



SECURITY AND DATA PRIVACY

ENSURING DATA PRIVACY AND SECURITY IN INDUSTRIAL ENERGY MANAGEMENT WITH GENERATIVE AI

WHITE PAPER

Introduction

A TALE OF TWO REVOLUTIONS

It's not every day that we get to witness one revolutionary change, let alone two. The ongoing energy transition from fossil fuel to sustainable, clean energy sources has marked a pivotal turning point in our approach to environmental stewardship and energy consumption. This movement has been accelerating over recent years and represents a fundamental shift in how we power our world. In 2023, we saw the emergence of another technological revolution that is poised to become another transformative force: Artificial Intelligence (AI).

The democratization and proliferation of advanced AI models within the past year have been nothing short of meteoric. Artificial Intelligence as a technology has the potential to rival the most transformative technologies of our generation, and it provides a unique opportunity for energy management. The convergence of AI with the energy sector is not coincidental, it was inevitable. Energy management in the industrial sector has favoured traditional methods over the cutting edge. Embracing this new technology enables a more efficient, sustainable, and effective approach to energy management.



An Inevitable
CONVERGENCE

Data, Data, Data

AN ISSUE OF DATA

Today's energy management landscape is dominated by the Internet of Things (IoT), extensive spreadsheets, and massive amounts of data. The challenge in modern energy management is no longer about the scarcity of data, but the abundance of it. Thanks to the IoT revolution in the past decade, industrial IoT has been on the rise in most facilities. Energy managers don't spend time collecting data anymore, they spend most of their time processing it, trying to discover valuable insights, and looking for vectors of improvement. The biggest problem energy managers face today is spending enormous amounts of time sifting through that data, thankfully the perfect solution has recently emerged.

What if a technology existed that didn't get crippled by the abundance of data, but instead thrived on it? What if that technology was able to learn, adapt, and become even more effective the more data you gave it? What if that technology was able to instantly give you the insights energy managers spend hours or even days trying to uncover? That technology now exists, and it's the vision behind Edgecom Energy's AI CoPilot.



Understanding Generative AI Assistants

Generative AI Assistants are AI-powered systems designed to collaborate with energy managers and other energy stakeholders in analyzing historical data, predicting future energy usage patterns, and recommending optimization strategies. The technology employs deep learning algorithms to generate insights, forecast energy demand, and suggest actionable recommendations.

Key Features:

- 1. Data Analysis:** Generative AI Assistants ingest and analyze vast amounts of historical energy data, identifying patterns and correlations that may not be apparent through traditional methods.
- 2. Predictive Modeling:** The system utilizes predictive modeling to forecast future energy demand based on historical trends, external factors, and real-time data inputs.
- 3. Optimization Strategies:** Generative AI Assistants generate optimization strategies by considering various factors such as time-of-use pricing, weather conditions, and equipment efficiency.
- 4. Continuous Learning:** The AI Assistants are designed to continuously learn from new data inputs, adapting their models and recommendations to evolving conditions.

Edgecom Energy's AI Energy CoPilot is a Generative AI Assistant built specifically for energy management. This tool is the next big evolution in how we manage energy in the industrial setting.

With such vast amounts of data, the main concern is the security and privacy of that data. The very same data that can fuel these AI models also poses a significant security risk when mishandled. In the next sections, we will discuss how Edgecom Energy has built its systems and infrastructure with security at the forefront.

End to End Security

IT BEGINS WITH DATA COLLECTION

Edgecom Energy offers a comprehensive solution from data acquisition to the delivery of actionable insights, and it all begins with data collection. We can acquire data in one of three ways: LoRa IoT Devices, direct API access, or via legacy meters at the facility.

LoRa Wireless technology serves as the foundation for our IoT devices, purpose-built to cater to industrial IoT applications. LoRa is one of the few protocols providing end-to-end 128-bit AES encryption whereas many traditional protocols only encrypt data over the air, but not within the operator's core network. Security begins during the activation phase where new devices must be authenticated to join the network. Once authenticated, two unique device keys, the application key, and the network key, are generated for each device. These keys are pivotal in ensuring the confidentiality and integrity of data. During network communication, session keys are derived from these device keys and employed for data protection. Additionally, LoRa incorporates a built-in mechanism for regular session key updates, further enhancing security. This multi-faceted approach of incorporating stringent authentication and encryption practices ensures comprehensive data protection at every stage of the communication and data collection process.

