

AI  
INDUSTRY  
SPOTLIGHT  
SERIES

# AI in Energy: A New Imperative

BRG 2025–2026

# AI Industry Spotlight Series



This report—the second installment in BRG’s *AI Industry Spotlight Series*—examines how energy companies are adopting artificial intelligence (AI) amid surging power demand, operational pressures, and evolving regulatory expectations.

The series—launched in November 2025 with a look at AI’s influence in the retail sector—is part of a broader BRG research initiative exploring AI implementation, impact, and risk across key industries. Upcoming editions will focus on financial institutions and healthcare, continuing BRG’s effort to deliver timely insights to help organizations unlock the value of AI.

## Read the first report in the series.

The first edition in BRG’s *AI Industry Spotlight Series* explores how AI is driving change in retail.

Read [\*AI in Retail: In Pursuit of Meaningful AI Adoption\*](#).

Unprecedented demand for power is quickly making artificial intelligence (AI) adoption an operational imperative for energy companies. A recent survey of industry leaders from around the world illuminates central opportunities, impacts, challenges, and risks of AI implementation in a rapidly digitizing global economy.

A [convergence](#) of surging data center power demand, lower oil prices,\* and overloaded grid systems is raising the stakes on energy producers' AI adoption, which promises numerous economic and operational benefits—from real-time price and resource forecasting to improved cybersecurity protection and asset management and more.

While Silicon Valley thrives on speed and disruption, energy-sector leaders typically adopt a more cautious approach when adopting new technologies given the critical nature of system resiliency and strict regulatory requirements.

To understand how the industry is implementing AI—as well as associated obstacles, impacts, and risks—BRG conducted a survey of one hundred energy executives from around the world who are involved in their organizations' AI efforts, with half from fossil fuel companies and half in clean energy.

Our research finds AI implementation is growing quickly and already delivering significant efficiency improvements in areas like cybersecurity, energy trading, and corporate functions. However, priorities diverge among fossil fuel and clean energy respondents, reflecting fissures that may point to where AI adoption is heading—and what may hold some organizations back.

"AI can make a measurable impact in not only cybersecurity and administrative functions but also energy trading, resource forecasting, and delivery—which are critical economic value drivers for the industry," said [Christopher Goncalves](#), chair of BRG's Energy & Climate practice. "Using AI to understand how to integrate resources optimally into an energy grid, as well as effectively see and respond to real-time market and operational signals, will drive tangible competitive advantages now and for years to come."

*\*Note: For more information about the report's respondent base, see the methodology section on pages 13 and 14. Of note as it relates to oil prices, the research was conducted in Fall 2025, before the Middle East conflict began in February 2026.*

Global energy AI market size is [expected](#) to reach over \$50 billion by 2030, growing at a compound annual rate of roughly 30% from 2025 to 2030. To maximize these tools' potential, energy leaders will benefit from analyzing how their peers are adopting AI, how to successfully implement the technology, and prominent risks and barriers to success.

**Our research provides a crucial benchmark. Below, we review four key takeaways.**

## Key Findings

1. AI implementation is growing, but fossil fuel and clean energy producers have different AI priorities.
2. Cybersecurity risk, data availability, and a lack of skilled talent pose the greatest challenges to AI implementation.
3. AI currently delivers the greatest efficiency gains in cybersecurity protection, energy trading and strategy, and corporate functions.
4. Only about four in ten organizations have AI policies fully equipped to manage risk in a changing regulatory environment.

## INDUSTRY DEFINITIONS

(based on International Energy Agency [glossary](#) and standard industry classifications)

<b>FOSSIL FUELS</b>	Energy sources that produce significant greenhouse gas (GHG) emissions when extracted and burned, including coal, oil, and natural gas.
<b>CLEAN ENERGY</b>	Energy sources that produce little to no GHG emissions, including solar, wind, hydropower, geothermal, nuclear, and low-emission fuels such as green hydrogen.

## FUNCTION DEFINITIONS AND CATEGORIZATION

FOSSIL FUELS	CLEAN ENERGY
<b>Functional and Corporate Support</b>	
<b>Corporate functions (finance, legal):</b> contract analysis, automated invoicing, compliance monitoring, dispute avoidance	<b>Corporate functions (finance, legal):</b> contract analysis, automated invoicing, compliance monitoring, dispute avoidance
<b>Cybersecurity protection:</b> threat intelligence, vulnerability detection, incident response	<b>Cybersecurity protection:</b> threat intelligence, vulnerability detection, incident response
<b>Emissions and sustainability tracking:</b> GHG tracking, carbon accounting, compliance monitoring	<b>Emissions and sustainability tracking:</b> GHG tracking, carbon accounting, renewable credit management, environmental, social, and governance (ESG) disclosures
<b>Capital project management:</b> cost estimation, planning, risk modeling for refineries, pipelines, liquefied natural gas (LNG) terminals	<b>Capital project management:</b> cost estimation, planning, risk modeling for wind, solar, nuclear facilities
<b>Markets, Pricing, and Forecasting</b>	
<b>Energy trading and strategy:</b> price forecasting, bidding strategy, commodity market analysis	<b>Energy trading and strategy:</b> price forecasting, bidding strategy in electricity, capacity markets
<b>Resource forecasting:</b> reservoir performance prediction, fuel demand forecasting, weather impact modeling	<b>Resource forecasting:</b> renewable generation prediction, demand forecasting
<b>Operations and Asset Management</b>	
<b>Asset operations:</b> predictive maintenance, failure detection, performance optimization for wells, refineries, pipelines	<b>Asset operations:</b> predictive maintenance, failure detection, performance optimization for turbines, solar panels, reactors
<b>Exploration and production:</b> seismic data analysis, drilling optimization, reservoir modeling	<b>Grid management:</b> grid balancing, load forecasting, renewable integration, demand response
<b>Energy storage and delivery:</b> gas storage optimization, LNG logistics, pipeline dispatch efficiency	<b>Energy storage and delivery:</b> battery efficiency, renewable dispatch optimization, hybrid storage-grid integration

