

WHITE PAPER

From Operational Visibility to Strategic Intelligence

Why APM and AI-Simulation AIP
are Better Together



EXECUTIVE SUMMARY

THE STRATEGIC LAYER IS WHAT'S MISSING

Asset-intensive organisations face a fundamental gap in their decision-making capability. They have tools that tell them how their assets are performing today, and tools that help them score and rank potential investments. What they lack is the ability to understand how their infrastructure system will behave over time, how investment decisions interact across that system, and how strategies will perform across multiple possible futures — before committing billions in capital.

This paper sets out how Asset Performance Management (APM) and AI-Simulation Asset Investment Planning (AIP) address different but genuinely complementary problems. It explains why the most capable organisations need both.

And it makes the case for how a deeper integration between APM capability and Cosmo Tech's simulation-native AIP can deliver something neither can offer alone: a complete asset management intelligence stack, from real-time operational health to long-horizon strategic confidence.

PROVEN OUTCOMES FROM INTEGRATED COSMO TECH ASSET DEPLOYMENTS

8%

average TOTEX reduction while respecting operational constraints — **Groupe E**

9–12%

improvement in return on capital employed (ROCE)

15%

additional regulatory budget secured through simulation evidence — **RTE**

DIFFERENT DECISIONS LIVE AT DIFFERENT TIME HORIZONS

Asset management decisions happen across multiple time horizons, and no single tool covers all of them.

At the base, **operational decisions** are made by the minute and the week: which assets need attention now, what is failing, what needs a work order. This is the natural domain of APM. It is essential, real-time, and grounded in the current state of the asset.

At the top, **strategic decisions** span years and decades: where to invest capital, how to manage the risk profile of an ageing asset base, how to defend a multi-billion investment plan to a regulator or a board. This is the domain of AIP. It is forward-looking, system-wide, and grounded in an understanding of how infrastructure evolves under uncertainty.

Between them sit tactical decisions: investment delivery, project prioritisation, CAPEX and OPEX allocation. These depend on both layers. They need the operational reality that APM provides and the strategic intelligence that simulation-based AIP generates.

The problem most organisations face today is not a shortage of data at the base. It is a gap at the top. Operational visibility is strong. Strategic intelligence — the ability to simulate system evolution, test investment strategies under uncertainty, and produce defensible capital plans — is missing.

Operational visibility is strong. Strategic intelligence is missing.