As part of our security-minded approach, Edgecom Energy's IoT devices do not require access to internal IT infrastructure. This design principle significantly enhances security by removing a potential entry point for cyber threats.



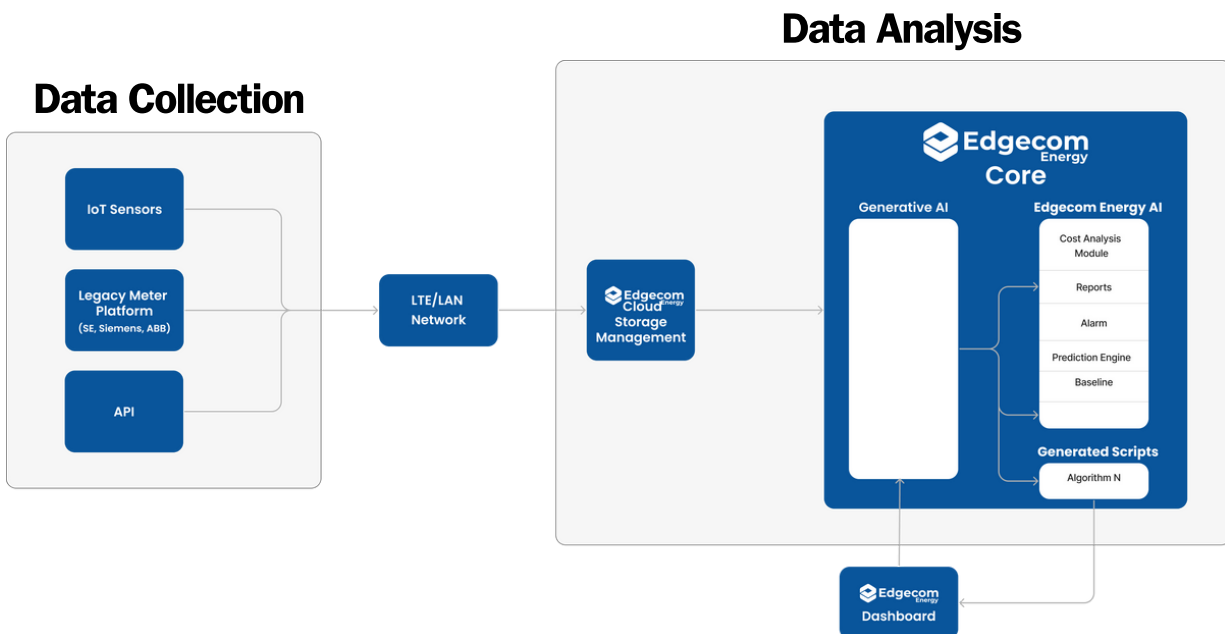
Additionally, this strategy is beneficial for IT teams as it simplifies network management and reduces the burden of securing their internal network from IoT-related vulnerabilities. The data that is collected by our IoT devices are independent of your networks and encrypted end-to-end.

Edgecom Energy's software is designed to seamlessly integrate with your existing IoT devices as well. Our system supports secure API connections for the safe transfer of your data to our servers. When choosing to share data via API, your data is protected via these methodologies:

- **API Keys:** A unique and secret identifier used to authenticate clients or users.
- **OAuth Protocol:** The industry standard for access control with third parties.
- **Transport Layer Security:** Cryptographic transmission protocol to secure data transmission, ensuring the confidentiality of data.

For facilities with legacy meters, Edgecom Energy offers a solution with our LoRa-enabled Modbus Converters. These devices can directly read data from your meters, map and convert the data to the appropriate formats, and securely transmit it to our servers. Even for facilities with older infrastructure, you can benefit from Edgecom Energy's modern software solutions.

Whatever system your facility uses, Edgecom Energy is dedicated to providing you with the highest security in data protection.



State of the Art Data Protection

SECURED BY SOC II COMPLIANCE

Edgecom Energy's server infrastructure is hosted and secured by Amazon Web Services (AWS), the most secure global data infrastructure available today. With AWS, industry-leading security technologies, global threat analyses, automated threat responses, and much more are handled with industry-leading standards.

