Designing with living organisms for our low-carbon future

Society is changing its relationship with how we consume energy. By 2050, the United Nations predicts that food production will need to increase by 50% to feed the growing global population, resulting in a greater need for energy, and a greater challenge of managing the resulting waste biomass. For food producers, this shift means optimizing biological processes to supply the food and energy that people need every day, as efficiently and sustainably as possible.

Navigating this opportunity through regulatory roadmaps, feedstock and offtake arrangements, applicable technologies, and other considerations can be daunting. At Stantec, we deliver Bio-Industrial projects utilizing traditional and innovative technologies on both greenfield and brownfield sites, with proven design methods, quality standards, and combined expertise. We have over 20 years of experience in converting organic matter into foods, chemicals, and energy for clients across North American and international markets.

Our Services

- Preliminary design to develop conceptual designs and information required for project feasibility and funding, involving traditional and innovative technologies
- Detailed design including specifications and documentation required for construction
- Innovative facility design utilizing the latest technologies, including 3D laser scanning, 3D modeling and incorporation of models into Virtual Reality
- Assistance with environmental and development permitting
- Site layout and development
- Dust control and aspiration system design
- Utility system design for steam/ condensate, compressed air, process water, and cooling water
- Wastewater reclamation, treatment and re-use
- Energy conservation system design
- Sustainable design, including capture and reuse of waste heat, alternative/clean energy use and production
- Mine planning and mining engineering for potash operations
- Feed operations planning and design
- Fertilizer and chemicals manufacturing facility planning and design
- Process equipment sizing, selection, and layout Instrumentation and Control
- Utilities and new equipment commissioning
- Structural platforms and equipment upgrades
- Wastewater treatment strategies and design
- Utilities conservation
- Custom equipment design and modernization
- Process Design
- Raw material receiving and bulk unloading
- Feed material processing systems
- Liquid, gas, and powder storage systems
- Clean-in-place (CIP) systems
- Complete piping systems for receiving batching, processing, packaging, and cleaning
- Plant floor operator interface systems and data collection systems
- Filtration, including micro-filtration, nano-filtration, and reverse osmosis

Our Experience

Red Rock Biofuels Facility

Stantec was the owners engineer for a 20 MGPY low carbon renewable jet and diesel fuels facility located in Lakeview, Oregon.

Stantec worked with Red Rock Biofuels, the engineer of record, general contractor, and major technology providers on gasification, Fischer-Tropsch, and hydro processing.

Stantec developed preliminary engineering documents including preliminary plans and specifications that were used to develop total installed costs and serve as a basis for much of the site permitting.

Cavendish Farms Biogas Facility

The facility uses potato waste as a substrate to create, capture, store, transport, and combust biogas. This process reduces fossil fuel required by the larger plant's main boiler while also reducing costs of trucking potato waste off site.

We designed the controls system and network, collaborated heavily on the development of the PP&IDs for the facility, commissioned the controls and automation system, and provided integration services for all the various vendor-supplied process equipment. The facility is now in operation and reduces the boiler's oil requirements by 10,000,000 litres a year - reducing its carbon footprint by approximately 35 kilotones per year. This represents the largest single reduction in greenhouse gases in the province's history.

Confidential Renewable Fuel Project

Our Energy team is working with our client to design their first large-scale hydrogenation-derived renewable diesel (HDRD) facility.

The HDRD facility will be built within an existing refinery and enhance its operations. With combined gasoline and diesel production, the refinery consistently achieves record throughput, reaching over 12,000 barrels per day (bpd). To help the refinery meet increasing demand and transition to clean energy, our team is providing detailed engineering, procurement, construction support, commissioning support, and as-built production services for the new HDRD facility in collaboration with our client and their partners. The facility will include renewable pre-treatment and diesel units, a 10 million standard cubic feet per day renewable hydrogen unit, and associated utilities and offsites drawn from the existing refinery.

The HDRD facility will produce 3,000 bpd of renewable diesel from feedstocks, ranging from canola oil to beef tallow and used cooking oil, and reduce the region's environmental footprint.

Confidential Canola Oil Processing Facility

Stantec was the Lead Engineer for all engineering design services for this $180 million Canola Oil Processing Facility. As Lead Engineer, the Stantec team completed the in-house design services which included: mechanical, electrical, process piping, site layout and process controls design. Stantec also managed the client selected subcontractors for civil and structural/architectural design services. To complete the air permitting, Stantec used air dispersion modeling and utilized 3D CADWorx as the primary engineering design tool. The project consisted of design documents, drawings and isometrics, piping, valves, instruments, site development and design, and P&ID's. The project services totaled over 39,000 hours.

Bayer CropScience Seed Cleaning Facility Expansion

The Bayer CropScience Canola Seed Cleaning Facility in Lethbridge provides all required services for producing plantable seed - the raw canola must be cleaned, sorted, stored, and treated with fertilizers specific to the region in which it will eventually be planted. A 30% expansion was needed to meet growing demand. To make this a reality, Bayer CropScience engaged Stantec in the cleaning, treating, and packaging lines of the facility expansion.

The Stantec team completed a number of projects, including instrumentation and controls engineering and design and review services for the expanded packaging facilities. Our construction management team oversaw the project work, resulting in a project completed on schedule, and on budget.

Viterra Canola and Soybean Oil Processing Facility

Viterra was looking to increase their production capabilities. Our job? We contributed over 25,000 work hours of multi-disciplinary services on the implementation of a $185 million processing facility which can "swing" between processing canola or soybeans.

As lead engineer, we completed in-house design services including all process design as well as the detailed design for the industrial wastewater treatment system. Process and engineering services included mechanical design, electrical design, process/process piping design, and process controls design. The team also assisted with air and wastewater permitting, detail design general arrangements for equipment layout, and material handling and transfer systems.

Additional Experience

Stantec is currently providing permitting support and leading the Saskatchewan Environmental Assessment and Stewardship Branch Technical Proposals for two new heavy Bio-Industrial facilities located within the City of Regina.

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