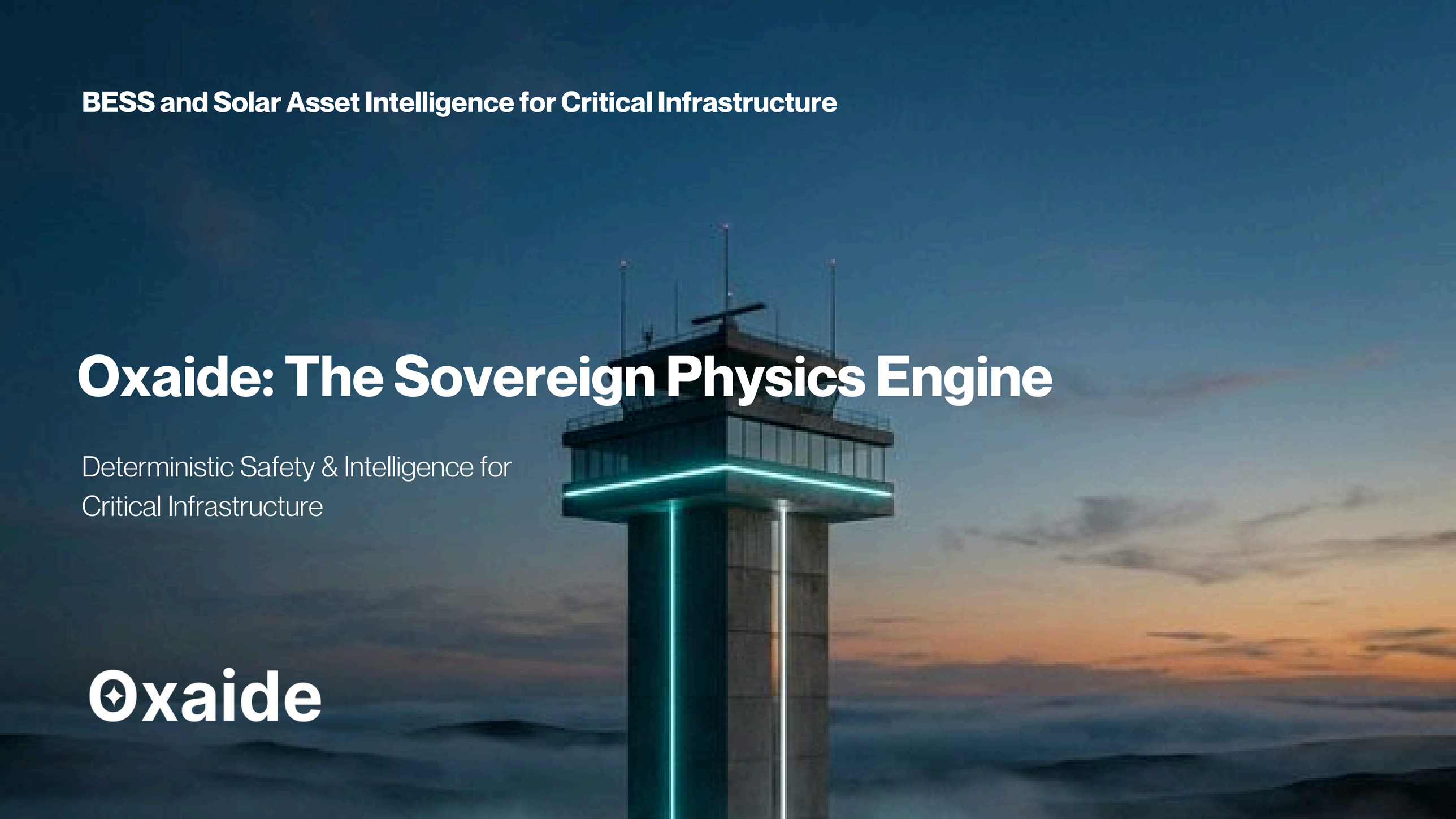
BESS and Solar Asset Intelligence for Critical Infrastructure

