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Found Energy +
PLC Construction, Engineering Services
**Corvo – Coordinated Automation
& Controls for Aluminum Reactor Pilot**

Partnership Case Study

Executive Summary

Found Energy's Corvo project is an aluminum water reactor pilot designed to generate hydrogen and thermal energy through a controlled reaction between aluminum and water. The project represents a research and development effort focused on validating core process concepts, system integration, and operability under real-world conditions.

Found Energy led the development and iteration of the reactor process, mechanical systems, and test objectives, while PLC Construction served as a trusted engineering partner responsible for automation, controls, and electrical system execution. Working in close coordination, the teams translated system requirements into a flexible, test-ready control architecture that enabled safe operation, repeatable material handling, and scalability without extensive system rework.

The resulting pilot control system provided Found Energy with a stable platform for experimentation and validation, while intentionally preserving flexibility to support future process changes, subsystem additions, and scale-up exploration.



Figure 1: Corvo Pilot System with PLC panel



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Project Overview

Found Energy is developing an energy system that releases the stored energy in aluminum by reacting aluminum with water to produce hydrogen and thermal energy with zero point-source emissions. Corvo serves as a scalable pilot platform to evaluate reactor behavior, material handling approaches, and integrated system performance.

PLC Construction supported Found Energy as a tightly coordinated engineering partner throughout the pilot's development. The engagement began with development of a local Ignition-based HMI to support early testing and troubleshooting, and expanded to include full automation and controls architecture, electrical engineering and drafting, PLC platform selection, control panel design, automation logic development, field integration, and commissioning support.

Throughout the project, engineering decisions were made collaboratively, with Found Energy defining system requirements and test intent while PLC Construction translated those needs into control strategies, sequencing logic, and electrical designs suitable for safe and adaptable pilot operation.

The Challenge

Corvo required a unified control architecture capable of coordinating diverse equipment—including VFD-driven motors, EtherCAT-controlled servo motors, valves, sensors, and instrumentation—under a single deterministic control platform. As a pilot, system requirements continued to evolve as testing progressed, placing a premium on flexibility, observability, and rapid modification.

A key technical challenge was the aluminum fuel feed mechanism. Fuel pucks delivery required precise 12-degree indexing for alignment and configurable metering, followed by timed transfer via a mechanical arm within a strict time window. Coordinating these motions reliably was essential to both safe operation and credible test results.

The Solution

PLC Construction and Found Energy jointly developed a PLC-based automation architecture designed to support the full Corvo process—from fuel handling and metering through reactor operation, byproduct handling, and recycle routing—while intentionally accommodating ongoing process iteration.

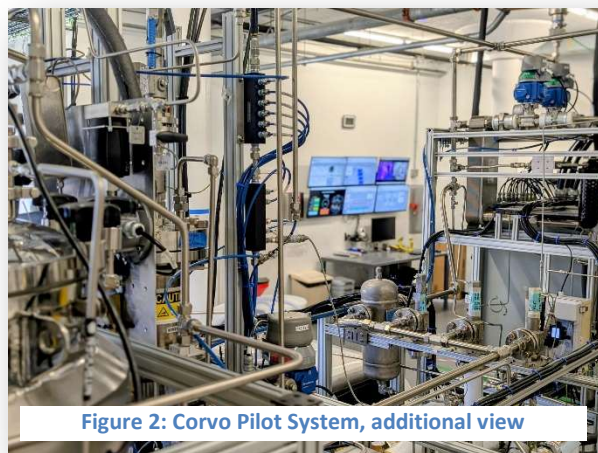


Figure 2: Corvo Pilot System, additional view



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A Beckhoff PLC with EtherCAT integration was selected as the unified control platform, enabling deterministic coordination of high-precision servo motion alongside conventional I/O and motor control. This architecture allowed PLC Construction to implement modular control strategies that could be refined or expanded as Found Energy's research activities evolved.

Ignition-based touchscreen HMI screens were developed to support startup, normal operation, monitoring, and troubleshooting. The HMI emphasized visibility into process state and sequencing to support experimental testing, diagnostics, and rapid adjustment during pilot operation.



Figure 3: Corvo System, additional view

Implementation

Implementation focused on delivering a fully functional, test-ready automation system on an accelerated schedule while preserving flexibility for change. PLC Construction executed PLC and EtherCAT configuration, automation logic development, electrical and control panel design, field device integration, HMI deployment, and commissioning support.

These efforts were closely coordinated with Found Energy's ongoing mechanical development and testing activities, ensuring that sequencing,

timing, and interlocks aligned with evolving experimental requirements rather than fixed production assumptions.

Outcome

The completed system delivered integrated automation and control for the Corvo pilot, enabling reliable fuel handling, coordinated reactor operation, and downstream material management within a single, unified platform.

Most importantly, the controls architecture provided Found Energy with a stable yet adaptable foundation for pilot testing. The system supported repeatable operation while allowing parameters, sequencing, and logic to be adjusted as research insights emerged—reducing friction between experimentation and execution.



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Summary of Engineering Outcomes

- System of systems design supporting continuous feed of aluminum scrap generating hydrogen gas, thermal heat and hydrated alumina
- System design supporting operations in a mixed hazardous and non-hazardous environment
- Ignition-based local HMI development for pilot operation and troubleshooting
- Automation and controls architecture spanning fuel handling, reactor operation, and material routing
- Electrical engineering and control system design with fabrication-ready documentation
- PLC platform specification and configuration (Beckhoff PLC)
- EtherCAT integration for high-precision servo control
- Custom sequencing logic supporting time-critical fuel feed operations
- Control panel design and build supporting motors, drives, instrumentation, and safety interlocks
- Functional testing and commissioning support to validate sequencing and safe operation