## 1. AI implementation is growing, but fossil fuel and clean energy producers have different AI priorities.

A striking 95% of respondents report having implemented AI to a large (36%) or moderate (59%) extent, meaning that AI is active in core functions at most respondent organizations. Nearly all respondents have implemented AI functions, supported such efforts, or been involved in planning the use of AI at their organizations—experiences that could influence their enthusiasm for the technology.

More than half of both fossil fuel and clean energy respondents have adopted AI in corporate functions and cybersecurity protection as organizations across sectors do the same. This makes sense given the relatively lower stakes involved with AI use in these areas and mandatory cybersecurity requirements utilities impose on energy suppliers.

The real value drivers come in areas where AI can optimize the energy value chain: resource forecasting, emissions and sustainability tracking, capital project management, energy trading and strategy, and energy storage and delivery. At least 40% of both fossil fuel and clean energy respondents have implemented AI in these areas.

“AI can reprioritize billions in capital expenditure by continuously updating project economics as fuel prices, weather patterns, and policy signals fluctuate,” said [Peter Smith](#), a managing director and AI expert at BRG.

Respondents also believe AI will have the greatest long-term impact on most of these functions—namely emissions and sustainability tracking (particularly for clean energy respondents), energy trading and strategy, and resource forecasting.

## Clean energy and fossil fuel organizations’ AI priorities diverge

There are telling differences in current AI adoption for these functions. Six in ten fossil fuel organizations have implemented AI for resource forecasting, compared to 46% of those in clean energy. Oil and gas businesses live by commodity markets, where prices are increasingly probabilistic and stochastic and accurate forecasting has long been a priority.

Simultaneously, AI may not be ready for widespread adoption when it comes to complex tasks like reservoir and well performance optimization and forecasting, according to BRG Managing Director [Franco Ciulla](#). “Not only is predictability challenging in these areas, but case-by-case situations require algorithms tailored to each specific reservoir and—sometimes—well.”

AI tools have shown promise in predicting renewable generation and loads. One study [found](#) that generative AI improves these sources’ forecasting accuracy by up to 25%. But outputs can be disrupted by rare weather events, making historical training data less reliable. As the grid evolves to incorporate more distributed energy resources, certain load forecasts may quickly become outdated.

These concerns may apply to energy trading and storage/delivery applications of AI too. Four in ten clean energy respondents have implemented AI in the latter area. The relatively low level of current implementation may stem from the complexities of battery storage for renewables as demand grows. It tracks that 38% of clean energy respondents have implemented AI in grid management and 54% are planning to.

Finally, clean energy organizations significantly lead fossil fuel companies in AI use for asset operations (58% versus 36%). This may reflect the digital-first makeup of clean energy players and the need to monitor intermittent energy sources closely. For example, clean energy companies are [implementing](#) AI tools to analyze vibration data in wind turbines, thermal imaging for solar panels, and batteries’ charge and discharge cycles to optimize performance and enable predictive maintenance.

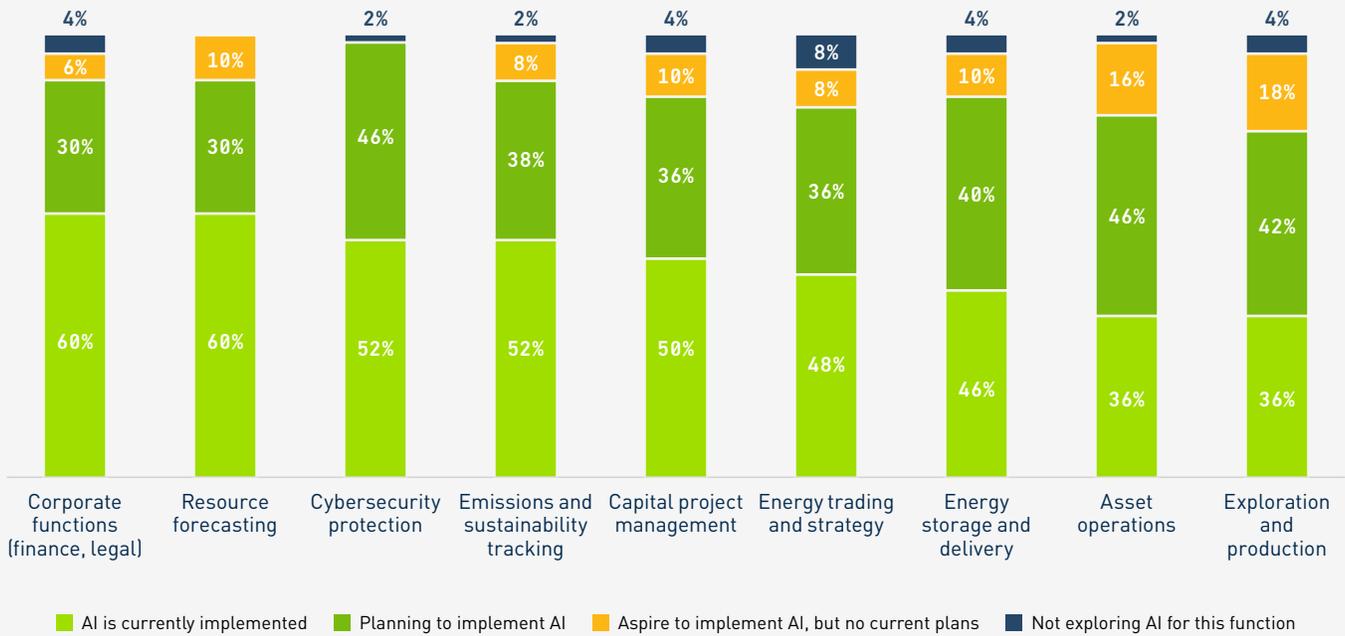
**Six in ten fossil fuel organizations** have implemented AI for resource forecasting, compared to **46% of those in clean energy.**

