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SNOC

ADIPEC ROUNDTABLE
INSIGHTS REPORT 2025

"How Can the Middle East Energy Sector Harness AI to Ensure Emissions Accountability and Drive the Energy Transition?"

GI Publishing Intelligence Consultancy

FOREWORD

The Energy Industry Has Moved Beyond *If* to *How* Best to Adopt Artificial Intelligence

H.E. Khamis Al Mazrouei
Chief Executive Officer,
Sharjah National Oil Corporation (SNOC)

Artificial Intelligence is no longer an experiment; it is a defining force shaping the future of the energy industry. At SNOC, we view AI not as a distant innovation, but as an essential tool that will transform every aspect of our operations — from predictive maintenance and energy optimization to emissions monitoring and accurate production forecasting.

The key question is no longer whether to adopt AI, but how to do so most effectively. Our priority is to integrate AI into the heart of our digital transformation, ensuring that our systems are intelligent, interconnected, and data-driven. This will allow us to reduce emissions while continuing to provide affordable, reliable, and secure energy to our communities and to the world.

As we progress toward a low-carbon future, we embrace the concept of energy addition — expanding new sources while improving the efficiency and sustainability of existing ones. AI will be instrumental in delivering this balance.

Ultimately, technology alone cannot achieve success. It must be supported by people, skills, and partnerships. At SNOC, we believe AI will not replace human talent; it will empower it — enhancing productivity, fostering innovation, and driving cleaner, more sustainable growth for generations to come. ■

Harnessing AI to Drive UAE's Energy Transition and Ensure Emissions Accountability

Dr. Eng. Nawal Alhanaee,
Director of the Future Energy Department,
UAE Ministry of Energy and Infrastructure

Artificial Intelligence is rapidly becoming the foundation of a smarter, more transparent energy future. In the United Arab Emirates, we have integrated AI directly into our national energy strategy—no longer as a peripheral tool, but as a core driver of decarbonisation, efficiency, and emissions accountability.

When we updated the UAE Energy Strategy 2031-2050, we aligned the growth of digital infrastructure with our clean-energy targets. Data centres are now recognised as critical national assets. Through our National Committee for Data Centres and AI, we ensure that these new digital engines are powered by renewable energy and supported by investments in grid-scale battery storage and nuclear capacity.

The digitalisation of our energy system also requires firm governance. The UAE was one of the first nations to appoint a Minister for Artificial Intelligence, embedding algorithmic foresight into the policy process. AI already supports Cabinet-level decisions, providing predictive analysis that helps us craft resilient, data-driven strategies.

But technology alone is not enough. Each company and government entity must deploy AI with purpose. It should be guided by clear priorities, not public relations. Responsible innovation means defining outcomes, measuring progress, and aligning every digital investment with sustainability goals.

Just as importantly, AI governance cannot stop at national borders. Emissions accountability and data integrity must operate on a regional scale. The Gulf's economies are deeply interconnected, and coordinated AI frameworks will prevent carbon leakage and promote shared progress toward Net Zero.

AI also enables us to confront the modern energy trilemma—how to ensure security, affordability, and sustainability simultaneously. By processing real-time data, AI helps policymakers manage these competing imperatives and identify pathways that protect both prosperity and the planet.

Our commitment to Net Zero 2050 depends on diversification—renewables, nuclear, and low-carbon hydro—all optimised through intelligent digital systems. This transformation is collaborative: we work through an inclusive, bottom-up process that engages every stakeholder, ensuring no one is left behind.

Finally, accountability is the cornerstone. The UAE's national Measurement, Reporting and Verification (MRV) platform, supported by AI, ensures transparent emissions reporting from company to cabinet to the United Nations. In doing so, we build a model where AI does not replace human responsibility—it reinforces it. ■

TOP 9 INSIGHTS

Dr. Valentina Dedi, Associate Director in Economics, KBR – Middle East Consulting Division

"How Can the Middle East Energy Sector Harness AI to Ensure Emissions Accountability and Drive the Energy Transition?"

1. Train Both People and Companies in AI and Data Competence

AI can only deliver real impact if both individuals and organizations are trained to handle, interpret, and share data effectively. Large energy companies often struggle with siloed data systems, weak integration between departments, and inconsistent methodologies — all of which undermine the potential of AI-driven emissions accountability.

