Artificial Intelligence in Energy Market by Application (Energy Demand Forecasting, Grid optimization & management, Energy Storage Optimization), End Use (Generation, Transmission, Distribution, Consumption) - Global Forecast to 2030

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Report description:

The AI in energy market is estimated at USD 8.91 billion in 2024 to USD 58.66 billion by 2030, at a Compound Annual Growth Rate (CAGR) of 36.9%. AI-based methods and ML techniques are expected to help buildings run more efficiently and provide greater comfort levels to occupants. Buildings and HVAC systems have been designed, constructed, and commissioned as fixed systems and with static environmental assumptions. This can lead to inefficiencies because building use, occupancy, and environmental factors change over time. AI can be applied to parse data collected by building systems and integrate with controls to continuously adjust setpoints to optimize HVAC performance while maintaining or improving occupant comfort. AI-based methods can provide additional. Controls to the operators, enabling increased load flexibility of buildings for participation in Virtual Power Plants (VPPs).

"By energy type, conventional energy segment to hold the largest market size during the forecast period."

Artificial intelligence is increasingly being integrated into the more traditional energy sectors such as coal, oil, natural gas, and nuclear energy to make it much more efficient, safe, and sustainable. In fossil fuel-based energy generation, AI optimizes resource extraction, improves plant performance, and enables predictive maintenance that reduces downtime and operational costs. Using coal, oil, and natural gas, AI systems can forecast demand fluctuations, adjust supply levels, and monitor emissions, helping operators comply with environmental regulations. With nuclear energy, AI ensures safety by monitoring reactor conditions and predicting anomalies while automating response mechanisms, hence increasing the overall plant reliability. In addition, AI use supports the development of better extracting processes and fewer operational risks in other conventional energy sources, such as peat, oil shale, and tar sands, toward sustainability in energy production. In doing so, AI is redefining the conventional energy landscape, ensuring it is more efficient, safe, and environmentally friendly.

"The services segment to register the fastest growth rate during the forecast period."

In the AI-driven energy sector, services such as training, consulting, deploying, integrating systems, supporting, and maintenance are critical for operation optimization in generation, distribution, and consumption across an entire power system. Professional services aid energy companies in identifying specific needs using AI solutions, with potential expertise in grid optimization, energy forecasting, and smart grid management. Deployment and integration services guarantee the smooth integration of AI systems with existing energy infrastructures. Support and maintenance ensure that the AI-powered solutions stay up and running with swift troubleshooting and updates, ensuring maximum uptime. Managed services allow energy companies to step back from AI solutions, as external providers handle them to improve efficiency and minimize operational costs. Together, these services empower energy organizations to use AI technologies holistically to drive operational excellence and innovation across the value chain.

"Asia Pacific to hold the highest market growth rate during the forecast period."

In October 2023, BluWave-ai expanded its business in the Japanese market using AI-driven energy optimization technology. BluWave-ai introduced its technology from global AI deployments to enable the energy transition in Japan by optimizing energy at industrial grid-attached plants with solar generation and battery storage. It partnered with Japanese engineering companies and completed a project at an industrial R&D center. The work included optimization of rooftop solar, battery storage, and biomass generation systems. The Smart Grid Optimizer did some incredible feats such as 20% peak demand reduction, 100% utilization of renewable energy without reverse power flow and significant savings in energy costs. By November 2024, ZTE Corporation and China Mobile developed an AI-driven Green Telco Cloud that dynamically adjusts computing resources using load-based network adjustments toward making energy use in telecommunications networks optimal. In China in November 2024, ZTE Corporation and China Mobile developed an AI-driven Green Telco Cloud that makes energy use in telecommunications networks optimal with load-based network adjustments dynamically adjusting computing resources.

In-depth interviews have been conducted with chief executive officers (CEOs), Directors, and other executives from various key organizations operating in the AI in energy market.

-□By Company Type: Tier 1 - 40%, Tier 2 - 35%, and Tier 3 - 25%
-□By Designation: Directors -25%, Managers - 35%, and Others - 40%
-□By Region: North America - 37%, Europe - 42%, Asia Pacific - 21

The major players in the AI in energy market include Schneider Electric SE (France), GE Vernova (US), ABB Ltd (Switzerland), Honeywell International (US), Siemens AG (Germany), AWS (US), IBM (US), Microsoft (US), Oracle (US), Vestas Wind Systems A/S (Denmark), Atos zData (US), C3.ai (US), Tesla (US), Alpiq (Switzerland), Enel group (Italy), Origami Energy (UK), Innowatts (US), Irasus technologies (India), Grid4C (US), Uplight (US), GridBeyond (Ireland), eSmart Systems (Norway), Ndustrial (US), Datategy (France), Omdena (US). These players have adopted various growth strategies, such as partnerships, agreements and collaborations, new product launches, enhancements, and acquisitions to expand their AI in energy market footprint.

