DEKRA

Whitepaper

From vision to reality: **bankability as the key to green hydrogen**

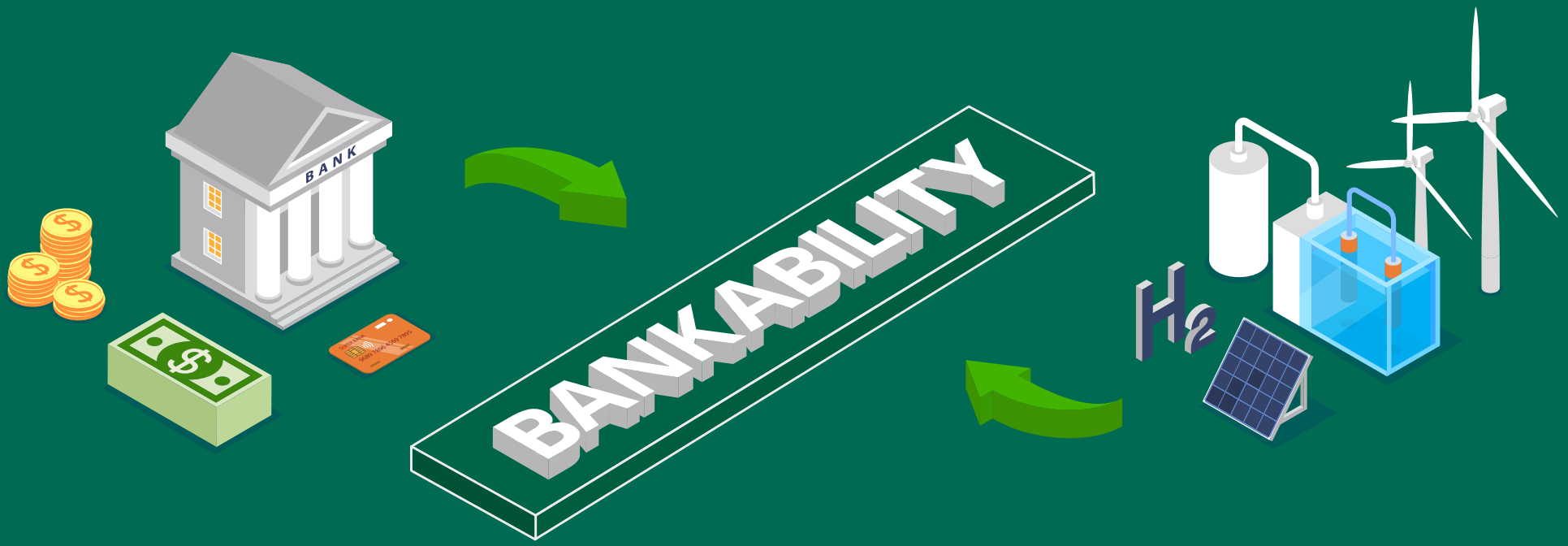


Table of **contents**

Key **takeaways**

Bankability: unlocking financing for green hydrogen
Bankability is a critical factor for scaling green hydrogen projects, ensuring they can attract the financing required for large-scale deployment. It is a multidimensional concept that extends beyond financial assessments to include risk prevention, regulatory integration, and stakeholder engagement. Despite the sector's potential, only USD 38 billion has been invested to date compared to an announced project volume of USD 514 billion—highlighting a substantial financing gap that must be closed to achieve the sector's growth ambitions.