2. Break Down Data Silos to Enable Transparent Emissions Monitoring

For AI to enhance emissions tracking and accountability, energy firms must first ensure alignment across their data infrastructure. Real-time, standardized, and transparent data-sharing between departments is critical to achieving measurable emissions reductions and building trust in reported outcomes.

3. Use AI Intentionally, Not Because It's Trendy

AI should not be deployed for complexity's sake. Many companies rush to apply machine learning models without understanding their purpose or context. Effective use of AI requires clarity on what problem it solves — particularly in emission reduction, predictive maintenance, or efficiency optimization.

4. Develop Ethical and Transparent AI Practices

The energy transition must be guided by ethical AI adoption. Companies should ensure their models and algorithms are explainable, transparent, and traceable to maintain credibility in emissions reporting and to comply with tightening global ESG disclosure standards.

5. Simplify Models Where Appropriate

In some areas of the energy industry, simpler analytical models still outperform over-engineered AI systems. Companies must balance sophistication with usability — ensuring stakeholders, including regulators and partners, can understand and validate outputs related to carbon accounting.

6. Apply AI to Real-Time, Variable Sectors Like Power and Renewables

Unlike traditional oil and gas, the electricity and renewables sectors face high variability based on weather and demand cycles. AI can provide immense value here by enabling real-time prediction and adjustment of emissions and efficiency metrics — supporting grid stability and low-carbon reliability.

7. Align AI Deployment with the Region's Net-Zero and Hydrogen Strategies

AI can play a central role in optimizing carbon capture, utilization, and storage (CCUS) and hydrogen systems — improving detection of leakage, predicting energy intensity, and optimizing operations to meet national decarbonization targets.

8. Promote Cross-Sector Collaboration for AI in Emissions Management

The region's energy transition will depend on collaboration between government agencies, NOCs, utilities, and AI innovators. Joint data platforms and shared AI-driven monitoring tools can ensure consistency in emissions measurement across the Middle East's energy value chain.

9. Build AI Literacy into Corporate Culture and Leadership

AI adoption must start from the top. Leaders must understand both the opportunities and limitations of AI — embedding digital and data literacy into corporate governance, investment planning, and reporting structures for emissions accountability. ■

Harnessing AI for Emissions Accountability in the Middle East Energy Transition

By Dr. Grigorios Frangos, Sharjah Cyber Security Center

Artificial Intelligence has become the defining tool of our age — but in the energy sector, its promise will only be realized if it is implemented with discipline, security, and clarity of purpose. For the Middle East, where the energy transition must balance growth with environmental accountability, AI offers a once-in-a-generation opportunity to transform how we monitor, manage, and reduce emissions. Yet that transformation cannot succeed without strong data governance and human oversight.

First and foremost, AI systems are only as trustworthy as the data we feed them. If information is poorly classified or incomplete, the algorithms will generate misleading results — and, even more dangerously, we may not realize it. The foundation of emissions accountability is therefore reliable, well-curated data supported by robust verification.

Equally critical is leadership education. Too often, executives request "AI solutions" without understanding what that means in practice. This creates the illusion of progress rather than measurable outcomes. For AI to truly serve climate goals, leaders themselves must be literate in its logic, limitations, and security implications.

There is no universal template. Each country and company in the region must tailor AI models to its own data maturity, industrial infrastructure, and policy environment. What works for one national oil company or grid operator may not suit another. A one-size-fits-all approach to emissions monitoring will fail.

Security must also be treated as integral, not optional. Energy infrastructure is a prime target for cyber-attacks, and introducing AI without built-in cybersecurity controls simply multiplies the risk. The UAE's new national cybersecurity framework demonstrates how policy and technology can evolve together — a model that should inspire similar coordination across the region.

AI will never replace strategic clarity. Before any deployment, organizations must define what success means: emissions reduction, transparency, or efficiency gains. Continuous validation and independent auditing are non-negotiable to ensure accuracy and public trust.

