Emerson Total Solution for
Biomass Power Plants

Challenges

Utilities, developers, and other power producers are increasingly considering biomass combustion options to enhance their renewable energy portfolios, especially in areas with limited solar, wind, and hydro capabilities.

The driving forces for obtaining biomass production differ for each plant owner or operator. Utilities want to meet renewable portfolio standards, extend asset life cycles, and promote a "green" image. Developers are seeking to efficiently produce contracted power for sale to local utilities, effectively manage plant operations, and ensure the ongoing commercial viability of their asset base.

Biomass plants can originate as new dedicated biomass-fueled facilities, as existing units retrofitted to co-fire coal and biomass, or as existing coal-fired units repowered to solely fire biomass fuels. Regardless of origin, each plant provides many benefits, but also presents challenges with cost, performance, and risk.

Consider it Solved.

For over a century, power producers have turned to Emerson to control critical power generation processes, increase plant efficiencies and megawatt production, and realize long-term O&M savings. An Emerson total solution for your biomass power plant can help you achieve business objectives — from a single unit to your entire generating fleet. Our ability to architect, implement, and manage a biomass automation project will generate increased returns while mitigating risk and staff impacts.

As a leader in power generation automation, Emerson solutions can help reduce outages, promote consistent equipment operation, and support realization of financial objectives.

We recognize that power producers with diverse assets that include biomass generation require broad scope solutions that incorporate innovative technology and lifecycle services. Emerson's vast experience with coal-fired, combined cycle, cogeneration, and biomass units enables us to provide integrated solutions that encompass the entire plant. Our automation strategies promote commercial success by increasing operational efficiency and improving reliability and availability while mitigating risk.

EMERSON™
Process Management

Emerson Offerings for
Biomass Power Plants

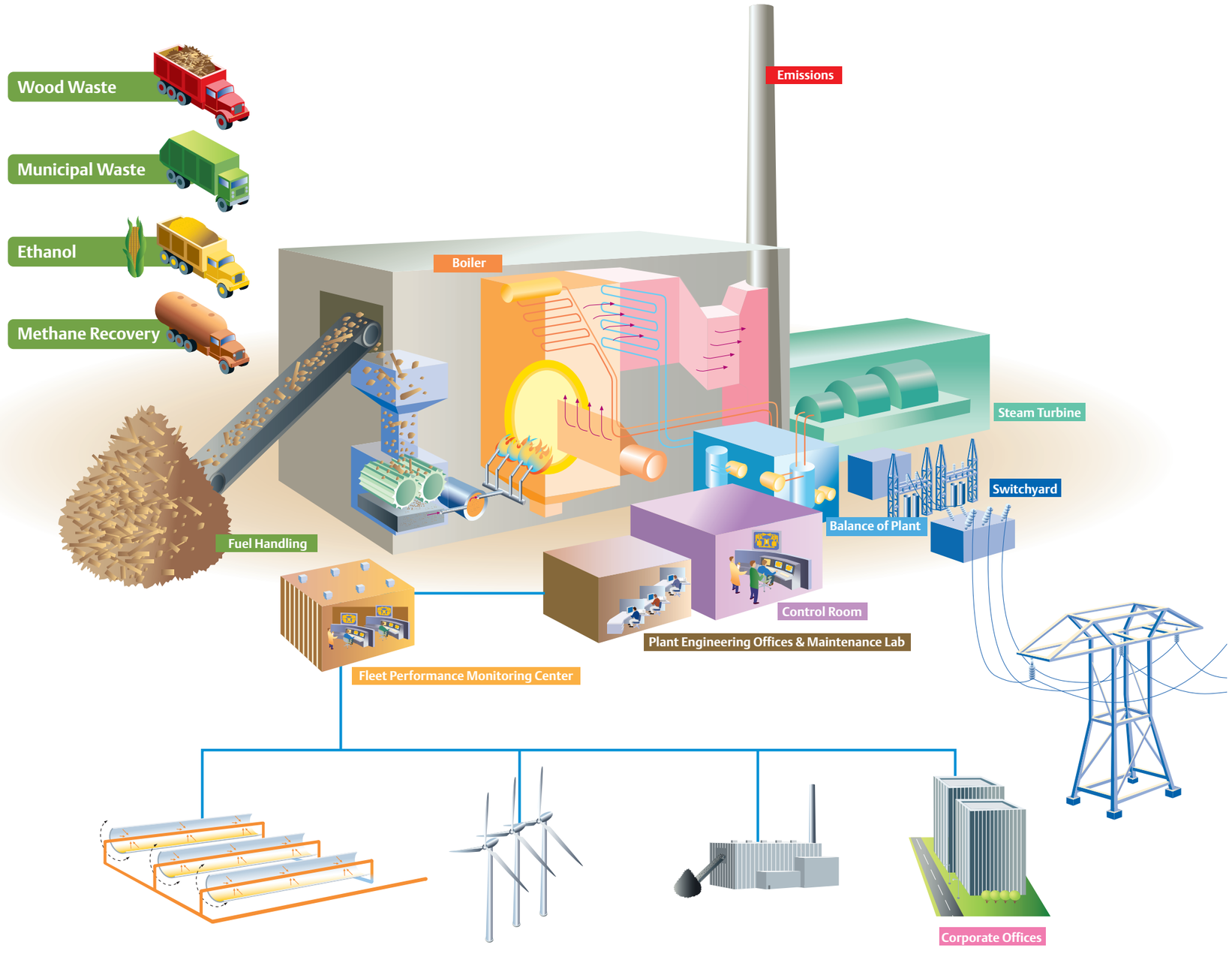
Fleet/Enterprise Management & Optimization
- Enterprise-wide systems integration
- Fleet financial performance optimization
- Fleet emissions optimization
- Fleet performance monitoring and visualization
- Fleet-wide asset management reliability programs