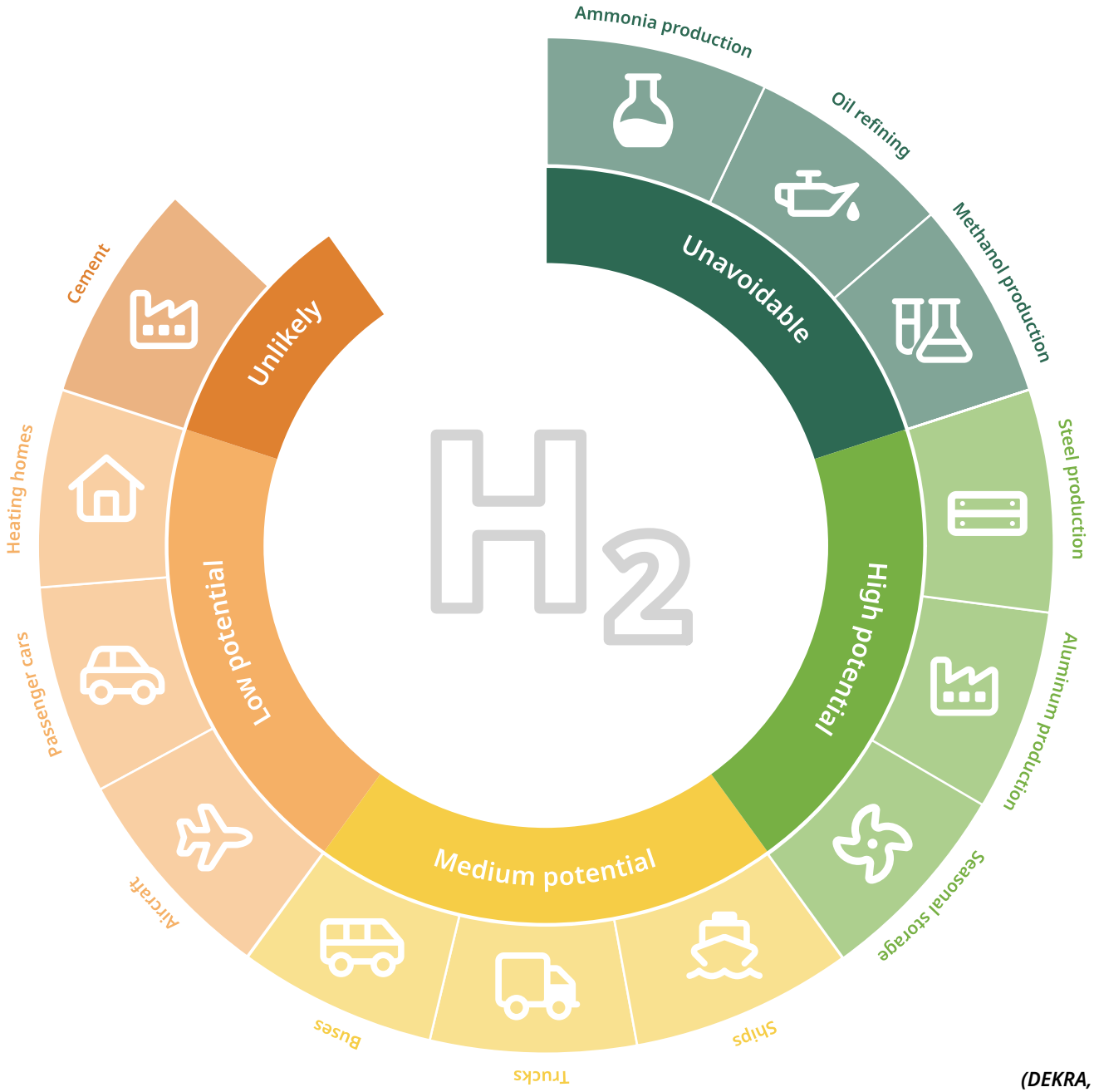
Lessons from the photovoltaic industry
The early development of the photovoltaic (PV) industry offers valuable insights for scaling green hydrogen. After the 2007–2008 financial crisis, access to capital was severely restricted, yet PV projects with strong financial models, risk control, and stakeholder alignment still secured funding. This resilience proved that bankability is a practical financing framework. By adopting lessons from PV, the hydrogen sector can accelerate its growth and avoid early-stage financing pitfalls.

Structured bankability management
To move from fragmented approaches to a scalable financing framework, this paper proposes a standardized bankability management system for hydrogen projects. This system would provide consistent evaluation criteria for all stakeholders, from developers to financial institutions, and offer a shared platform for defining investment-grade requirements. Core elements include structured risk assessment frameworks, transparent performance indicators, and mechanisms for aligning financial, technical, and legal factors. By formalizing these processes, the bankability management system would reduce perceived risks, streamline decision-making, and create a more predictable environment for financing—critical for attracting the significant capital needed for large-scale hydrogen deployment.

The bankability-ready seal
The proposed bankability-ready seal would not certify the overall investability of a hydrogen project, but specifically verifies the document quality and completeness of its project data room. Developed in consultation with banks, policymakers, and industry stakeholders, it would ensure that financial, technical, and legal documentation is consistent, transparent, and decision-ready. For banks, the seal would reduce uncertainty at an early stage by confirming that all required information is available for due diligence. For developers, it would provide a clear framework for preparing investment-grade documentation. By creating this trusted pre-due-diligence benchmark, the bankability-ready seal could accelerate financial assessments and contribute to faster project financing across the hydrogen sector, and ultimately lead to trust in the industry.

Hydrogen in hard-to-abate sectors: **from unlikely to indispensable**

Wind and solar are transforming energy systems, but direct electrification cannot provide industrial feedstock or decarbonize all heavy industries, shipping, long-haul transportation, or aviation. Moreover, the best resource regions are often far from demand centers. Hydrogen and Power-to-X add the missing link—storing surplus renewables, enabling global energy trade, and supplying fuels and feedstocks to hard-to-abate sectors.