Finally, collaboration is key. Partnerships like those between ADNOC and Siemens show how combining industrial expertise with digital innovation can turn emissions accountability from a policy aspiration into an operational reality. If we in the Middle East approach AI not as a shortcut, but as a disciplined instrument of transformation, it can become the most powerful ally we have in driving the energy transition toward a truly accountable future. ■

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TOP 9 INSIGHTS

Ellis Renforth, President of Operations for Europe, Middle East and Africa (EMEA), Wood

"Adopt, Don't Await: Harnessing Proven AI to Deliver Emissions Accountability Across the Middle East Energy Sector"

1. Deploy AI for Real-Time Emissions Monitoring
The Middle East can harness AI to achieve real-time visibility on methane and CO_2 emissions across its assets. As Ellis Renforth noted, technologies already exist to continuously monitor emissions using sensors and satellite data — transforming measurement from estimation into verification and creating a foundation for transparent emissions reporting.

2. Leverage Predictive AI to Optimize Maintenance and Reduce Waste
Wood's "MaintAI" platform demonstrates how predictive AI can deliver up to a 40% reduction in maintenance backlogs. Applying similar predictive systems across regional infrastructure would cut inefficiencies, extend asset life, and reduce energy waste — key enablers of lower operational emissions and higher productivity in the energy transition.

3. Prioritize AI Integration with Aging Assets
Many Middle Eastern facilities are mature, so success lies in retrofitting AI into aging infrastructure rather than waiting for new builds. The technology can be adapted to legacy systems to improve monitoring and maintenance — bridging today's operations with the net-zero goals of tomorrow without massive capital reinvestment.

4. Adopt Proven Technologies Instead of Waiting for New Ones
Ellis stressed that the tools for emissions accountability already exist; the real challenge is adoption. The region should focus on scaling existing, proven AI applications rather than chasing untested innovations. Rapid deployment of mature AI systems will accelerate measurable progress toward decarbonization goals.

5. Focus AI Efforts on Remote and Hard-to-Reach Sites
AI delivers the greatest impact in remote and offshore environments, where human access is limited. Applying autonomous monitoring and control systems in these locations can drastically improve safety, reduce emissions from manual interventions, and ensure continuous oversight of critical infrastructure in extreme conditions.

6. Build Data Quality as the Core of AI Success
AI-driven emissions accountability depends on high-quality, consistent, and verifiable data. According to Renforth, most failures stem from poor data rather than flawed technology. Regional operators should invest in robust data governance frameworks to ensure that AI outputs are credible and aligned with ESG reporting standards.

7. Use AI to Enhance Decision-Making, Not Replace It
Autonomous operations don't mean human-free systems. AI enhances operational efficiency by enabling faster, data-driven decisions, but human interpretation remains vital for context and accountability. The Middle East can use AI as a strategic decision-support tool to balance sustainability goals with production imperatives.

8. Bridge the Skills Gap Through Partnerships
Renforth dismissed fears that an aging workforce would hinder AI implementation, emphasizing that AI expertise can be delivered through partnerships with technology providers and service contractors. The region can replicate this model by fostering collaborations between energy firms, digital start-ups, and universities to accelerate AI adoption.

9. Align AI Deployment with Emissions Hotspots
AI systems can target the most impactful emissions sources, such as methane leaks and inefficient compressors, providing precise and predictive insights. Addressing these low-hanging fruits first ensures rapid emissions reductions while building a roadmap for more sophisticated decarbonization applications.■

EXECUTIVE SUMMARY

Artificial intelligence has become the defining force behind the global Energy Transition. What was once an experimental technology has now evolved into a strategic instrument shaping national policies, corporate agendas, and human development. From predictive maintenance to policymaking, AI is embedding itself in every layer of the energy ecosystem — but its success depends not on the technology itself, rather on how we choose to wield it.

A New Energy Imperative

In the Gulf and beyond, AI is no longer a question of if but how. Energy companies are integrating digital intelligence to optimize operations, reduce emissions, and deliver reliable power. The conversation has shifted from adoption to adaptation: how to use AI effectively, ethically, and sustainably to meet the dual mandate of growth and decarbonization. The UAE's revised Energy Strategy 2050 embodies this evolution. By setting an ambitious target of 35% clean energy by 2031, including nuclear power, and embedding AI and data-center integration, the country is creating a digital backbone for its low-carbon future. The establishment of a dedicated Ministry for Artificial Intelligence underscores that this is not a passing trend but a fundamental re-engineering of governance and industrial strategy.