Research Coverage

The market study covers the AI in energy market size across different segments. It aims at estimating the market size and the growth potential across various segments, including by offering (solutions and services (professional services, managed services) by energy type (conventional energy (fossil fuels, nuclear energy, other conventional energy types) renewable energy (solar, wind, hydropower, biomass, other renewable energy types) by type (Generative AI, other AI), by application (energy demand forecasting, grid optimization & management, energy storage optimization , renewables integration , energy trading & market forecasting, energy sustainability management, disaster resilience and recovery, other applications (energy theft detection and customer management)) by end use (generation, transmission , distribution, consumption(commercial, industrial)) and Region (North America, Europe, Asia Pacific, Middle East & Africa, and Latin America). The study includes an in-depth competitive analysis of the leading market players, their company profiles, key observations related to product and business offerings, recent developments, and market strategies.

Key Benefits of Buying the Report

The report will help the market leaders/new entrants with information on the closest approximations of the global AI in energy market's revenue numbers and subsegments. This report will help stakeholders understand the competitive landscape and gain more insights to position their businesses better and plan suitable go-to-market strategies. Moreover, the report will provide insights for stakeholders to understand the market's pulse and provide them with information on key market drivers, restraints, challenges, and opportunities.
The report provides insights on the following pointers:

Analysis of key drivers (energy market volatility and risk management, rising consumer demand for smart energy solutions, AI-Powered robots increasing energy sector worker safety), restraints (data privacy and security, high implementation cost) opportunities (increasing shift towards carbon emission reduction and sustainability, renewable energy integration), and challenges (insufficient real-time energy data limiting the training and deployment of AI models, lack of skilled professionals in AI and energy analytics.) influencing the growth of the AI in energy market.

Product Development/Innovation: Detailed insights on upcoming technologies, research & development activities, and new product & service launches in the AI in energy market.
Market Development: The report provides comprehensive information about lucrative markets and analyses the AI in energy market across various regions.
Market Diversification: Exhaustive information about new products & services, untapped geographies, recent developments, and investments in the AI in energy market.
Competitive Assessment: In-depth assessment of market shares, growth strategies and service offerings of leading include include Schneider Electric SE (France), GE Vernova (US), ABB Ltd (Switzerland), Honeywell International (US), Siemens AG (Germany), AWS (US), IBM (US), Microsoft (US), Oracle (US), Vestas Wind Systems A/S (Denmark), Atos zData (US), C3.ai (US), Tesla (US), Alpiq (Switzerland), Enel group (Italy), Origami Energy (UK), Innowatts (US), Irasus technologies (India), Grid4C (US), Uplight (US), GridBeyond (Ireland), eSmart Systems (Norway), Ndustrial (US), Datategy (France), Omdena (US).

Table of Contents:

1□INTRODUCTION□33
1.1□STUDY OBJECTIVES□33
1.2□MARKET DEFINITION□33
1.3□STUDY SCOPE□34
1.3.1□MARKET SEGMENTATION□34
1.3.2□INCLUSIONS AND EXCLUSIONS□35
1.4□YEARS CONSIDERED□36
1.5□CURRENCY CONSIDERED□36
1.6□STAKEHOLDERS□37
2□RESEARCH METHODOLOGY□38
2.1□RESEARCH DATA□38
2.1.1□SECONDARY DATA□39
2.1.2□PRIMARY DATA□39
2.1.2.1□Primary interviews with experts□39
2.1.2.2□Breakdown of primary profiles□40
2.1.2.3□Key insights from industry experts□40
2.2□MARKET SIZE ESTIMATION□41
2.2.1□TOP-DOWN APPROACH□42
2.2.2□BOTTOM-UP APPROACH□43
2.2.3□AI IN ENERGY MARKET ESTIMATION: DEMAND-SIDE ANALYSIS□44
2.3□DATA TRIANGULATION□45

