

ANMD-MRS25-248 · Renewable Energy Integration

Grid-Forming Inverters

A Global Sustainability Due Diligence & Market Research Study

History 2020–2024 · Base Year 2025 · Forecast 2025–2032 · Outlooks 2035 / 2040 / 2050 · Currency US\$

WHY THIS REPORT

Grid-forming inverters establish voltage and frequency from inverter-based resources, enabling stable, high-renewable and islanded grids without synchronous generators, delivering combined performance and sustainability outcomes with minimal waste. This decision-grade study sizes the global market three ways — value, volume and units — across the report's segmentation axes, seven regions and four scenarios to 2032, with outlooks to 2050.

SUSTAINABILITY & SDG IMPACT — THE ANMD LENS

Sustainability is this report's backbone, not an afterthought. Beyond performance, grid-forming inverters deliver measurable energy resilience and clean-power outcomes, while resource-efficient design and circularity strengthen the natural-capital story.

Mapped Sustainable Development Goals:

SDG 7 Affordable & Clean Energy	SDG 9 Industry & Infrastructure	SDG 13 Climate Action
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Measurable sustainability outcomes assessed:

- Grid stability and inertia from inverter-based resources
- Higher renewable penetration and islanding capability
- Reduced reliance on fossil synchronous generation
- Power-electronics embodied carbon and unit end-of-life as material risks

Framework alignment: Double materiality mapped to GRI, SASB, ISSB, TCFD, TNFD, CSRD and the EU Taxonomy, with greenwashing and SDG-washing screens applied throughout.

WHAT'S INSIDE AT A GLANCE

53 Chapters	9 Report Parts	7 Regions Covered	40+ Country Markets
2025–32 Forecast Horizon	4 Forward Scenarios	25+ Companies Profiled	3 SDGs Mapped

REPORT COVERAGE

Geographic scope: North America, Europe, Asia Pacific, Latin America, Africa, Middle East and Rest of World — with named country intelligence. Asia Pacific scale engine ; North America innovation leader ; Europe policy leader.

MARKET OVERVIEW

From demonstration to grid-code requirement — where inverters set the grid rather than merely follow it.

Grid-forming inverters are moving from demonstration to grid-code requirement. Demand is driven by declining system inertia, weak-grid integration and black-start needs, supported by maturing grid-forming controls and IEEE 2800. The market is read three ways — value, installed capacity (MW) and unit volume — and forecast under conservative, base, accelerated and disruption scenarios, with every projection resolved to the 2025 base year and each region reported separately rather than folded into Rest of World.

- Australia & Europe lead early adoption, anchored by Australia, the United Kingdom and Germany, where low-inertia grids drive grid-forming mandates.
- North America is accelerating, supported by United States storage growth and IEEE 2800 inverter-based-resource standards.
- Asia Pacific scales on storage, as China, India and South Korea pair grid-forming with large battery deployments.
- Application and power class segment the value, across black-start, synthetic inertia and islanding, and utility to grid-scale power classes, each with distinct economics.
- Stability without machines is the differentiator, synthetic inertia and black-start underpin value grid-following inverters cannot provide.

REGIONAL OUTLOOK

Across the seven reporting regions, the report separates deployment leaders from high-growth and emerging markets, profiling named country sub-markets, policy regimes and project pipelines in each. Asia Pacific and North America anchor near-term volume; Europe leads on grid policy; while Latin America, Africa and the Middle East are assessed on their own merits — for energy access, grid expansion and decarbonisation — rather than aggregated away.