Data — the Lifeblood of AI

Every conversation on AI eventually returns to one immutable truth: no data, no intelligence. Despite rapid digital transformation, many organizations still lack robust data pipelines and governance frameworks. Fragmented systems, siloed departments, and incompatible platforms prevent industries from realizing AI's full potential. The solution is not to centralize all data — a costly and inefficient approach — but to connect existing repositories through interoperable, open-source standards. Such frameworks allow information to flow seamlessly between predictive maintenance systems, emissions monitoring tools, and operational databases, creating a unified ecosystem where insight drives action.

The shift from predictive to prescriptive analytics marks a crucial turning point. Rather than merely forecasting what may happen, AI can now recommend what should happen. In the energy sector, this distinction could mean the difference between reactive compliance and proactive sustainability.

The Human Dimension

For all the promise of automation, AI's true power lies in augmentation. It will not replace human intelligence but enhance it. Engineers, analysts, and policymakers need new skill sets — data literacy, computational reasoning, and ethical awareness — to collaborate effectively with machines. Upskilling is not optional. Universities and training institutes must design curricula that bridge data science and industry-specific applications. Likewise, leadership must nurture a culture of curiosity rather than fear. The goal is not to create an army of coders but to empower decision-makers who understand how AI can serve their mission.

Cross-sector learning is also indispensable. Lessons from aviation, manufacturing, and mining prove that digital transformation succeeds only when people evolve with technology. The energy industry can accelerate its progress by borrowing best practices from sectors that have already navigated similar transitions, blending safety, efficiency, and adaptability.

Efficiency, Accountability, and Ethics

AI's most immediate value in energy lies in its ability to enhance efficiency and accountability. Predictive maintenance solutions have already reduced maintenance backlogs by up to 40% and enabled real-time emissions tracking across onshore and offshore assets. These tangible results illustrate that technology, when applied purposefully, can deliver measurable environmental and financial gains.

Yet, there is a growing paradox. The same AI systems that promise to cut emissions also consume significant amounts of energy. Training a single large model can emit hundreds of tons of CO_2. This irony cannot be ignored. Policymakers and corporations must adopt strategy-driven rather than technology-driven approaches — selecting low-compute, fit-for-purpose models that balance innovation with sustainability.

Governance will be key. The UAE's national AI strategy, which integrates cybersecurity, energy efficiency, and cabinet-level decision-making, offers a regional benchmark for ethical deployment. Regulatory frameworks must ensure that data privacy, transparency, and carbon accountability remain central to technological progress.

Bridging Policy and Innovation

Policy often lags behind technology, but forward-looking governments can turn that gap into an advantage. The Gulf's proactive stance — creating ministerial oversight, promoting public-private partnerships, and investing in AI infrastructure — demonstrates how regulation can guide innovation rather than constrain it. At the same time, policymakers must embrace a "no-regrets" approach to energy planning. Investments in grid enhancement, carbon-capture systems, and renewable dispatchability should continue regardless of how quickly AI evolves. When the next generation of AI-driven data centers demands more power, nations that have already strengthened their clean-energy grids will be prepared to meet it responsibly.

From Projects to Purpose

A sobering statistic from MIT suggests that 95% of corporate AI projects fail — not because of technology, but because of poor alignment with business objectives. Many organizations pursue AI for prestige rather than purpose, launching proof-of-concepts that never scale or deliver value. The antidote is clarity. Companies must start with the right questions: What problem are we solving? What data do we have? What value do we seek to create? Incremental, high-impact projects yield better returns than sweeping transformations. The emphasis must shift from quantity to quality — fewer pilots, more purpose.

Fit-for-purpose design, user-centric interfaces, and management of change determine whether AI succeeds in the field. The energy sector's risk-averse nature is justified; reliability is paramount. But cautious adoption should not mean stagnation. Success stories such as AI-optimized gas-turbine controllers that improved efficiency by 2.2% and cut 23,000 tons of CO_2 show that small, targeted applications can yield outsized benefits.