(DEKRA, 2024)

The financing gap for **green hydrogen projects**

The expansion of renewable energy has reshaped the global energy landscape, but integrating intermittent sources like wind and solar remains a challenge. Hydrogen and Power-to-X (PtX) technologies offer a crucial part of the solution. Acting as both storable energy carrier and chemical feedstock, they can decarbonize hard-to-abate sectors—such as steel, chemicals, and long-haul transport—while enhancing grid stability. Green hydrogen, produced using renewable electricity, holds the potential to cut emissions dramatically and create significant economic opportunities.

Despite ambitious global targets, investment still lags behind what the market needs. Around USD 514 billion in projects are planned to deliver roughly 48 million tonnes of clean hydrogen per year by 2030. This would still fall short of the low-emission hydrogen demand envisaged in the Net-Zero-Emission pathway. However, to date, Final Investment Decisions (FIDs) have been taken on projects worth only about USD 38 billion—roughly 7% of the planned capital—highlighting both the sector's early stage and persistent market uncertainty. Without faster infrastructure build-out, stable policy frameworks, and effective risk-sharing mechanisms, scaling production at the required pace will be difficult.

Once market and distribution bottlenecks are solved, the investment gap rests on one factor: bankability. While public policy support is critical, it is insufficient on its own. Projects must demonstrate financial viability, robust risk management, and credible delivery plans to attract institutional capital. Bankability is the bridge between ambitious project proposals and investor trust—it ensures predictable returns, manageable risk profiles, and compliance with market standards.

Other industries have faced similar challenges and found ways to overcome them. The photovoltaic (PV) solar sector, for example, managed to secure funding even in adverse economic conditions by building investor confidence.

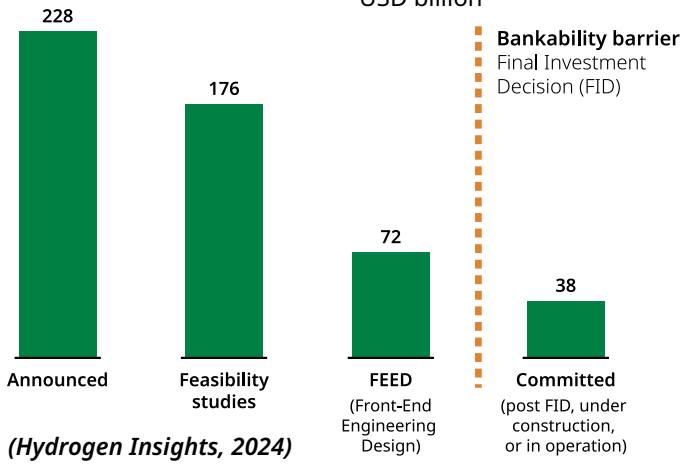
For hydrogen to fulfill its role in the energy transition, bankability must move from a buzzword to a structured, measurable standard—one that aligns financial, technical, and legal requirements to drive investment at scale.

> "For green hydrogen, the decisive challenge is not technology. It is financing. Bankability transforms promising projects into investable assets by creating transparency, reducing risks, and building trust. Without it, the energy transition will remain a vision; with it, we can accelerate towards reality."

Dr. Christoph Flink
VP Hydrogen Economy
at DEKRA

Bankability is the key to turning hydrogen potential into a financeable, scalable reality.

Direct clean hydrogen production investment until 2030, as of May 2024:
USD billion



(Hydrogen Insights, 2024)

What does **bankability mean?**

Bankability is often mistaken for simply having a working business plan—for example, with secured off-takers or stable policy support. In reality, that is only where the bankability process begins, and projects without a sound business plan are by definition not bankable. Bankability is also frequently confused with concepts like creditworthiness or profitability. While related, these are not the same. Creditworthiness focuses on the borrower's overall ability to repay debt, often based on the balance sheet of a company. Profitability reflects whether a project generates more revenue than its costs. Bankability, however, sits at the heart of project finance, dealing with limited- or non-recourse financing and off-balance-sheet accounting structures, where repayment depends solely on the performance of the project itself.

In such cases, projects are usually structured as Special Purpose Vehicles (SPVs) to isolate risks from the parent company. Here, lenders rely entirely on the project's cash flows for debt service. This makes rigorous, transparent due diligence and aligned stakeholder commitments essential to reducing default risk and securing debt repayment.

While the roots of non-recourse loans can be traced back to ancient bottomry contracts in maritime trade—where shipowners borrowed money for a voyage and repayment was due only if the ship returned safely—the notion of 'bankability' as a formal criterion in modern project finance gained prominence only with the 2007–2008 financial crisis and the introduction of Basel III regulations, during which banks significantly tightened lending requirements. Well-structured, de-risked projects became a priority—not only for developers but for all project stakeholders.

> "For me, bankability is more like philosophy than business science. Because you cannot grasp it. It is quite differently valued by a large number of parties."
>
> **Head of supply chain management, project developer**

> "Bankability means that the bank is convinced to the greatest possible extent that the cash flows are stable and the loan will be repaid."
>
> **Credit risk manager, structured finance, major bank**

> "Bankability is not a focus for us now and we know little about how we are perceived; we will need to deal with it in the future."
>
> **Head of marketing, module manufacturer**

(Hampl, Lüdeke, Flink, Olbert, Ade, 2011)

20 in-depth expert interviews in Germany and China from equity investment, project development, system integrators, module manufacturers, and banks.