2.4 LIMITATIONS AND RISK ASSESSMENT 46
2.5 RESEARCH ASSUMPTIONS 46
2.6 RESEARCH LIMITATIONS 46
3 EXECUTIVE SUMMARY 47
4 PREMIUM INSIGHTS 49
4.1 OPPORTUNITIES FOR KEY PLAYERS IN AI IN ENERGY MARKET 49
4.2 AI IN ENERGY MARKET, BY OFFERING 49
4.3 AI IN ENERGY MARKET, BY SERVICE 50
4.4 AI IN ENERGY MARKET, BY PROFESSIONAL SERVICE 50
4.5 AI IN ENERGY MARKET, BY APPLICATION 51
4.6 AI IN ENERGY MARKET, BY ENERGY TYPE 51
4.7 AI IN ENERGY MARKET, BY END USE 52
4.8 AI IN ENERGY MARKET, BY TYPE 52
4.9 NORTH AMERICA: AI IN ENERGY MARKET, BY OFFERING AND END USE 53
5 MARKET OVERVIEW AND INDUSTRY TRENDS 54
5.1 INTRODUCTION 54
5.2 MARKET DYNAMICS 54
5.2.1 DRIVERS 55
5.2.1.1 Energy market volatility and risk management 55
5.2.1.2 Rising consumer demand for smart energy solutions 55
5.2.1.3 AI-powered robots increasing energy sector worker safety 55
5.2.2 RESTRAINTS 55
5.2.2.1 Data privacy and security 55
5.2.2.2 High implementation costs 56
5.2.3 OPPORTUNITIES 56
5.2.3.1 Increasing shift toward carbon emission reduction and sustainability 56
5.2.3.2 Renewable energy integration 56
5.2.4 CHALLENGES 57
5.2.4.1 Insufficient real-time energy data limiting training and deployment of AI models 57
5.2.4.2 Lack of skilled professionals in AI and energy analytics 57
5.3 BRIEF HISTORY OF AI IN ENERGY MARKET 57
5.4 ECOSYSTEM ANALYSIS 59
5.5 CASE STUDY ANALYSIS 60
5.5.1 OPTIMIZING ENERGY EFFICIENCY ACROSS PORTFOLIOS: BLACKSTONE'S STRATEGIC PARTNERSHIP WITH SCHNEIDER ELECTRIC 60
5.5.2 C3 AI ENERGY MANAGEMENT PLATFORM HELPED LEADING PETROCHEMICAL COMPANY BOOST ENERGY EFFICIENCY AND ENVIRONMENTAL PERFORMANCE 61
5.5.3 ENVERUS INSTANT ANALYST ENABLED ENERGY COMPANIES IMPROVE DECISION-MAKING AND OPERATIONAL EFFICIENCY 62
5.5.4 AI-POWERED MICROGRIDS FACILITATED ENERGY RESILIENCE AND EQUITY IN REGIONAL COMMUNITIES 62
5.5.5 C3 AI ENERGY MANAGEMENT PLATFORM HELPED LEADING STEEL MANUFACTURER GAIN SUBSTANTIAL COST SAVINGS AND OPERATIONAL IMPROVEMENTS 63
5.6 SUPPLY CHAIN ANALYSIS 64
5.7 TARIFF AND REGULATORY LANDSCAPE 65
5.7.1 TARIFF RELATED TO PROCESSORS AND CONTROLLERS (HSN: 854231) 65
5.7.2 REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS 67
5.7.3 KEY REGULATIONS: AI IN ENERGY 70
5.7.3.1 North America 70

