Setmetrics Whitepaper

Digital Twin Technology for the C&I Industry

Digital Transformation of the Commercial and Industrial Building Retrofit Market

Setmetrics' software technology platform puts data, tools and know-how directly into the hands of building owners and their service providers to drive optimised capital project outcomes.

Technology is rapidly changing the landscape of business, replacing old paradigms and re-engineering processes, structures and relationships. Sub-optimal capital projects and underperforming commercial buildings are costing millions in wasted energy, excessive running costs and inadequate returns.

Setmetrics has developed a 'digital twin' cloud service that provides the engine, tools and the launching pad for the digital transformation of the building retrofit and services delivery - at the building, portfolio or city level.

The breakthrough technology allows users to rapidly create an accurate digital twin of a building, unlocking hourly energy consumption forecasts and powerful project optimisation tools. The unique "Software as a Service" (SaaS) platform drives speed and productivity by embedding innovative digital solutions into the processes used to identify, design and manage building retrofits.

The application of Setmetrics' technology to building retrofits delivers major benefits – digitising and standardising workflows, centralising data, and delivering significant cost savings and efficiency gains across the building lifecycle.

THE QUEST FOR BETTER BUILDINGS

Buildings are frequently subjected to reactive building performance resulting from limited budgets, siloed data, and disparate systems that lack holistic building insight.

The service providers tasked with maintaining, upgrading and optimising buildings are constrained by pre-digital processes, lacking effective technology, tools and timely whole-of-building data for fast, effective analysis and informed decision making. They need practical technology to help them assess what to do, how to meet specified building targets within a given capital budget and how to measure progress and verify success.

Building owners are seeking the means to optimise their buildings and their business strategy: they need tools to develop an accurate long-term master plan across a portfolio, to ensure regulatory compliance, to meet their Environmental, Social and Governance (ESG) obligations, and to prioritise, measure and verify contracted works.

NEW TECHNOLOGY FOR OLD CHALLENGES - THE SETMETRICS SOLUTION

For the first time, our unique platform puts capital projects planning technology directly into the hands of building owners and their service providers. Deceptively easy to use but highly accurate, the platform is underpinned by a gold-standard energy modeling engine and provides powerful analytical and forecasting tools that leverage advanced simulation and AI technologies.

The platform is highly scalable: new buildings can be linked into the ecosystem in a day, enabling the fast on-boarding of large building portfolios and creating the opportunity for city-wide applications.

PRODUCTIVITY	Increase the speed of proposal development, engineering analysis and reporting for more sales opportunities and deeper customer engagement
ACCURACY	Accurate, engineering-grade outputs matched with investment-grade financial analysis leads to clear and optimal decisions for building lifecycle management
PERFORMANCE	Validate your project's ROI with automated measurement and verification processes designed to industry best-practice.

A new paradigm for the industry

Setmetrics' platform digitises the industry - fundamentally changing the quality of advice provided to building owners.

Based on data transparency and collaboration, the platform digitally connects building owners and service providers including Mechanical, Electrical, Plumbing (MEP), System Integrators, Consulting Engineers, OEM Suppliers, Government Agencies, Standards bodies and Financial stakeholders.

With broad access to easy-to-use digital tools, participants collaborate to provide informed advice on how best to improve and increase the value and performance of the building, aligning all participants around the building owner's objectives.

Service providers have the means to standardise and automate processes, to differentiate and demonstrate their value as a trusted adviser and ultimately deliver measurable and proven value to the owner. It expands their role and capabilities and enables a major shift from reactive to proactive long-term asset management.

