

American Journal of Economics and Business Management

Vol. 9 Issue 10 | **pp.** 652-662 | **ISSN:** 2576-5973

Available online @ https://www.globalresearchnetwork.us/index.php/ajebm

Article

Applying IFRS across the Life Cycle of Green Energy Projects

Yakubova Dilfuza[1]

1. Department of Accounting, International School of Finance Technology and Science Institute, Tashkent, Uzbekistan

* Correspondence: dilya.yakubova89@gmail.com

Abstract: Green energy projects combine substantial initial investment, long operating horizons, complex contractual arrangements and obligations that may remain outstanding after electricity generation ends. These characteristics require coordinated accounting decisions across project stages. This conceptual study develops a seven-stage framework connecting the life cycle of renewable energy projects with relevant IFRS Accounting Standards and IFRS Sustainability Disclosure Standards. A qualitative analysis of the supplied project narrative, selected life-cycle research and authoritative standard-setting materials is used to identify recognition, measurement and disclosure decisions. The framework covers preliminary assessment, financing and contracts, construction, readiness for use, operations, impairment and estimate revisions, and decommissioning. Its central proposal is a persistent project identifier linking source documents, components, contracts, estimates and sustainability information. The analysis identifies three recurring coordination problems: inconsistent capitalization boundaries, inadequate component records and unexplained differences between financial and climate-related assumptions. The framework addresses these problems through documented decision points, component-level records and reconciliation of reporting assumptions. Its contribution is an implementation-oriented synthesis of existing requirements rather than a new accounting standard or an empirically validated model. The proposed approach provides a basis for improving the traceability of renewable energy accounting, including in enterprises undertaking IFRS implementation in Uzbekistan. Future research should evaluate its costs and effectiveness using actual project records.

Keywords: renewable energy; IFRS; life-cycle accounting; component depreciation; power purchase agreements; decommissioning provisions; climate-related disclosures.

Citation: Dilfuza Y. Applying IFRS across the Life Cycle of Green Energy Projects. American Journal of Economics and Business Management 2026, 9(10), 652-662

Received: 10th Jul 2026
Revised: 11th Aug 2026
Accepted: 11th Sep 2026
Published: 18st Oct 2026

Copyright: © 2026 by the authors. Submitted for open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/)

1. Introduction

Small Reliable financial reporting is essential for renewable energy projects because financing decisions depend on expectations about construction expenditure, electricity revenues, equipment performance and long-term obligations. Solar and wind projects involve substantial expenditure before revenue generation begins. Their financial statements must distinguish expenditure that creates a recognizable asset from expenditure consumed during the period, while reflecting financing arrangements and contractual risks.[1]

This study identifies the need to coordinate IFRS application throughout the project life cycle. This issue is particularly relevant to energy enterprises implementing international reporting practices in Uzbekistan. The present article develops that argument into a conceptual framework without claiming to measure compliance across Uzbek enterprises or to establish causal effects on investment.[2]

Separate standards address property, plant and equipment, borrowing costs, government grants, financial instruments, leases, revenue, impairment and provisions.

Nevertheless, practical decisions cross these boundaries. A change in the expected commissioning date affects depreciation and borrowing-cost capitalization. A component replacement affects asset recognition, derecognition and future estimates. Climate risks can influence both impairment assumptions and sustainability disclosures. The research problem is therefore how to organize these interdependent decisions within a coherent project information system.[3]

The study asks two questions. First, how can recognition, measurement and disclosure decisions be organized across the life cycle of green energy projects? Second, what documentation and reconciliation controls are needed to connect financial accounting with sustainability-related financial information? The article proposes seven stages and a persistent project identifier as an operational structure for answering these questions.[4]

The contribution lies in connecting project stages to accounting decisions and their supporting evidence. This is an implementation proposal; it does not replace professional judgement, contractual analysis or the requirements of individual standards. References to IFRS S1 and IFRS S2 concern sustainability-related financial disclosures and do not imply that these standards are mandatory in every jurisdiction applying IFRS Accounting Standards.[5]

