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Technology Performance Insurance: Bridging the Gap Between Innovation & Bankability

By David Bowcott

Across global infrastructure markets, capital is not scarce—but deployable capital is. Institutional investors, lenders, and governments are sitting on unprecedented pools of funding earmarked for energy transition and infrastructure modernization, yet many projects fail to progress beyond development. The constraint is rarely ambition or technology availability. It is the inability to convert emerging technologies into risk profiles that fit within conventional project finance structures.

In sectors ranging from renewable energy to industrial decarbonization and energy storage, technically credible technologies routinely stall at pilot or demonstration scale. These technologies often work, but they lack the operating history, standardized performance data, and long-term validation required by debt providers. As a result, projects that depend on them are labeled “unbankable,” not because they are fundamentally flawed, but because the capital stack has no mechanism to absorb early-stage technology risk.

From the perspective of lenders and investors, this hesitation is understandable. Project finance depends on predictability. Cash flows must be defensible, downside cases must be quantifiable, and risks must be clearly allocated. Technologies with limited operating history—often described as having low or intermediate Technology Readiness Levels (TRLs)—introduce uncertainty that traditional financing structures are not designed to carry. In many cases, it is not actual

technology failure that prevents financing, but perceived performance risk.

This is where **technology performance insurance** becomes relevant.

Technology performance insurance (sometimes referred to as technology performance guarantees) is designed to transfer the risk that a technology does not perform as expected. In practical terms, it protects lenders and investors against defined shortfalls in output, efficiency, availability, or other performance metrics that underpin a project’s financial model. By converting technology risk into a structured, insurable exposure, it allows capital to engage with projects earlier than it otherwise could.

The effect of this risk transfer is often decisive. Projects that previously failed to meet lender requirements can suddenly support larger debt facilities, improved pricing, and longer tenors. In many transactions, the presence of a credible performance guarantee is the difference between a project reaching financial close or remaining indefinitely at the development stage.

What is frequently overlooked is that technology performance insurance is not simply a policy added late in the process. It is a **methodology**.

Specialized underwriters operating in this space combine actuarial expertise with engineering, operational, and project finance experience.

Their underwriting process mirrors the scrutiny applied by institutional capital and, in many cases, exceeds it. The underwriting itself becomes a filter that determines whether a technology is sufficiently mature to transition from innovation to infrastructure.

To qualify for technology performance insurance, technology developers and project sponsors must demonstrate a credible pathway to scale. This typically begins with pilot projects designed not only to prove technical feasibility, but to generate decision-useful data. That data must be organized, validated, and contextualized so underwriters can assess performance variability, degradation rates, failure modes, and operational dependencies. Technologies that cannot demonstrate this discipline rarely attract insurance capacity—and, by extension, rarely attract project finance.

The underwriting process generally begins with three core inputs.

First, a **robust financial model** that clearly links technology performance to revenue, operating costs, and debt service. Underwriters must understand precisely how underperformance impacts cash flows and capital structure resilience.

Second, **technology performance data**, typically derived from pilot or early commercial deployments. While long operating histories are uncommon, consistency, transparency, and relevance are critical.

Third, **engineering and technical reports** that allow independent experts to validate whether observed performance can be replicated under commercial operating conditions.

From this information—often shared through a secure data room—underwriters assess whether performance risk can be insured and under what terms. If viable, an

initial terms sheet is issued outlining coverage scope, limits, pricing, and performance triggers. Project stakeholders can then evaluate whether the insurance materially improves financing outcomes. If it does, a deeper diligence phase follows, culminating in a bindable policy that directly supports financial close.

Beyond individual transactions, technology performance insurance plays a broader role in infrastructure and energy-transition markets. It aligns technology developers, engineers, insurers, and financiers around measurable outcomes. Developers are incentivized to design pilots that generate finance-grade data. Engineers are pushed toward standardization. Capital gains a mechanism to engage earlier without taking uncompensated risk.

While early adoption has focused on renewable energy and energy storage, the same approach applies wherever project cash flows depend on novel or integrated technologies—from advanced industrial systems to complex transit infrastructure. As global capital accelerates toward decarbonization and modernization, demand for credible technology risk transfer will continue to grow.

Technology performance insurance is not a substitute for sound engineering or economic fundamentals. But it does address one of the most persistent constraints in infrastructure deployment: the inability to translate innovation into investable assets.

If deployed correctly, technology performance insurance allows insurance capital to move beyond passive risk transfer and into a **deal-enabling role**. In doing so, it may prove to be one of the most consequential products the insurance industry has developed—not because it removes risk, but because it finally allows capital to engage with innovation at scale.

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