A key milestone in formalizing the concept was the 2011 study "The Myth of Bankability", which interviewed 20 stakeholders from the photovoltaic (PV) sector, including equity investment, project development, system integrators, module manufacturers, and banks. The research revealed that interpretations of bankability ranged from vague philosophy to actionable strategic frameworks. It concluded that bankability is best understood as a dynamic, multi-dimensional, multi-stakeholder process aimed at ensuring that a project can consistently meet debt service and return expectations.

While each stakeholder views bankability through their own risk lens, their central goal must be the same: to create the trust and transparency needed for bank financing.

The word "bankability" has been in use for over a century, originally describing trustworthy money orders and assets in banking. Today, it has evolved into a comprehensive standard for project financing.

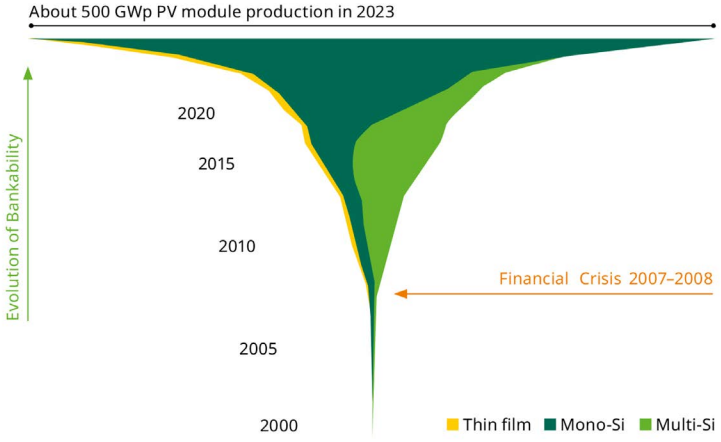
The photovoltaic industry's 2008 crisis proved that well-structured, risk-managed projects can secure financing even under the tightest credit conditions—**a lesson green hydrogen must embrace.**

The 2008 financial crisis marked a decisive test for renewable energy projects. In the photovoltaic (PV) sector, credit markets tightened dramatically, but projects with strong bankability profiles—including reliable off-take agreements, robust risk mitigation strategies, and solid counterparties—continued to attract funding despite the restrictive environment.

Public policy support, like FITs, provided long-term revenue stability and predictable cash flows, significantly reducing investor uncertainty. These policies created the confidence needed for lenders to approve financing, even during times of lending restrictions. At the same time, standardization emerged as a critical enabler: consistent technical specifications, component testing protocols, and performance guarantees allowed banks to assess project risks more objectively, lowering perceived risk premiums.

For green hydrogen, these lessons are directly relevant. As in the early PV market, the sector faces uncertainty, high capital requirements, and evolving regulatory frameworks. Policy support remains essential, but alone it is insufficient. To secure large-scale investment, hydrogen projects must demonstrate financial resilience and effective risk management, backed by verifiable performance data and trustworthy partnerships.

Establishing a structured financing application process with transparent, standardized risk allocation could provide the clarity needed to accelerate the bankability process. This should be developed collaboratively through a stakeholder dialogue and independently verified via a bankability-ready seal before a bank's due diligence. And by embedding such practices from the outset, the sector can unlock investment at scale, remain resilient through financial market fluctuations, and move more quickly toward its decarbonization goals.



Success story of the photovoltaic industry overcoming the financial crisis in 2007–2008

(Fraunhofer, 2024)

Resilient growth despite crisis: Even during the 2007–2008 financial crisis, the PV industry maintained momentum, demonstrating that strong bankability under supportive policy frameworks can sustain investment flows under adverse market conditions.