Oxaide: The Sovereign Physics Engine

Deterministic Safety & Intelligence for
Critical Infrastructure



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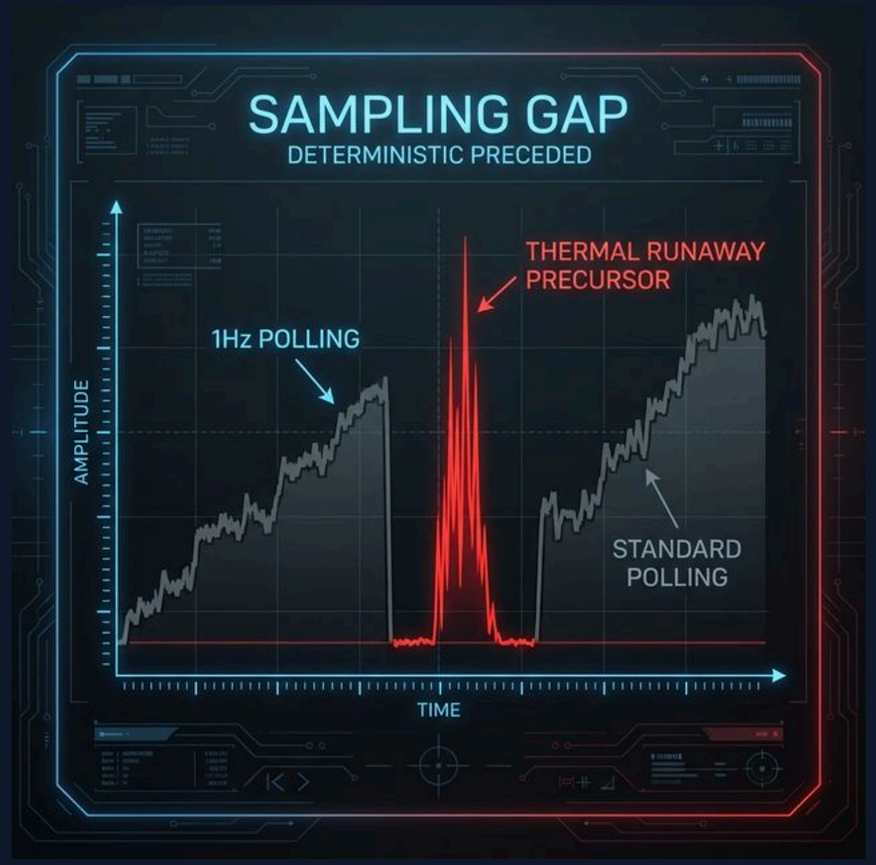
The Problem - The $100M Sampling Gap



Your battery management system polls at 1Hz. Everything that happens between readings - the micro-thermal spikes, the electrochemical drift, the early signature of lithium plating - is invisible to it.

This is not a minor gap. It is the gap where fires start.

Post-fire insurance re-ratings, EMA mandatory safety inspections, and IEC 62443 OT security enforcement are now forcing operators to answer a question their current monitoring cannot answer: what happened between the polls? Oxaide was built to answer that question.

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The Solution - High-Frequency Execution

The insight behind Oxaide came from high-frequency trading, where the difference between a profitable signal and a dangerous one is measured in microseconds. We ported that discipline to industrial physics.

The engine is written entirely in Rust with no garbage collector, no runtime heap allocation in the hot path, and no managed memory that can pause at the wrong moment. Every kernel was domain-certified independently before integration. The result is a 70% reduction in deployment risk versus greenfield AI builds and deterministic sub-millisecond inference.

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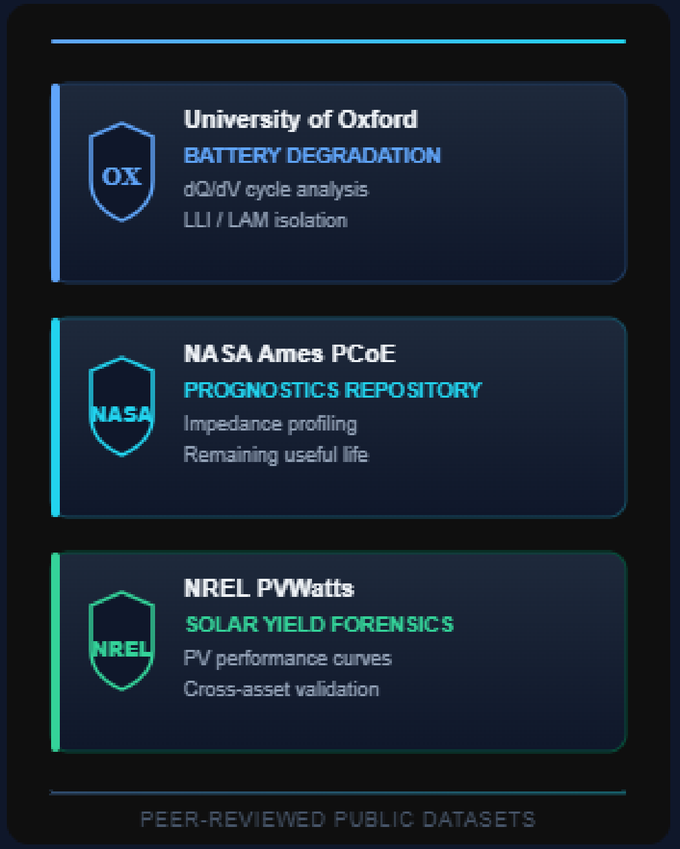
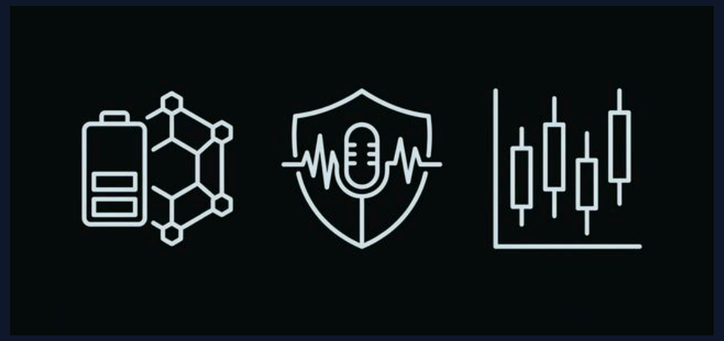
Validation Provenance