Plant Optimization Software and Plant Performance Monitoring
- Boiler efficiency optimization
- Combustion emissions monitoring systems (CEMS)
- Emissions optimization
- Plant financial performance optimization
- Sootblower optimization
- Steam temperature optimization
- Unit response optimization
- Real-time on-line monitoring
  - Plant heat rate & unit efficiencies performance calculations
  - Controllable losses
  - Equipment performance deviations from design
- Web-based remote equipment performance monitoring of:
  - Turbines, heat exchangers, condensers, solar tracking, cooling towers, thermal storage tanks, desuperheaters, pumps, etc.

Unit Controls & Monitoring System
- Distributed control systems (HMIs, controllers, I/O, networks, etc.) for:
  - Boiler/Balance of plant
  - Burner management
  - Emissions (SCR, SNCR, precipitators, scrubbers)
  - Fuel handling
  - Steam turbine
  - Switchyard
- SCADA systems
- Unit historian and report generator
- Electronic documentation
- Integration with other systems and intranet/ Internet
- Fieldbus solutions (HART, Foundation Fieldbus, Profibus, DeviceNet, ASIbus, etc.)
- Wireless

Simulation
- First-principle high-fidelity
- Algorithmic
- Tie-back
- Virtual technology

Equipment Condition Monitoring
- Online/portable vibration monitoring
- Motor diagnostics
- Infrared thermography
- Laser alignment/balancing
- Oil analysis



Intelligent Device Management
- Management software for HART & Foundation Fieldbus devices for:
  - Health monitoring
  - Calibration
  - Configuration
  - Audit trails

Intelligent and Analog Field Devices
- Liquid/Gas Analyzers
  - CO, O2, NOx, SO2, pH, conductivity
- Transmitters
  - Pressure, temperature, flow, and level
- Valves and valve actuators
  - General, severe, and specialty services

Electrical Auxiliaries
- UPS, power conditioning, and distribution
- Precision cooling
- Motors
- Couplings
- Gear-reduction drives
- Backup power generators

Services
- Installation, commissioning, and start-up services
- Support, reliability, and maintenance services
  - Mechanical equipment
  - Electrical equipment
  - Process equipment
  - Control systems
  - Instrumentation and valves
- Optimization programs
  - Operations
  - Automation and information systems
  - Reliability-centered maintenance
- Educational services
  - Asset optimization, reliability, and safety
  - Process control and automation
  - Engineering, operations, maintenance and management of field devices, control systems, electrical equipment, etc.

Legend
- Balance of Plant
- Boiler
- Control Room
- Corporate Offices
- Emissions
- Fleet Performance Monitoring Center
- Fuel Handling
- Plant Engineering Offices & Maintenance Lab
- Steam Turbine
- Switchyard

Emerson Solutions for Your Biomass Power Plant

Emerson Brand	Function	Plant Location
PlantWeb™	Digital plant architecture	Control room
Ovation™	Distributed monitoring and control system, SCADA	Boiler Balance of plant Control room Corporate offices Emissions Fuel handling Fleet performance & monitoring center Plant engineering offices & maintenance lab Steam turbine Switchyard
AMS™ Suite	Predictive maintenance software	Control room Plant engineering & monitoring center
Smart Wireless	Wireless field and plant networks	Boiler Balance of plant Control room Emissions Fuel handling Steam turbine Switchyard
Scenario™	Plant simulation	Control room Fleet performance & monitoring center Plant engineering offices & maintenance lab
SmartProcess™	Plant optimization and performance monitoring	Control room Fleet performance & monitoring center Plant engineering offices & maintenance lab
ControlWave®	Remote terminal units for SCADA applications	Switch yard, revenue metering interface
Fisher®	Control valves and severe service valves	Balance of plant Boiler Emissions Fuel handling Steam turbine
Machinery Health™ Management	Predictive and protective technology and services for mechanical equipment	Balance of plant Steam turbine
Rosemount®	Pressure, temperature, level, and flow measurement	Balance of plant Boiler Emissions Fuel handling Steam turbine
Liebert	UPS and precision cooling	Control room Fleet performance & monitoring center Plant engineering offices & maintenance lab

For more information visit **www.EmersonProcess-PowerWater.com**

PWS_005016 Rev. 1

EMERSON™
Process Management