Case Study

European Energy Måde PtX Facility

How Plug Power Helped Bring One of Denmark's Earliest Operational Power-to-X Facilities into Active Hydrogen Production



Executive Summary

The Måde Power-to-X (PtX) facility represents a significant milestone in Europe's transition from hydrogen pilots to operational renewable hydrogen infrastructure. As governments, industry, and energy providers work to decarbonize hard-to-abate sectors, projects like Måde demonstrate how renewable electricity can be converted into certified green hydrogen and deployed in real-world applications.

Developed and operated by European Energy, the facility is among Denmark's earliest operational Power-to-X sites and highlights how standardized electrolyzer technology can accelerate project deployment while reducing execution complexity.

At the center of the project is Plug Power's 5 MW GenEco™ PEM electrolyzer system, which was successfully installed, commissioned, site-tested, and brought into active hydrogen production.

Project Snapshot

Project: Måde Power-to-X Facility
Location: Esbjerg, Denmark
Developer: European Energy
Technology: Plug GenEco™ PEM Electrolyzer
Electrolyzer Capacity: 5 MW
Application: Power-to-X (PtX)
Annual Hydrogen Production: Approximately 550 metric tons
Certification: RFNBO under ISCC certification scheme
Status: Operational

The Challenge

Europe's hydrogen strategy depends on moving projects beyond demonstration and pilot phases into reliable commercial operation. While significant investment has flowed into renewable hydrogen development, project developers continue to face challenges related to system integration, commissioning timelines, regulatory compliance, and operational readiness.

For early Power-to-X facilities, success requires more than selecting the right technology. Developers must integrate renewable power, hydrogen production systems, certification requirements, and downstream applications into a functioning operational platform.

European Energy sought a solution that could support rapid deployment, reduce on-site complexity, and provide confidence that the facility could move efficiently from installation to hydrogen production.

Building the Måde Platform

The Måde facility was developed as part of European Energy's broader strategy to advance commercial Power-to-X infrastructure across Europe.

Located in Esbjerg, Denmark, the project combines renewable electricity generation with hydrogen production to create certified renewable fuel that supports industrial decarbonization and future low-carbon fuel markets.

At full capacity, the facility is expected to produce approximately 550 metric tons of green hydrogen annually. The hydrogen produced is certified as Renewable Fuel of Non-Biological Origin (RFNBO) under the ISCC certification framework, helping ensure compliance with evolving European sustainability requirements.

The project demonstrates how renewable energy developers, technology providers, and regulatory frameworks can work together to transform Power-to-X concepts into operational infrastructure.

Why Plug Power Was Selected

As hydrogen projects move toward commercial deployment, technology selection increasingly depends on proven execution capabilities as much as system performance.

European Energy selected Plug's GenEco™ PEM electrolyzer platform for its standardized design, scalability, and growing operational track record. The fully containerized configuration helped reduce installation complexity while enabling a streamlined commissioning process.

The project also benefited from Plug's expanding global electrolyzer fleet. With more than 70 GenEco systems operating across six continents, Plug continues to apply lessons learned from previous deployments to improve project delivery, commissioning efficiency, and operational performance.

For customers, this growing install base provides confidence that new projects are built upon proven experience rather than first-of-a-kind execution.

Industry Perspective

"As Plug enters its next phase of disciplined growth and operational maturity, we're seeing a shift from one-off deployments to repeatable execution. Each project builds on prior experience, allowing us to standardize delivery, reduce timelines, and improve performance with every Plug system we bring online."

Jose Luis Crespo, Chief Executive Officer, Plug Power

The Måde project reflects Plug's broader strategy of leveraging experience from a growing global electrolyzer fleet to improve execution, reduce commissioning complexity, and accelerate time to production. With more than 70 GenEco systems operating worldwide, each deployment strengthens the company's ability to deliver repeatable outcomes for customers.

Results and Operational Impact

The Måde facility has successfully transitioned from development into active hydrogen production.

Key outcomes include:

- Successful installation and commissioning of a 5 MW GenEco PEM electrolyzer
- Completion of site acceptance testing and system handover
- Operational production of RFNBO-certified green hydrogen
- Expected annual production of approximately 550 metric tons of hydrogen
- Reduced installation complexity through Plug's containerized system architecture

Beyond these project milestones, Måde demonstrates a broader industry trend: Power-to-X infrastructure is increasingly moving from concept and policy discussions into operational commercial facilities.

Customer Perspective

"The Måde facility is an important step in bringing Power-to-X projects from concept into operation. Working with Plug, we've been able to move efficiently through installation and commissioning to begin producing certified renewable hydrogen. Projects like this demonstrate how PtX can be implemented in practice and support the continued development of Europe's hydrogen market."

Rene Alcaraz Frederiksen
EVP & Head of Power-to-X, European Energy

For European Energy, the successful commissioning of the Måde facility demonstrates the growing maturity of Power-to-X infrastructure and the role renewable hydrogen can play in supporting Europe's decarbonization objectives. The project provides a real-world example of how renewable electricity can be transformed into certified green hydrogen through commercially operational infrastructure.

Conclusion

The Måde Power-to-X facility demonstrates how renewable hydrogen projects can move efficiently from development into operation through standardized technology, proven execution practices, and strong project collaboration.

For European Energy, the project provides an operational platform for certified renewable hydrogen production.

For Plug Power, the successful commissioning reinforces the company's ability to deploy electrolyzer systems efficiently and repeatedly across global markets.

Most importantly, Måde provides a practical example of how Power-to-X infrastructure can support Europe's transition toward a lower-carbon energy future while helping establish a blueprint for future hydrogen deployments across the region.