THE GAP AT THE TOP OF THE DECISION STACK

FIGURE 1

THE ASSET MANAGEMENT DECISION STACK

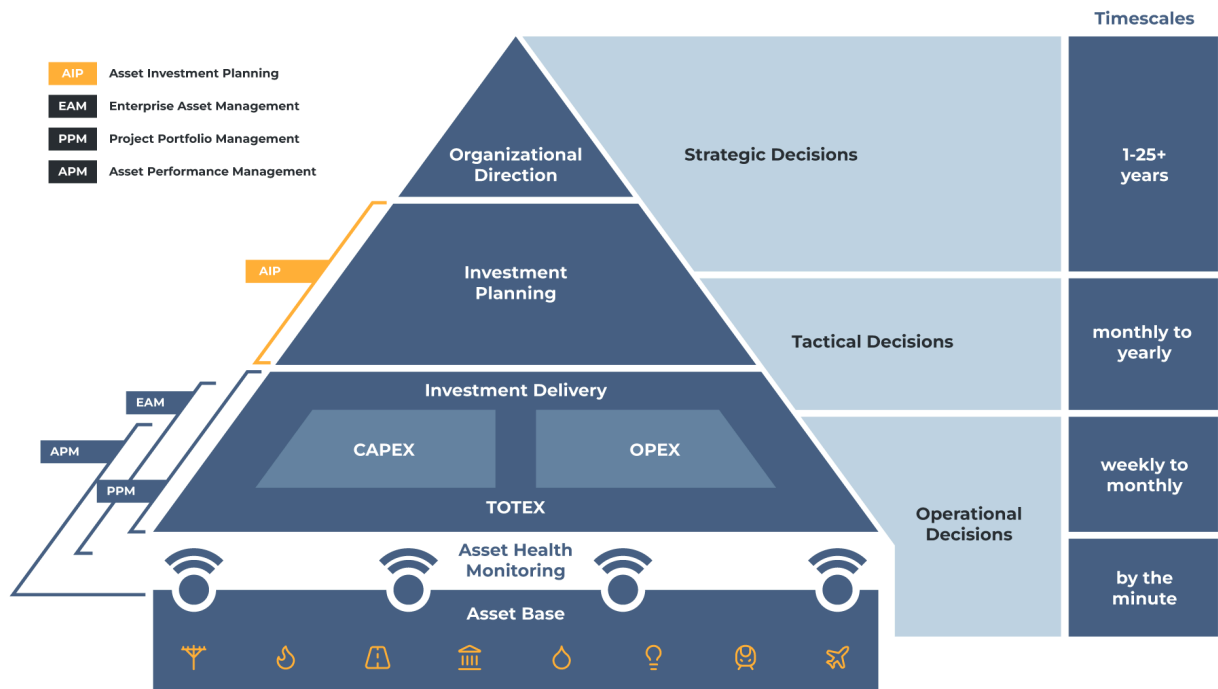


Figure 1: The asset management decision stack — different tools serve different time horizons.

DEPTH OVER BREADTH, IN NEAR REAL TIME

APM solutions are designed around a specific and critical purpose: keeping assets running reliably and efficiently in the near term. It is a bottom-up discipline — starting with the individual asset, its condition, performance and risk of failure, and building upward. The emphasis is depth over breadth: rich, granular intelligence on each asset in near real time.

APM “encompasses the capabilities of data capture, integration, and analytics tied together for the explicit purpose of improving the reliability and availability of physical assets.”

GARTNER

Key APM capabilities

01 ASSET HEALTH MONITORING

Captures real-time condition data — from on-asset sensors and field inspections — to establish the current health of every asset.

02 MAINTENANCE DEMAND GENERATION

Configures condition indicators and rules that automatically trigger action — such as raising a work order in an EAM system for a specific maintenance task.

03 ASSET FAILURE PREDICTION

Runs analytics — and a digital twin of each asset — to model how condition degrades through use and over time. Real-time IIoT sensor feeds and machine learning compare live data against historical baselines across asset types to detect performance anomalies, score the probability of failure, and schedule the right intervention before failure occurs.

04 CRITICALITY ASSESSMENT

Estimates each asset's risk against a risk matrix through a structured, questionnaire-based assessment — an informed estimate where precise forecasting is not possible.

05 MAINTENANCE STRATEGY MANAGEMENT

Applies a risk-based methodology to set the best approach per asset — fix-on-failure or fix-before-failure — maximising individual-asset uptime and informing downtime scheduling, though without program-level resource or budget constraints.

INFRASTRUCTURE IS NOT AN OPTIMISATION PROBLEM

APM's depth is enormously valuable — but it has a structural boundary. APM tells you what each asset needs in isolation. It does not tell you how to allocate constrained capital across thousands of assets over a ten- or twenty-year horizon, how to simulate the way infrastructure systems behave as they age, or how investment strategies perform under different demand, climate, or regulatory futures. And it does not produce the explainable, auditable strategic plans that boards and regulators now require.

The conventional AIP market has attempted to fill the strategic gap, but most approaches stop short of what is actually needed. Standard AIP tools score and rank investment projects against a set of weighted criteria. They are, in essence, sophisticated scoring engines. And scoring is not the problem.

The real problem is that infrastructure investment is not an optimisation problem. It is a complex system problem under uncertainty. Asset managers do not struggle with knowing which projects score highest. They struggle to know whether their 10-year plan will hold up if grid congestion accelerates, workforce constraints tighten, or an extreme weather event changes failure rates across the network. **Scoring tools cannot answer these questions. Simulation can.**

AI-SIMULATION FOR CAPITAL PLANNING

Cosmo Tech Asset is an AI-Simulation platform for Asset Investment Planning. It is recognised by Gartner in the AIP Market Guide and in the Intelligent Simulation and Digital Twin of the Organisation categories, and in May 2026 Cosmo Tech was identified as the **company to beat** in supply chain intelligent simulation. The distinction from conventional AIP tools is not incremental. It is architectural.

Cosmo Tech builds a simulation twin of an organisation's asset system: its infrastructure, interdependencies, operating constraints, workforce and logistics limits, and financial model. It then runs stochastic, agent-based simulations to show how that system evolves over time under different investment strategies and different futures.

This shifts the fundamental question from **“which projects rank highest?”** to **“which combination of investments produces the strongest long-term system outcome across the range of futures we might actually face?”**



Figure 2: Cosmo Tech Asset and APM operate at fundamentally different planning horizons — a portfolio of asset classes planned over years, versus a single asset tracked over weeks.