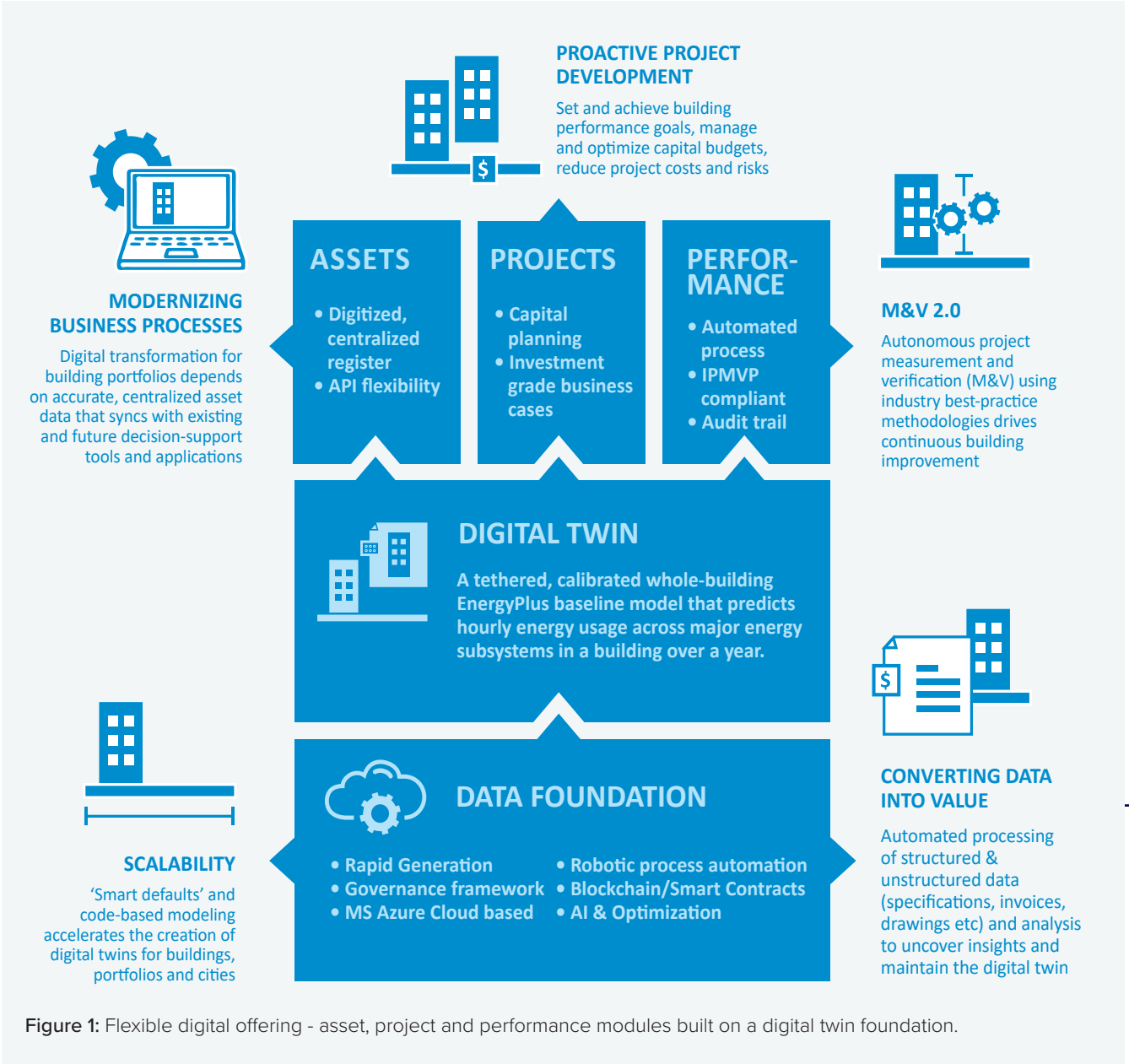

Figure 1: Flexible digital offering - asset, project and performance modules built on a digital twin foundation.

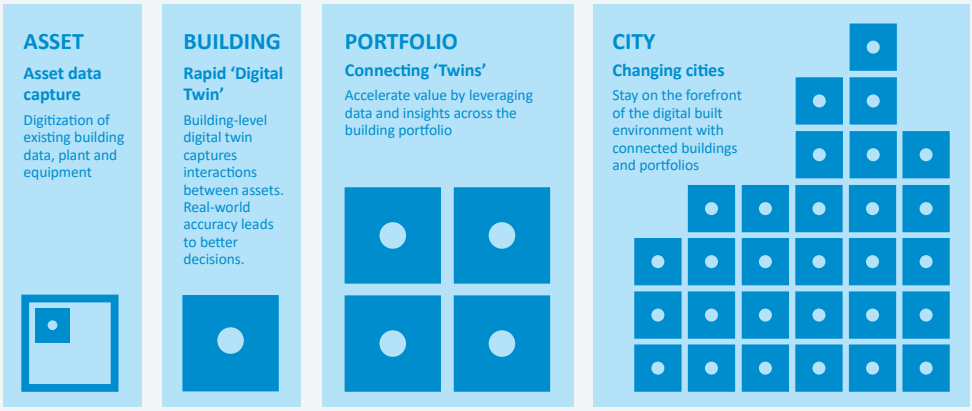

Figure 2: Platform scalability - digitising the built environment from single assets to cities.