Region	Stage	Lead Markets & Drivers
Asia Pacific	Scale engine	China, India, Japan, Australia, South Korea — deployment scale, manufacturing, targets
North America	Innovation leader	United States, Canada — market reform, incentives, DER & storage growth
Europe	Policy leader	Germany, Spain, United Kingdom, Italy — grid codes, flexibility markets, decarbonisation
Latin America	Emerging	Brazil, Chile, Mexico — auctions, distributed solar, grid expansion
Africa	Frontier	South Africa, Kenya, Nigeria — energy access, minigrids, off-grid solar
Middle East	Frontier	Saudi Arabia, UAE — utility-scale renewables, diversification, sovereign investment

KEY MARKET DRIVERS & RESTRAINTS

Drivers	Restraints
• Declining system inertia & stability needs • Weak-grid & high-IBR integration • Black-start & islanding requirements • Grid codes (IEEE 2800, grid-forming mandates) • Control & power-semiconductor technology gains	• Cost premium vs grid-following inverters • Controls complexity & validation • Standards & interoperability immaturity • Semiconductor & magnetics cost inflation • Stability-modelling & study burden

SEGMENTATION SNAPSHOT

By Application	Black-start · synthetic inertia · islanding
By Power Class	Utility · grid-scale · microgrid
By Component	Power semiconductors · controls · magnetics · software
By End User	Utilities · grid operators · IPPs · microgrid developers
By Business Model	Hardware sale · firmware/SaaS · grid-services
By Coupling	Battery storage · solar + storage · microgrid

TABLE OF CONTENTS — PARTS & CHAPTERS

The full report is organised into nine parts across 53 chapters, listed below. Detailed sub-headings, country tables and directories are provided in the full report.

Part I — Report Foundation, Discovery and Strategic Intelligence

- › Chapter 1. Scope, Methodology and Report Architecture
- › Chapter 2. Industry Discovery Summary — Grid-Forming Inverters
- › Chapter 3. Executive Intelligence and Decision Dashboard
- › Chapter 4. Strategic Findings, Materiality and Investment Verdict Preview

Part II — Market Intelligence, Sizing, Forecasting and Segmentation

- › Chapter 5. Industry Overview and Market Evolution
- › Chapter 6. Market Dynamics
- › Chapter 7. Global Market Size and Forecast, 2020–2032
- › Chapter 8. Market Segmentation Analysis
- › Chapter 9. End-User and Demand-Side Intelligence
- › Chapter 10. Pricing, Cost and Commercial Model Intelligence

Part III — Regional and Country Intelligence

- › Chapter 11. Global Regional Intelligence Framework
- › Chapter 12. North America Market Intelligence
- › Chapter 13. Europe Market Intelligence
- › Chapter 14. Asia Pacific Market Intelligence
- › Chapter 15. Latin America Market Intelligence
- › Chapter 16. Africa Market Intelligence
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- › Chapter 18. Rest of World Market Intelligence

Part IV — Technology, Innovation and Category-Specific Intelligence

- › Chapter 19. Technology Landscape and Architecture
- › Chapter 20. Emerging and Next-Generation Technology Intelligence
- › Chapter 21. Category-Specific Intelligence Module
- › Chapter 22. Research, Innovation and Funding Landscape

Part V — Company, Competition, Patent and Project Intelligence

- › Chapter 23. Competitive Landscape
- › Chapter 24. Company Profiles
- › Chapter 25. Mergers, Acquisitions, Partnerships and Ecosystem Intelligence
- › Chapter 26. Patent Landscape and Intellectual Property Intelligence
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Part VI — Sustainability, ESG, SDG, Climate and Natural-Capital Intelligence

- › Chapter 28. Sustainability Intelligence Suite
- › Chapter 29. ESG Intelligence and Double Materiality
- › Chapter 30. ESG and Sustainability Framework Alignment
- › Chapter 31. SDG Intelligence
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- › Chapter 33. Water, Biodiversity and Natural-Capital Intelligence
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- › Chapter 36. Climate Risk, Adaptation and Resilience Intelligence

Part VII — Supply Chain, Policy, Legal, Economics and Finance

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- › Chapter 38. Policy, Regulation and Incentive Intelligence
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- › Chapter 41. Investment, Sustainable Finance and Bankability Intelligence