Life-cycle costing and energy asset management

Wang et al. (2020), cited in the underlying conceptual material, examine the life-cycle costs of power grid projects using a system dynamics approach. Their focus on investment, operation and maintenance, and end-of-life costs supports the treatment of an energy project as a sequence of connected economic processes. The analysis uses this study to motivate a broader accounting structure. Its full article was not independently accessible during preparation, so the present discussion is confined to that supplied description.[6]

Wang et al. (2021) discuss full life-cycle management of power systems integrating renewable energy. Their work emphasizes cost collection, estimation and information integration across asset stages. It supports the view that project and equipment data should remain connected throughout procurement, construction, operation and disposal. However, a management cost model and a financial reporting framework have different purposes. An expenditure may be relevant to investment evaluation without qualifying for recognition as an asset in financial statements.[7]

These studies provide a methodological starting point rather than evidence that the proposed seven-stage framework is unique in all prior literature. The targeted review does not constitute a systematic survey. The gap addressed here is narrower: the supplied life-cycle argument requires an explicit connection between project events, IFRS decisions and the records needed to support those decisions.[8]

Recognition boundaries and subsequent measurement

The conceptual analysis gives particular attention to IAS 16 Property, Plant and Equipment; IAS 23 Borrowing Costs; IAS 20 Accounting for Government Grants and Disclosure of Government Assistance; IAS 36 Impairment of Assets; and IAS 37 Provisions, Contingent Liabilities and Contingent Assets. Together, these standards address asset costs, eligible financing expenditure, government assistance, impairment and obligations arising from past events. Applying them separately can obscure the way one decision affects another. For example, an asset-related grant presented as a deduction from an asset changes its carrying amount and depreciation presentation; deferred-income presentation preserves a gross asset amount while recognizing grant income over appropriate periods.[9]

IAS 38 provides a separate recognition structure for intangible assets. The IFRS Foundation explains that research expenditure is expensed, whereas development expenditure is recognized only when specified conditions are satisfied. This distinction

must not be applied mechanically to all feasibility or engineering expenditure for a physical power plant. Such expenditure requires analysis under the standard applicable to the resource being created.[10]

The IAS 16 amendments on proceeds before intended use also show why project-stage accounting requires explicit rules. Revenue from items produced while preparing an asset for use and the related costs are recognized in profit or loss rather than netted against the asset cost (IFRS Foundation, 2020). This is relevant to electricity generated during testing.

Electricity contracts and connected reporting

Power purchase agreements require assessment of their terms rather than classification from their title alone. The IASB issued amendments to IFRS 9 and IFRS 7 concerning contracts referencing nature-dependent electricity, effective for annual periods beginning on or after 1 January 2026. The amendments address own-use assessment, specified hedge-accounting arrangements and disclosures (IFRS Foundation, 2024).

IFRS S1 establishes general requirements for sustainability-related financial information, while IFRS S2 addresses climate-related risks and opportunities. Their reporting objectives differ from asset recognition and measurement. Nevertheless, information about electricity output, asset lives and climate exposures may be relevant to both reporting processes. This article proposes documented reconciliation of such assumptions, while allowing differences justified by reporting purpose, horizon and measurement requirements.

2. Materials and Methods

Research design and materials

The study adopts a qualitative conceptual design based on document analysis and normative accounting synthesis. The starting point is a conceptual account of IFRS application in green energy projects developed in Uzbek and translated into English for this study. Supplementary materials comprise its two identified life-cycle studies and selected IFRS Foundation publications concerning intangible assets, provisions, pre-use production, nature-dependent electricity contracts and sustainability reporting.

The materials were selected purposively because they address decisions emphasized in the underlying conceptual material. This is a targeted review, not a systematic literature review: no database-wide search, screening count or bibliometric analysis was undertaken. The 2021 life-cycle article and the selected IFRS Foundation materials were checked through their publisher or standard-setter pages. The 2020 study is retained as a source-manuscript reference with the access limitation noted above.p[11]

Analytical procedure

The analysis followed four steps. First, the source narrative was translated and organized into project stages. Second, each stage was examined for transactions, accounting judgements and supporting evidence. Third, dependencies between stages were identified, including capitalization commencement, readiness for use, component replacement, impairment and provision revisions. Fourth, these dependencies were translated into proposed records and controls.