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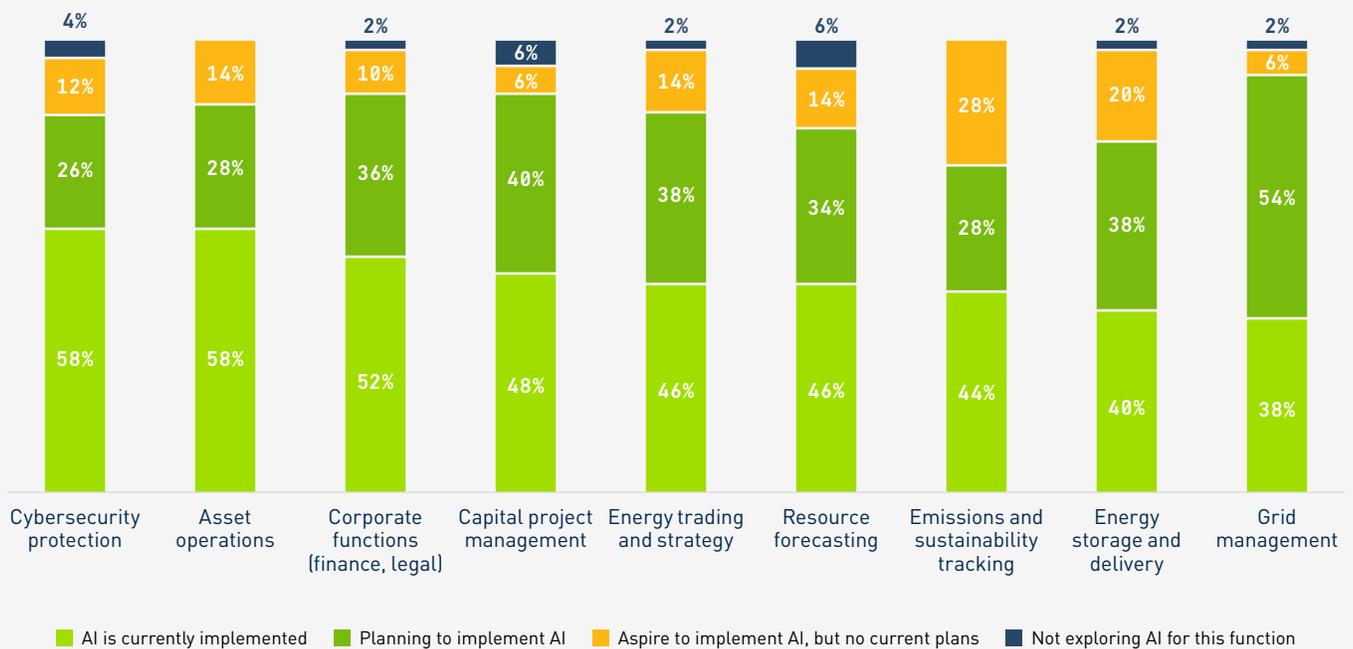
**Christopher Goncalves**  
Managing Director and Chair of  
BRG's Energy & Climate Practice  
WASHINGTON, DC



## Fossil Fuels: AI Implementation Status by Function



## Clean Energy: AI Implementation Status by Function



## Function Where AI Will Have the Greatest Long-Term Impact

■ All Respondents ■ Fossil Fuels ■ Clean Energy



\* Not offered to fossil fuels/clean energy respondents



## 2. Cybersecurity risk, data availability, and a lack of skilled talent pose the greatest challenges to AI implementation.

In 2023, 90% of the world’s top energy companies **suffered** from data breaches through third parties. The risks have since escalated as digitization, AI adoption, and widespread geopolitical tensions deepen potential exposure.

“Cybersecurity isn’t just a risk—it is part of the AI arms race,” said Mr. Smith. “Attackers are already leveraging AI, and defenders must adopt adaptive, self-learning defenses to avoid structural disadvantages.”

Relatedly, cybersecurity and data privacy concerns (selected by 55% of all respondents) present the top challenge to capturing AI-driven efficiencies. Data availability, quality, or accessibility issues came in second (47%). However, 58% of clean energy respondents cited this as an obstacle—the leading challenge for this group—compared with only 36% of fossil fuel companies.

