

SUSTAINABLE AUTOMATION

Distributed Generation and Wind Hybrid Power System Integration and Controls



Sustainable Automation Inc.
3131 75th St. - Suite 250
Boulder, CO 80301-4634
USA

Phone: 1-303-996-0647
Fax: 1-303-996-4610

www.SustainableAutomation.com

Sales@SustainableAutomation.com

APPLICATIONS

Village Power

In many regions of the world, standalone diesel power systems are the principal means of rural electrification. Diesel generators have high operating costs in remote areas due to high routine maintenance requirements and high cost of fuel transport and storage. Wind-diesel hybrid power is often the technology of choice for reducing the overall cost and environmental impact of electric power generation in remote communities.

Industrial Distributed Generation

Combining wind turbines or other renewable energy sources with various types of conventional distributed generation equipment (diesel generator sets, natural gas powered reciprocating engine generator sets, microturbines, etc.) and/or advanced energy storage systems can greatly expand opportunities for renewable energy to participate in the industrial and commercial distributed generation market. The operation of the renewable and non-renewable generation sources can be automatically coordinated to minimize the user's energy costs given his particular electric and thermal load profile, utility rate structure, and financial incentives such as renewable energy credits (RECs).

Remote Industrial Power

Oil pumping in remote locations far of the main electric grid, groundwater remediation at abandoned mine sites, fish processing on offshore islands, and irrigation using industrial wastewater. All these are excellent applications for wind hybrid systems, not only to reduce energy costs, but also to reduce the hazards associated with fuel transport and storage and the greenhouse gas emissions associated with fossil fuel consumption.

Sustainable Automation provides system integration engineering expertise to rural utilities, industrial facilities, and project developers interested in implementing distributed renewable energy systems. Once the power system is fully defined, Sustainable Automation can supply the core control components that will allow the system to function optimally and in fully automatic mode.

SERVICES WE PROVIDE

Wind Resource Assessment

Most projects will require some level of wind resource assessment as part of the project feasibility study. We specify the data logging equipment, contract for met tower erection, analyze and report on the data, correlate the measurements with other available data sources, and make energy output projections. We can also recommend optimal wind turbine placement on your site.

Facility Load Profiling

We evaluate all available data (gas and electric bills, equipment power ratings, plant operating characteristics, etc.) to develop approximate hourly, weekly, and monthly electric and thermal load profiles for your facility. These profiles are necessary for both the design of a distributed generation system and modeling of its performance. For a more accurate analysis, we have the equipment to measure and record minute-by-minute electric load of village power plants or industrial facilities.

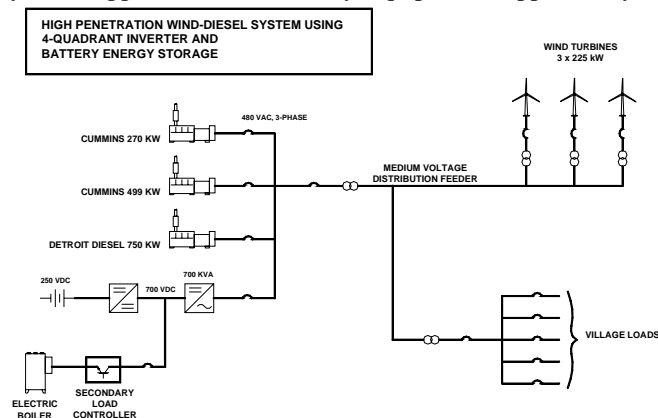
Modeling of Energy Flows and Economic Performance

Using advanced computer simulation tools, we model the energy flows and economic performance of a proposed distributed generation system with the available renewable energy and given site loads. Whether for grid-connected industrial and commercial sites, or for off-grid village and remote industrial sites, we then design the optimal hybrid power system to meet the customer's cost, fuel savings, and environmental goals. Where possible, excess wind energy and waste heat is captured to serve a variety of secondary loads, which may include water heating and chilling, water purification, and ice making.

System Integration Engineering

Successful implementation of wind hybrid power and distributed generation demands a systems approach. For many equipment suppliers, hybrid power systems are an

unknown application for their products. System integration requires experienced system engineers that fully understand the operating environment and possible unusual interactions between components.



PRODUCTS

Secondary Load Controllers

Secondary loads, such as electric boilers, provide power system stability by dissipating excess wind power. Sustainable Automation's Secondary Load Controllers precisely regulate the power flow to an electric boiler by rapidly switching an array of solid-state relays. The fast response of the controller makes it capable of being the sole frequency control in a high penetration wind-diesel system, allowing the diesels to be shut down during periods of high wind.



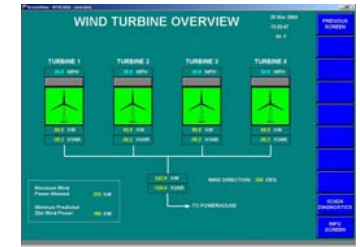
Electric Boilers

In collaboration with an established boiler manufacturer, Sustainable Automation has developed a line of boilers pre-engineered to work with our Secondary Load Controllers, ensuring that equipment operation is perfectly coordinated from the moment of commissioning.



Hybrid System Supervisory Controllers

We design and build supervisory control systems for a variety of hybrid power and distributed generation applications. While most applications require some customization, our modular system architecture allows rapid and cost effective system deployment.



Central Web-Based Data Server for Monitoring of Dispersed Systems

To meet the needs of our customers who deploy a large number of geographically dispersed power systems, we have under development a centralized web-based server that gathers and processes data from multiple systems in the field and presents the information in user-friendly format. The information may then be readily integrated with the customer's business information systems.

