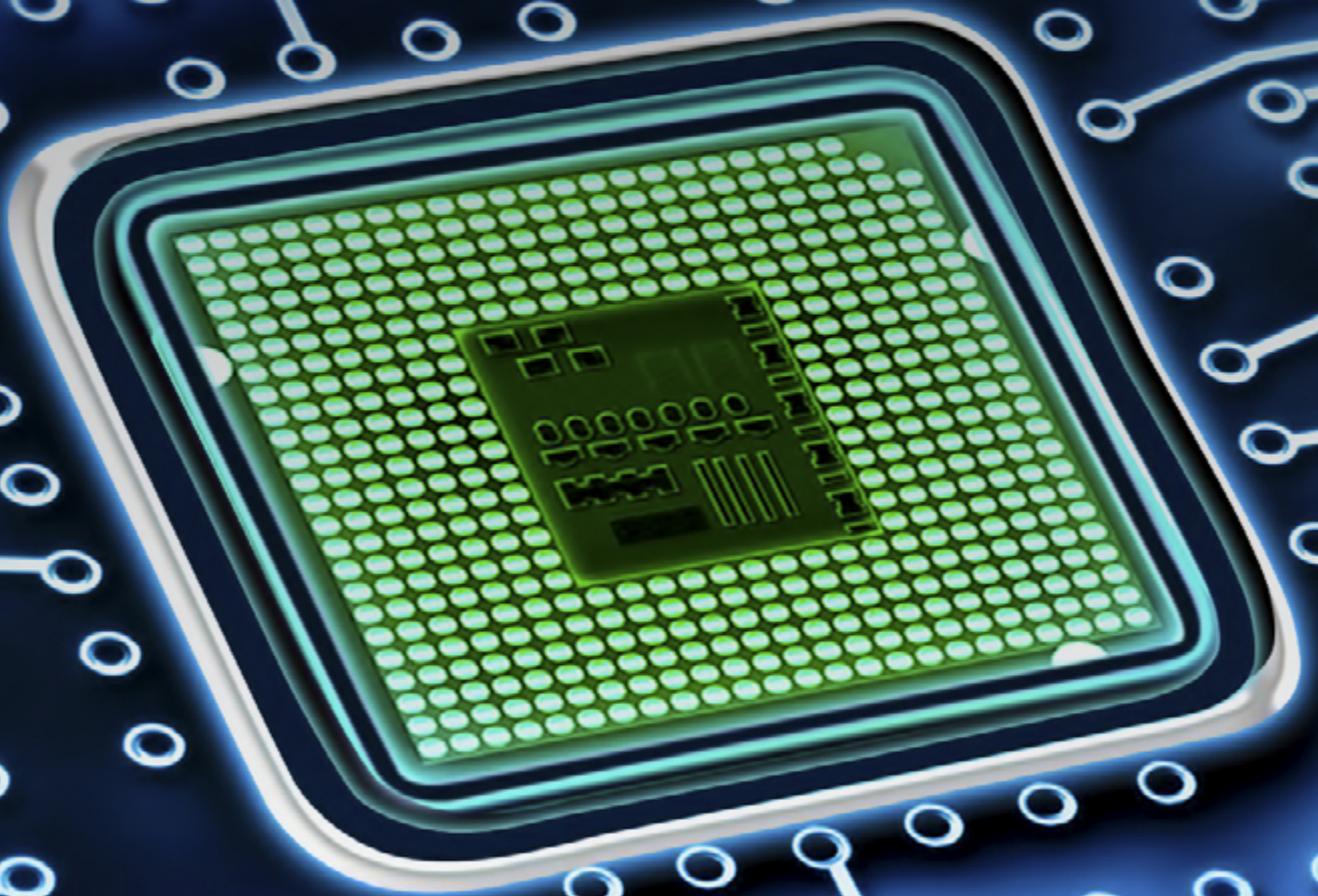

It's getting easier to be green

Utility's smart meter initiative grows into using AI and ML to stabilize the impact of intermittent renewables on the power grid



At a glance

Smart meters and industrial IoT infrastructure lead a major utility to AI and ML in pursuit of clean energy goals

Outcomes:

- 36 million customers upgrading to smart meters
- 40 legacy applications integrated with industrial IoT infrastructure
- 6 million smart meters and 100,000 data concentrators activated in phase 1
- 48-hour forecast of renewable usage and production

The main electricity distribution system operator (DSO) in France has been rolling-out smart meters nationwide to 36 million customers, using Atos Codex for its industrial IoT infrastructure and analytics platform.

