



Z Energy

Tallow to Biodiesel Plant

WIRI, AUCKLAND, NEW ZEALAND





The Project

Z Energy obtained the Intellectual Property (IP) for a patented process to produce biodiesel from NZ beef tallow. Biodiesel is essentially fatty acid methyl esters (FAME) derived from triglycerides which are building blocks of natural fats and oils. Biodiesel is biodegradable and is considered a green fuel because of its significantly lower carbon dioxide emission during combustion. It is also a sustainable fuel due to it being derived from renewable resources. Beef tallow is the feedstock of choice because it is a low value by-product of the NZ meat processing industry. Z Energy biodiesel decided to build its first biodiesel production plant in Wiri, Auckland with a production rate of 20 million litres per annum, with capacity to upgrade to 40 million litres per annum.

Fitzroy was engaged by Z Energy in July 2013 to perform the FEED study to estimate the capital cost for building the biodiesel plant. The comprehensive costing exercise was completed by December 2013 and presented to Z Energy's board of directors for review. In March 2014, Project Daisy obtained the green light to proceed and in June 2014, Fitzroy was awarded the EPCM contract to execute the project. The Z Energy biodiesel production plant was completed in December 2016 with an initial production rate of 20 million litres of EN 14214 quality biodiesel per annum.

Scope of Works Included;

Front End Engineering Design (FEED), Detailed Engineering, Procurement, Construction, Project Management, Testing, Commissioning, Training.

- Process design and development of PIDs for feedstock and product storage, feedstock pre-treatment, feedstock conversion (reaction), product and by-product purification, distillation of product and methanol, product dosing systems, and product/raw materials loading/unloading systems, heat and mass balances, production scheduling for sizing of unit operations and related plant utilities.
- Plant layout compliant with the requirements of NZ HSNO Regulations for storage, handling and processing of flammable liquids and also compliant with NZ Standards for storage and handling of corrosive liquids.
- Mechanical design and calculations for all process vessels and storage tanks to API 650 and pressure vessels to AS1210/ ASME 8 Div 1

- Thermal stress analysis for hot oil and hot water pipe systems
- Structural calculations and design for all services platforms and process plant support frames compliant with NZS 1170
- Line sizing, specification and procurement of all plant valves, pumps, filters, flame arrestors, gas detectors, control instruments, pressure vessels, non-pressure vessels, distillation columns, PLC system and other plant ancillaries.
- HAZOP process and implementation of all HAZOP-ed actions.
- Development of plant operating procedures.
- Electrical design including supply and installation of MCC, MCP, PLC, all field power and instruments cabling, electrical heat tracing for both non-hazardous and hazardous areas termination, testing, functional descriptions and Programming of the PLC system
- Detailed construction drawings for all pressure vessels, non-pressure process vessels, storage vessels, structures and platforms including obtaining Third Party verification for all pressure vessels
- Detailed plant layout drawings in AUTOCAD 2-D & Plant 3-D
- Detailed piping drawings in AUTOCAD 2D & Plant 3-D including production of spooled Isometric pipe drawings
- Placement and installation of all plant components. Supply of all materials, fittings and installation of all pipes including insulation and cladding.
- Project progress review reports and managing of project delivery program using Microsoft Project
- Management of project health, safety and hazard requirements, in line with Z Energy's HSSE policies
- Overall site project management and cost control
- Managing and supervision of all testing, Third Party certification, plant commissioning and training of Z personnel.
- Compile and supply of all operation manuals, training manuals, maintenance manuals, spare parts list, as-built drawings, vendor equipment manuals, producer statements, Third Party certificates (NZ-OSH Pressure vessel, NZ-ERMA Environmental), final acceptance certificates and formal handover to Z Energy Ltd.

Duration:

24 months from order placement to beneficial use.

Value:

NZD26m

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