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Renewable Energy Certificate/Credit (REC) Market - A Global and Regional Analysis: Focus on Application, Product, and Regional Analysis - Analysis and Forecast, 2025-2035

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Abstracts

The global renewable energy certificate/credit market was valued at $27,503,377.4 thousand in 2024 and is projected to grow at a CAGR of 6.85% during the forecast period 2025-2035. Market growth is driven by the accelerating global transition toward renewable energy, rising corporate sustainability commitments, and increasing regulatory mandates supporting green power adoption. The growing participation of organizations in voluntary renewable procurement programs and carbon offset initiatives is further fueling market expansion. Additionally, advancements in digital tracking systems, blockchain-based verification, and cross-border trading platforms are enhancing transparency and operational efficiency. The alignment of REC frameworks with national renewable energy targets and the integration of real-time generation data are improving traceability and compliance. Supported by continuous innovation, policy harmonization, and expanding renewable generation capacity, the global renewable energy certificate/credit market is expected to witness sustained growth through 2035, positioning RECs as a pivotal mechanism in advancing the global clean energy transition.

Introduction of Renewable Energy Certificates

The study conducted by BIS Research identifies the renewable energy certificates as a critical mechanism for accelerating the global transition toward clean energy and sustainability across industrial, commercial, and residential sectors. Renewable energy certificates serve as verified instruments that represent proof of renewable electricity generation and consumption, allowing businesses and utilities to substantiate their

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green energy claims. The market's growth has been driven by increasing corporate commitments to carbon neutrality, government renewable energy mandates, and consumer demand for transparent, verifiable renewable sourcing. Advancements in digital tracking, blockchain integration, and automation are enhancing traceability and accountability within the certificate ecosystem. By enabling both voluntary and compliance-based renewable procurement, renewable energy certificates are fostering market-driven decarbonization and facilitating investment in new renewable generation capacity. The system supports countries in achieving net-zero targets, strengthens corporate sustainability disclosures, and ensures accountability across the energy value chain. As energy systems evolve toward decentralization and digitization, renewable energy certificates are emerging as a cornerstone of global clean energy governance, linking renewable generation with verifiable environmental impact and long-term climate responsibility.

Market Introduction

The global renewable energy certificate/credit market has been experiencing rapid expansion as nations, corporations, and utilities intensify efforts to meet renewable energy and carbon reduction targets. These certificates function as tradable instruments that verify electricity generation from renewable sources such as wind, solar, hydro, and biomass, driving both compliance and voluntary market growth. Growing international commitments to decarbonization, along with corporate renewable procurement programs, are fueling demand across developed and emerging economies. Governments are introducing renewable portfolio standards, green premium programs, and cross-border trading mechanisms to stimulate renewable investment and market liquidity. Technological advancements, including blockchain-enabled registries and hourly matching systems, are improving transparency and accountability in certificate issuance and retirement.

The market's expansion is further supported by rising corporate participation in renewable power purchase agreements and sustainability-linked energy sourcing. Regions such as North America, Europe, and Asia-Pacific are leading adoption, with Asia-Pacific positioned for strong growth due to policy momentum in countries like China, India, Japan, and South Korea. As clean energy transitions gain pace, the global renewable energy certificate/credit market is becoming a central pillar of the global renewable ecosystem, facilitating traceable green power procurement, enhancing climate reporting credibility, and supporting the world's transition toward a sustainable, low-carbon energy future.

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Industrial Impact

The growing adoption of renewable energy certificate mechanisms is reshaping industrial operations across power generation, manufacturing, technology, and corporate sustainability sectors. These certificates are enabling industries to validate their renewable electricity use, align with environmental regulations, and meet corporate decarbonization targets without direct access to physical renewable power. In the energy and utilities sector, renewable energy certificates are driving the development of new wind, solar, and hydro projects by providing an additional revenue stream that improves project bankability and attracts green investment. Manufacturers and data center operators are leveraging renewable energy certificates to offset carbon-intensive electricity use, demonstrating progress toward net-zero emissions and meeting environmental, social, and governance (ESG) standards.

For multinational corporations, renewable energy certificates serve as an essential compliance and voluntary tool to manage energy portfolios, secure renewable attributes, and strengthen sustainability reporting credibility. The growing use of bundled certificates within long-term power purchase agreements further ensures traceable and verifiable renewable sourcing, particularly in sectors such as technology, telecommunications, and heavy industry. This industrial transition is also supported by blockchain and digital tracking systems, which provide greater transparency and real-time validation of renewable energy transactions.