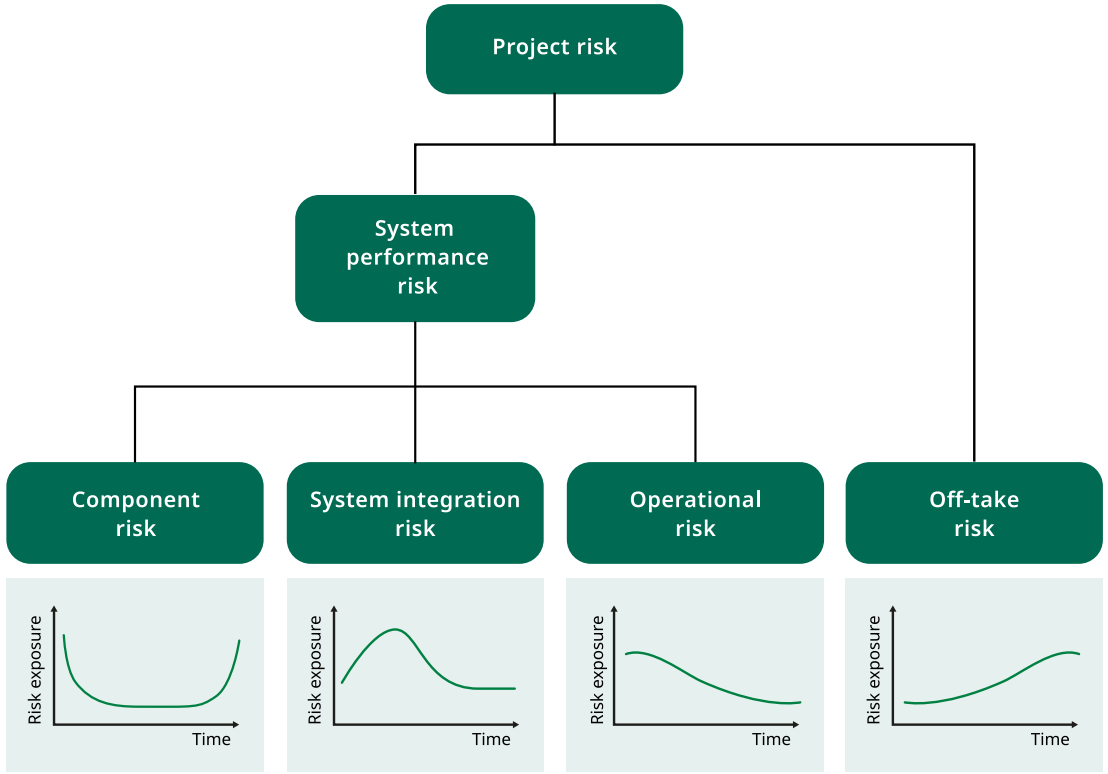
Rapid scale-up post-crisis: After overcoming the crisis, PV module production surged to around 500 GWp by 2023, proving that early risk mitigation and standardization can unlock exponential market growth.

Achieving bankability depends on one factor above all: systematically identifying and mitigating risks. **Projects that convincingly address financial, technical, legal, and operational uncertainties are far more likely to secure funding and attract investor confidence.**

Key risk categories include off-taker risks, such as the reliability and creditworthiness of buyers. In addition, system integrators face construction and delivery risks, while operators must manage performance risks during project operation. Technical risks often arise from component quality, performance, and warranty obligations. Each category can impact cash flow predictability and long-term viability.

A structured risk matrix enables consistent evaluation across projects, independent of specific technologies or project maturity levels. This approach allows lenders and stakeholders to compare risk profiles and prioritize projects with robust mitigation strategies.

From a financial institution's perspective, risk mitigation is at the core of bankability. Banks evaluate whether projected revenues are stable enough to service debt and whether legal and technical safeguards are in place. Off-taker agreements, system integration, and operational reliability as well as component performance are central to this assessment. Internal stakeholders who can demonstrate robust risk management practices not only improve the likelihood of financing but also contribute to building industry confidence. By embedding structured risk analysis into every stage of project preparation, projects align more closely with lender expectations and strengthen their credibility in competitive renewable energy markets.



(Flink, 2014)

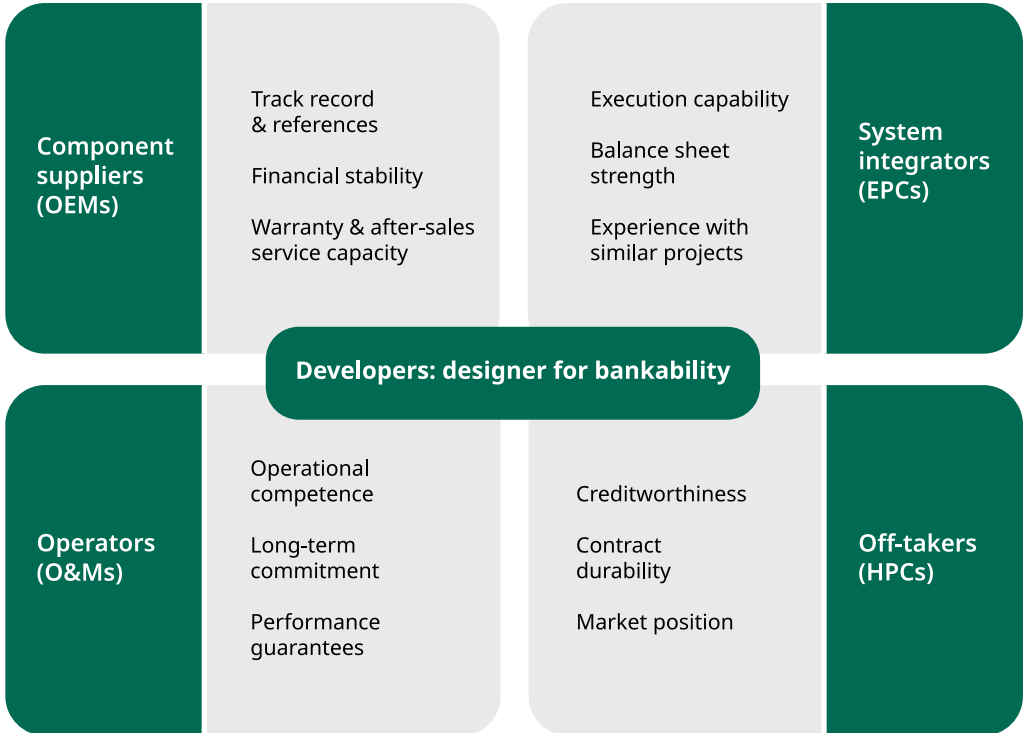
Risk mitigation is the bridge between innovation and investment. Without clear strategies to manage off-take, system integration, operational, and component risks, even promising projects struggle to attract funding. Bankability transforms when risk governance is embedded into every stage of project development.

