

Developing Small-Scale Modular Electrical Power Generating Plants

Benefits

Each 1,500kW installation displaces 38.4 billion Btu of conventional fuel annually

Many sites can make use of plant's cogeneration capability in the form of thermal energy in addition to the electricity produced

Fuel for plants can come from poultry litter, agricultural crop residues, forest management debris, also coal fines and miscellaneous biomass, even trash

The small scale of the plants allow installations nearly anywhere, bring power generation closer to the load

Performance improvements in the electrical distribution grid can be realized when these plants are integrated, and this can be of economic value to utility companies.

Applications

Plants can be installed at poultry processing facilities, dairies, breweries, sawmills, coal mines, prisons, municipal locations, and other facilities within a region that generates a reliable source of biomass or coal wastes

Such installations can produce electricity, steam, hot air and other process fluids for the operation of these facilities

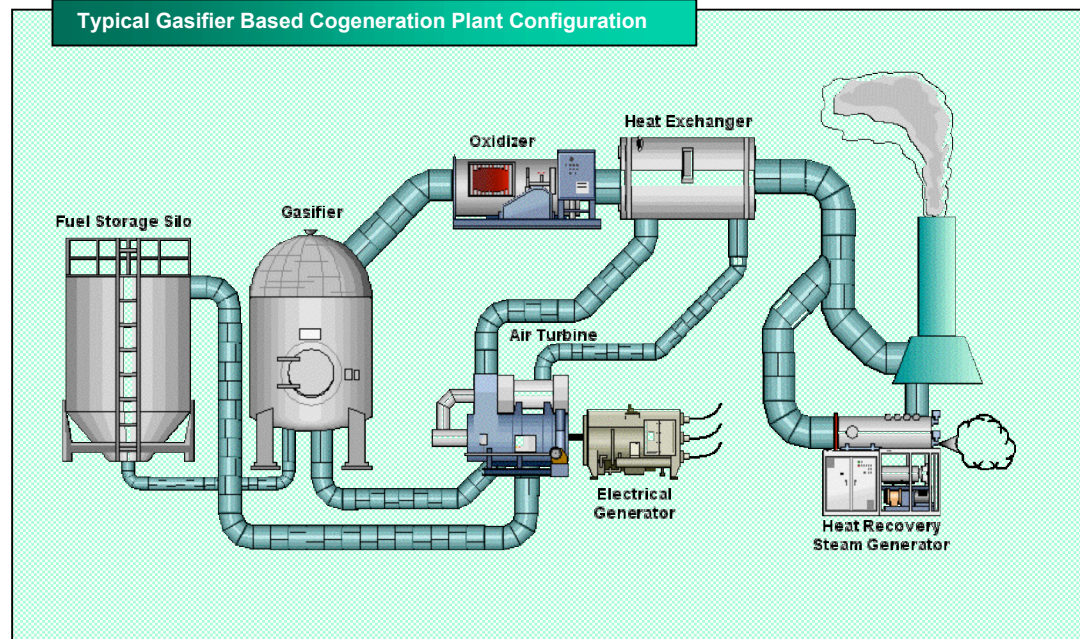
New model for electrical cogeneration that utilizes recovered and renewable resources

Presently there are no commercially available small-scale power plants designed to specifically utilize renewable and recovered energy fuels. There are millions of tons of useable materials that are discarded purely as wastes, or which are posing other environmental liabilities to the generator so an alternative disposal option is needed.

Recovered Energy Resources (RER) has developed a complete modular power plant that uses renewable and recovered energy solid fuels to produce electrical and thermal energy for a dedicated customer. The plants utilize innovative and proven technologies based on the available fuel and desired primary energy to be produced.

RER is the only company expressly focused to build, own, and operate these plants consuming the available fuel materials and producing useable energy for a dedicated customer. The company performs all of the development work to determine the economic viability of each plant and then secures a contract for the generated energy. There is no capital requirement from the customer to build the plant

Typical Gasifier Based Cogeneration Plant Configuration



Rather than using a single technology to convert or extract the useable energy from the fuels, the RER design allows the use of multiple technologies; each is specially engineered into a module that can be easily exchanged in the moduTrainsm of the plant design. Each complete moduTrainsm is designed to produce 1.5MW of electrical energy and a varying amount of thermal energy.

The standard size for the moduTrainsm allows for economies of scale in the manufacturing and rapid site assembly. If a customer load exceeds the output of a single moduTrainsm, a second or third train can be installed in parallel to achieve the desired output. A multiple moduTrainsm plant provides virtually 100% availability. And plant size can range from 1.5 to 20 MWe output.

Part of the RER operations management is a proprietary web based fuels resource management system to ensure steady and effective flow of fuel to the plant and the take-away of resalable ash and plant by-products.

The RER plants fulfill the power industry's goals for distributed energy and the decentralization of power generation. The plants also provide multiple benefits to the grid at large through reduced line losses, reduced grid congestion, and numerous other transmission related improvements. This can lead to lower operating costs for a utility without having to actually purchase the RER plant output.

Typical Project Description

RER would build own and operate a 1.5MW plant fueled with poultry litter at the processing plant of a major poultry producer. The litter comes from within a geographic area around the processor. The processor enters into a power purchase agreement for electrical energy as well as steam for its process needs. Its energy costs and availability are now less volatile. And the processor is relieved of the direct or indirect responsibility for litter improperly applied to cropland.

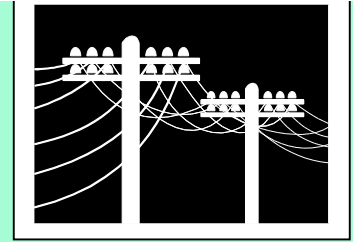
The plant consumes litter that cannot be placed on farmland due to phosphorus and nitrogen runoff issues. The ash from the plant is sold for use in the production of granular fertilizer. The utility sees improvements in the stability and reliability of the grid. The poultry farmer, processor, environment, local utility and RER all benefit and profit from the plant.

Progress and Milestones

- Engineering for plant design is ongoing as are test firings on fuels.
- A full scale commercial sized 25 million Btu/Hr gasifier is running in Illinois for testing purposes.
- Engineering is progressing on an air-turbine for power generation
- Contracts for power purchase are being solicited and secured for electricity and thermal energy

Economics and Commercial Potential

The poultry industry alone offers the potential for over 1,000MW of load capacity. The coal industry offers another 1,750MW, at a minimum, and numerous other fuels add yet more potential. RER is planning for the development of a network in excess of 100 plants by 2010 producing some 38.4 million therms of energy each year from renewable and recovered energy resources.



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