According to the International Renewable Energy Agency (IRENA) and market operators such as I-REC and Green-e, renewable energy certificates are accelerating cross-border trade, creating liquid renewable attribute markets, and stimulating renewable investments across emerging economies. As industries increasingly integrate renewable energy certificates into procurement and reporting strategies, they are not only reducing operational emissions but also enhancing competitiveness, investor confidence, and global sustainability alignment. Overall, the global renewable energy certificate/credit market is transforming industrial energy practices by linking economic growth with measurable climate responsibility and renewable expansion.

Market Segmentation:

Segmentation 1: by Application

- Compliance RECs

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Voluntary RECs

Compliance RECs to Dominate the Global Renewable Energy Certificate/Credit Market (by Application)

Compliance renewable energy certificates are projected to dominate the global market through 2035, accounting for approximately 55% to 60% of the total market value. These certificates are mandated under renewable portfolio standards or equivalent renewable energy obligations across regions such as the U.S., Europe, India, and Australia. Consistent demand from obligated entities, utilities, retailers, and large industrial consumers ensures strong market liquidity and price stability compared to voluntary certificates. In 2024, over 470 million compliance certificates were retired in the U.S. alone, reflecting steady growth in state-level renewable targets. Strong policy enforcement, compliance penalties, and technology-specific carve-outs, such as solar or tier-I certificates, continue to sustain price premiums in key markets. Furthermore, emerging economies like India and China are tightening renewable purchase obligations, further driving compliance-based demand. As global governments scale renewable energy ambitions toward 2030 and beyond, compliance with renewable energy certificates is expected to remain the market's primary growth driver, providing stable revenue streams for renewable project developers.

Segmentation 2: by Transaction Type

Bundled RECs

Unbundled RECs

Bundled RECs to Dominate the Global Renewable Energy Certificate/Credit Market (by Transaction Type)

Bundled renewable energy certificates, which are sold together with renewable electricity through power purchase agreements or utility green tariffs, are expected to dominate the market by transaction type, contributing nearly two-thirds of total market revenue by 2035. The increasing preference for bundled procurement reflects buyers' focus on additionality, traceability, and verified impact. Multinational corporations, particularly in technology and manufacturing, are prioritizing long-term power purchase agreements that secure both renewable electricity and corresponding certificates,

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ensuring cost stability and credibility in renewable energy claims. In the U.S., over 70% of corporate renewable deals in 2024 included bundled certificates. Similar trends are gaining traction in Europe through Guarantee of Origin–backed corporate PPAs and in Asia via Japan's non-fossil certificate auctions. The emergence of hourly matching and blockchain-based tracking is further strengthening transparency and accountability in bundled transactions. As corporate sustainability strategies advance toward 24/7 carbon-free energy goals, bundled renewable energy certificates are positioned to become the most credible and impactful procurement mechanism across both developed and emerging markets.

Segmentation 3: by Resource Type

Solar RECs

Wind RECs

Hydro RECs

Biomass RECs

Others

Wind RECs to Dominate the Global Renewable Energy Certificate/Credit Market (by Resource Type)

Wind-based renewable energy certificates are expected to lead the market by resource type from 2025 to 2035, driven by wind energy's dominant share in global renewable generation and its strong cost efficiency. In 2024, wind power represented about 37% of all renewable certificate issuances worldwide, surpassing solar and hydro resources. The affordability and scalability of wind projects, particularly across North America, Europe, and India, have positioned wind-based certificates as the most traded category in both compliance and voluntary markets. Corporations increasingly favor wind-based certificates for their accessibility and suitability for large-scale sustainability commitments. Continued expansion of high-capacity onshore and offshore wind farms in regions such as the U.S., China, and the North Sea is further strengthening supply. Technological advancements in turbine design and digital monitoring are reducing generation costs and improving transparency. By 2035, wind-based renewable energy certificates are expected to remain the leading resource segment, supported by growing

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offshore investments and real-time integration of generation data into certificate tracking platforms.

Segmentation 4: by Region

North America: U.S., Canada, and Mexico

Europe: Germany, France, U.K., Italy, Spain, and Rest-of-Europe

Asia-Pacific: China, Japan, India, Australia, South Korea, and Rest-of-Asia-Pacific

Rest-of-the-World: South America and Middle East and Africa

Asia-Pacific is expected to dominate the global renewable energy certificate/credit market, with South Korea emerging as the regional leader. This growth is driven by ambitious renewable energy targets, advanced digital infrastructure, and strong government initiatives supporting carbon-neutral development. Countries such as China, Japan, and South Korea are leading in renewable adoption through national mandates, corporate sustainability commitments, and expanding cross-border trade in green power. The region’s growing renewable generation capacity, particularly in solar, wind, and biomass, is driving high demand for renewable energy certificates across both compliance and voluntary markets. Additionally, the introduction of digital trading platforms and government-led carbon neutrality frameworks is improving market transparency, efficiency, and investor confidence. As the Asia-Pacific region continues to advance its renewable energy transition and regional cooperation, it is expected to remain the global center for renewable energy certificate innovation and exchange.