Dataset	Institution	What it validates
Oxford Battery Degradation Dataset	University of Oxford (UK)	dQ/dV cycle analysis, LLI/LAM chemical isolation
NASA PCoE Prognostics Repository	NASA Ames Research Center (US)	Impedance profiling, remaining useful life prediction
NREL PVWatts Validation Suite	U.S. National Renewable Energy Lab	Cross-asset solar yield forensics

Every claim Oxaide makes is reproducible against publicly available, peer-reviewed datasets that any engineering team can independently verify.



The Industrial Application Map



The engine is purpose-built for energy asset operators who need forensic-grade intelligence, not dashboard summaries of data they already have.

BESS Operators and Utilities - We reconstruct what your battery was actually doing at a chemical level from the cycle data you already hold. Lithium plating, capacity fade, and thermal precursors surface in the audit before they surface in your BMS alerts or your insurance renewal.

Solar IPPs and Asset Managers - Inverter clipping, soiling drift, and inter-string mismatches that standard monitoring misses show up in the yield forensics output. The same engine that reads battery chemistry reads PV performance curves.

O&M and EPC Contractors - A Verify audit on handover data gives your client an independent forensic baseline at the start of the O&M contract. That baseline is the reference point for every future warranty and insurance claim.

One Engine. Every Asset. From CSV to Forensic Audit.

Engagement Mode I - Oxaide Verify

Most operators already have the data they need. Send us your telemetry - voltage, current, temperature, cycle logs - and we reconstruct the degradation model from first principles with no hardware purchase, no site visit, and no vendor qualification process.

We return a forensic audit document showing which anomalies are present, what chemical mechanism is driving them, and the asset's actual remaining capacity versus what the BMS reports. This is the standard entry point for pre-insurance renewal audits, fleet-level degradation triage, and safety validation before deployment.

Engagement Mode II - Oxaide Horizon

When a Verify audit surfaces something worth monitoring continuously, Horizon is the permanent solution.

We train the engine against your site's specific operating profile remotely, then deliver a compiled Rust binary that runs on a fanless edge node, connects to your BMS and SCADA via Modbus/TCP, and detects anomalies in real time without sending operational data outside your perimeter. No cloud. No foreign data platform. No manufacturer lock-in. For operators under EMA, MAS, or equivalent frameworks, the node can be fully air-gapped from day one.

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The Yield - Asset Life Extension (S$10M+ Impact)

The commercial case for Oxaide is about what the alternative costs.

A S$20M BESS site with undetected degradation carries a realistic 20% life reduction exposure - S$4M in premature capital replacement that shows up in your insurance renewal before it shows up in your P&L. Early detection changes that equation: a single forensic audit identifying one latent fault more than covers the cost of the engagement, before the fault becomes a claim.

For solar assets, undetected inverter clipping and inter-string mismatch compounds quietly across the asset life. The yield loss is invisible on standard monitoring until the next performance test. Verify makes it visible on demand, from existing data.

Continuous Assurance (Institutional Shield)

Every deployment includes the option of full source code escrow: if Oxaide ceases to operate, your team retains complete technical access and can maintain the engine independently. This is not a standard vendor offer, and we include it because operational dependency on a vendor with no continuity mechanism is a risk grid operators cannot accept.