Internal stakeholders: **building bankability from within**

In the hydrogen sector, internal stakeholders hold a decisive role in shaping bankability. These are the actors directly involved in project conception, design, and delivery—developers, off-takers, system integrators, operators, and suppliers. Their collective actions determine a project's technical credibility, operational reliability, and commercial attractiveness.

Developers must structure projects to meet strict financial, technical, and legal requirements, aligning design, timelines, and budgets with lender expectations. Off-takers—those committing to purchase the hydrogen—provide the revenue backbone, with their creditworthiness and contract terms strongly influencing financing decisions. System integrators carry the responsibility of delivering on time, within budget, and to agreed performance standards. Suppliers, including component manufacturers, ensure technological reliability and compliance with quality standards, directly impacting long-term performance and maintenance costs. Operators need to demonstrate their ability to manage a smooth operation over the lifetime of the project.

For all internal stakeholders, being "bankable" themselves is essential—demonstrating operational competence, financial stability, and alignment with standards. Projects backed by credible and proven internal teams stand out as lower-risk investments, accelerating funding decisions and enhancing market credibility. Without the alignment of internal stakeholders, even well-financed projects risk underperformance or failure, which makes the contribution of developers, EPCs, suppliers, and off-takers to bankability indispensable.



(Flink, 2013)

Shared responsibility: **a collective path to investment readiness**

Internal stakeholders are interdependent. A developer's well-crafted plan is only as strong as the system integrator's ability to execute, the supplier's ability to deliver, the off-taker's reliability in fulfilling contracts, and the operator's ability to achieve a stable performance of the site over the entire repayment period. Weakness in one area increases perceived risks across the entire project.

To strengthen bankability, internal stakeholders must actively coordinate—sharing information, aligning on timelines, and resolving potential bottlenecks before they escalate. Joint quality assurance frameworks together with transparent reporting can build confidence among lenders, while standardized contractual structures reduce legal ambiguity.

This collective approach is strategic. By presenting a united, well-prepared front, internal stakeholders signal to banks and investors that risk is understood, mitigated, and managed. In a sector where green hydrogen must prove its competitiveness against gray hydrogen, such unity can be the decisive factor in securing financing.

External stakeholders: **aligning capital, policy, and assurance for bankability**

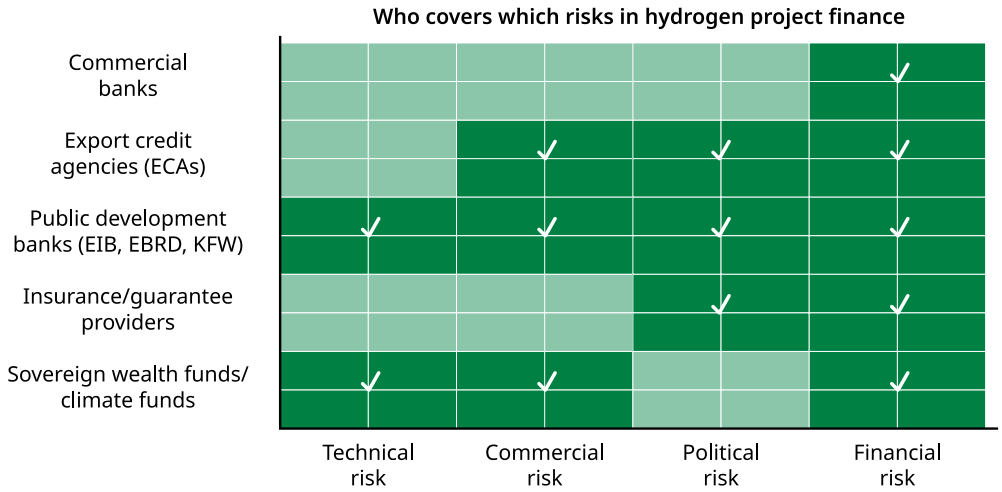
While internal stakeholders lay the foundation of a hydrogen project, external stakeholders provide the guardrails that steer it toward investment readiness. They shape the financial environment, set the regulatory framework, and provide the independent verification needed to build trust. In the context of bankability, their role is both enabling and gatekeeping.