“Fossil fuel companies often have to contend with paywalled vendor data that is impossible for AI models to scrape,” said Mr. Goncalves. “Similarly, clean energy firms must manage often unreliable meteorological inputs and operational data that may live behind the confidentiality wall of utility companies.”

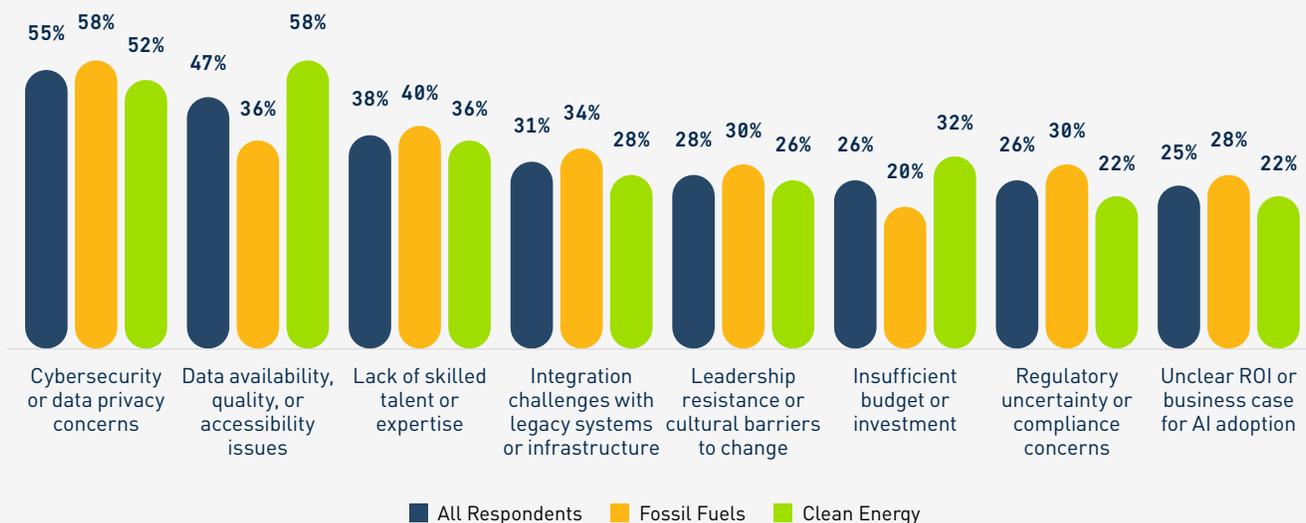
Both groups flagged lack of skilled talent, highlighting the challenge of finding employees who combine AI technological expertise with energy industry knowledge. Four out of ten fossil fuel and 36% of clean energy respondents cite it as an issue.

But what fossil fuel organizations may lack in talent, they make up for in capital: only 20% of these respondents cited an insufficient budget as a potential challenge to capture AI-driven efficiencies, compared with 32% of clean energy respondents.

Other AI implementation issues include integration challenges with legacy systems or infrastructure as well as leadership resistance or cultural barriers to change, both selected by about one-third of respondents. These roadblocks may come into sharper focus as the energy industry advances its use of AI, with higher-order systems issues such as coordination across energy vectors and algorithmic bias joining foundational challenges like data quality and cybersecurity.

This trend may suggest “**a maturation of the field**, from asking ‘Can we build it?’ to ‘How should we build it responsibly and integrate it systemically?’”

Challenges Most Likely to Limit AI’s Impact





### 3. AI currently delivers the greatest efficiency gains in cybersecurity protection, energy trading and strategy, and corporate functions.

Any new technology brings a gap between implementation and actual return on investment. AI is no different: one recent [study](#) revealed that despite billions of dollars of generative AI investment, 95% of pilot projects at organizations [failed to deliver](#) savings or improve profits.

Our findings, however, indicate great promise. Most respondents who have already implemented AI in the surveyed areas see significant impacts on efficiency in cybersecurity protection (70%), energy trading and strategy (67%), corporate functions (61%), resource forecasting (59%), and energy storage and delivery (58%).

One key performance indicator organizations should be tracking to measure these impacts is “decision latency,” according to Mr. Smith. “AI compresses time-to-decision in trading, dispatch, and incident response, underscoring how decision latency can be a more critical KPI [key performance indicator] than raw accuracy in volatile energy systems.”

Clean energy respondents are particularly bullish on energy trading and strategy impacts (70% versus 63% of fossil fuel respondents). However, they view AI as having less impact on cybersecurity protection (62% versus 77%).

How do these efficiencies play out in practice?

- **Cybersecurity protection:** AI automatically can help detect anomalous activity on energy networks, allowing for faster and more effective responses.
- **Energy trading and strategy:** AI can be used for price forecasting, portfolio optimization, risk management, and automated execution through settlement and reconciliation. Some firms even combine real-time sensor data to support these decisions.
- **Corporate functions:** AI can automate certain operations and routine tasks, enhance contract analyses, assist with document drafting, and improve detection of fraud, credit, and loan risks.
- **Resource forecasting:** AI can ingest real-time data to better forecast power generation, net load, and other resource demands.
- **Energy storage and delivery:** AI can help with battery management, predictive maintenance, and smart grid orchestration.

