



ANMD-MRS1-006 · Advanced Agriculture Technologies

Vertical Farming LED Systems

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

Vertical farming LED systems convert electricity into tuned, crop-specific light, enabling high-density, year-round production with measurable photon efficiency and energy savings. This decision-grade study sizes the global market three ways — value, fixtures and grow area (m²) — across spectrum type, automation level 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 yield, LED systems deliver measurable photon-efficiency gains, energy savings and resource-efficient cultivation, while improved energy productivity and crop quality strengthen the natural-capital story.

Mapped Sustainable Development Goals:

SDG 2 Zero Hunger	SDG 7 Affordable Clean Energy	SDG 11 Sustainable Cities	SDG 12 Responsible Consumption	SDG 13 Climate Action
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Measurable sustainability outcomes assessed:

- Photon-efficiency (μmol/J) and energy-productivity gains
- Energy savings versus legacy horticultural lighting
- Resource-efficient, year-round high-density cultivation
- Electronics embodied carbon and fixture end-of-life circularity 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	5 SDGs Mapped

REPORT COVERAGE

Geographic scope: North America, Europe, Asia Pacific, Latin America, Africa, Middle East and Rest of World — with named country intelligence. Europe leads on horticulture-lighting base and CEA intensity; North America scales on vertical-farm and greenhouse lighting; Asia Pacific expands on high-density urban production.



MARKET OVERVIEW

From early adoption to commercial scale — where tuned light becomes the engine of high-density farming.

The vertical farming LED systems market is moving from early adoption to mainstream commercial scale. Demand is driven by intensifying energy, input-cost and climate pressure on protected cultivation, supported by maturing incentives across Europe, North America and Asia Pacific. The market is read three ways — value, fixtures and grow area (m²) — and forecast under four scenarios, each region reported separately.

- Europe is the technology leader — the Netherlands, Sweden and Germany, on a deep horticulture-lighting base and CEA intensity
- North America scales on vertical-farm and greenhouse lighting investment
- Asia Pacific expands on high-density urban production near consumption
- Resource-and-yield economics is the differentiator — energy and photon-efficiency savings plus yield gain, increasingly with service and data revenue

REGIONAL OUTLOOK

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

Region	Stage	Lead Markets & Drivers
Europe	Technology leader	Netherlands, Sweden, Germany — horticulture-lighting base, CEA
North America	Scaling	United States, Canada — vertical-farm & greenhouse lighting
Asia Pacific	Scaling	Japan, Singapore, China — high-density urban production
Latin America	Emerging	Brazil, Mexico — urban agriculture, high-value greens
Africa	Frontier	South Africa — controlled-environment pilots, food security
Middle East	Frontier	UAE, Saudi Arabia — desert agriculture, food security

KEY MARKET DRIVERS & RESTRAINTS

Drivers	Restraints
• Energy-efficiency + protected-cultivation convergence • Photon efficiency & energy-cost savings • Policy support (CEA, energy & food-resilience schemes) • Year-round high-value crop economics • Tunable-spectrum, sensor & AI-control technology gains	• Fixture & integration CAPEX vs legacy lighting • Energy intensity & grid-dependency exposure • Spectrum-recipe complexity & crop variability • Electronics & semiconductor cost inflation • Operator skills, financing & unit-economics barriers



SEGMENTATION SNAPSHOT

By Spectrum Type	Full-spectrum · tunable · red-blue · toplighting / interlighting
By Automation Level	Fixed · dimmable · networked / AI-controlled
By Application	Leafy greens · herbs · microgreens · propagation
By End User	Vertical farms · CEA operators · greenhouses · research · public schemes
By Component	LED fixtures · drivers · controls · sensors · software
By Scale	Modular / container · commercial · large-format facility

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 — Vertical Farming LED Systems
- › 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
- › Chapter 17. Middle East Market Intelligence
- › 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
- › Chapter 27. Project, Deployment and Case-Study Intelligence



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
- › Chapter 32. Carbon, Net-Zero and Climate-Mitigation Intelligence
- › Chapter 33. Water, Biodiversity and Natural-Capital Intelligence
- › Chapter 34. Circular Economy and Resource-Security Intelligence
- › Chapter 35. Social Impact, Human Capital and Community Intelligence
- › Chapter 36. Climate Risk, Adaptation and Resilience Intelligence

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

- › Chapter 37. Value Chain, Supply Chain and Geopolitical Intelligence
- › Chapter 38. Policy, Regulation and Incentive Intelligence
- › Chapter 39. Legal, Contracting and Risk-Allocation Intelligence
- › Chapter 40. Unit Economics, CAPEX, OPEX and Return Analysis
- › Chapter 41. Investment, Sustainable Finance and Bankability Intelligence

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

- › Chapter 42. Scenario Analysis and Future Intelligence
- › Chapter 43. Sustainability Due Diligence Framework and Data-Room Index
- › 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 specialist horticulture-lighting providers, established LED manufacturers, and regional integrators. Deal activity — distribution partnerships, technology licensing and demonstration programmes — signals a market consolidating around bankable, repeatable designs.

Representative players profiled in the full report:

Signify N.V. (Philips Horticulture) · Heliospectra AB · Gavita International B.V. (Signify) · Valoya Oy (Sander) · ams-OSRAM AG · and 20+ further profiled players across fixtures, controls and software.

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

KEY QUESTIONS THIS REPORT ANSWERS

- ? How large is the global vertical farming LED systems market, and how fast will it grow to 2032?
- ? Which regions, countries and segments offer the strongest risk-adjusted opportunity?
- ? How do resource-and-yield economics change returns versus conventional methods?
- ? 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, water 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 area 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 and infrastructure / PE funds, equipment and component manufacturers, system integrators, growers, agribusinesses and cooperatives, research institutions, policymakers, and corporate strategy and ESG teams.

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.