Each decision was evaluated against three questions: what resource, obligation or transaction is being accounted for; which standard governs the decision; and what evidence supports the timing and measurement? Particular attention was given to avoiding automatic capitalization, recognizing obligations only when the relevant criteria are met, and separating physical electricity sales from financial-instrument results where applicable.[12]

Scope and limitations

The unit of analysis is the project accounting process rather than an enterprise sample. No interviews, financial-statement sample, econometric estimation or field implementation were conducted. Accordingly, the results are analytical proposals and cannot demonstrate reduced errors, lower financing costs or improved investment performance. The framework is primarily developed for solar and wind projects; extension to hydropower, biomass, storage or concession arrangements requires additional analysis.

Financial reporting requirements and local adoption rules may change. The framework must therefore be applied with the standards effective for the reporting period and the relevant jurisdiction. It also leaves entity-specific issues such as consolidation, tax, concession accounting and complex financing arrangements outside its detailed scope.[13]

3. Result

Structure of the proposed framework

The analysis produces a seven-stage structure. The stages represent accounting decision clusters rather than a strictly linear sequence: impairment reviews and estimate revisions may occur during construction or operation, and decommissioning obligations may arise well before the final stage. A persistent project identifier is proposed as the common link between documents and reporting outputs.

Table 1 summarizes the principal decision and evidence for each stage. The listed standards are indicative rather than exhaustive.

Stage	Principal standards	Principal decision	Supporting evidence
1 Preliminary assessment	IAS 16 and IAS 38	Expense or recognize qualifying expenditure	Feasibility documents and recognition assessment
2 Financing and contracts	IFRS 9 IFRS 7 IFRS 11 and IFRS 16	Classify financing rights and contractual obligations	Contracts and documented classification
3 Design and construction	IAS 16 IAS 23 IAS 20 and IAS 37	Determine eligible costs grants and provisions	Invoices cost allocation and obligation estimates
4 Readiness for use	IAS 16 IAS 23 and IAS 8	Determine availability and component depreciation	Technical readiness evidence and asset register
5 Operation	IFRS 15 IFRS 9 IAS 16 and IAS 2	Recognize revenue servicing and replacements	Meter readings maintenance records and contracts
6 Reviews and impairment	IAS 36 IAS 8 IFRS S1 and IFRS S2	Review estimates and reconcile assumptions	Cash-flow models and climate assumptions
7 Decommissioning	IAS 37 IFRIC 1 IAS 16 and IFRS 5	Settle obligations and derecognize assets	Restoration records settlements and disposal evidence

Preliminary assessment and recognition of expenditure

The first stage covers resource assessment, alternative sites, grid access, technology selection and commercial feasibility. The accounting task is to identify the resource being developed before deciding whether expenditure qualifies for recognition. Approval by a project committee is relevant evidence but is neither a sufficient recognition criterion nor a universal date from which all expenditure becomes capitalizable.

Preliminary market research and unsuccessful site investigations will often be period expenses. Directly attributable expenditure relating to a recognizable physical asset requires assessment under IAS 16. Software and other identifiable intangible resources require assessment under IAS 38. A recognition register should record the applicable standard, expenditure category, evidence, decision date and responsible reviewer. Previously expensed intangible expenditure is not reinstated simply because later development criteria are satisfied.[14]

Financing structure and contractual assessment

The second stage covers debt and equity financing, project-company arrangements, government support, procurement contracts, leases and electricity agreements. Many project borrowings are subsequently measured at amortized cost using the effective interest method, but classification must be assessed rather than presumed. Transaction costs depend on the measurement category of the financial instrument.

Joint arrangements require analysis of joint control and the parties' rights and obligations. Lease assessment requires an identified asset and the right to control its use. A supplier's substitution right is relevant when it is substantive; a contractual substitution clause alone does not automatically prevent lease accounting.