5.7.3.1.1 SCR 17: Artificial Intelligence Bill (California) 70
5.7.3.1.2 S1103: Artificial Intelligence Automated Decision Bill (Connecticut) 70
5.7.3.1.3 National Artificial Intelligence Initiative Act (NAIIA) 70
5.7.3.1.4 The Artificial Intelligence and Data Act (AIDA) - Canada 71
5.7.3.2 Europe 71
5.7.3.2.1 European Union (EU) - Artificial Intelligence Act (AIA) 71
5.7.3.2.2 General Data Protection Regulation (Europe) 72
5.7.3.3 Asia Pacific 72
5.7.3.3.1 Interim Administrative Measures for Generative Artificial Intelligence Services (China) 72
5.7.3.3.2 National AI Strategy (Singapore) 73
5.7.3.3.3 Hiroshima AI Process Comprehensive Policy Framework (Japan) 73
5.7.3.4 Middle East & Africa 74
5.7.3.4.1 National Strategy for Artificial Intelligence (UAE) 74
5.7.3.4.2 National Artificial Intelligence Strategy (Qatar) 74
5.7.3.4.3 AI Ethics Principles and Guidelines (Dubai) 75
5.7.3.5 Latin America 75
5.7.3.5.1 Santiago Declaration (Chile) 75
5.7.3.5.2 Brazilian Artificial Intelligence Strategy (EBIA) 75
5.8 PRICING ANALYSIS 76
5.8.1 AVERAGE SELLING PRICE TREND AMONG KEY PLAYERS,
BY RENEWABLE ENERGY TYPE 76
5.8.2 INDICATIVE PRICING ANALYSIS, BY OFFERING, 2024 77
5.9 TECHNOLOGY ANALYSIS 77
5.9.1 KEY TECHNOLOGIES 77
5.9.1.1 Conversational AI 77
5.9.1.2 Energy modeling and simulation tools 78
5.9.1.3 AutoML 78
5.9.1.4 MLOps 78
5.9.2 COMPLEMENTARY TECHNOLOGIES 79
5.9.2.1 Blockchain 79
5.9.2.2 Edge computing 79
5.9.2.3 Sensors and robotics 79
5.9.2.4 Cybersecurity 80
5.9.2.5 Big data 80
5.9.2.6 IoT 80
5.9.3 ADJACENT TECHNOLOGIES 81
5.9.3.1 Smart grids 81
5.9.3.2 Robotics 81
5.9.3.3 Geospatial technologies 81
5.10 PATENT ANALYSIS 82
5.10.1 LIST OF MAJOR PATENTS 83
5.11 PORTER'S FIVE FORCES ANALYSIS 85
5.11.1 THREAT OF NEW ENTRANTS 86
5.11.2 THREAT OF SUBSTITUTES 86
5.11.3 BARGAINING POWER OF BUYERS 87
5.11.4 BARGAINING POWER OF SUPPLIERS 87
5.11.5 INTENSITY OF COMPETITIVE RIVALRY 87

5.12 TRENDS/DISRUPTIONS IMPACTING CUSTOMER BUSINESS 87
5.13 KEY STAKEHOLDERS AND BUYING CRITERIA 88
5.13.1 KEY STAKEHOLDERS IN BUYING PROCESS 88
5.13.2 BUYING CRITERIA 89
5.14 KEY CONFERENCES AND EVENTS, 2024-2025 90
5.15 TECHNOLOGY ROADMAP FOR AI IN ENERGY MARKET 91
5.15.1 SHORT-TERM ROADMAP (2023-2025) 91
5.15.2 MID-TERM ROADMAP (2026-2028) 91
5.15.3 LONG-TERM ROADMAP (2029-2030) 91
5.16 BEST PRACTICES IN AI IN ENERGY MARKET 92
5.16.1 ENSURE DATA QUALITY AND INTEGRATION 92
5.16.2 ADOPT AI-POWERED PREDICTIVE MAINTENANCE 92
5.16.3 FOSTER COLLABORATION AMONG STAKEHOLDERS 92
5.16.4 PRIORITIZE SCALABILITY AND FLEXIBILITY 92
5.16.5 FOCUS ON ETHICAL AI IMPLEMENTATION 92
5.16.6 INVEST IN AI-DRIVEN ENERGY TRADING PLATFORMS 92
5.16.7 IMPLEMENT AI FOR ENERGY FORECASTING AND LOAD MANAGEMENT 92
5.16.8 ENHANCE CUSTOMER ENGAGEMENT WITH AI SOLUTIONS 92
5.17 CURRENT AND EMERGING BUSINESS MODELS 93
5.17.1 ENERGY-AS-A-SERVICE (EAAS) 93
5.17.2 PREDICTIVE MAINTENANCE CONTRACTS 93
5.17.3 AI-DRIVEN TRADING PLATFORMS 93
5.17.4 GRID FLEXIBILITY SOLUTIONS 93
5.17.5 SUSTAINABILITY-AS-A-SERVICE 93
5.17.6 REMOTE ENERGY MONITORING AND MANAGEMENT 93
5.17.7 GREEN FINANCE AND AI-POWERED CREDIT SCORING 93
5.17.8 AI-BASED ENERGY EFFICIENCY AUDITS AND RETROFITTING SERVICES 93
5.18 AI IN ENERGY MARKET: TOOLS, FRAMEWORKS, AND TECHNIQUES 94
5.19 TRADE ANALYSIS (8542) 94
5.19.1 EXPORT SCENARIO OF PROCESSORS AND CONTROLLERS 94
5.19.2 IMPORT SCENARIO OF PROCESSORS AND CONTROLLERS 96
5.20 INVESTMENT AND FUNDING SCENARIO 97
5.21 IMPACT OF AI/GEN AI ON AI IN ENERGY MARKET 98
5.21.1 IMPACT OF AI/GEN AI ON ENERGY SECTOR 98
5.21.2 USE CASES OF GEN AI IN ENERGY SECTOR 98
?
6 AI IN ENERGY MARKET, BY OFFERING 100
6.1 INTRODUCTION 101
6.1.1 OFFERING: AI IN ENERGY MARKET DRIVERS 101
6.2 SOLUTIONS 102
6.2.1 AI IN ENERGY SOLUTIONS TO DRIVE EFFICIENCY, SUSTAINABILITY,
AND INNOVATION 102
6.3 SERVICES 103
6.3.1 FOCUS ON CONTINUOUS MONITORING, MAINTENANCE,
AND PERFORMANCE OPTIMIZATION TO BOOST MARKET 103
6.3.2 PROFESSIONAL SERVICES 105
6.3.2.1 Training & consulting 107