Supply Chains and Transparency

Sustainability does not end at the plant gate. About 90% of emissions in global supply chains originate from small and medium-sized enterprises that often lack the tools to measure or report them. AI can democratize accountability by enabling suppliers to contribute real-time sustainability data, helping corporations map their true scope 1, 2, and 3 emissions. Platforms that integrate these data flows create transparency, turning ESG reporting from a compliance exercise into a strategic asset. When AI simplifies sustainability for every participant in the supply chain, it transforms environmental responsibility into competitive advantage.

Cybersecurity and Trust

As data volumes expand, so do vulnerabilities. The convergence of open data, industrial control systems, and AI introduces new risks. Misclassified or manipulated data can produce false insights or expose critical infrastructure to cyber-attacks. Energy companies must therefore treat cybersecurity as intrinsic to AI strategy, not an afterthought. Proper data classification, model validation, and threat-monitoring protocols safeguard both operations and public trust. Without this foundation, even the most advanced AI systems can become liabilities.

Innovation Through Collaboration

The energy breakthroughs of tomorrow — from carbon-capture materials to hydrogen production and nuclear fusion — will not emerge in isolation. They will be forged through collaboration between governments, academia, and industry, leveraging AI as an accelerant of discovery. Generative AI, for instance, can simulate millions of chemical reactions to identify new catalysts or materials in weeks rather than years. These capabilities could unlock the next generation of clean technologies, but only if supported by visionary public-private investment and coordinated global research networks.

Precision Over Proliferation

AI is not a universal remedy. Its deployment must be precise, contextual, and goal-driven. Applying AI indiscriminately wastes resources and erodes confidence. The future of energy intelligence lies in focus — selecting use cases where measurable outcomes can be achieved, where data is mature, and where technology complements human judgment. ■

TOP 20 TAKEAWAYS

1. AI as a Strategic Enabler
AI is central to Energy Transition strategies, supporting emission reduction, operational efficiency, and reliable energy supply. The shift is no longer about adoption but about effective adaptation. AI will empower human capabilities, enhance productivity, and foster low-carbon, affordable, and secure energy systems across industrial and regional energy networks.

2. UAE's National AI Integration
The UAE's updated Energy Strategy 2050 emphasizes integrating AI and data centers to meet growing energy demands. Targets include 35% clean energy share by 2031, combining renewable and nuclear energy. Continuous revisions ensure policies align with AI-driven growth, technological advancements, and sustainability objectives across national infrastructure and governance.

3. Data Centers as Energy Catalysts
Massive investments in data centers are accelerating digital transformation across the Gulf. These hubs demand high renewable capacity, driving advancements in clean energy integration, energy storage, and international partnerships. The UAE's proactive approach ensures data infrastructure development aligns with sustainability, efficiency, and global competitiveness in AI-driven industries.

4. AI-Driven Maintenance and Monitoring
AI enhances predictive maintenance, emissions tracking, and operational forecasting across aging energy assets. Technologies like MaintAI demonstrate up to 40% maintenance reduction and real-time emissions tracking. The challenge lies in integrating AI into legacy systems while maintaining compatibility, reliability, and leveraging autonomous yet human-supervised operational decision-making frameworks.

5. Cross-Sector Learning Imperative
Lessons from aviation, nuclear, and mining sectors show the need for synchronized human-machine collaboration. Digital transformation requires upskilling and cultural adaptation. Transferring methodologies from mature industries helps energy firms balance safety, innovation, and efficiency, ensuring people evolve alongside technology through multidisciplinary collaboration and adaptive leadership strategies.

6. Evolution from Predictive to Agentic AI
AI evolution spans from predictive models to agentic systems capable of orchestrating energy flows autonomously. Integrating sensing, analysis, and control enables optimized demand response and renewable dispatch. Future systems will achieve energy orchestration across distributed resources, transforming the grid into a self-managing intelligent network supporting dynamic energy ecosystems.

7. Unified Data Infrastructure Challenge
Energy industries struggle to connect fragmented data systems. Centralized data platforms without unnecessary migration enable faster AI scaling. The focus shifts from predictive to prescriptive modeling using industry-specific language models that enhance context, reduce costs, and create actionable insights through efficient, connected, and intelligent data ecosystems.