A physical electricity purchase agreement does not qualify for the own-use exception merely because electricity is intended for internal consumption. Its terms, delivery arrangements and applicable IFRS 9 requirements must be assessed. Virtual arrangements involving net financial settlement require separate analysis. The 2026 amendments reinforce the need to document nature-dependent volume variability and any qualifying hedge designation.

Construction costs grants and restoration obligations

The third stage concerns initial measurement and cost allocation. The analysis identifies purchase price, site preparation, transport, installation, testing and directly attributable professional services as potentially eligible asset costs. Administrative expenditure, training and inefficiencies require separate assessment and should not be included merely because they occur during construction.

Borrowing costs are capitalized for qualifying assets when expenditure, borrowing costs and preparation activities are occurring. Prolonged interruption may require suspension, subject to the standard's exceptions, and capitalization ceases when substantially all necessary preparation is complete. Specific and general borrowings require different calculations. These decisions should be supported by a schedule connecting financing records with construction progress.

Government grants require reasonable assurance concerning receipt and compliance with conditions. Asset-related grants may be presented as deferred income or deducted from the asset's carrying amount under IAS 20. The choice affects presentation and related expense recognition, but it does not override asset recognition criteria.

A restoration provision requires a present obligation from a past event, a probable outflow and a reliable estimate. Where the time value of money is material, the obligation is discounted. The initial amount is included in asset cost when required, while subsequent unwinding is a finance cost. A provision is an accounting liability and does not itself establish a funded bank account.

Construction costs should be allocated to components using a documented technical or cost-based method. Shared costs require a rational allocation basis applied consistently. Testing electricity and associated production costs should be identified separately from expenditure needed to prepare the plant for its intended operation.

Readiness for use and component depreciation

The fourth stage establishes when an asset is available for use. A formal commissioning certificate can support this assessment but should not override the asset's actual location and condition. Once available for use, depreciation begins even if utilization remains below planned capacity. Borrowing-cost cessation must also be assessed using IAS 23's completion criterion rather than delayed automatically until commercial production reaches its target.

Significant parts are depreciated separately under IAS 16. Panels, inverters, batteries, transformers and infrastructure may require separate records, depending on materiality and their consumption patterns. Similar principles apply to significant wind-turbine components. Grouping may be appropriate where useful lives and depreciation methods are the same.

The component register should contain allocated cost, availability date, useful life, residual value, depreciation method and replacement history. Useful lives, residual values and methods require annual review. Changes in estimates are applied prospectively; correction of a prior-period error must be distinguished from an estimate revision. Output degradation informs useful-life and cash-flow assessments but does not automatically prescribe a particular depreciation method.

Operation revenue and environmental attributes

During operation, electricity sales, capacity services and other contractual services require separate assessment. For transactions within IFRS 15, the entity identifies the contract and performance obligations, determines and allocates the transaction price, and recognizes revenue as control transfers. Electricity delivered and consumed continuously will commonly support recognition over time, with metering and contract terms informing measurement.

Financial settlement under a derivative arrangement is accounted for under the applicable financial-instrument requirements. It should not be confused with the consideration for physical electricity sales. Hedge accounting requires qualifying relationships and documentation; its use is not automatic simply because a contract reduces economic risk.

Routine servicing is expensed as incurred. Qualifying replacement and major-inspection expenditure may be recognized as part of an asset, with derecognition of the replaced component or previous inspection amount where required. Spare parts meeting the definition of property, plant and equipment are accounted for under IAS 16; other items are generally inventories.

Environmental attributes require assessment of the specific rights, control, acquisition route and intended use. IAS 2 or IAS 38 may be relevant, with IAS 8 guiding policy development where no standard specifically applies. Neither renewable electricity generation nor estimated avoided emissions automatically creates a recognized carbon asset. Financial recognition, ownership of certificates and sustainability metrics require separate evidence.