Amazon Web Services (AWS) prioritizes security from the ground up, starting with stringent physical safeguards. Environmental controls, power backups, and robust redundancy protocols ensure the safety of your data. Rigorous on-site security measures, including strict access controls and continuous intrusion monitoring guard against physical threats. Digitally, AWS excels with its around-the-clock threat monitoring systems, safeguarding the confidentiality, integrity, and availability of your data. Utilizing machine learning and its extensive global server network, AWS proactively identifies and mitigates emerging threats. Furthermore, data encryption at the physical layer guarantees that from the moment data is collected by our LoRa devices, your data remains securely encrypted throughout its journey to becoming insights.

Edgecom Energy never shares your data with third parties. While we utilize OpenAI's GPT language learning models, the actual data processing is done with Edgecom Energy's proprietary AI algorithms on our servers. The high-level overview of this process is as follows:

1. Data acquisition occurs via one of three vectors: Our LoRa IoT devices, Legacy Meter Systems, or Direct API connections.
2. Encrypted data is sent to our secure servers.
3. When a user asks a question via our AI Energy CoPilot, we interpret the question and intelligently determine the answer via our AI algorithm stack.
4. If no such algorithm exists, a request is made to OpenAI which then generates an algorithm script based on our specifications and is sent back to Edgecom Energy servers. Your data NEVER leaves our servers.
5. The script is then executed on our servers, where the answer is generated, and relayed back to the user on the front end.

Our process is designed to ensure your data is protected in our servers, never shared with third parties, and always encrypted in transit.