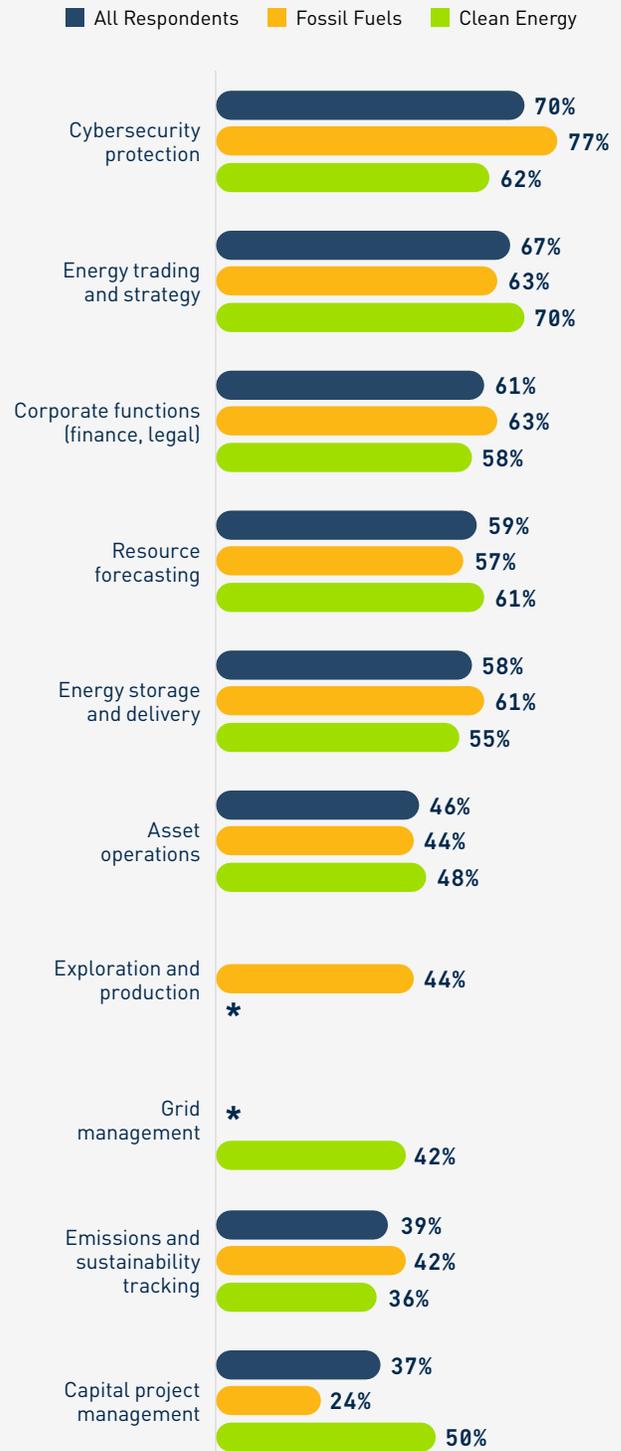
Fewer than one-half of respondents see AI efficiency gains in asset operations (46%), emissions and sustainability tracking (39%), and capital project management (37%). The same is true for fossil fuel respondents with respect to exploration and production (44%) and for clean energy respondents regarding grid management (42%). Asset operations and grid management efficiencies may be particularly challenging to achieve given the number of companies at play throughout the grid.

Fossil fuel respondents see more value in sustainability/emissions tracking (42% versus 36%), whereas clean energy executives see a much greater impact in capital project management (50% versus 24%).

“Renewables live and die by good financing and capital project management; once the infrastructure is built and commissioned, operating costs are limited to maintenance and less intensive than fossil fuel generation,” said Mr. Goncalves. “Conversely, fossil fuel generation has ongoing variable costs—fuel purchases, transport, carbon—that vary with commodity markets and are subject to increasing emissions regulation worldwide.”

## AI’s Impact on Efficiency by Function

*Share reporting “AI has fundamentally improved efficiency in this function”*



\* Not offered to fossil fuels/clean energy respondents

## 4. More than one-half of organizations say their AI policies are not fully equipped to manage risk in a changing regulatory environment.

In the United States, Canada, the European Union (EU), and China, the number of laws related to data protection, cybersecurity, and AI [has grown by 400% since 2016](#). Many will come into effect in 2026, including key elements of the EU [AI Act](#) and a sweeping law in Colorado [requiring](#) companies deploying “high-risk” systems to assess potential harms, document data sources, and disclose when AI makes consequential decisions.

Government bodies around the world have released guidelines and strategy documents directed at the energy industry’s AI use, particularly for organizations involved with critical infrastructure. These include the EU’s [Network and Information Systems Directive](#), UK energy regulator Ofgem’s AI [guidance](#), and the US Department of Energy’s [AI Strategy](#). This has led to a complex and ever-evolving patchwork of overlapping regulatory requirements, standards, and recommendations.

Effective AI policies and governance are critical. Yet only 41% of respondents say their policies are comprehensive and adaptable to regulatory changes. Fossil fuel respondents are more confident (46% say their policies are fully equipped) than those in clean energy (36%), but both numbers indicate that companies are underprepared when it comes to their AI policies and guidance. Meanwhile, 55% of all organizations surveyed have policies that cover current risks but may require updates as regulations change; 8% of fossil fuel organizations say their policies are not equipped at all.

Data security, management, and privacy is the leading risk area that respondents’ current AI policies aim to address (74%). At least one-half also selected transparency and explainability (53%), accuracy and reliability (52%), and intellectual property (IP) and ownership (50%). Clean energy organizations’ policies are particularly focused on IP (68% versus 32% of fossil fuel respondents), a gap that likely reflects the group’s emphasis on technology ownership, software partnerships, and grid-related innovation.