From that base, the two companies have advanced to using artificial intelligence (AI) and machine learning (ML) to remove barriers that used to block the widespread use of renewables:

- **Forecasting production and local consumption based on real-time usage data**
- **Stabilizing grid operations to soften the impact of production**
- **Stimulating the prosumer experience to encourage additional production**

Renew your expectations

By 2030, the European Union (EU) aims to reduce greenhouse gas emissions by 40% compared to 1990 levels and increase the share of renewable energy to 27% of consumption. Ambitious goals like these are easily dismissed as farfetched, but new technologies put them easily within reach.

For example, the utility company managing the public electricity distribution network for 95% of continental France has been working on a series of projects to meet the EU goals. It partnered with Atos, one of the world's leading technology services companies, to build a smart meter infrastructure and a big data platform. From there, the two companies have advanced to solving problems with AI and ML.

Infrastructure first

First, in order to do anything with renewable energy, every point of consumer connection to the grid must be upgraded to a smart meter. And the smart meters need an industrial IoT infrastructure to connect to.

Using design thinking and agile functional development, the utility and Atos planned how they'd connect, collect and leverage data from multiple sources such as:

- Measured and calculated meter data (i.e., index, load curves, maximum power, active and reactive energy, power overload, voltage accumulations)
- IoT sensors on renewable facilities
- SCADA and distribution management systems
- Contractual data relating to the measurement points or meters, required for processing
- Weather data (i.e., temperature, cloudiness, wind, radiation, forecasts)



Ingestion and storage

Storing and logging data from multiple sources in a data lake, providing cross-domain controls for consistency



Processing

Data mapping and data anonymization



Validation and control

Validating workflows and detecting anomalies



Simulation

Modeling the impact of various changes for a profiling model



Calculation

Load curve processing (based upon aggregation criteria)

The answer was Atos Codex for Utilities, hosted in the cloud, to power a smart metering infrastructure platform. Codex is a scalable analytics solution that integrates data from multiple sources. It incorporates automation, AI and ML for continuous improvement of processes and identification of nontechnical losses (NTLs) such as fraud, and recognition of consumption patterns.

The two companies also incorporated a Hadoop cluster to address the scale of the utility's requirements for ingestion, storage, processing, access management, mapping of data and data anonymization. This phase of the project provided the utility's data scientists with a dedicated portal, a dedicated data lake and other computing solutions that enable microservices.

Going national

The new industrial IoT platform was integrated with the utility's 40 legacy applications to support the phase-1 activation of 6 million smart meters and 100,000 data concentrators, or smart grid nodes, located in secondary substations. The data concentrators, a standout feature of the Atos approach, shift intelligence from the meters to centralized nodes, which simplifies interoperability and enables future smart grid evolution.

The success of this project led to the national rollout of smart meters in France. Averaging 8 million upgrades a year, the utility is well on its way to connecting its base of 36 million customers to the smart grid infrastructure.

What data does best

Now, the two companies are using the new capabilities to do what data does best: solve problems. Renewable energy is, by definition, intermittent and distributed. It has a destabilizing effect on power grids, which increases the likelihood of widespread outages. The problem of stability must be solved in order to meet the EU's ambitiously green goals.

In the utilities industry, Atos Codex is improving grid operations and stability, and helping to better forecast renewable production versus consumption. Real-time data is ingested from IoT sensors at renewable facilities and integrated with data from the utility's SCADA and distribution management systems. Then, Codex uses machine learning to produce a 48-hour forecast for renewable energy sources. This enables the utility to balance local production with consumption and anticipate the impact of renewables on the grid – and will even reduce nontechnical losses.

Why Atos for digital utilities

Atos integrates IT and OT to deliver real-time industrial IoT solutions for energy and utility companies. We work across the power, water, oil and gas industries – from production and distribution to transportation and retail services. With more than 35 years of utilities experience, over 3,000 industry specialists and an innovation-focused R&D culture, we help energy and utility companies drive digital change to realize business value across their organizations.

Learn more at

<https://atos.net/en-na/lp/iot-utility-2019>

or send an email to info.na@atos.net.



Access management

Granting access rights and partial views of the data depending on a user's credentials



Exploration

Visualization of data on load curves and energy consumption, data exports, predefined queries, reports and dashboards



Balance sheet production

Aggregation of flows to produce global consumption budgets



Insights for microservices

Extending insights to deliver smart city services for energy consumers

About Atos

Atos is a global leader in digital transformation with 120,000 employees in 73 countries and annual revenue of over € 12 billion.

European number one in Cloud, Cybersecurity and High-Performance Computing, the Group provides end-to-end Orchestrated Hybrid Cloud, Big Data, Business Applications and Digital Workplace solutions through its Digital Transformation Factory, as well as transactional services through Worldline, the European leader in the payment industry. With its cutting-edge technologies and industry knowledge, Atos supports the digital transformation of its clients across all business sectors. The Group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and operates under the brands Atos, Atos Syntel, Unify and Worldline. Atos is listed on the CAC40 Paris stock index.

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Let's start a discussion together



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