Demand - Drivers, Limitations, and Opportunities

Market Demand Driver: Strengthening Renewable Energy Mandates and Targets

The global renewable energy certificate/credit market has been experiencing strong growth driven by the increasing implementation of renewable energy mandates and clean energy targets worldwide. Governments and regulatory bodies are introducing ambitious renewable portfolio standards and net-zero emission goals, encouraging both public and private sectors to adopt renewable energy solutions. Renewable energy certificates (RECs) have emerged as an essential market-based mechanism that allows

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organizations to demonstrate compliance with these mandates while promoting transparency in renewable energy sourcing. The expansion of corporate sustainability commitments and the rapid growth of voluntary REC purchases further strengthen market demand. As nations work toward decarbonizing their power sectors, the establishment of mandatory and voluntary REC frameworks continues to serve as a key driver for accelerating renewable energy deployment globally.

Market Challenge: Regulatory Uncertainty and Policy Reversals

Despite strong momentum, the global renewable energy certificate/credit market faces challenges stemming from inconsistent policy frameworks and regulatory uncertainty. Frequent policy shifts, delays in renewable energy auctions, and changing government priorities can undermine investor confidence and disrupt market stability. In some regions, sudden reversals of clean energy incentives or unclear rules regarding cross-border REC trading create uncertainty for market participants. Additionally, varying standards and definitions of RECs across jurisdictions complicate market harmonization, making it difficult for stakeholders to navigate compliance requirements. These inconsistencies not only affect long-term planning but also limit the scalability of renewable energy projects. Addressing these policy gaps and ensuring transparent, stable governance are critical to sustaining market confidence and supporting continuous renewable energy expansion.

Market Opportunity: Cross-Border and International Trade Expansions

The growing globalization of renewable energy markets presents a significant opportunity for cross-border and international trade of renewable energy certificates. As corporations and countries strive to achieve sustainability goals beyond domestic boundaries, the demand for internationally recognized and tradable RECs is increasing. Harmonizing certification standards and facilitating mutual recognition agreements between countries can unlock new market potential, allowing surplus renewable energy production in one region to offset carbon footprints elsewhere. This cross-border expansion not only enhances liquidity and transparency in REC trading but also encourages international collaboration toward climate targets. Moreover, the development of digital trading platforms and blockchain-based verification systems is expected to further streamline international REC transactions, making global renewable energy procurement more efficient and accessible.

How can this report add value to an organization?

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Product/Innovation Strategy: In the global renewable energy certificate/credit market, companies are emphasizing innovation and technological integration to strengthen their position in the evolving renewable energy landscape. Digital transformation and transparency are central to these strategies, with key innovations focusing on blockchain-based tracking systems, automated registry platforms, and artificial intelligence–enabled verification tools that ensure the authenticity and traceability of renewable energy transactions. Market players are investing in the development of digital marketplaces that facilitate real-time trading, pricing visibility, and cross-border compatibility of renewable energy certificates. The adoption of cloud-based infrastructure and decentralized ledger technologies is enhancing operational efficiency and reducing administrative costs. Additionally, companies are promoting the integration of renewable energy certificates with corporate sustainability reporting and carbon accounting systems to enable organizations to meet net-zero and ESG goals more efficiently. Strategic collaborations between certificate issuers, technology providers, and energy producers are driving the evolution of scalable, secure, and interoperable trading platforms, fostering confidence and growth in the global renewable energy ecosystem.

Growth/Marketing Strategy: The global renewable energy certificate/credit market presents strong growth potential through strategic market expansion, policy alignment, and technological adoption. Companies are pursuing regional diversification and cross-border trading to capitalize on increasing renewable energy commitments across North America, Europe, and the Asia-Pacific. Market participants are focusing on product differentiation by offering customized certificate bundles for solar, wind, hydro, and biomass energy sources, aligning with diverse regulatory and corporate sustainability frameworks. Mergers, acquisitions, and partnerships are central to strengthening technological capabilities and expanding into high-demand markets where renewable energy targets are accelerating. Companies are also enhancing their marketing initiatives by promoting transparency, traceability, and environmental accountability, appealing to both institutional buyers and individual consumers seeking credible green energy solutions. Collaborative efforts with regulatory bodies and renewable energy associations are enabling firms to influence emerging market structures and compliance mechanisms. As global demand for verifiable and tradeable renewable energy solutions increases, companies implementing robust growth and marketing strategies will be well-positioned to lead the market’s next phase of expansion.