But critical gaps remain. Only about one-third of respondents say their policies aim to address workforce impacts (33%) and bias and fairness (31%).

In the years to come, AI won’t just present regulatory risks—it will help form future regulation.

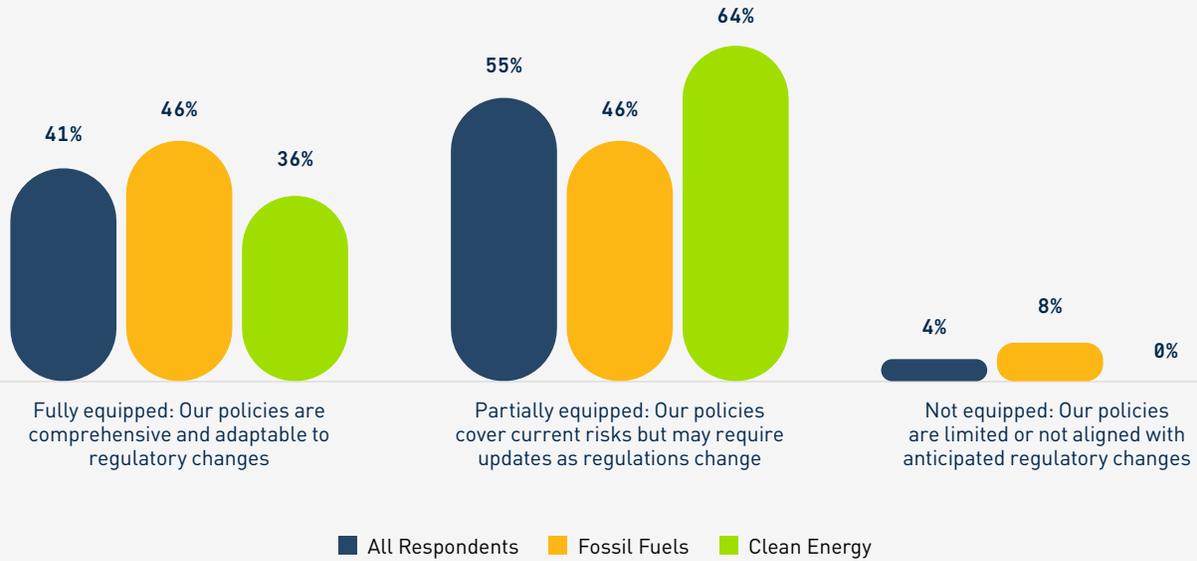
“AI can be a grid-shaping force, not just a grid-optimizing tool,” said Mr. Smith. “Rather than treating regulation as an external factor, firms can influence market design, congestion pricing, and interconnection rules using AI-derived evidence.”

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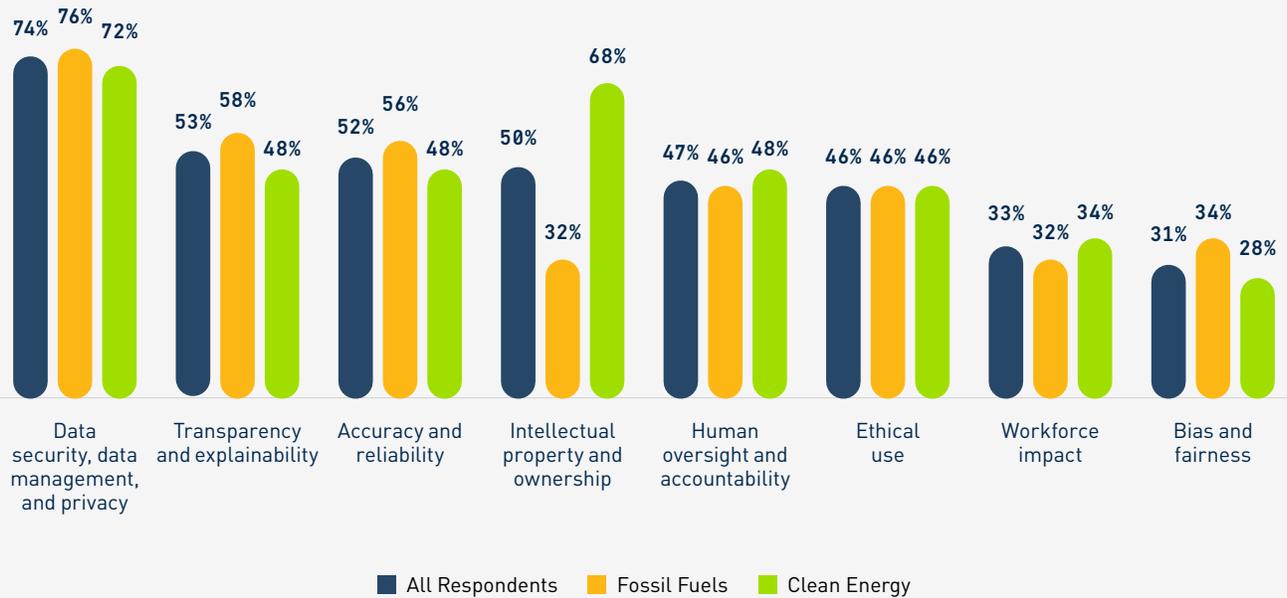