DIGITAL TRANSFORMATION OF CAPITAL PROJECTS

As more building data is digitised it becomes a powerful asset, a tool for business management and informed decision-making that now can be accessed, shared and leveraged by anyone tasked with driving better building performance. The project data becomes a valuable tool to win and grow business from key customers.

Setmetrics' technology provides a framework for a business to implement its digital strategy with a holistic, long-term approach. The modular features provide maximum flexibility and ensure that subsequent investment in technology can be integrated, and much more effective.

CASE STUDY

Commercial Office Complex

Securing State Government tenants was the motivation for improving this building's NABERS Energy rating. The facilities team implemented the Setmetrics platform alongside external engineering consultants, the systems integrator, and the MEP contractors to identify a comprehensive retrofit plan.

Setmetrics created a detailed energy model tuned to BMS trend logs and an in-depth scenario analysis for upgrades ranging from mechanical plant to operational tuning. The combination of engineering rigour, capital planning visibility and multi-stakeholder communication ensured the success of the project and a lease commitment from the tenant.

How it works

Innovative and smart applications that automate the creation of whole-building thermal energy models for every building in your portfolio

We utilise scalable Microsoft Azure cloud-based computing infrastructure to drive end-to-end whole-building thermal modelling processes. The easy-to-use software front end disguises a powerful engine which rapidly delivers highly detailed engineering-grade results.

Setmetrics' platform is game-changing, transforming the business model for the entire industry.

RAPID DIGITAL TWIN CREATION

Setmetrics leverages the industry-leading building energy modeling engine (EnergyPlus) wrapped around clever breakthrough technologies that unlock energy modelling capabilities for a broad audience.

Users create a digital twin by interacting with a web interface to upload documentation and building information, and receive real-time feedback that focuses their data collection effort and reduces audit costs. Behind the scenes, processes extract key input data and create a custom database of indexed, building-specific information. Optical character recognition (OCR) techniques scan drawings, invoices and photos converting unstructured data into valuable, searchable information that is used to seed the energy model.

Any data gaps are resolved with default archetypes that are intelligently guided by factors such as building size, location, age and relevant building codes. Every input field can be interrogated and modified, creating a feedback loop for even smarter defaults over time.

Advanced building-profiling technology allows an energy model digital twin to be created in just hours, rather than weeks. Once complete, the twin is launched onto the platform – 'live' and ready to deliver results.

CASE STUDY

Rapid Modelling for Value Management

A 20,000 sqm NLA new build over an existing heritage façade presented the bidding contractor with a range of value management opportunities to improve the building design and reduce the delivery risk.

Almost immediately, the project team was able to use the Setmetrics platform to identify that the tender documents proposed undersized key HVAC plant. A range of opportunities were evaluated including optimised glazing performance and right-sized mechanical plant. These items were demonstrated to save $1.06m in project cost and maintain the required 5-star NABERS Energy rating.

In total, the digital twin was constructed and 189 value management and optimisation simulations were undertaken within a 10-day submission timeframe.

TOOLS TO OPTIMISE ASSETS

The Asset module hosts extracted and digitised asset information in a centralised asset register comprising key engineering and financial parameters. This digital dataset can be synced with other asset management tools to unlock new value creation opportunities such as detailed asset master plans, optimal plant and equipment management strategies and the ability to quantify the impact of deferred maintenance or replacement decisions.

OPTIMISING CAPITAL PROJECTS

The Projects module caters from small operational changes to multi-year, million-dollar capital upgrades. Users can use an intuitive, guided wizard to model proposed building changes to create engineering-grade performance and financial results. The simulation

engine (EnergyPlus, US Department of Energy) handles complex analyses with rigour and repeatability and has become the standard for Energy Performance Contracts, Public Private Partnerships and all scenarios where accuracy is critical.

Figure 3: The perfect corporate toolset to achieve portfolio-wide emissions reduction targets, cost savings and performance improvements.

OPTIMISE PERFORMANCE AND REDUCE RISK

Developed in accordance with international standards (IPMVP) for energy savings calculations, Setmetrics' Performance module enables users to automate project measurement and verification (M&V) and manage risks associated with under-performing projects, shifting baselines and interference from unrelated building operations.

With transparency, auditability and third-party independence introduced to energy savings calculations, the industry is presented with new opportunities. Setmetrics is at the forefront of exploring how digital ledger technologies such as smart contracts can further enhance these benefits and unlock even more value: financial liabilities once associated with long-term performance guarantees can be better managed; projects across multiple locations can be bundled to share risk and reward; and contractual disputes arising from under-performance can be avoided as the impacts of each party's actions are readily quantifiable and remedied.

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