Part VIII — Scenario, Future Intelligence and Final Due Diligence Verdict

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- › Chapter 44. Risk Register, RAG Rating and Anti-Greenwashing Screen
- › Chapter 45. Bottom-Line Verdict and Strategic Recommendations
- › Chapter 46. Implementation Roadmap and Stakeholder Playbooks

Part IX — Annexes, Directories and Reference Material

- › Chapter 47. Methodology Annex
- › Chapter 48. Corporate Directory and Company Intelligence Annex
- › Chapter 49. Patent Directory and Patent Intelligence Annex
- › Chapter 50. Project Intelligence Annex
- › Chapter 51. Forecast Annex
- › Chapter 52. Sustainability KPI Annex
- › Chapter 53. Reference Annexes

COMPETITIVE & INVESTMENT SNAPSHOT

The competitive field spans established energy-technology majors, specialist software and hardware vendors, and turnkey integrators. Profiled players include SMA Solar, Power Electronics, Sungrow, GE Vernova and Hitachi Energy. Deal activity — partnerships, technology licensing and demonstration programmes — signals a market consolidating around bankable, repeatable designs.

Representative players profiled in the full report:

SMA Solar Technology AG · Power Electronics S.L. · Sungrow Power Supply Co., Ltd. · GE Vernova Inc. · Hitachi Energy Ltd · and 20+ further profiled players across the value chain.

Investment intelligence: venture, growth, infrastructure, development, climate and blended finance, green bonds and sustainability-linked instruments — culminating in a bankability assessment and a Go / No-Go / Conditional-Go investment verdict.

KEY QUESTIONS THIS REPORT ANSWERS

- ? How large is the global grid-forming inverters market, and how fast will it grow to 2032?
- ? Which regions, countries and segments offer the strongest risk-adjusted opportunity?
- ? How do the category's economics change returns versus conventional approaches?
- ? Who leads, and where is the competitive and patent white space?
- ? Is the investment case bankable — and under what conditions?
- ? How does the technology align with the SDGs and emerging disclosure regulation?

WHY ANMD — THE DIFFERENCE

Most market studies stop at units and revenue. This report is built as a sustainability due diligence instrument — fusing market sizing with ESG, SDG, climate and natural-capital intelligence and a decision-ready bankability verdict in a single architecture.

- **Triangulated sizing** — every market read three ways so value, volume and adoption views reconcile rather than conflict.
- **Region-honest forecasting** — Latin America, Africa and the Middle East reported in full, never hidden inside Rest of World, every forecast resolved to the 2025 base year.
- **Integrated evidence base** — company, patent and project databases linked to the analysis, with published-filing patents and FTO treated as an indicator, not a legal conclusion.
- **No-fabrication discipline** — every estimate carries a data-confidence rating and disclosed sources; gaps are flagged for further diligence, never filled with invented numbers.
- **Anti-greenwashing rigour** — SDG-washing and greenwashing screens plus claim-substantiation checks built into the ESG and project analysis.
- **Decision-first structure** — 9 Parts and 53 Chapters culminating in stakeholder playbooks and a clear Go / No-Go / Conditional-Go investment verdict.

WHO SHOULD BUY THIS REPORT

Investors, inverter OEMs, utilities, grid operators, IPPs, microgrid developers, lenders, and corporate strategy and ESG teams — alongside strategic corporate planners and decision-makers.

Access the Full Report

The complete report delivers all 53 chapters in full, with every sub-heading, country table, company and patent directory, forecast model and due diligence checklist.

Purchase at www.anewmarketdynamics.com · Standard & Premium licences · Single-Site (SSL) and Global-Site (GSL) options at checkout.

Want the Complete Detailed Table of Contents?

This prospectus lists the nine parts and 53 chapters. The complete detailed table of contents — every sub-heading, country table, exhibit, company and patent directory and annex — is available on request to registered users. To receive it, register with your official company email at www.anewmarketdynamics.com. The full detailed table of contents will be sent directly to your registered company email address.