Wilson Engineering Services, PC – CHP and Energy Projects	
Owner/Project	**Services and Description**
Fairview Swiss Cheese Anaerobic Digester/CHP Project	**Feasibility Study, Grant Application, Project Implementation;** Feasibility study including inventory of community feed stocks; identify appropriate anaerobic digester technology; evaluate loads and processes to optimize the use of renewable energy, and financial analysis. Conceptual design including: generator sizing, thermal storage and distribution of process heat and electricity. Additional services included: grid interconnection agreements, grant applications and securing funding for the study and implementing recommendations, identifying markets for renewable energy credits (RECs), securing air quality and environmental permits. The implemented CHP project is a fixed film digester that generates biogas from cheese whey to operate an IC engine generator and recovers engine heat used for processing milk into cheese. The generator provides 300 kW of electricity and 1.5 mmBtu/hr of recaptured heat. The project eliminates 50,000 gallons of fuel oil purchases annually while generating 2,100 MWh of electricity. Net annual energy savings are $350,000. In addition to energy savings, this project eliminated field application of whey, reducing plant operating costs and improving local water quality.
Crawford Central School District Biomass CHP/District Heating Project	**Feasibility Study, Grant Application, Project Implementation**, **Air Quality Plan Approval, Design and Construction Oversight;** Feasibility study of a CHP, District Heating biomass boiler system to be constructed centrally between three public buildings. The study identified $250,000 in annual energy savings. Assistance provided secured $940,000 in grant funding and identified $750,000 in value engineering savings after initial bidding. Additional services included: air quality plan application, net metering agreement application, drafting of a joint operating agreement between the three public entities, and project and construction management as the owner's representative. The $3.5 M system under construction will produce steam and run a single stage turbine to generate electricity that is net metered to offset local school electric purchases. Steam from the turbine is condensed to supply existing domestic hot water and space heat systems via a system of hydronic pipes and heat exchangers that run to each of the three facilities. The system provides 180 kW of electricity and 8.5 mmBtu/hr of hot water, and will replace 85% of the existing natural gas fuel usage and 15% of electric usage for a High School/Middle School, Career Center and Recreation Complex.
Chillicothe, OH – VA Hospital CHP Biomass Project	**Feasibility Study, Equipment Specifications;** Services included feasibility study, assistance to Army Corp of Engineers in writing project scope of work and equipment specifications, arranging site visits to existing biomass installations for VA personnel. equipment option This $14 M CHP biomass project was added to construction of a new gas fired central steam plant that was in the final stages of design for the Chillicothe VA Hospital. The project currently under construction and includes a 600 hp biomass steam boiler, 350 kWe backpressure steam turbine. The CHP system that will offset 90% of natural gas usage and generate 1,600 MWh of electricity annually. The project also includes a 100-ton absorption chiller to offset electric use for cooling and to balance annual steam demand.

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Owner/Project	**Services and Description**
Sullivan County Biomass Energy Plant	**Feasibility Study, Grant Application, Project Implementation**, **Air Quality Plan Approval, Design Oversight;** Services include: feasibility study, development of grant applications, air quality plan application, biomass boiler sizing and specifications, design review, and technical assistance to the owner. The project includes a 2.8 mmBtu/hr biomass hot water boiler offsetting 85% of the annual fuel oil usage that the Elementary and High School complex. The project will provide over $100,000 in annual energy savings. Assistance provided secured $1.1 million in grant funding for the $1.4 million project.
Ernst Biomass Densification Plant	**Feasibility Study, Grant Application, Air Quality Plan Application, Equipment Specifications and Design Review;** The biomass densification plant is designed to produce pellets and briquettes from warm season grasses and wood byproducts for commercial and residential applications. Assistance provided included concept development, feasibility study, grant application, project design review, and air quality plan application. The plant currently under construction is designed to produce up to 30,000 tons per year of pellets from either wood or residue from the seed production of warm season grasses. Assistance provided secured $985,000 in grant funding for the project.
University of Wisconsin-Stevens Point Biomass CHP Study	**Feasibility Study;** Conduct a feasibility study for a biomass CHP system to offset coal and natural gas use at UW-Stevens Point. The feasibility study identified $800,000 in annual energy savings by offsetting 90% of coal and natural gas use in the central plant.
University of Wisconsin-Superior CHP Study	**Feasibility Study;** Conduct a feasibility study for a biomass CHP system to offset coal and natural gas at UW-Superior. The study identified $380,000 in annual savings by offsetting 85% of coal and natural gas use in the central steam plant
Rockingham County, NH Biomass Project	**Feasibility Study, Technical Assistance;** Assistance includes: review of equipment options and energy savings, development of project scope of work for RFQ for design build proposals. The 8.5 mmBtu/hr biomass system and 100-ton absorption chiller will offset 200,000 gallons of fuel oil and a portion of the annual cooling load with wood chips.
MO Fuels for Schools Projects	**Feasibility Study, Equipment Specifications and Technical Oversight;** Provide wood energy feasibility studies for 13 schools in Southern Missouri as part of the MDC Fuels for Schools Project. In addition to feasibility studies services included: technical assistance for development of grant agreements, development of for A/E scope of work and RFQ, development of biomass equipment specifications, value engineering, A/E design review as MDC technical representative, and technical assistance to MDC. From the 13 schools, six signed grant agreements to complete biomass thermal projects. The projects range in size from 0.5 mmBtu/hr to 3.0 mmBtu/hr, will replace 85% of the fossil fuel loads at each school, and are under construction with Summer 2011 completion anticipated.

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Owner/Project	**Services and Description**
Harvard Forest Biomass District Heating Project	**Feasibility Study, Equipment Specifications, Technical Support;** Assistance included concept development of the project to provide a district heating system for the Harvard Forest campus, development of technical portions of grant applications, development of technical specifications for A/E RFP process and interview of design firms, design review, value engineering, and technical support to the owner. The 1.5 mmBtu/hr biomass district heating system would include a hot water distribution system to supply 90% of the campus heating demand and replace aging heating equipment.
Bortnick Dairy, LLC Anaerobic Mixed Digester/CHP Project	**Grant Application, Design Review, Permitting and Utility Interconnect Agreement;** Services included: assistance in grant application and administration, coordination of NPDES permit, Air Quality Plan application, assistance in electric interconnection with local utility. This anaerobic mixed digester combines dairy manure and food waste in a mixed digester. Biogas produced fuels an IC engine/generator set (500 kWe) with heat recovered to maintain digester temperature. Future use of recovered heat is planned to dry biosolids that are separated from the manure and used as cattle bedding and sold to the landscape industry as a soil amendment. Annually the project generates over $250,000 in sales of electricity, biosolids and food waste tipping fees. The $1.4 million project was financed with $950,000 in grants with the balance owner financing.