**Peter Smith**  
Managing Director, BRG  
NEW YORK

## AI Policy Readiness



## Risk Areas Addressed by AI Policies



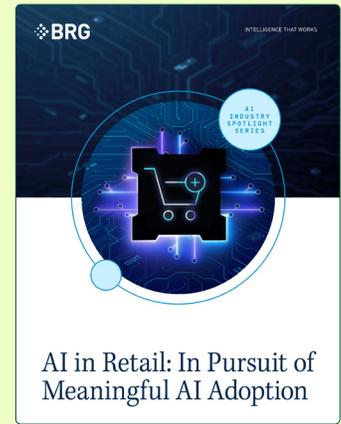
# Methodology

The research for this report was conducted in October 2025 via a quantitative survey of one hundred energy executives and corporate leaders evenly distributed across North America, Asia-Pacific, and Europe, the Middle East, and Africa. Respondents held leadership positions at their organizations and were involved in their organizations' AI implementation efforts.

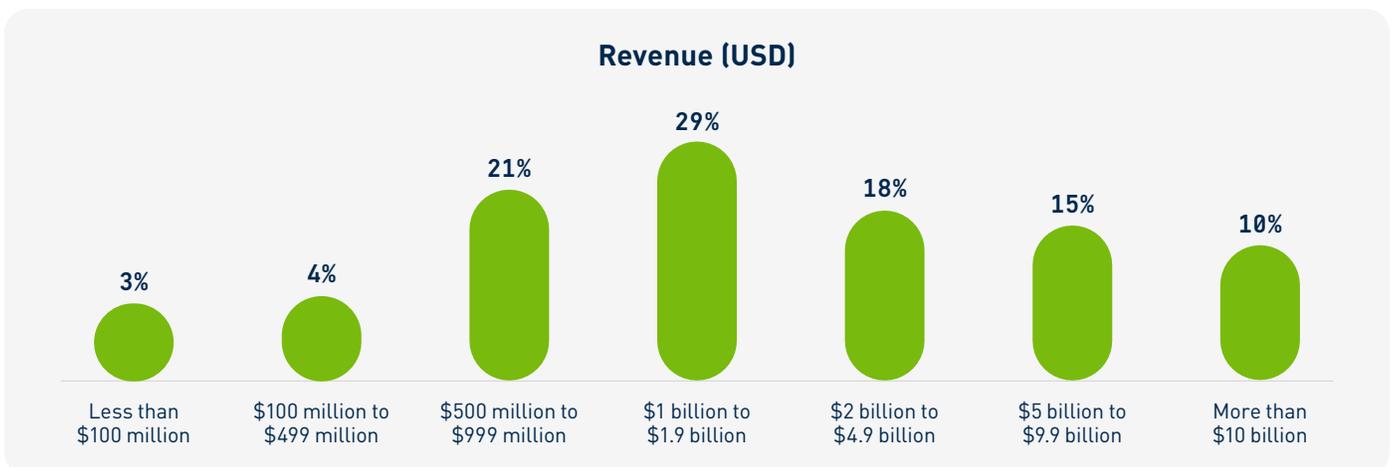
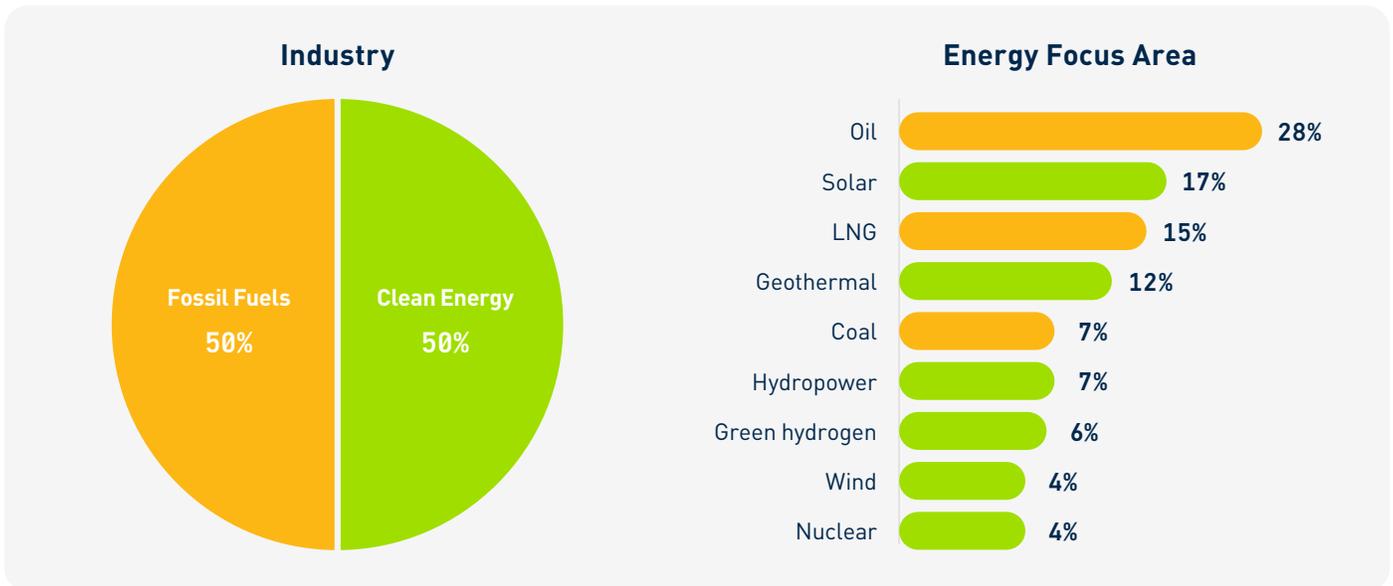
The research included organizations across both the fossil fuels and clean energy industries. Respondents represent a range of energy areas including oil, natural gas, coal, solar, wind, hydropower, geothermal, green hydrogen, and nuclear.