6.3.2.2 System integration & implementation 108
6.3.2.3 Support & maintenance 109
6.3.3 MANAGED SERVICES 110
7 AI IN ENERGY MARKET, BY ENERGY TYPE 111
7.1 INTRODUCTION 112
7.1.1 ENERGY TYPE: AI IN ENERGY MARKET DRIVERS 112
7.2 CONVENTIONAL ENERGY 113
7.2.1 ENHANCED MONITORING AND OPERATIONAL OPTIMIZATION TO PROPEL MARKET GROWTH 113
7.2.2 FOSSIL FUELS 114
7.2.2.1 Coal 115
7.2.2.2 Oil 115
7.2.2.3 Natural gas 115
7.2.3 NUCLEAR ENERGY 116
7.2.4 OTHER CONVENTIONAL ENERGY TYPES 117
7.3 RENEWABLE ENERGY 118
7.3.1 BETTER MAINTENANCE PRACTICES, RESOURCE ALLOCATION, AND INTEGRATION OF INNOVATIVE SOLUTIONS TO SUPPORT MARKET GROWTH 118
7.3.2 SOLAR 119
7.3.3 WIND 120
7.3.4 HYDROPOWER 121
7.3.5 BIOMASS 122
7.3.6 OTHER RENEWABLE ENERGY TYPES 123
8 AI IN ENERGY MARKET, BY TYPE 124
8.1 INTRODUCTION 125
8.1.1 TYPE: AI IN ENERGY MARKET DRIVERS 125
8.2 GENERATIVE AI 126
8.2.1 GENERATION OF SYNTHETIC DATA THAT MIMICS REAL-WORLD CONDITIONS TO DRIVE MARKET 126
?
8.3 OTHER AI 127
8.3.1 AI TECHNOLOGIES TO TRANSFORM ENERGY PROCESSES WITH SMARTER, FASTER, AND MORE ADAPTIVE SOLUTIONS 127
8.3.2 MACHINE LEARNING 128
8.3.3 NATURAL LANGUAGE PROCESSING 129
8.3.4 PREDICTIVE ANALYTICS 129
8.3.5 COMPUTER VISION 129
9 AI IN ENERGY MARKET, BY APPLICATION 130
9.1 INTRODUCTION 131
9.1.1 APPLICATION: AI IN ENERGY MARKET DRIVERS 131
9.2 ENERGY DEMAND FORECASTING 133
9.2.1 ALIGNING SUPPLY WITH ANTICIPATED DEMAND AND REAL-TIME DEMAND PREDICTIONS TO PROPEL MARKET GROWTH 133
9.3 GRID OPTIMIZATION & MANAGEMENT 134
9.3.1 REAL-TIME MONITORING, ANALYSIS, AND CONTROL TO HELP TRANSFORM ENERGY NETWORKS INTO INTELLIGENT SYSTEMS 134
9.4 ENERGY STORAGE OPTIMIZATION 135
9.4.1 PREDICTION OF ENERGY NEEDS AND IDENTIFICATION OF PERFORMANCE ANOMALIES IN STORAGE SYSTEMS TO AID MARKET GROWTH 135
9.5 RENEWABLE INTEGRATION 136
9.5.1 SEAMLESS INCORPORATION OF VARIABLE ENERGY SOURCES INTO POWER GRIDS TO ENSURE EFFICIENCY AND

