EVIDEN

Empowering Energy & Utility Industry with **Eviden's solutions on AWS for Greener Future**

Executive Summary

The energy & utility retailers are under pressure from all directions and with pandemic and cost of living crisis has worsen the situation. There has been increasing demands for energy efficiency, reliability, and sustainability, whilst at the same time need to lower down energy bills for customers.

The objective of this article is to dive deep how Eviden, empowering Energy & utility industries with Data & AI solutions on AWS to improve operational efficiency, reducing cost and reimagining customer experience.

Rising Opportunities and Challenges

The energy industry is undergoing profound transformation driven by digitalization and the integration of industrial artificial intelligence (AI). As global energy demands increase and the push for sustainable and efficient energy solutions intensifies, traditional energy systems are being reinvented. Digitalization and industrial AI play a pivotal role in this evolution, offering innovative approaches to optimize operations, enhance decision-making, and ensure reliable energy supply while minimizing environmental impact.

As per U.S. Energy Information Administration (EIA), energy demand is likely to increase by 47% over the next 25 years, with renewable energy sources growing by over 125%. These trends will increase grid complexity, and existing energy infrastructure will need to support 50% of energy demand even in 2050. The power grid was originally designed for peak scenarios, where power flows only one direction across the grid, from generation sources to customers. But now distributed energy resources such as solar are coming online. Individuals are buying electric vehicles and business customers are electrifying their vehicle fleets. This is leading to a decentralized, distributed and customer-centric power grid, where power can flow both ways between the grid and the customer. This requires planning and designing the grid for a large number of complex scenarios, beyond traditional seasonal peaks.

Digitalization and industrial AI enabling the Energy Transition cycle

Digitalization and industrial AI are critical enablers of the energy transition, which is the shift from fossil fuels to renewable energy sources. These technologies power the energy transition cycle in several key aways:

- **Enhanced Energy Efficiency:** Digital tools and AI improve the efficiency of energy production, distribution, and consumption. For example, smart grids utilize AI to manage electricity flow, balance supply and demand, and integrate renewable energy sources like solar and wind more effectively. This optimization reduces energy waste and enhances grid reliability.
- **Predictive Maintenance:** AI-driven predictive maintenance helps in identifying potential equipment failures before they occur, reducing downtime and maintenance costs. In power plants and renewable energy installations, this ensures continuous and efficient operation, thereby supporting the stable supply of clean energy.
- **Renewable Energy Integration:** Digitalization facilitates the integration of variable renewable energy sources into the grid. AI algorithms forecast energy production from solar and wind, allowing for better planning and utilization of these resources. This integration is crucial for maintaining grid stability and reducing reliance on fossil fuels.
- **Demand Response and Energy Management:** Advanced digital platforms enable real-time monitoring and management of energy use in buildings and industrial processes. AI can predict and adjust energy consumption patterns, thereby aligning usage with renewable energy availability and reducing peak demand. This helps in lowering overall energy consumption and costs.
- **Data-Driven Decision Making:** The vast amount of data generated by digital sensors and IoT devices in the energy sector is analyzed using AI and big data analytics. These insights drive strategic decisions on energy investments, policy-making, and operational improvements, fostering a more efficient and sustainable energy ecosystem.

By enhancing operational efficiency, reducing costs, integrating renewable energy sources, and optimizing energy use, digitalization and industrial AI are pivotal in advancing the global energy transition towards a more sustainable and resilient energy future. Several customer challenges are addressed through innovative solutions developed by Eviden on AWS.

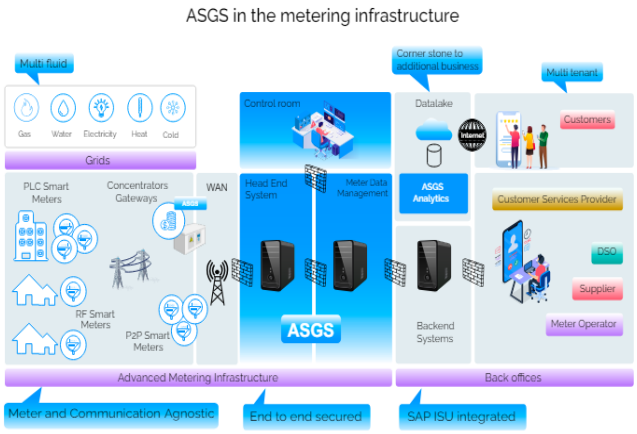
Customer Challenges

Energy & utility companies need effective smart grid and smart metering strategies without any capital investment.

Eviden Solution

Eviden developed Atos Smart Grid Suite (ASGS) powered by AWS.

More than the simple collection and billing operations, ASGS provides Smart Services such as data aggregation, process supervision, meter data management etc. ASGS smooth transition from Utility to Smart Utility.



Customer Benefits

- ASGS is end-to-end platform solution including meter data and asset management, real time supervision, outage and workforce management, grid management, billing and customer care.
- ASGS is completely “device-agnostic” and can be used in conjunction with all leading smart meters, concentrators, and networking components.
- ASGS provides an end-to-end Automated Metering Infrastructure (AMI), ready for the immediate adoption of smart grid features.