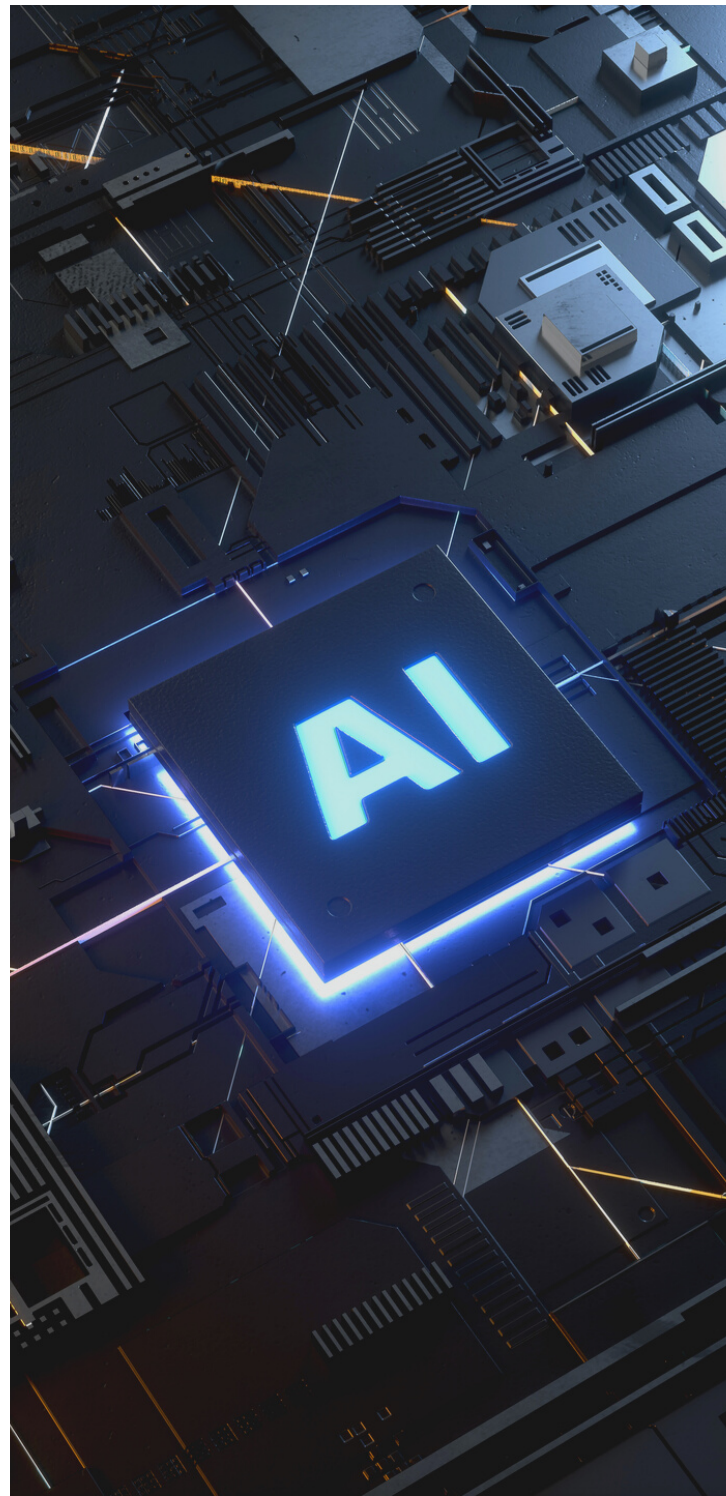
Tailored for Energy Management

PURPOSE-BUILT INTELLIGENCE

Edgecom Energy's AI Energy CoPilot is a sophisticated tool that merges our proprietary machine learning algorithms with OpenAI's GPT language learning model. The foundation of this advanced system lies in years of dedicated development of coincident peak-prediction algorithms, a field in which Edgecom Energy has achieved remarkable success. The integration of prediction algorithms with a comprehensive stack of energy algorithms and the capabilities of the GPT language model creates a powerful generative AI assistant, tailored specifically for the intricacies and demands of energy management. The tool's design reflects a deep understanding of the energy sector's needs, addressing key aspects such as consumption analysis, cost reduction, emission reduction, and efficient resource management.

We leverage GPT's language capabilities to understand and tokenize user requests and intelligently select proper energy algorithms to generate the responses. If our system cannot determine an appropriate algorithm in the stack, a request is made to GPT to generate a custom algorithm script, which is then sent back to Edgecom Energy's servers and incorporated into our AI. It's important to note that customer data never leaves Edgecom Energy's servers; we determine the requirements of the algorithm and only a request is sent to OpenAI's servers. The novel script is then deployed on Edgecom Energy servers where the customer data resides, generating the appropriate results.

This approach allows the AI Energy CoPilot to continuously learn, expand its algorithmic capabilities, and adapt to the evolving needs of the customer. The result is a dynamic, intelligent, and secure AI assistant that not only responds to current energy management challenges but also evolves to meet future demands.



Conclusion

LEAP INTO THE **FUTURE**

In an era where the energy sector is undergoing a pivotal transformation, the role of AI is the catalytic tool that can propel your business ahead of your competitors. Artificial Intelligence offers unprecedented opportunities to optimize energy usage, reduce costs, and contribute to a more sustainable future while reducing the workload of energy managers.

Edgecom Energy is at the forefront of this revolution, harnessing the power of AI to drive efficiency and innovation in energy management. Our AI Energy CoPilot is not just a tool, but your strategic partner in energy management, built from the ground up to deliver you actionable insights infused with decades of experience from our energy experts. By leveraging cutting-edge technology and deep industry knowledge, we empower you to optimize your energy usage, reduce costs, and contribute to a more sustainable future. Join us in shaping a smarter, more efficient energy world where technology, security, and expertise come together to meet the challenges of tomorrow.

Your Strategic
PARTNER

About

EDGECOM ENERGY

Empowering large energy consumers to reduce energy costs & emissions through IoT and AI solutions.

At Edgecom Energy, we empower large energy consumers to take control of their energy costs and reduce emissions by harnessing the power of IoT and AI solutions. Our innovative technology helps you optimize energy usage, save money, and contribute to a greener, more sustainable future.

We understand the importance of seamless integration and customized solutions to meet the unique needs of our customers. Our API capabilities serve as a cornerstone for empowering large energy consumers with cutting-edge technology. Our APIs are designed for seamless integration with your existing systems and infrastructure. Whether you're utilizing energy management software, building automation systems, or other platforms, our solutions seamlessly integrate to ensure a cohesive and interconnected energy management ecosystem.

Book a Demo



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