Financial Institutions: Commercial banks, public development banks, and export credit institutes are the primary arbiters of funding. They evaluate and support projects based on their ability for loan repayment, requiring predictable cash flows, proven technology, and robust contractual arrangements. Their lending criteria are shaped by market conditions, regulatory incentives, and internal risk models. In hydrogen, where large-scale commercial projects are still emerging, financing decisions rely heavily on the credibility of the overall project ecosystem.

Investors: Equity investors and infrastructure funds play a critical role in early-stage financing. They are typically more risk-tolerant but demand higher returns, pushing project developers to demonstrate scalability, competitive advantage, and a clear exit strategy. Strategic investors—such as energy companies diversifying into hydrogen—also bring market access and operational expertise, adding non-financial value to bankability.

Testing, Inspection, and Certification (TIC) companies: Testing, Inspection, and Certification (TIC) companies like DEKRA, traditionally focused on safety, quality, and performance, also verify sustainability and security

Financial institutions in bankability



Hydrogen's potential is substantial, but success depends on well-structured projects that align financial and technical realities.

services through independent certification and validation. Their services not only satisfy regulatory requirements but also provide a neutral assurance to financiers and insurers that the project's components and processes meet international benchmarks. By verifying the document quality and completeness of a project's data room against a standardized checklist, TIC companies add a decisive layer of transparency and trust—helping secure the integrity of a hydrogen project's bank loan application and accelerating access to capital.

Advisors and Consultants: Financial, technical and legal advisors translate complex project structures into decision-ready information for lenders and regulators. Their due diligence reports form a critical part of lender evaluations, especially in assessing technical project feasibility, contractual robustness, and financial statement validation.

Regulators and Policymakers: A stable, transparent, and supportive regulatory environment is essential for bankability. Clear permitting processes, enforceable contracts, and consistent policy incentives such as feed-in-tariffs or contract-for-difference reduce uncertainty and attract investment. Regulatory clarity is particularly important for cross-border hydrogen trade, where alignment on certification schemes and emissions accounting will shape market access.

Insurers: Risk transfer through insurance products—covering construction delays, equipment failure, or business interruption—provides additional comfort to lenders and investors. The scope, cost, and availability of insurance coverage often directly influence financing terms. In nascent markets like hydrogen, innovative insurance solutions can address technology- and off-take-specific risks, making projects more likely bankable.

Interdependencies and Strategic Collaboration: External stakeholders can effectively strengthen bankability. Banks depend on TIC certifications, insurers rely on regulator-approved standards, and policymakers consider industry input to design effective incentives. Well-designed services can streamline due diligence, reduce transaction costs, de-risk projects, and ultimately accelerate final investment decisions.

This coordination can be institutionalized through a stakeholder dialogue, joint standard-setting, and transparent data sharing. By reducing fragmentation and uncertainty, external stakeholders can attract the capital needed to bridge the hydrogen financing gap.

Introducing the bankability-ready seal: **setting the standard for hydrogen project finance**

Bankability in green hydrogen is not a fixed attribute but a dynamic process shaped by risk alignment, stakeholder credibility, and trust. Unlike mature industries such as PV solar, which achieved bankability through years of standardization and repetition, the hydrogen sector faces higher technological complexity, evolving regulations, and fragmented due diligence practices. To scale effectively, it requires a structured, transparent, and universally recognized framework.

The bankability-ready seal is proposed as a third-party assessment and data room-ready validation, designed to verify project readiness across financial, technical, and legal dimensions. It functions as a pre-due-diligence step, confirming that documentation is complete, consistent, and relevant before costly credit assessments begin. By reducing uncertainty at early stages, the seal enables investors and banks to make faster, better-informed decisions—accelerating time-to-finance without compromising thoroughness.

DEKRA's role is to lead this initiative with uncompromising independence, drawing on decades of experience in compliance, quality assurance, and verification in regulated industries. Its position as a neutral authority enables it to set auditable, sector-wide criteria and enforce them consistently, even in high-stakes, politically sensitive contexts. This leadership is not about market advantage—it is about establishing a non-negotiable benchmark for credibility and investment readiness in hydrogen.

The seal forms part of a wider bankability management system that also includes a bankability stakeholder dialogue—a structured platform for aligning the expectations of developers, financiers, regulators, and technology providers. This is not merely a tool for compliance; it embeds "bankability by design" into projects from the outset, fostering investment-grade profiles through proactive credibility management.

