Renewable Fuel and Energy Production Solutions
Reduce Your Total Cost of Ownership

Biomass represents a fast-growing solution for renewable fuel, which can help reduce the need for foreign oil and provide an environmentally-friendly alternative for energy production. Typical biomass sources include switchgrass, hemp, wheat straw, corn stover, woody materials, and sugarcane tops. It is no wonder why biomass is capturing so much market interest as a replacement for coal in energy production as it produces less sulfur, significantly less CO₂, and less ash, than typical coal fuel production. Compared to other renewable fuels and energy sources such as hydro, wind, and geothermal, biomass represents one of the nearest-term and lowest-cost options for development. To sustain a profitable biomass manufacturing operation, however, requires skilled management of production processes. Siemens has a proven track record with renewable fuels and energy production solutions to help solve your biomass production objectives.
Biomass fuel and energy applications have several industry challenges which include feedstock management, production scale-up, safety standards, and mixed public support. With all these challenges, it is important to select a proven partner. Automation systems from Siemens have been used to produce over 7 billion gallons of biofuels in the U.S. annually, and generate more than 40 percent of the country's electrical power.

The challenges and needs for increased efficiency in biomass fuel and energy production are ever changing. This means evolving and more cost-effective technologies will play an important role in your operation. Ideally, you need solution partners with flexible technological capabilities who own their solutions. Siemens' commitment to R&D and internal development of products and solutions has made us a global leader in innovation. Not only to help solve today's biomass problems, but, in partnership with research institutions and industry, Siemens helps define and address the challenges of the future.

As a biomass manufacturer, you need to closely manage all aspects of your production cycles to be profitable. Total Cost of Ownership (TCO) analysis provides a method to study the many hidden and ongoing costs that are frequently overlooked when a project is first proposed. Siemens focuses on strategies to minimize your TCO during the production lifecycle. These include:

- Minimizing design, engineering, and installation costs
- Lowering operational and maintenance expenses

A key strategy for lowering your operation's TCO is to increase the level of process integration and automation, providing for:

- Shortages of industry trained personnel
- Need for consistent, efficient, and high quality operations
- Scalable solutions from multiple feed stocks to increase the production output
- Need for safety and risk management due to the process and environmental attributes of biomass production

Siemens can help you lower your TCO during the design, engineering, installation, operation, and maintenance phases of your production.

**Process Automation, Safety, Electrical, and Instrumentation**

Siemens Process Automation Systems (PCS 7) is the leading process controls systems in use within the biofuels industry. Your project will have reduced risk and a faster time-to-production because Siemens provides field-proven solutions in combination with industry application knowledge.

Integrating process applications with Siemens Totally Integrated Automation (TIA) benefits your system with advantages of the legacy system integration for system-wide controls communications, system design, and data management.

Integrating the electrical applications with Siemens Totally Integrated Power (TIP) for smart motor control centers, drives, and switchgear enables you to monitor, measure, and improve your utilization of electrical energy.

Siemens helps you determine the correct field measurement devices for pressure, temperature, level, and flow applications by leveraging the process instrumentation team's application knowledge with our broad product portfolio. This ensures that you have the right measurement device for the application from the start, which reduces your time to production and total cost of ownership.
The PCS 7 plant Asset Management System provides a color-coded tool to help reduce your TCO by providing key information you will need to engineer, commission, operate, and maintain your automation, instrumentation, analytical, utility, and electrical infrastructure.

**Application examples:**
- Process automation, PLC, burner management, and instrumentation
- Electrical infrastructure including motors, motor control centers, switchgear, power monitoring, and substations

**Clean Energy Solutions**
Siemens has demonstrated a long-term commitment to bringing environmental options to the energy market, and strives to push equipment efficiency to maximum levels. In addition to the traditional rotating equipment, Siemens provides products and services that are uniquely designed to enhance environmental performance and contribute to climate protection.

Siemens provides engineering solutions for all renewable energy sources:
- Wind Power
- Solar Plants
- Geothermal Plants
- Biomass
- Reheat Process
- Waste-to-Energy (WtE)
Clean Energy, with Plant Water and Wastewater Solutions
Siemens Water Technologies offers integrated solutions and services to automate and control your water and wastewater treatment system. Additionally, Siemens provides clean energy via anaerobic digester biogas application solutions for municipal and industrial projects.

Dystor Gas Holding Systems

Applications:
- Wastewater to Energy (WwTE) via Biogas anaerobic digestion
- Sludge to energy
- Process water management

Process Analytics for Process Control and EPA Compliance

The goal of Siemens is to provide you with highly reliable process analytical solutions that improve or positively impact the environment, safety and production optimization.

The Configurable Low NO\textsubscript{x} Continuous Emission Monitoring System (CEMS) is a low cost emissions monitoring package designed to operate outdoors with no shelter. The system is designed to monitor predefined ranges of nitrogen oxides, carbon monoxide, and oxygen in gas-fired boilers and furnaces. The analysis cabinet does not require installation inside of a shelter for environmental protection, providing a faster time to production at a lower cost.

Application examples:
- Process Analytics and Gas Chromatographs
- Continuous Emission Monitoring Systems

Thinking Globally, Acting Locally
Construction projects for fuel and renewable energy plants can be executed locally or around the globe. This is why you benefit from working with a partner like Siemens, a company that offers service and support in 190 countries, as well as expertise in local standards, regulations, and multiple feed stocks. Siemens also has a global network of biofuels competence that focuses on the specific concerns of your industry. Industry knowledge, integrated solutions, and global resources can help reduce your commissioning time and lower your risk by allowing you to focus on your core business and the demands of your marketplace.

Siemens welcomes the opportunity to leverage its proven biofuels industry solutions to help streamline your operation, and reduce your production total cost of ownership.

For more information on renewable fuel and energy production solutions from Siemens contact:

David Meyer
Biofuels Industry Specialist
d.meyer@siemens.com
952-908-2018
www.sea.siemens.com/biofuels

Gary McDonald
Biofuels Industry Specialist
r.gary.mcdonald@siemens.com
303-431-3788
www.sea.siemens.com/biofuels

Clean Energy, with Plant Water and Wastewater Solutions
Siemens Water Technologies offers integrated solutions and services to automate and control your water and wastewater treatment system. Additionally, Siemens provides clean energy via anaerobic digester biogas application solutions for municipal and industrial projects.

Oxymat 6, Ultramat 6, and Ultramat 23 Continuous Gas Analyzers