

CASE STUDY

CLIENT: RENEWABLE ENERGY PLANT

DISTRIBUTED CONTROL SOLUTION



CAPULA

DISTRIBUTED CONTROL SOLUTION FOR MAJOR RECYCLING AND RENEWABLE ENERGY PLANT

Following public consultations construction began on a £154 million new recycling and renewable energy centre in a major Scottish city. The extraordinary facility produces enough energy to power the equivalent of 22,000 households and heat the equivalent of 8,000 homes, offsetting 90,000 tonnes of carbon dioxide every year*.

KEY BENEFITS

- Cost savings associated with diversion of waste from landfill
- Sustainable facility - delivering a saving of 90,000 tonnes of carbon dioxide annually
- Cogeneration systems that generate electricity and heat at the same time are highly efficient
- Provides local employment to community

ABOUT THE CLIENT

The recycling and renewable energy centre is a new build facility in Scotland that processes 200,000 tonnes of council residual waste every year. Material is recovered and recycled as much as possible, with all unrecoverable or unrecyclable waste being converted into a fuel for thermal disposal in an advanced thermal reactor built on the same site. By diverting 90% of residual waste away from landfill, the energy centre is saving millions of pounds, releasing recyclable resources from household waste and producing valuable heat and power from what is one of the most advanced waste management facilities in Europe.

DESIGN FEATURES

- Easy to use: common 'look and feel' user interface across plant
- Easy to maintain: through common software modules and structure
- Secure: cyber security built into the system
- Fully integrated diagnostics: results in reduced downtime



THE PROBLEM

Key objectives for the control solution at this new facility included the provision of a secure, reliable, cost and energy efficient system. This was required to help the local City Council comply with the EU Waste Framework Directive by diverting waste from landfill, to facilitate the recycling and energy recovery from municipal waste. The project scope included implementing a distributed control system (DCS) for the Mechanical and Biological Treatment Plant (MBT) for three key functional areas of the facility:

- Materials Recovery Facility (MRF)
- Anaerobic Digester (AD)
- Fuel preparation and balance of plant

THE SOLUTION

A Siemens PCS7 DCS system was chosen, with an integrated safety shutdown system. Capula provided a full scope of supply including design, software engineering, supply and delivery of all control and safety system equipment fully mounted in cubicles with ancillary equipment. The fully integrated system was tested, installed and commissioned.

THE IMPACT

Capula completed its section of the works at this complex facility to schedule. It was essential that the control system implemented functioned reliably and efficiently, especially since there were many stakeholders relying on the plant's services and output. All technologies selected and delivered for this project were proven and trusted. The solution was designed with cyber security in mind: typical downtime losses in revenue alone, for plants of this size and capacity can exceed approximately £85,000 per day*. Damage resulting from a successful cyber breach can take weeks or even months recover due to data losses and lengthy restoration procedures.

The control solution also enabled alarm handling and introduced automatic event logging to allow system health checks to be carried out. Such diagnostic facilities were embedded in the DCS to facilitate simplified maintenance and fault finding.

Within the plant there was a variety of technical elements supplied by different vendors. The total cost of ownership of assets is reduced when a well-structured system with fully integrated diagnostics is implemented. Our engineers possessed the right skills to be able to understand the complexities and characteristics of equipment from different suppliers and they were able to integrate all components between these interfaces correctly. We embedded one common engineering tool and operator system to enable efficient and reliable control and monitoring of the facility, whilst allowing for any enhancements or upgrades of the facility in the future.

The progression of the project activities followed a typical project lifecycle which involved carrying out stringent design and testing before delivery to site to ensure a smooth, problem-free implementation.

The execution of the project for this complex system was completed in a secure and transparent way for the client. The services of our engineers were engaged in the early stages of the project, however due to the nature of this complex project, changes were required to the control system architecture as the project progressed. Engineers worked flexibly and tirelessly with the client to ensure these elements were incorporated into the revised control solution. We ensured that the client's evolving needs were met in a timely manner, ahead of the completion of the plant and the equipment installation programmes of other parties.

This flexible approach also paid off with regard to changes to the mix of stakeholders involved in the project. Measures were implemented to ensure the correct flow of information to all parties remained uninterrupted and to allow project deadlines to be met.

Capula's expertise and previous experience in this sector helped in resolving all technical issues and to deliver an efficient and technically advanced plant. The implementation of this control system puts the client in a position where they are well placed to meet the operational and legislative compliance demands imposed on municipal waste recycling facilities.

* based on a typical recycling and energy plant that powers 22,000 homes and handles 200,000 tonnes of waste/year.

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