By creating transparent evaluation standards, clear checklists, and robust governance mechanisms, the bankability-ready seal transforms bankability from a loosely defined aspiration into a tangible, verifiable reality. In doing so, it bridges the gap between ambition and implementation—providing the hydrogen sector with the same investment reliability that has enabled other industries to thrive at scale.

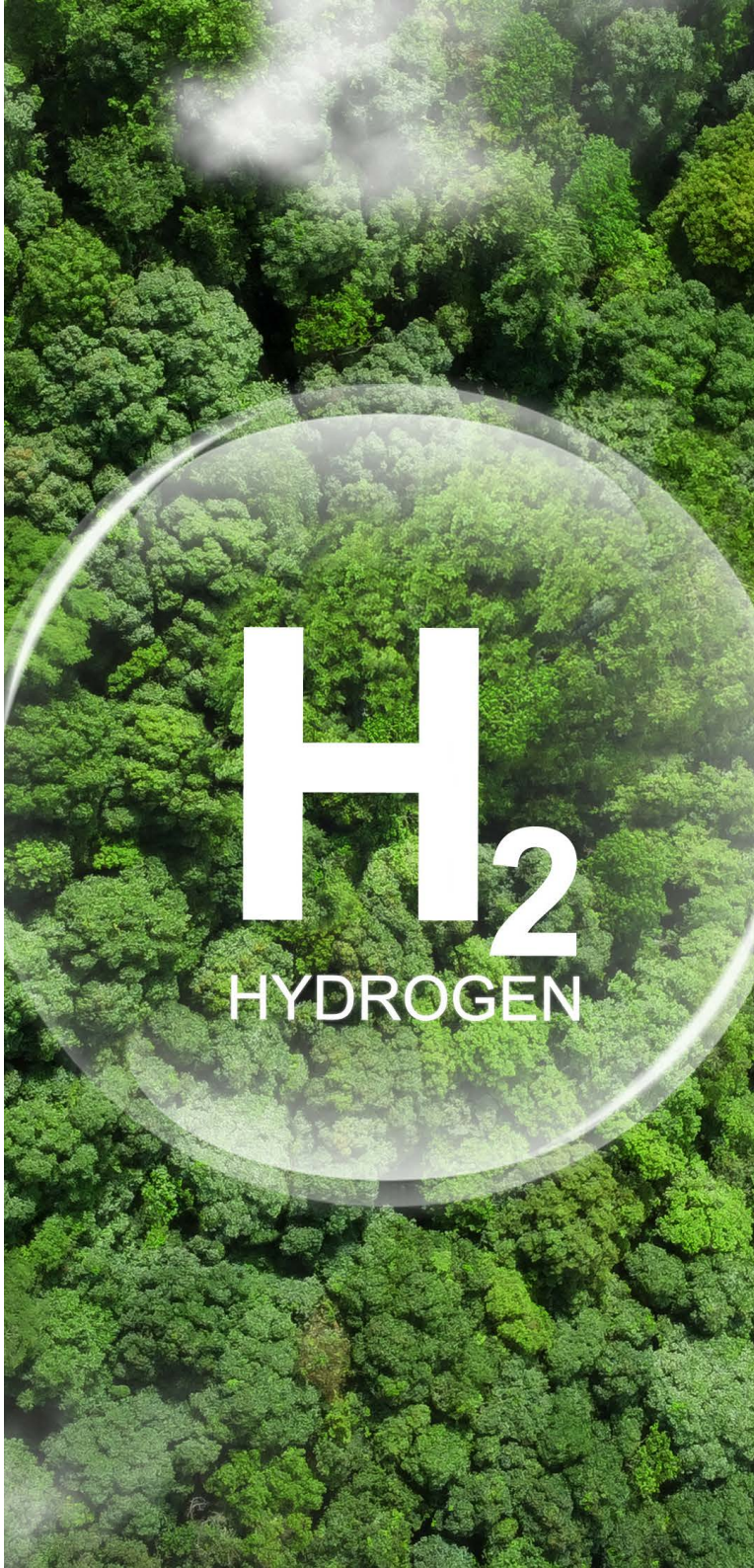
From buzzword to investment standard

Bankability in green hydrogen must evolve from a vague term into a structured management system that aligns financial, technical, and legal requirements. The proposed bankability-ready seal offers a standardized, verifiable approach to de-risk projects, strengthen investor trust, and accelerate financing.

The priority now is action: through the bankability stakeholder dialogue, DEKRA invites all relevant parties to help refine and implement a standardized bankability checklist, creating a shared bankability-ready standard. Turning bankability into a discipline—rather than a buzzword—will determine how quickly hydrogen projects move from vision to reality.

More about **the hydrogen economy**

Contact us



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DEKRA

dekra.com

DEKRA e.V.
Handwerkstraße 15
70565 Stuttgart
T +49.711.7861-0