FIGURE 3

INSIDE THE SIMULATION TWIN

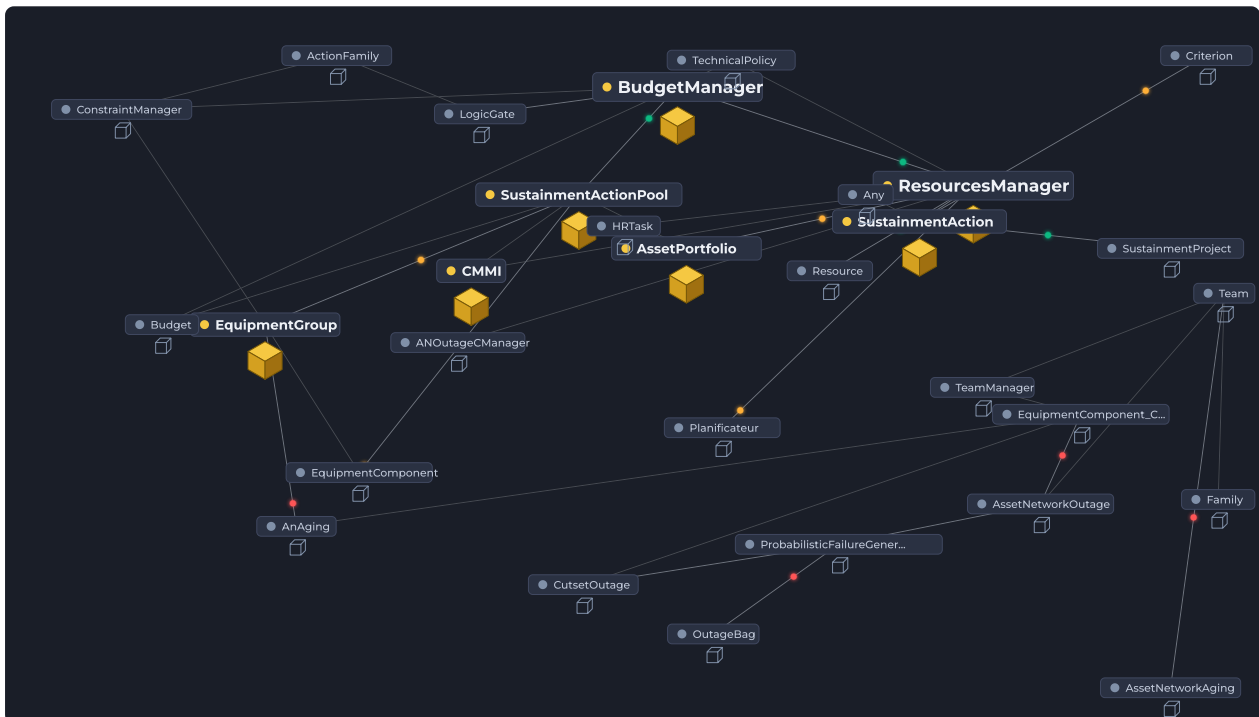


Figure 3: A fragment of the Cosmo Tech simulation-twin model. The asset system is represented as a connected graph — managers for budget and resources (gold), the asset portfolio and its equipment components, sustainment actions and projects, operating constraints, and probabilistic failure and outage models — so investment strategies can be simulated across the whole interdependent system rather than scored asset-by-asset.

FIVE THINGS SCORING TOOLS CANNOT DO

Cosmo Tech's advantage is not a better score — it is a different class of analysis: system simulation under deep uncertainty.

1 System-level simulation, not asset-level scoring

Cosmo Tech models how assets interact within a network, how failures cascade, and how investment decisions compound or conflict over time — revealing second-order effects that static ranking tools miss entirely.

2 Robustness across multiple futures

Rather than validating a plan against a single forecast, Cosmo Tech tests strategies across hundreds of scenarios simultaneously. The result is not the optimal plan for one future — it is the most robust plan across many.

3 Transparent, explainable decision logic

Every recommendation is traceable back to the model and its assumptions. RTE used simulation to justify a major investment programme to its regulator, demonstrating that scenario-based planning can directly influence regulatory outcomes and unlock budget approval at scale.

4 Real-world constraint modelling

Cosmo Tech embeds workforce, logistics and supply-chain limits directly into the simulation. Groupe E applied AI simulation to future-proof its investment planning in the face of growing demand volatility, evolving grid topology, and the challenge of justifying long-term decisions to a regulated stakeholder environment — achieving an 8% TOTEX reduction in the process.