RELIABILITY 136
9.6 ENERGY TRADING & MARKET FORECASTING 137
9.6.1 CRUCIAL ROLE IN STREAMLINING OPERATIONS AND FOSTERING SUSTAINABLE ENERGY ECONOMIES TO SUPPORT MARKET GROWTH 137
9.7 ENERGY SUSTAINABILITY MANAGEMENT 138
9.7.1 REAL-TIME MONITORING OF ENERGY CONSUMPTION TO DRIVE MARKET 138
9.8 DISASTER RESILIENCE & RECOVERY 139
9.8.1 RISING DEMAND FOR MINIMIZING DOWNTIME AND ENSURING RELIABLE POWER DURING CRISES TO HELP MARKET GROWTH 139
9.9 OTHER APPLICATIONS 140
10 AI IN ENERGY MARKET, BY END USE 141
10.1 INTRODUCTION 142
10.1.1 END USE: AI IN ENERGY MARKET DRIVERS 142
10.2 GENERATION 144
10.2.1 REDUCED COSTS, ENHANCED SUSTAINABILITY, AND IMPROVED OPERATIONAL EFFICIENCY TO FOSTER MARKET GROWTH 144
10.3 TRANSMISSION 145
10.3.1 RESILIENT, SUSTAINABLE, AND SECURE ENERGY INFRASTRUCTURE TO DRIVE MARKET 145
?
10.4 DISTRIBUTION 146
10.4.1 OPTIMIZATION OF ENERGY DISTRIBUTION BY BALANCING LOAD DEMAND AND DETECTING FAULTS IN REAL TIME TO BOOST MARKET 146
10.5 CONSUMPTION 147
10.5.1 OPTIMIZED ENERGY USAGE, REDUCED COSTS, AND ENHANCED SUSTAINABILITY TO FUEL MARKET GROWTH 147
10.5.2 COMMERCIAL 148
10.5.3 INDUSTRIAL 149
11 AI IN ENERGY MARKET, BY REGION 151
11.1 INTRODUCTION 152
11.2 NORTH AMERICA 153
11.2.1 NORTH AMERICA: MACROECONOMIC OUTLOOK 153
11.2.2 US 161
11.2.2.1 Government initiatives and funding to boost market growth 161
11.2.3 CANADA 166
11.2.3.1 Increased focus on reducing energy consumption
to fuel market growth 166
11.3 EUROPE 173
11.3.1 EUROPE: MACROECONOMIC OUTLOOK 173
11.3.2 GERMANY 180
11.3.2.1 Significant investments and collaborative projects to drive market growth 180
11.3.3 UK 186
11.3.3.1 Key investments focused on cutting emissions in energy and transportation to drive market 186
11.3.4 FRANCE 187
11.3.4.1 Increased focus on reducing environmental impact of fossil fuels to accelerate market growth 187
11.3.5 ITALY 187
11.3.5.1 Public investments and collaboration between private players to drive market 187
11.3.6 SPAIN 187
11.3.6.1 Green energy initiatives and investments to aid market growth 187
11.3.7 NORDICS 188

11.3.7.1 Innovative AI-based projects to reduce energy consumption and government initiatives driving market growth 188
11.3.8 REST OF EUROPE 188
11.4 ASIA PACIFIC 189
11.4.1 ASIA PACIFIC: MACROECONOMIC OUTLOOK 189
11.4.2 CHINA 197
11.4.2.1 Rising demand for energy efficiency and sustainability to fuel market growth 197
?
11.4.3 JAPAN 203
11.4.3.1 Initiatives for reducing fossil fuel reliance to drive sustainable
market growth 203
11.4.4 INDIA 203
11.4.4.1 Government initiatives for sustainable development and efficient resource management to foster market growth 203
11.4.5 AUSTRALIA & NEW ZEALAND 204
11.4.5.1 Increasing demand for smart home energy to drive market 204
11.4.6 SOUTH KOREA 204
11.4.6.1 Transformative shift driven by AI initiatives to bolster market growth 204
11.4.7 ASEAN 205
11.4.7.1 Growing integration of AI into energy systems to drive sustainability and efficiency 205
11.4.8 REST OF ASIA PACIFIC 205
11.5 MIDDLE EAST & AFRICA 205
11.5.1 MIDDLE EAST & AFRICA: MACROECONOMIC OUTLOOK 205
11.5.1.1 KSA 212
11.5.1.1.1 Increasing focus on reducing transmission losses and enhancing energy efficiency goals to aid market growth 212
11.5.1.2 UAE 218
11.5.1.2.1 Increasing energy demands and focus on reducing environmental footprints to foster market growth 218
11.5.1.3 Kuwait 218
11.5.1.3.1 Rising applications of AI for enhancing asset management, operational excellence, and technical capabilities to assist market growth 218
11.5.1.4 Bahrain 219
11.5.1.4.1 Digitalization in energy sector to drive growth 219
11.5.1.5 South Africa 219
11.5.1.5.1 Increasing awareness of sustainability and government commitments to create significant growth opportunities 219
11.5.1.6 Rest of Middle East & Africa 219
11.6 LATIN AMERICA 220
11.6.1 LATIN AMERICA: MACROECONOMIC OUTLOOK 220
11.6.2 BRAZIL 227
11.6.2.1 Government support, technological advancements, and skilled workforce to drive market 227
11.6.3 ARGENTINA 232
11.6.3.1 Government initiatives for optimizing energy consumption and integrating renewable sources to accelerate market growth 232
11.6.4 MEXICO 233
11.6.4.1 National AI strategy and increasing demand for energy forecasting to drive market 233
11.6.5 REST OF LATIN AMERICA 233
?
12 COMPETITIVE LANDSCAPE 234
12.1 INTRODUCTION 234
12.2 KEY PLAYER STRATEGIES/RIGHT TO WIN, 2021-2024 234

