

The Missing Link

A Framework for the Bankability of Long-Duration Energy Storage

How emerging energy technologies become investable infrastructure.

Marlene Vesterdal

Independent Analyst & Advisor

Bankability • Financing • Insurance • Commercialization • Investment Readiness

Technical readiness is not bankability

Long-duration energy storage is increasingly recognized as strategic infrastructure. Yet technical progress, policy support and market interest do not automatically translate into institutional capital.

The central question is therefore not simply whether a storage technology works. It is whether a project can be structured, evidenced and governed in ways that allow banks to finance it, insurers to underwrite it, infrastructure investors to own it and utilities to rely upon it over decades.

Technology creates capability. Investment readiness reduces uncertainty. Bankability is the institutional recognition that enough confidence has been created.

The refinement from project-finance practice

Established project finance already knows how to identify, allocate and mitigate technology risk. The harder problem for emerging LDES is what makes that risk sufficiently evidenced, independently validated, contractible and supported by credible counterparties for established financing disciplines to work.

This distinction matters. The missing link is not a new financing vocabulary. It is the translation of emerging-technology uncertainty into forms that independent institutions can evaluate and accept.

The financing question

A risk can be known without being financeable. For long-term capital, the decisive questions are: Can it be measured? Can it be allocated? Is the obligation enforceable? Is the responsible party capable of performing? Does the support survive for the required financing horizon?

The Architecture of Confidence

Infrastructure projects are rarely financed because risk has disappeared. They are financed because uncertainty has been reduced, responsibilities are clear, and remaining risks have become understandable and manageable.

Capital does not avoid risk. It avoids unstructured risk.

Eight mutually reinforcing pillars

1. Technical validation Independent testing, standards compliance and performance evidence reduce technology risk.	2. Commercial viability Durable revenue models, market access, customer credit strength and realistic assumptions support the business case.
3. Contractual clarity Responsibilities, remedies, performance obligations and dispute mechanisms must be explicit.	4. Operational evidence Real-world data, maintenance practice, reliability and failure experience convert claims into evidence.
5. Risk allocation Risk should sit with the party best able to manage it and be supported by enforceable obligations.	6. Insurance & risk transfer Insurance, warranties, guarantees and other mechanisms can transfer selected risks where evidence supports underwriting.
7. Financial resilience Capital structure, liquidity, sensitivity analysis and downside resilience determine whether the project can withstand stress.	8. Institutional credibility Governance, counterparties, track record and alignment of interests determine whether obligations are credible.

Six foundations that must mature together

Investment readiness is not a milestone. It is the disciplined process through which uncertainty is progressively reduced across the dimensions that matter to institutional capital.

Technical	Representative performance evidence, independent validation, manufacturing quality and engineering credibility.
Commercial	Credible revenue mechanisms, demand, market access and resilience under changing conditions.
Contractual	Clear allocation of responsibilities, liabilities, performance expectations and remedies.
Risk Transfer	Warranties, guarantees, insurance, performance security and other mechanisms that make residual risk manageable.
Financial	Robust cash flows, debt capacity, capital structure, sensitivity analysis and realistic downside cases.
Institutional	Governance, transparency, credible counterparties and evidence sufficient for independent decision-making.

The Investment Readiness Test

- Has the technology been independently validated under representative operating conditions?
- Does the project demonstrate a credible and resilient commercial model?
- Are contractual responsibilities clearly allocated?
- Can principal risks be insured, transferred or otherwise managed?
- Does the financial structure remain robust under realistic stress scenarios?
- Do counterparties possess the experience and financial strength required for long-term delivery?
- Can each critical stakeholder independently justify its participation?

From evidence to lender acceptance

The enhanced framework makes the institutional pathway explicit. Technical performance alone is not enough; evidence must travel through a chain of independent validation, contractual allocation and credible support before it can influence financing decisions.

1	Evidence	Performance data, testing, operating history, degradation and failure information.
2	Independent Validation	Technical advisers and other independent parties test whether evidence is representative and decision-useful.
3	Contractual Allocation	Obligations, remedies and interfaces define who carries which risk.
4	Creditworthy Support	The entity standing behind an obligation must have the capability and financial durability to perform.
5	Insurance / Risk Transfer	Selected residual risks may be transferred where they are sufficiently understood and underwritable.
6	Lender Acceptance	Debt providers determine whether the remaining uncertainty is acceptable for the financing horizon.