5 Portfolio as a system, not a ranking

Cosmo Tech evaluates how combinations of interventions interact across the full asset base over time, identifying which portfolio configurations produce the strongest long-term outcomes — not which individual projects score best in isolation.

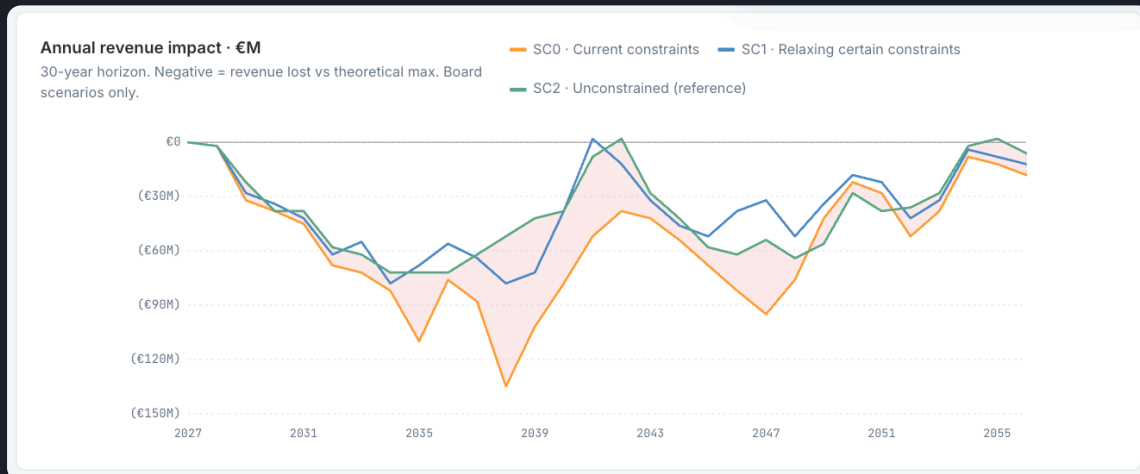
Quantifying the cost of staying constrained

A major European power generator used Cosmo Tech Asset to model the long-horizon revenue impact of its investment constraints across its critical asset fleet — ahead of a board-level investment review.

Three scenarios were simulated: continuing under current constraints, relaxing selected constraints to enable more asset replacements, and an unconstrained reference ceiling. The results revealed a pattern invisible to conventional scoring tools. Relaxing constraints requires taking more generation capacity offline in the short term — producing a near-term

revenue dip. But through the medium and long term, the trajectory inverts. The operator that stays constrained accumulates a mounting performance gap, with cumulative revenue at risk running into the hundreds of millions of euros over the simulation horizon.

This was an emergent system-level effect — one the asset management team had not been able to quantify before simulation. The analysis gave them, for the first time, the evidence needed to challenge the company’s current strategy at board level.



Simulated annual revenue impact (€M) across the three board scenarios over the 30-year horizon. Negative values are revenue lost versus the theoretical maximum — the constrained path (SC0) carries the deepest, most sustained losses.

1,300

critical assets modelled from a 35,000-asset portfolio

6

constraint types modelled simultaneously — budget, workforce, spatial, flow, electrical, logistics

3

investment scenarios compared across a 30-year horizon

Figure 4: How a major European power generator used system-level simulation to quantify the revenue impact of investment constraints — an effect invisible to asset-by-asset scoring approaches.

WHY BOTH ARE REQUIRED

APM and AI-Simulation AIP are not competing approaches. They serve different decision-making contexts, address different time horizons, and produce fundamentally different kinds of intelligence. The organisations that perform best in asset management are those that use both.

APM and AI-Simulation AIP: Different Tools, Different Questions



| Dimension |  APM |  Cosmo Tech AIP |
|-----------------------|---|--|
| Time horizon | Minutes to weeks | Months to decades |
| Focus | Individual asset performance | System-wide strategy |
| Core question | What needs attention now? | Which strategy survives the future? |
| Approach | Bottom-up, asset by asset | Top-down, system simulation |
| Primary output | Work orders, maintenance alerts | Capital plans, scenario analysis, regulatory evidence |
| Primary users | Operations and maintenance teams | Capital planners, asset strategy, finance, regulation |
| Data input | Real-time IIoT sensor feeds | Asset registry, failure history, cost and constraint data |

Table 1: APM and AI-Simulation AIP answer different questions at different points in the decision stack.

APM produces the richest possible picture of what is happening to individual assets today. Cosmo Tech uses that picture as an input — consuming asset health data, failure history, and operational performance data to calibrate a simulation twin that shows how the asset population will evolve over the long term.