Competitive Strategy: In the global renewable energy certificate/credit market, companies are leveraging innovation, strategic partnerships, and market integration to strengthen their competitive positioning. Leading players such as Statkraft AS, NextEra

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Energy Resources, LLC (NEER), and Enel Green Power S.p.A. are focusing on platform scalability, verification integrity, and global market access as key differentiators. The emphasis on digital verification technologies and transparent trading systems is reshaping competition by prioritizing trust, efficiency, and environmental impact. Strategic alliances between certificate issuers, renewable energy generators, and corporate sustainability platforms are enabling the creation of integrated ecosystems that cater to diverse compliance and voluntary market requirements. Market leaders are also expanding their service offerings to include portfolio management, automated compliance reporting, and data analytics for renewable energy sourcing, helping organizations streamline sustainability operations. Furthermore, competitive differentiation increasingly depends on data transparency, interoperability, and user experience, factors that enhance trust and participation in certificate trading. As sustainability commitments intensify worldwide, companies that effectively combine technology, credibility, and strategic collaboration will likely maintain a strong competitive edge in the rapidly growing global renewable energy certificate/credit market.

Research Methodology

Factors for Data Prediction and Modelling

The base currency considered for the global renewable energy certificate/credit market analysis is the US$. Currencies other than the US$ have been converted to US$ for all statistical calculations, considering the average conversion rate for that particular year.

The currency conversion rate has been taken from the historical exchange rate on the Oanda website.

Nearly all the recent developments from January 2021 to September 2025 have been considered in this research study.

The information rendered in the report is a result of in-depth primary interviews, surveys, and secondary analysis.

Where relevant information was not available, proxy indicators and extrapolation were employed.

Any economic downturn in the future has not been taken into consideration for

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the market estimation and forecast.

Technologies currently used are expected to persist through the forecast with no major technological breakthroughs.

Market Estimation and Forecast

This research study involves the usage of extensive secondary sources, such as certified publications, articles from recognized authors, white papers, annual reports of companies, directories, and major databases, to collect useful and effective information for an extensive, technical, market-oriented, and commercial study of the global renewable energy certificate/credit market.

The market engineering process involves the calculation of the market statistics, market size estimation, market forecast, market breakdown, and data triangulation (the methodology for such quantitative data processes has been explained in further sections). The primary research study has been undertaken to gather information and validate the market numbers for segmentation types and industry trends of the key players in the market.

Primary Research

The primary sources for this study include industry experts and key stakeholders across the global renewable energy certificate/credit market ecosystem. Respondents such as chief executive officers, vice presidents, market development heads, sustainability officers, and technology directors were interviewed to gather and validate both qualitative and quantitative insights. These interviews helped ensure accuracy, depth, and relevance in understanding the market's current dynamics, competitive landscape, and future growth opportunities.

The key data points obtained from primary sources include:

validation and triangulation of all numerical data, charts, and projections

verification of report segmentations and qualitative findings

insights into the competitive environment and strategic positioning of key players

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- validation of market figures across different certificate types and trading mechanisms
- percentage split and contribution of individual regional markets for comparative analysis

Secondary Research

The secondary research component involved extensive use of credible databases, company reports, and industry publications to ensure comprehensive coverage of the global renewable energy certificate/credit market. Sources included platforms such as Bloomberg, Factiva, Hoovers, and Businessweek, along with government and institutional databases such as the International Renewable Energy Agency (IRENA), the International Energy Agency (IEA), and national energy departments. This secondary research provided valuable insights into policy frameworks, pricing mechanisms, and market development patterns across regions.

The study also leveraged official reports, trade association data, and academic research to map the value chain, understand revenue models, and identify both current and emerging use cases.

The key data points obtained from secondary research include:

- market segmentation and percentage distribution across regions and certificate types
- data related to market valuation and trading volume
- analysis of leading industry trends and developments among top market participants
- qualitative insights into policy evolution, corporate sustainability initiatives, and technological advancements
- quantitative data used for economic modeling, forecasting, and statistical validation

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Key Market Players and Competition Synopsis

The companies that are profiled in the global renewable energy certificate/credit market have been selected based on inputs gathered from primary experts, who have analyzed company coverage, product portfolio, and market penetration.

Some of the prominent names in the global renewable energy certificate/credit market are:

Adani Green Energy Limited (AGEL)

Brookfield Renewable Partners L.P.

China Three Gorges Corporation (CTG)

EDF Renewables

ENGIE SA

Enel Green Power S.p.A.

Iberdrola, S.A.

Invenergy LLC

Masdar

NextEra Energy Resources, LLC (NEER)

?rsted A/S

Scatec ASA

Statkraft AS

Tata Power Renewable Energy Limited (TPREL)

TotalEnergies SE

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Companies that are not a part of the aforementioned pool have been well represented across different sections of the global renewable energy certificate market report (wherever applicable).

This report can be delivered within 1 working day.

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