Security & Compliance Needs

The changes and challenges facing the global energy industry require companies across the energy value chain to optimize their cybersecurity and compliance.

Eviden has built next-gen Managed Detect & Respond (MDR) platform utilizing Gartner’s cybermesh principle, powered by AWS Security Lake. The mesh architecture enables integration of security tools across clouds, endpoints, applications, databases, and the IT/OT/IoT network. The solution is built on the Open Cybersecurity Schema Framework, which helps normalize security telemetry and improve integration.

Customer Challenges

A Central European Energy & Utilities company required **mandatory** implementation of **attack detection systems** in accordance with the German IT Security Act 2.0. Customer had challenges in implementing the requirements of the IT Security Act 2.0 and achieving the required maturity level through a verification assessment. This required identification of a suitable OT-IDS solution for the underlying infrastructure and a 24x7 OT-SOC for continuous monitoring of the infrastructure.

Eviden Solution

Eviden is #1 in managed security services ranked by Gartner, having 6500+ Security specialists and 16+ Security operations centers worldwide. To address the **challenges**, Eviden implemented **holistic approach** with the following activities:

- Conducting an **OT security assessment** to evaluate the general threat situation.
- Realization of a **proof of concept (PoC)** for network evaluation using an OT intrusion detection system (OT-IDS) from Nozomi Networks.
- Performing a comprehensive network analysis.
- Supporting the **implementation**, **operation** and **monitoring** of the deployed **OT-IDS sensors, OT-SOC and a Managed Detection and Response (MDR) platform.**
- Assistance with a successful subsequent audit (regulations § 11 para. 1d, 1e EnWG in conjunction with BSI-orientation guide).

Customer Benefits

- **Comprehensive threat reduction** by using synergies of existing IT projects. A holistic approach was pursued to **monitor both** the **IT** infrastructure and the **OT** infrastructure and to respond optimally to alarms with specially trained SOCs.
- **Fulfilment of compliance requirements** according to the German IT Security Act 2.0 and the required attack detection systems. It increased the security level in the control and command technology by enabling threats detected at an early stage.

New Innovations

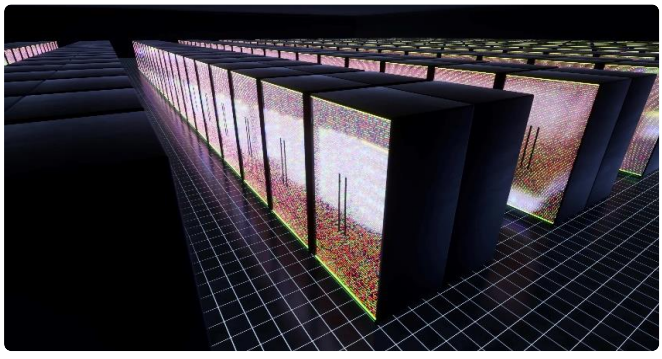
According to The International Energy Agency, as energy demand and grid complexity increase with the transition to renewable sources, generative AI can help manage smart grids, optimize supply/demand predictions, and prevent grid failures through improved reliability and security.

Customer Challenges

Continuous improvement is one of the key goals that Energy & Utility industry and in particular Operations and Maintenance teams strive to optimize cost and improve productivity. Leading energy customer was looking to reduce downtime for their wind turbine failure towards predictive maintenance outcome.

Eviden Solution

Eviden Digital Twin Platform—with its building blocks of data integration, industry-agnostic cloud platform, and extendable APIs—provides acceleration to deliver key digital twin functionalities. This covers data acquisition, data modelling, data standardization (IEC/ISO specific), application development, and enterprise connectivity.



Eviden's Digital twin combines data about assets and processes from different systems into one digital companion, or digital view. The continuous gathering and analysis of data through advanced statistical models and machine learning (ML) leads to autonomous/decision making system, increasing asset availability, reduced operational costs, improved asset performance, and a step change in quality.

Eviden Digital Twin enables

- Mapping of wind sensors of the physical asset with virtual assets in legacy systems like MES to establish digital threads.
- Prediction of life of cutting tools, axles, clamps, spindle and preventive measure to maximize it.
- Reduce downtime and idle time by proper scheduling.
- Automate processes of inspections.
- Reduce wastage through Lean methodologies.
- Reduce manual intervention to avoid error.

Customer Benefits

- Monitor assets in real time. Quickly locate the turbine and select the relevant part or sensor from 3D digital replica.
- Reduction of Wastage & Tool Costs
- Improved productivity. Reduced Mean Time to Response (MTTR) by 20%, reduced operational costs by 12%, and increased asset uptime.

Full fidelity digital twins enable energy & utility industries to simulate the physical world and solves problems. Leveraging Digital Twin, Eviden supported several customers including leading utility company in the UK to innovate and proactively control environmental pollution incidents accelerating their corporate goals towards sustainability.

As Energy industries **invest in low carbon energy technology & sustainable future outcomes,** there is opportunity to modernize IT infrastructure on cloud and improving energy efficiency. Measuring and reporting carbon emissions is crucial for any business. Eviden has developed Carbon Calculator on AWS for carbon accounting & tracking carbon.