In return, the strategic investment plan that simulation produces gives operations teams the context they need to prioritise maintenance in alignment with the organisation's long-term direction. This prevents a common and costly failure mode: significant OPEX spend on assets that are already scheduled for capital replacement. Together, the two tools close the loop between today's operational reality and the organisation's long-horizon strategy.

CONTINUOUS, NOT CYCLICAL

The integrated workflow is straightforward in concept and proven in deployment. An APM platform captures real-time asset condition data, generates failure predictions, and produces maintenance recommendations. This data — exported as structured asset health scores, failure history, and maintenance records — is ingested by Cosmo Tech Asset to calibrate and continuously update the simulation twin.

Cosmo Tech then simulates how the asset population will evolve across a 10 to 30-year horizon under different investment strategies, testing each against multiple demand, climate, and operational scenarios. As the operational picture changes, the simulation twin is refreshed and capital plans update accordingly — the planning environment becomes continuous rather than cyclical.

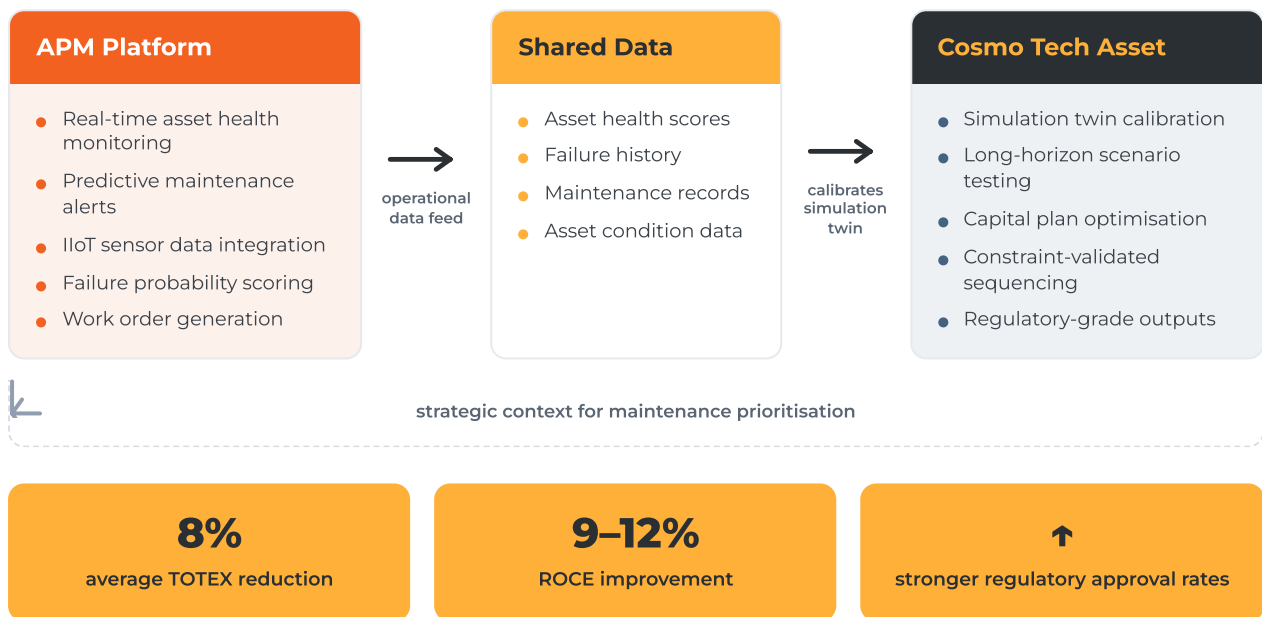


Figure 5: APM operational data calibrates the Cosmo Tech simulation twin. Strategic planning outputs in turn inform maintenance prioritisation — closing the loop between operations and capital strategy.

FROM SPECULATIVE PLANNING TO DEFENSIBLE DECISIONS

Asset-intensive operators consistently face the same gap: tools that optimise individual asset families in isolation, producing partial optima that conflict when they meet reality. The outcomes below reflect what customers achieve when that gap closes.

| | | | |
|---|--|---|--|
| ~80% faster initial strategic planning · CNR hydropower | 30% CAPEX reduction over a 10-year plan · a national grid operator | 8% of TOTEX redirected to higher value · European DSO | 5% FTE reduction vs. baseline · workforce planning |
|---|--|---|--|

CNR · HYDROPOWER, FRANCE

A single plan that connects strategy to execution

CNR, one of France's leading renewable electricity producers, used the Cosmo Tech simulation platform as a decision-support tool to optimise investment strategies for its industrial equipment and ensure alignment among all stakeholders — compressing initial strategic planning time by approximately 80% in the process.

