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	SDG 9	SDG 13
Affordable & Clean Energy	Industry & Infrastructure	Climate Action

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.

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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

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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.

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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.

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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.

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