Energy and utilities companies operate in diverse environments, consisting of legacy and modern OT systems, discrete edge infrastructure, multi-cloud, hybrid, and on-premises IT systems. About 90% of industrial data is never used – and one of the big reasons is that it is often siloed, stored in industrial systems from where it is hard to extract to enable data-driven decisions.

Some of the common challenges are: 1/ lack of access to information and visibility throughout the industry, 2/ inability to become proactive, leading to reactive action once issues have already come up, 3/ slow process to identify root cause in the field, 4/ cost for these legacy systems continuing to rise further reducing their ROI, and 5/ inability to integrate systems to be able to contextualize data as well as challenges scaling operations.

Most of energy customers adopted several systems to handle different aspects of the operation, including processes, production capacity, compliance, inventory fulfillment, machine health and maintenance. Each of those systems have their own data stores, dashboards, and protocols. More importantly, often lack integration and don't “talk” to each other.

In addition, customers have hundreds of equipment using different protocols (such as PROFINET, Modbus, and EtherCAT) to capture and store data in different formats. These protocols are used to enable communication between various types of equipment and systems within a manufacturing environment. However, their incompatibility can create data silos, restricting the seamless flow of information.

AWS helps energy customers to get the most out of their current investment and adopt a modern data infrastructure.

Customer Challenge

An energy company was having trouble getting relevant information out of its Confluence documentation and GitLab code repositories. Searching was time-consuming, and results were often inaccurate. The situation was draining productivity and internal knowledge management.

Eviden Solution

Eviden built Generative AI based conversational AI solution using retrieval-augmented generation (RAG) on AWS to carry out enterprise search. Solution used data ingestion from several IT systems for further classification and retrieval by Gen AI application.

Customer benefits

Demonstrated the potential of using Gen AI to enhance internal knowledge management, accelerate search and increase overall productivity.

Cost of Living & Rising Cost of Energy Bills

Since 2018 there has been 10x increase in debt books on average in Utilities. A quarter of UK households switched energy or gas suppliers in 2022. 62.5% of energy companies reporting an increase in failure to pay. 7.5 million households in Fuel poverty. Just in Q4 '23 unsecured debt raised from £553 to £1,125 this year.

Customer Challenge

As the cost-of-living crisis continues, more and more consumers are moving away from direct debit payment. As a result, many are heading deeper into arrears and failed payments. Debt books are spiralling and vulnerable customers are feeling the difficult consequences as they try to meet their payments. Energy & Utilities industry need to empower consumers to pay their utility bill.

Eviden Solution

Eviden developed an Intelligent FlexiPayments system that works with the consumer to take control of their payments and proactively identify and protect the most vulnerable from the effects of Fuel Poverty.

The AI-driven payment guidance and notification engine allows customers to make deposits from multiple funding sources, in amounts that suit the financial ability, securely and easily. The system encourages monthly or more frequent payments as funds become available; reducing their dues in a way that is management to them.

Customer benefits

- Reducing debt book while offering more consumer flexibility and safeguarding.
- Empowering people to make payments according to their own financial rhythm and cash flow status by offering choice & control without overwhelming admin.
- Identifies, supports, and protects the vulnerable and at-risk people in society proactively, signposting to the help they need.

The Future of Energy Systems

Digitalization and industrial AI are revolutionizing the energy industry, driving it towards a more efficient, reliable, and sustainable future. As technologies continue to evolve, their impact is expected to grow, offering new solutions addressing critical challenges in the quest for a sustainable energy landscape.

Implementing digital twins, predictive analytics, and smart grid monitoring technologies can significantly enhance operational efficiency. This leads to reduced downtime, optimized energy consumption, and better integration of renewable energy sources.

Digitalization and AI help achieve sustainability goals by optimizing energy use and reducing carbon footprints. Using data analytics to identify energy-saving opportunities and implement AI-driven solutions for efficient energy management.

Adopting security solutions protecting data and infrastructure will ensure compliance with industry regulations, which is critical for maintaining trust and avoiding potential penalties.

Several Energy & Utility industries are experimenting Generative AI technologies for automation and technology integration projects. In order to best leverage Data & AI across the energy industry, goverments needs to approve mechanisms for data sharing and governance. Industry leaders should prioritize the appropriate use case for Gen AI adoption to make their digital strategies successful. Cloud and data are foundational to achieving success and AWS is building the energy systems of the future and helping leading organizations across the value chain increase energy production, lower cost and risks, reduce carbon emissions, and improve safety and security.

Reach out to Eviden today to turn proof of values on AWS to scaled outcomes.

Eviden is AWS Energy Competency partner helping energy & utilities industries build and implement advanced solutions powered by AWS across the industry value chain.

Read more about Eviden in Energy & Utilities here.

Ashok Ramachandran
Cloud Strategy & Architecture
Office of the CTO – Eviden
ashok.ramachandran@eviden.com

Prasanta Roy
Global Head, Solutions Architecture – Eviden Partnership
Amazon Web Services
roypras@amazon.co.uk

Connect with us

eviden.com