“Our choice of Cosmo Tech’s AI Simulation capabilities marks a significant advancement towards supporting our 2030 strategy.”

Mathieu Stortz
General Director, CNR

GROUPE E · ELECTRICITY DISTRIBUTION, SWITZERLAND

Investment scenarios that answer board-level questions

Groupe E, a Swiss distribution system operator, applied AI simulation to future-proof its investment planning in the face of growing demand volatility, evolving grid topology, and the challenge of justifying long-term decisions to a regulated stakeholder environment. Each board-level change request was re-simulated, the impact quantified, and the revised plan returned — and approved.

“It’s the only solution that allows us to simulate all scenarios in an integrated way and align technical performance, economic feasibility, and regulatory constraints.”

Alain Ruffieux
Head of Grid Asset Management, Groupe E

OPTIMISING ACROSS THE WHOLE SYSTEM

8% Hard trade-offs made visible before they become crises

Where a European DSO once chose between mandated smart-infrastructure programmes and legacy renewal on instinct, simulation made the trade-off quantified and sequenced — 8% of TOTEX redirected, failure risk stabilised, and a nine-figure deferral supported by evidence rather than opinion.

5% Workforce planning with regional precision

Simulation identified which regions of a large distribution network would face workload pressure, and when — enabling targeted recruitment years in advance and a 5% FTE reduction against baseline. In tight European labour markets, that forward visibility is itself a financial outcome.

Scenario comparison that replaces opinion with evidence

Multiple strategies — differing in budget, sequencing, or technical approach — are evaluated simultaneously against a full set of KPIs: cost, service continuity, network value, resource consumption, and risk exposure. Trade-offs are quantified; recommendations are traceable.

30% Capital released by optimising across the whole system

When a national grid operator evaluated smart-grid flexibility levers alongside traditional reinforcement — in one model, across all asset families — the result was a 30% CAPEX reduction across a ten-year plan. That comparison is only possible when every asset family is evaluated together under the same constraints.

Investment needs identified systematically, not retrospectively

For operators managing MV and HV networks, the platform supports structured identification of investment needs across technical, reliability, regulatory, and connection criteria — linking each need to a costed, parameterised action from the investment catalogue, with dependency modelling across assets.

Data gaps surfaced as part of the process, not a blocker before it

European operators across utilities, hydropower, and grid management have consistently begun with imperfect data. In each case, simulation identified which data points mattered most and drove targeted improvement. Operators do not need a perfect data estate to start — they need a way to make the data they have work harder than a spreadsheet can.

The common thread across every deployment: the bottleneck is never the data. It is the inability to let the system carry the complexity of the decision.

A COMPLETE INTELLIGENCE STACK

The asset management software market is converging on a recognition that operational visibility and strategic intelligence are different capabilities — and that organisations managing complex, capital-intensive infrastructure need both.

APM platforms deliver the operational layer with exceptional depth and granularity. What has been missing is a strategic layer that consumes that operational intelligence and uses it to answer the harder questions: How will this system behave over time? Which investment strategy is most robust across the futures we actually face? How do we produce a capital plan that a regulator will accept and a board will stand behind?

Cosmo Tech Asset answers those questions. Not by ranking projects, but by simulating system evolution. Not by optimising against one forecast, but by testing strategies across many futures. Not by producing black-box recommendations, but by making every decision fully traceable and explainable.

The combination of a best-in-class APM platform and Cosmo Tech's AI-Simulation AIP is not a feature overlap. It is a complete asset management intelligence stack. Operational visibility at the base, strategic simulation at the top, and a live data connection between the two that makes both significantly more valuable.

For utilities and energy infrastructure operators navigating unprecedented capital pressure and system complexity, that combination is not a nice-to-have. It is what confident, defensible decision-making now requires.

Cosmo Tech Asset is deployed by major transmission and distribution operators, pipeline operators, and asset-intensive enterprises across Europe and North America. Cosmo Tech is listed in the Gartner Market Guide for Asset Investment Planning and recognised under Intelligent Simulation and Digital Twin of the Organisation. For more information: cosmotech.com

Find Your Forward.

Cosmo Tech is an AI-Simulation platform for complex, high-stakes decisions. Recognised by Gartner in Intelligent Simulation and Digital Twin of the Organisation.



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