A risk is not financeable merely because it has been identified. It must be measurable, allocable, supported by an enforceable obligation and credible over the required financing horizon.

Completion is not long-term performance

A conventional EPC structure can transfer construction and completion risk. For emerging storage, however, passing commissioning tests does not by itself establish that the asset will deliver the required service throughout a 15- or 20-year financing horizon.

The distinction

Completion / commissioning	Long-term performance assurance
Was the facility built to specification? Did it pass acceptance testing? Can it begin commercial operation?	Will the asset continue to deliver contracted power, energy, efficiency, availability and other performance over the required life?

Questions for the independent technical adviser

- Is the performance evidence representative of the proposed duty cycle and operating environment?
- How are degradation, augmentation, replacement and maintenance assumptions supported?
- Do EPC, OEM, warranty, O&M/LTSA and revenue obligations align technically and contractually?
- Are performance tests and remedies measurable, repeatable and enforceable?
- What happens if a critical technology provider or service counterparty is unavailable later in the asset life?

This is where technical due diligence becomes a financing interface: not simply confirming that the technology works, but determining whether the evidence and obligations supporting long-term cash flow are credible.

A warranty is not bankable because it is long

A nominal 15- or 20-year warranty can still leave material financing uncertainty. Duration matters, but so do scope, remedy, exclusions, assignment, counterparty strength and survival through the debt tenor.

What capital providers need to understand

Performance trigger	What measurable event constitutes failure?
Remedy	Repair, replacement, liquidated damages, capacity restoration—or something else?
Financial capacity	Can the obligor meet the remedy if failures are systemic or occur late in asset life?
Tenor alignment	Does support remain effective for the period in which lenders and investors remain exposed?
Continuity	Can the project operate, maintain and source critical components if the OEM/service provider disappears?
Transferability	Do warranties, LTSAs and key rights survive assignment, enforcement and lender step-in?

Insurance enters before financial close

Insurance should not be treated only as a policy purchased after project design. Early underwriting engagement can expose weak evidence, unclear interfaces, unsuitable risk allocation and contractual gaps before they become embedded in the project.

Insurance cannot repair an unstructured risk after the fact. Its greatest strategic value may be helping make the project underwritable before capital is committed.

The same project. Different decisions.

Bankability is an ecosystem outcome. Independent institutions apply different criteria and reach their own conclusions. The project becomes bankable when those assessments become compatible enough for long-term participation.

Technology provider	Does the system perform as designed?
Project developer	Can the project be delivered successfully?
EPC contractor	Can construction and interface risks be managed?
Insurer / reinsurer	Can remaining risks be understood, allocated and underwritten?
Bank	Can predictable cash flows support long-term debt?
Infrastructure investor	Will the asset preserve value over decades?
Utility / customer	Can the project operate reliably throughout its expected life?

The Convergence Principle of Bankability

A project becomes bankable when independent institutions, applying different decision criteria, independently conclude that long-term participation is justified.

Convergence does not mean unanimity or the elimination of risk. It means sufficient evidence, governance, contractual clarity and risk allocation exist for each critical institution to justify its own decision.

From framework to project diagnostic

The Missing Link is designed to be applied, not merely read. A project-level bankability review can use the framework to identify where the confidence chain is strongest, where it breaks, and what evidence or restructuring is required next.

A practical diagnostic output

Bankability gap	Financing consequence	Evidence required	Risk owner	Priority action
Project-specific	Project-specific	Project-specific	Project-specific	Project-specific
Project-specific	Project-specific	Project-specific	Project-specific	Project-specific
Project-specific	Project-specific	Project-specific	Project-specific	Project-specific

What remains proprietary in advisory work

The public framework establishes the principles and common language. Project-specific application—including evidence requirements, red-flag thresholds, gap analysis, prioritization and remediation sequencing—belongs inside a scoped advisory engagement.

Selected institutional references

- Commercial Law Development Program (CLDP), Understanding Power Project Financing, Second Edition (2024).
- Commercial Law Development Program (CLDP), Understanding Energy Storage.
- World Bank Group / ESMAP, Warranties for Battery Energy Storage Systems in Developing Countries (2020).
- DNV, Technical Due Diligence for Investors and Lenders; relevant energy-storage testing and performance guidance.
- IEC 62932 series, Flow Battery Energy Storage Systems.

**The energy transition will not be financed by technology alone.
It will be financed by confidence.**

Marlene Vesterdal | Independent Analyst & Advisor | vesterdal.energy