Impairment and reconciliation of assumptions

The sixth stage includes recurring reviews. Changes in electricity prices, curtailment, equipment performance, financing conditions and physical climate exposure may indicate impairment. Recoverable amount is the higher of value in use and fair value less costs of disposal. Testing is conducted at the individual asset level or the appropriate cash-generating unit when independent cash inflows cannot be identified for a component.

Value-in-use estimates must follow IAS 36 requirements. The analysis emphasizes approved forecasts, generation expectations, degradation and operating expenditure. Risks should not be counted both in cash flows and in the discount rate. Forecasts must also respect restrictions concerning future restructuring and enhancement of an asset's current condition.

The proposed control is an assumption register connecting financial models and climate-related analysis. It should identify the variable, source, reporting purpose, horizon, version and reviewer. Differences between impairment and climate-scenario assumptions may be justified; the aim is to explain them rather than force identical models. This reconciliation is a proposed implementation practice, not a claim that every scenario disclosure is an IAS 36 measurement input.

Decommissioning and closure

The final stage includes dismantling, waste treatment, restoration and settlement of outstanding obligations. Its accounting starts earlier whenever recognition criteria are satisfied. Provisions are reviewed at each reporting date, including changes in expected expenditure, timing and discount rates.

Under the cost model, IFRIC 1 generally connects changes in an existing restoration liability with the related asset's carrying amount, subject to its limitations. Unwinding of the discount remains a finance cost. Assets are derecognized on disposal or when no future economic benefits are expected from use or disposal. Classification as held for sale requires the IFRS 5 criteria; an intention to close a plant alone is insufficient.

Project closure should reconcile the asset register, provisions, grants, lease balances, contractual settlements and receivables or payables. Differences between estimated and actual closure expenditure provide information for later projects, although they do not justify retrospective alteration of valid earlier estimates.[15]

4. Discussion

Contribution and implementation implications

The framework connects life-cycle management with financial reporting through explicit decision points and evidence requirements. Its contribution is the combination of stage-based mapping, component records and reconciliation of assumptions. It does not establish a new valuation method, and the targeted literature review does not support a universal claim of originality.

A persistent project identifier can support traceability when contracts, invoices, engineering reports and environmental records originate in different departments. The identifier should connect, rather than replace, asset, component, contract and financing identifiers. Transactions remain subject to the appropriate recognition and measurement requirements. Software implementation is therefore secondary to establishing an agreed information structure and review responsibility.

For enterprises in Uzbekistan, the framework offers a possible way to organize IFRS implementation at project level. Applying it requires assessment of existing registers, contractual documentation and engineering data. The article does not assume that all energy enterprises have the same reporting obligations or that the framework has already been adopted locally.

Reporting quality and limits of integration

Three mechanisms may improve reporting processes. Documented capitalization decisions can make recognition boundaries more transparent. Component records can support depreciation and replacement accounting. Assumption reconciliation can reveal unexplained differences between financial and climate reporting. These are expected mechanisms rather than measured outcomes.

Integration also has limits. Climate disclosures may use longer horizons or scenarios that differ from financial measurement assumptions. An avoided-emissions indicator may be relevant to sustainability reporting without meeting financial asset recognition criteria. Maintaining these distinctions prevents an integrated information system from producing inappropriate accounting entries.

Implementation requires staff time, reliable technical information and version control. A proportionate approach would prioritize significant components, material contracts and sensitive estimates. Before enterprise-wide adoption, a pilot could assess whether the records provide useful evidence without imposing excessive administrative cost.

Future empirical evaluation

Future studies should examine actual project records and compare documented decisions before and after implementation. Potential measures include unresolved capitalization classifications, completeness of component registers, unexplained assumption differences and delays in updating restoration estimates. These measures would assess process performance rather than presume a direct effect on profitability.

Interviews with accountants, engineers and auditors could identify implementation barriers. Comparative case studies could examine whether project size, financing structure

and information-system maturity affect adoption costs. A credible evaluation would document selection criteria, baseline procedures and concurrent organizational changes before attributing improvements to the framework.

5. Conclusion

This article develops a seven-stage conceptual framework for applying IFRS across the life cycle of green energy projects. It connects preliminary expenditure, financing, construction, readiness for use, operations, impairment reviews and closure with their principal accounting decisions and evidence requirements.