12.3 MARKET SHARE ANALYSIS, 2024 236
12.3.1 MARKET RANKING ANALYSIS 238
12.4 REVENUE ANALYSIS, 2019-2023 239
12.5 COMPANY EVALUATION MATRIX: KEY PLAYERS, 2024 239
12.5.1 STARS 239
12.5.2 EMERGING LEADERS 239
12.5.3 PERVASIVE PLAYERS 240
12.5.4 PARTICIPANTS 240
12.5.5 COMPANY FOOTPRINT: KEY PLAYERS, 2024 241
12.5.5.1 Company footprint 241
12.5.5.2 Region footprint 242
12.5.5.3 Offering footprint 243
12.5.5.4 Energy type footprint 244
12.5.5.5 Type footprint 245
12.5.5.6 Application footprint 246
12.5.5.7 End-use footprint 247
12.6 COMPANY EVALUATION MATRIX: STARTUPS/SMES, 2024 248
12.6.1 PROGRESSIVE COMPANIES 248
12.6.2 RESPONSIVE COMPANIES 248
12.6.3 DYNAMIC COMPANIES 248
12.6.4 STARTING BLOCKS 248
12.6.5 COMPETITIVE BENCHMARKING: STARTUPS/SMES, 2024 250
12.6.5.1 Detailed list of key startups/SMEs 250
12.6.5.2 Competitive benchmarking of key startups/SMEs 251
12.7 COMPETITIVE SCENARIO 252
12.7.1 PRODUCT LAUNCHES AND ENHANCEMENTS 252
12.7.2 DEALS 252
12.8 BRAND/PRODUCT COMPARISON 254
12.9 COMPANY VALUATION AND FINANCIAL METRICS 255
?
13 COMPANY PROFILES 256
13.1 KEY PLAYERS 256
13.1.1 SCHNEIDER ELECTRIC SE 256
13.1.1.1 Business overview 256
13.1.1.2 Products/Solutions/Services offered 258
13.1.1.3 Recent developments 258
13.1.1.3.1 Deals 258
13.1.1.4 MnM view 259
13.1.1.4.1 Key strengths 259
13.1.1.4.2 Strategic choices 259
13.1.1.4.3 Weaknesses and competitive threats 259
13.1.2 GE VERNOVA 260
13.1.2.1 Business overview 260
13.1.2.2 Products/Solutions/Services offered 260
13.1.2.3 Recent developments 261
13.1.2.3.1 Product launches and enhancements 261
13.1.2.3.2 Deals 262