Professional indemnity and cyber liability coverage up to S$1M+ is provided through Rocketship Pte. Ltd. The engine is IM8 and IEC 62443 compliant, benchmarked at sub-100ms inference on commodity edge hardware with zero cloud dependency.

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Ready for Deployment

Send us one week of your battery or solar telemetry. We run a free forensic scan and return an honest assessment with no sales process and no commitment required. If the audit surfaces something worth addressing, we scope a paid engagement from there.

Pilots are limited to two active deployments per quarter so every client receives direct Principal oversight.

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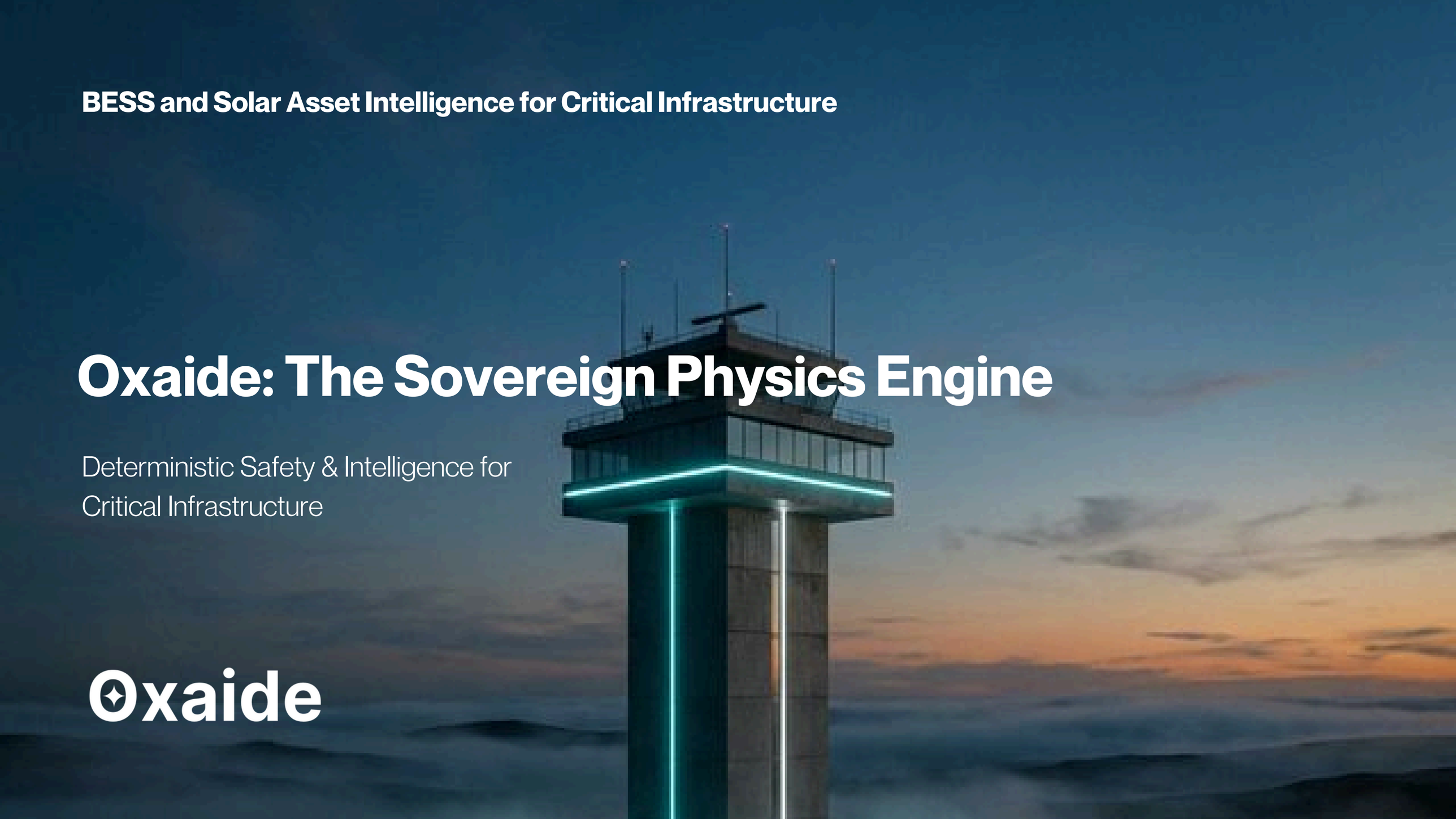

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