8. AI Adoption Through Purpose Alignment
Organizations must define clear objectives before adopting AI. Success depends on identifying the specific problems to solve and prioritizing high-impact areas. Incremental implementation, structured multidisciplinary teams, and reusable solutions maximize ROI, reduce risks, and ensure that technology investments translate into measurable and sustainable operational improvements.

9. Distinguishing True AI Value
AI is often misapplied due to its buzzword status. Businesses must focus on solving precise problems with appropriate tools rather than complex algorithms. Simpler models can often provide faster, cost-effective insights. The emphasis should be on outcomes, efficiency, and decision-making improvement rather than technological showmanship.

10. Balancing AI's Energy Footprint
While AI mitigates emissions through optimization, its computational processes consume vast energy. Policymakers must weigh costs and benefits, ensuring energy-efficient models are prioritized. Strategy-driven AI selection should replace technology-driven enthusiasm, minimizing unnecessary compute demand while maximizing sustainability and aligning AI growth with environmental stewardship.

11. Policy and Governance Leadership
The UAE leads the region with a dedicated AI Minister and national strategy. Governance frameworks ensure AI adoption aligns with cybersecurity, energy efficiency, and national sustainability. Integration of AI in cabinet-level decision-making exemplifies forward-looking governance ensuring policy coherence, accountability, and ethical implementation of emerging technologies.

12. Human Capital and Upskilling
Effective AI integration requires comprehensive employee training. Developing data literacy, analytical reasoning, and ethical AI understanding empowers workforces to collaborate effectively with intelligent systems. AI should augment human expertise, fostering innovation while maintaining accountability and safety across operational, engineering, and environmental decision-making processes.

13. Data Quality as the Cornerstone
AI effectiveness depends on robust, clean, and connected data. Many organizations lack proper data analysis capabilities, leading to inefficiencies and poor model performance. Investing in foundational data governance, analytics infrastructure, and open data standards is critical to achieving accurate predictions and transparent, accountable decision-making.

14. Open-Source Standards for Collaboration
Industry-wide open-source standards are essential to connect diverse systems across predictive maintenance, control, and emissions tracking. Proprietary silos hinder interoperability. Open frameworks enable efficient collaboration between operators, vendors, and regulators, fostering shared innovation and consistent standards for transparent and scalable digital transformation.

15. Overcoming AI Project Failures
Studies reveal most corporate AI projects fail due to poor design, lack of scalability, or misalignment with operational needs. Success demands early evaluation, adaptability, and user-centric design. Companies must prioritize fit-for-purpose solutions, avoid excessive experimentation, and ensure AI initiatives deliver tangible, measurable business outcomes.

16. Ethical and Sustainable AI Practice
AI's environmental impact and ethical implications necessitate regulatory oversight. Low-compute, purpose-driven AI solutions should be mandated to ensure energy efficiency. Ethical frameworks must guide technology selection, emphasizing long-term value creation, carbon accountability, and alignment with national sustainability goals rather than short-term technological hype.

17. Innovation Through Public–Private Synergy
Breakthrough technologies like carbon capture, hydrogen generation, and nuclear fusion require joint industry-government efforts. Policy should drive innovation by supporting early-stage research and development. Generative AI's potential to accelerate material discovery and clean technology development underscores the need for large-scale coordinated public–private investment frameworks.

18. Supply Chain and Transparency
Sustainability in energy transition depends on transparent, data-driven supply chains. AI enables visibility across suppliers, supporting scope 1–3 emissions tracking and sustainability metrics. Integrating AI platforms helps smaller enterprises align with corporate ESG standards, strengthening overall accountability and reducing risks across energy production ecosystems.

19. Cybersecurity and AI Integrity
AI systems must be deployed securely with proper data classification to prevent cyber threats and misinformation. In energy sectors, AI models handling sensitive operational data must adhere to strict validation and governance protocols, ensuring accuracy, resilience, and defense against adversarial manipulation or data breaches.

20. Precision, Context, and Use-Case Focus
Successful AI adoption depends on defining clear, context-driven use cases. Applying AI indiscriminately leads to waste and confusion. The focus should remain on measurable outcomes, operational efficiency, and emissions accountability. Precision in design and purpose ensures AI enhances productivity without fueling unnecessary technological proliferation. ■

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