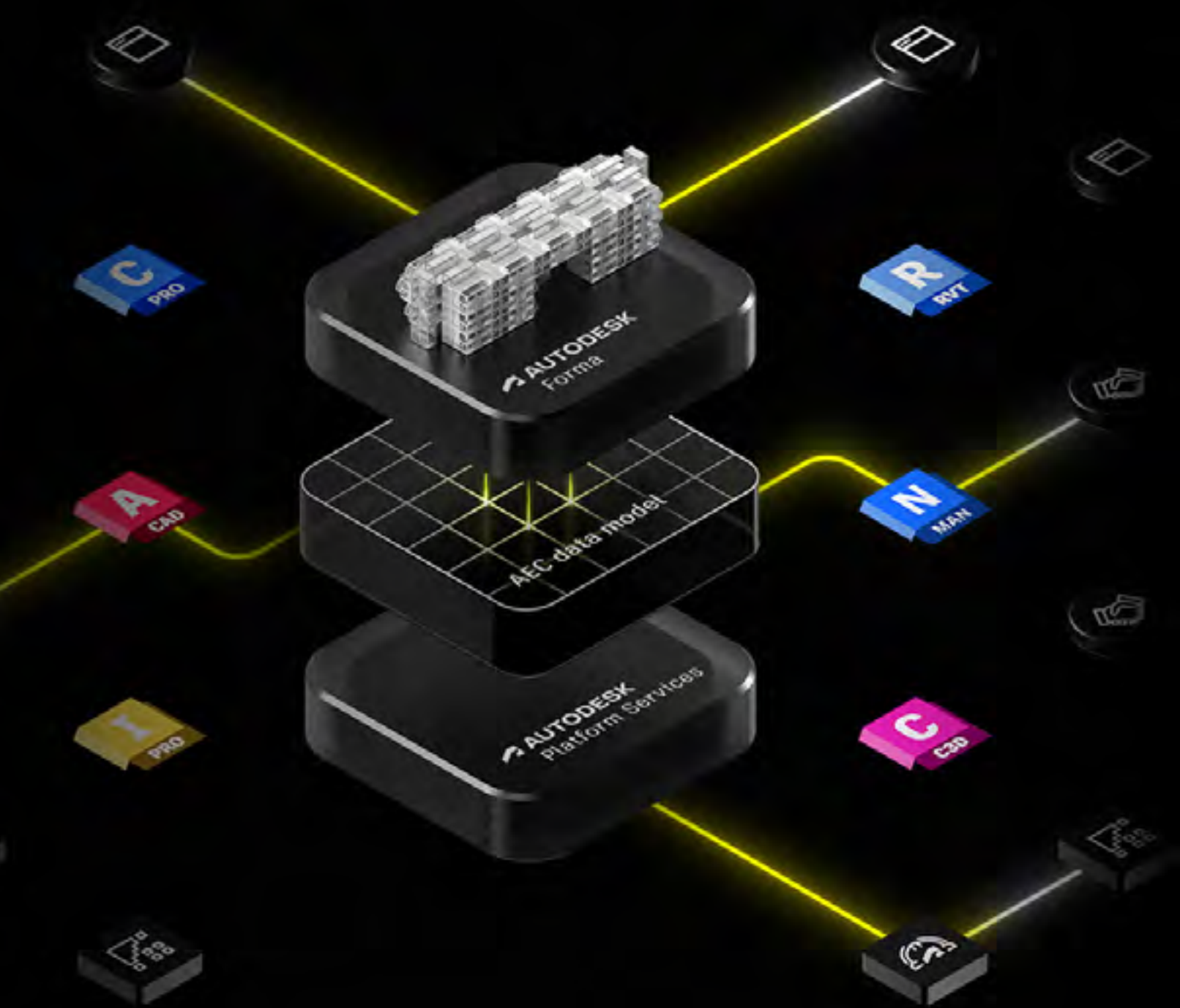


Owner takeaway

Sustainable site selection and reuse strategies can unlock faster approvals and improve long-term resilience.

10

Autodesk Forma: Enabling predictable, scalable owner outcomes



As data center portfolios grow, complexity does not just increase. It compounds across every phase. What happens in planning affects design. Design decisions shape construction. And gaps during delivery show up later in operations.

Autodesk Forma is built to connect those dots.

It gives owners a cloud-based foundation that brings planning, design, construction, and operations into one continuous workflow.

Forma helps owners:



Connect project phases into digital handover so data flows from planning through operations without getting lost



Support BIM-based digital twins for ongoing visibility and performance management



Integrate with owner systems and partner ecosystems to avoid new silos and fit into existing workflows

That continuity drives real outcomes. With Forma, owners can:



Reduce delivery risk by identifying issues earlier and keeping teams aligned



Improve transparency and accountability with a single source of truth



Protect and reuse project data across projects and over time



Enable AI-ready operations with structured, connected data



Scale portfolios with confidence using standardized workflows and insights

Owners can move faster without sacrificing control, make better decisions with reliable data, and deliver assets that perform as expected. That leads to faster time to market, reduced risk, and stronger lifecycle performance across the portfolio.

 **AUTODESK Forma**

Conclusion: Designing the future of data center delivery— together

Owners are not just building data centers. They are shaping the infrastructure behind AI and the digital economy. Long-term success is built on predictability, transparency, and sustainability at scale. With the right data foundation and delivery model, owners can move faster, operate smarter, and build assets that perform for decades.





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