13.1.2.4 MnM view 262
13.1.2.4.1 Key strengths 262
13.1.2.4.2 Strategic choices 262
13.1.2.4.3 Weaknesses and competitive threats 262
13.1.3 ABB LTD 263
13.1.3.1 Business overview 263
13.1.3.2 Products/Solutions/Services offered 264
13.1.3.3 Recent developments 265
13.1.3.3.1 Deals 265
13.1.3.4 MnM view 265
13.1.3.4.1 Key strengths 265
13.1.3.4.2 Strategic choices 265
13.1.3.4.3 Weaknesses and competitive threats 265
13.1.4 HONEYWELL INTERNATIONAL, INC. 266
13.1.4.1 Business overview 266
13.1.4.2 Products/Solutions/Services offered 268
13.1.4.3 Recent developments 269
13.1.4.3.1 Product launches and enhancements 269
13.1.4.3.2 Deals 269
13.1.4.4 MnM view 270
13.1.4.4.1 Key strengths 270
13.1.4.4.2 Strategic choices 270
13.1.4.4.3 Weaknesses and competitive threats 270
?
13.1.5 SIEMENS AG 271
13.1.5.1 Business overview 271
13.1.5.2 Products/Solutions/Services offered 272
13.1.5.3 Recent developments 273
13.1.5.3.1 Deals 273
13.1.5.4 MnM view 273
13.1.5.4.1 Key strengths 273
13.1.5.4.2 Strategic choices 273
13.1.5.4.3 Weaknesses and competitive threats 273
13.1.6 ORACLE CORPORATION 274
13.1.6.1 Business overview 274
13.1.6.2 Products/Solutions/Services offered 275
13.1.6.3 Recent developments 276
13.1.6.3.1 Deals 276
13.1.7 VESTAS WIND SYSTEMS A/S 277
13.1.7.1 Business overview 277
13.1.7.2 Products/Solutions/Services offered 278
13.1.7.3 Recent developments 279
13.1.7.3.1 Deals 279
13.1.8 IBM CORPORATION 280
13.1.8.1 Business overview 280
13.1.8.2 Products/Solutions/Services offered 282
13.1.8.3 Recent developments 283

13.1.8.3.1 Deals 283
13.1.9 MICROSOFT CORPORATION, INC. 284
13.1.9.1 Business overview 284
13.1.9.2 Products/Solutions/Services offered 285
13.1.9.3 Recent developments 286
13.1.9.3.1 Deals 286
13.1.10 AMAZON WEB SERVICES, INC 287
13.1.10.1 Business overview 287
13.1.10.2 Products/Solutions/Services offered 288
13.1.10.3 Recent developments 288
13.1.10.3.1 Deals 288
13.1.11 ATOS SE 289
13.1.11.1 Business overview 289
13.1.11.2 Products/Solutions/Services offered 290
13.1.11.3 Recent developments 292
13.1.11.3.1 Product launches and enhancements 292
13.1.11.3.2 Deals 292
13.1.12 TESLA, INC. 293
13.1.13 C3.AI, INC. 294
13.1.14 ALPIQ 295
13.1.15 ENEL S.P.A. 296
13.2 STARTUPS/SMES 297
13.2.1 ORIGAMI ENERGY 297
13.2.2 INNOWATS 298
13.2.3 IRASUS TECHNOLOGIES 299
13.2.4 GRID4C 299
13.2.5 UPLIGHT 300
13.2.6 GRIDBEYOND 300
13.2.7 ESMART SYSTEMS 301
13.2.8 NDUSTRIAL 301
13.2.9 DATATEGY 302
13.2.10 OMDENA 302
14 ADJACENT/RELATED MARKETS 303
14.1 INTRODUCTION 303
14.2 CONVERSATIONAL AI MARKET 303
14.2.1 MARKET OVERVIEW 303
14.2.2 CONVERSATIONAL AI MARKET, BY OFFERING 304
14.3 SERVICES 304
14.3.1 CONVERSATIONAL AI MARKET, BY SERVICE 304
14.3.2 CONVERSATIONAL AI MARKET, BY BUSINESS FUNCTION 305
14.3.3 CONVERSATIONAL AI MARKET, BY INTEGRATION MODE 306
14.3.4 CONVERSATIONAL AI MARKET, BY VERTICAL 307
14.4 CUSTOMER EXPERIENCE MANAGEMENT MARKET 308
14.4.1 MARKET DEFINITION 308
14.4.2 MARKET OVERVIEW 308
14.4.3 CUSTOMER EXPERIENCE MANAGEMENT MARKET, BY OFFERING 308
14.4.4 CUSTOMER EXPERIENCE MANAGEMENT MARKET, BY DEPLOYMENT TYPE 309

14.4.5 CUSTOMER EXPERIENCE MANAGEMENT MARKET, BY ORGANIZATION SIZE 310
14.4.6 CUSTOMER EXPERIENCE MANAGEMENT MARKET, BY VERTICAL 311
15 APPENDIX 312
15.1 DISCUSSION GUIDE 312
15.2 KNOWLEDGESTORE: MARKETSANDMARKETS' SUBSCRIPTION PORTAL 316
15.3 CUSTOMIZATION OPTIONS 318
15.4 RELATED REPORTS 318
15.5 AUTHOR DETAILS 319

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