The central proposal is a persistent project identifier supported by documented recognition decisions, component-level records and reconciliation of material reporting assumptions. The framework can help organize the application of existing standards while preserving distinctions between financial recognition and sustainability disclosure.

Its findings remain conceptual. The conceptual analysis contains no enterprise sample or field validation, and the targeted literature review cannot establish comprehensive novelty. Further research should test the framework using actual renewable energy project records and assess both reporting benefits and implementation costs. Until then, it should be treated as a structured accounting implementation proposal rather than demonstrated evidence of improved financial performance.

REFERENCES

[1] IFRS Foundation, "IAS 16: Property, Plant and Equipment." [Online]. Available: https://www.ifrs.org/issued-standards/list-of-standards/ias-16-property-plant-and-equipment/.

[2] IFRS Foundation, "IAS 37: Provisions, Contingent Liabilities and Contingent Assets." [Online]. Available: https://www.ifrs.org/issued-standards/list-of-standards/ias-37-provisions-contingent-liabilities-and-contingent-assets/.

[3] IFRS Foundation, "IAS 38: Intangible Assets." [Online]. Available: https://www.ifrs.org/issued-standards/list-of-standards/ias-38-intangible-assets/.

[4] IFRS Foundation, Property, Plant and Equipment—Proceeds before Intended Use (Amendments to IAS 16), 2020. [Online]. Available: https://www.ifrs.org/issued-standards/list-of-standards/ias-16-property-plant-and-equipment/.

[5] IFRS Foundation, IFRS S1: General Requirements for Disclosure of Sustainability-related Financial Information, 2023. [Online]. Available: https://www.ifrs.org/issued-standards/ifrs-sustainability-standards-navigator/ifrs-s1-general-requirements/.

[6] IFRS Foundation, Contracts Referencing Nature-dependent Electricity (Amendments to IFRS 9 and IFRS 7), 2024. [Online]. Available: https://www.ifrs.org/projects/completed-projects/2024/power-purchase-agreements/.

[7] K. Wang et al., "Full life cycle management of power system integrated with renewable energy: Concepts, developments and perspectives," Frontiers in Energy Research, vol. 9, Art. no. 680355, 2021, doi: 10.3389/fenrg.2021.680355.

[8] Y. Wang, S. Song, M. Gao, J. Wang, J. Zhu, and Z. Tan, "Accounting for the life cycle cost of power grid projects by employing a system dynamics technique: A power reform perspective," Sustainability, vol. 12, no. 8, Art. no. 3297, 2020, doi: 10.3390/su12083297.

[9] IFRS Foundation, IAS 1: Presentation of Financial Statements. [Online]. Available: https://www.ifrs.org/issued-standards/list-of-standards/ias-1-presentation-of-financial-statements/.

[10] IFRS Foundation, IAS 8: Basis of Preparation of Financial Statements. [Online]. Available: https://www.ifrs.org/issued-standards/list-of-standards/ias-8-accounting-policies-changes-in-accounting-estimates-and-errors/.

[11] IFRS Foundation, IAS 10: Events after the Reporting Period. [Online]. Available: https://www.ifrs.org/issued-standards/list-of-standards/ias-10-events-after-the-reporting-period/.

[12] IFRS Foundation, IAS 12: Income Taxes. [Online]. Available: https://www.ifrs.org/issued-standards/list-of-standards/ias-12-income-taxes/.

[13] IFRS Foundation, IAS 23: Borrowing Costs. [Online]. Available: https://www.ifrs.org/issued-standards/list-of-standards/ias-23-borrowing-costs/.

[14] IFRS Foundation, IFRS 9: Financial Instruments. [Online]. Available: https://www.ifrs.org/issued-standards/list-of-standards/ifrs-9-financial-instruments/.

[15] IFRS Foundation, IFRS 7: Financial Instruments: Disclosures. [Online]. Available: https://www.ifrs.org/issued-standards/list-of-standards/ifrs-7-financial-instruments-disclosures/.