This is the second report in BRG's *AI Industry Spotlight Series* that tracks AI's influence across key industries.

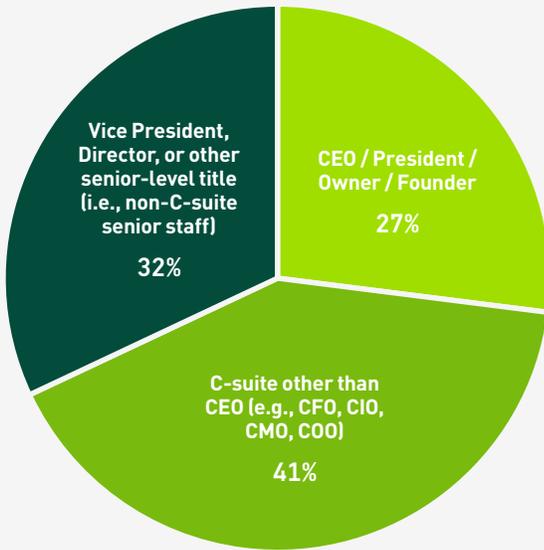
Due to rounding and questions asking for more than one response selection, data may not add up to 100%.



**Read the first report in the series: [AI in Retail: In Pursuit of Meaningful AI Adoption](#).**



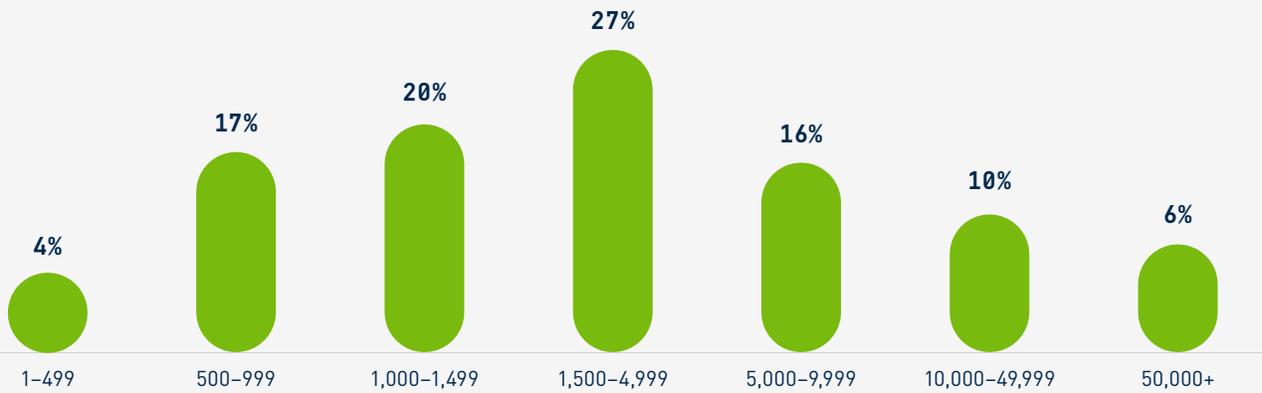
### Position



### AI Implementation Experience



### Number of Employees



# About BRG's Energy & Climate Practice

BRG's Energy & Climate experts provide integrated business advisory, finance and investment, and dispute resolution services to help energy companies, investors, buyers, and sellers navigate today's policy, economic, market, pricing, and competitive imperatives. The BRG Energy & Climate team is focused on business, regulatory, and dispute resolution challenges associated with rapid decarbonization and the transformation of energy use across the energy, industrial, and transportation sectors. Our energy business advisory offerings and dispute resolution work are synergistic and mutually reinforcing. Our extensive experience with energy disputes makes us realistic, grounded analysts of long-term opportunity, risk, pricing, and value. Similarly, our cross-disciplinary experience throughout the energy sector, as accomplished advisors, former executives, and financiers, makes us highly credible, effective experts for dispute resolution matters.

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### [Energy Economic Horizons - US and Global Market and Pricing Trends](#)

*Energy Economic Horizons* is a quarterly client publication of BRG's Energy & Climate practice that provides quantitative and qualitative analysis designed to highlight salient US and global market and pricing trends relevant to clean fuels, power, and renewable energy.

FOR A DEEPER CONVERSATION AND TO LEARN MORE ABOUT HOW BRG CAN HELP YOU,  
REACH OUT TO BRG'S ENERGY & CLIMATE TEAM.



**Christopher Goncalves**

Managing Director and Chair of BRG's Energy & Climate Practice

[cgoncalves@thinkbrg.com](mailto:cgoncalves@thinkbrg.com)

+1 202 480 2703

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Our top-tier professionals include specialist consultants, industry experts, renowned academics, and leading-edge data scientists. Together, they bring a diversity of proven real-world experience to economics, disputes, and investigations; corporate finance; and performance improvement services that address the most complex challenges for organizations across the globe.

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