Advanced Reactor Components

ANMD-MRS23-225 · Nuclear & Fusion Technologies

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

Advanced reactor components are the heavy-engineering heart of the nuclear renaissance — pressure vessels and reactor cores, heat exchangers and steam generators, and instrumentation and control (I&C) systems that make SMRs, high-temperature gas and molten-salt reactors buildable. Precision forgings, advanced materials and digital controls turn reactor designs into deployable plant. This decision-grade study sizes the global market three ways — value, unit count and component lifetime — across component type, technology platform and application, across 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 enabling clean power, components deliver measurable longer asset life, manufacturing efficiency and supply-chain resilience, while durable design strengthens the resource-efficiency story.

Mapped Sustainable Development Goals:

SDG 7	SDG 9	SDG 12
Affordable & Clean Energy	Industry, Innovation & Infrastructure	Responsible Consumption & Production

Measurable sustainability outcomes assessed:

- Longer asset life and manufacturing efficiency
- Supply-chain resilience for reactor build-out
- Embodied carbon in forgings as a material risk
- Material sourcing and end-of-life recycling assessed

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 leads heavy manufacturing; North America is rebuilding capacity; Europe is a precision anchor; other regions assessed on their own merits.

- The heavy-engineering heart of reactor deployment
- Pressure vessels, heat exchangers, steam generators and I&C
- Precision forgings, advanced materials and digital controls
- Embodied carbon, material sourcing and recycling as risks

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MARKET OVERVIEW

From reactor design to deployable plant — where nuclear-grade forging, advanced materials and qualified I&C underpin deployment speed designs alone cannot deliver.

The components market is being pulled forward by SMR and advanced-reactor deployment and the race to rebuild nuclear manufacturing capacity. Demand is driven by new reactor orders and supply-chain reshoring, supported by forging and fabrication investment across North America, Europe and Asia Pacific. The market is read three ways — value, unit count and component lifetime — and forecast under four scenarios, each region reported separately.

- **Asia Pacific leads heavy manufacturing** — South Korea, Japan and China, where Doosan Enerbility Co., Ltd., The Japan Steel Works, Ltd. and state forges hold the world's large-component fabrication capacity
- **North America is rebuilding capacity** — the United States and Canada, investing in forging, vessels and I&C to support domestic SMR and advanced-reactor programmes
- **Supply-chain capacity is the differentiator** — nuclear-grade forging, advanced materials and qualified I&C underpin deployment speed reactor designs alone cannot deliver
- **Component type and reactor application segment the value** — pressure vessels and cores, heat exchangers and steam generators, and I&C systems across SMR, HTGR and MSR designs, each with distinct economics

REGIONAL OUTLOOK

Across seven reporting regions, the report separates leading markets from high-growth and emerging ones — each profiled in full rather than aggregated into Rest of World.

Region	Stage	Lead Country Markets & Drivers
Asia Pacific	Manufacturing leader	South Korea, Japan, China — Doosan, JSW, large-component forging
Europe	Precision anchor	France, UK, Italy — Framatome, Sheffield Forgemasters, Ansaldo
North America	Rebuilding capacity	United States, Canada — forging, vessels, I&C reshoring
Latin America	Emerging	Brazil, Argentina — localisation, refurbishment demand
Africa	Frontier	South Africa — component localisation, programme support
Middle East	Frontier	UAE, Saudi Arabia — new-build supply, localisation targets

KEY MARKET DRIVERS & RESTRAINTS

Drivers	Restraints
• SMR and advanced-reactor order pipeline • Nuclear supply-chain reshoring and rebuild • High-temperature and advanced-materials demand • Digital I&C modernisation • Forging and fabrication capacity investment	• Nuclear-grade forging capacity bottlenecks • Qualification, code and certification lead times • Skilled-workforce and supply-chain gaps • High capital intensity of heavy manufacturing • First-of-a-kind component cost and risk

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SEGMENTATION SNAPSHOT

By Component Type	Pressure vessel / core · heat exchanger / SG · I&C systems · internals
By Technology Platform	SMR/LWR · high-temperature gas · molten-salt reactor components
By Application	New build · life-extension / replacement · refurbishment
By End User	Reactor vendors · utilities · EPCs · governments
By Business Model	Component sale · fabrication service · managed supply · refurbishment
By Scale	Prototype · first-of-a-kind · serial production

TECHNOLOGY & APPLICATION FINDINGS

Where the category is differentiating fastest — the technology and application fronts that separate leaders from followers:

- **New build** — reactor vendors and EPCs source vessels, steam generators and I&C for first-of-a-kind and fleet construction
- **Life-extension & replacement** — operating plants drive replacement of steam generators, internals and controls to extend fleet life
- **Advanced designs** — HTGR and MSR programmes demand high-temperature components, novel materials and qualified coolant systems

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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 heavy-forging majors, nuclear OEMs and I&C specialists. Deal activity — forging-capacity expansion, vendor supply agreements and I&C modernisation contracts — signals a market consolidating around qualified, code-compliant suppliers.

Representative players profiled in the full report:

BWX Technologies, Inc. · Doosan Enerbility Co., Ltd. · Sheffield Forgemasters International Ltd · The Japan Steel Works, Ltd. · Framatome SAS · Mitsubishi Heavy Industries, Ltd. · and 20+ further profiled players.

Investment intelligence: venture, infrastructure, development, climate and blended finance, green bonds and sustainability-linked loans — culminating in a bankability assessment and a conditional investment view.

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KEY QUESTIONS THIS REPORT ANSWERS

- How large is the global advanced reactor component market, and how fast will it grow to 2032?
- Which regions, countries and segments offer the strongest risk-adjusted opportunity?
- Which technologies and platforms reshape the addressable market and the cost curve?
- Who leads, and where is the competitive and patent white space?
- Is the investment case bankable — and under what conditions?
- How does the category align with the SDGs and 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 view in a single architecture.

- **Triangulated sizing** — every market read three ways so value, volume and the physical-unit 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, conditional investment view.

WHO SHOULD BUY THIS REPORT

Reactor vendors, utilities, EPCs, governments, component suppliers, investors and policymakers, and 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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