

RENEWABLE ENERGY EXPERIENCE

DAIRY RENEWABLE NATURAL GAS

Arizona DF Renewables

Butterfield Dairy
Renewable Natural Gas Facility

FNI is designing the balance of plant for a 1,000 nominal SCFM Biogas Upgrading Facility at the Butterfield Dairy in Maricopa County, Arizona. Housing 23,000 cattle and 9,000 Holstein milking cows, the facility will process incoming manure using a Daritech BioLynk system. A mixed plug flow DVO digester will convert the manure to biogas. The facility's freshwater flush system for manure collection will be converted to a recycle flush system that is fed from the Daritech BioLynk system. Once online, the Daritech system will provide the farm with adequate recycle flush water for manure collection. Key services include civil, structural, architectural, electrical, mechanical process, controls design, construction administration and permitting. The structural scope includes Daritech equipment as well as the plant integration and panel designs.



Arizona DF Renewables

Milky Way Dairy
Renewable Natural Gas Facility

FNI is designing the balance of plant for the 1,500 nominal SCFM Biogas Plant at the Milky Way Dairy in Maricopa County, Arizona. The facility houses 32,000 cattle and 12,000 Holstein milking cows as well as a virtual pipeline for the addition of manure from nearby smaller farms. Key services include civil, structural, architectural, electrical, mechanical, process, controls design, construction administration and permitting. The structural scope includes all DVO and Daritech equipment as well as the plant integration and panel designs.



Clean Energy Investment USA

Colorado Dairy
Renewable Natural Gas Facility

FNI provided engineering design and environmental permitting services for a RNG facility in Colorado. The facility consists of three dairies with anaerobic digesters connected via a 14.5-mile pipeline. The pipeline and gas sales point were designed to connect additional dairies to the project in the future. Key services included biogas and fuel gas pipeline hydraulics, electrical and structural engineering, right-of-way acquisition, state and local permitting, survey, project management and construction management services including inspection.



Clean Energy Investment USA

Georgia Dairy
Renewable Natural Gas Facility

FNI is providing engineering design and environmental permitting services for a RNG facility in Georgia. The facility consists of three dairies with anaerobic digesters connected via a 2.5-mile pipeline. The pipeline and gas sales point were designed to connect additional dairies to the project in the future. Key services include biogas and fuel gas pipeline hydraulics, electrical and structural engineering, right-of-way acquisition, state and local permitting, survey, project management and construction management services including inspection.



Brightmark Energy

South Dakota Dairy
Renewable Natural Gas Pipeline

FNI provided pipeline engineering and design services for a RNG facility encompassing two dairies with anaerobic digesters connected via four pipelines totaling 24 miles to a new natural gas sales point in a northern location. The RNG pipelines, fuel gas pipelines and gas sales point pipeline equipment were designed to connect additional dairies to the facility in the future. FNI designed 30 horizontal directional drilled (HDD) bores and developed 41 alignment sheets along with all pipeline surface site facilities such as pipeline pig launchers and receivers. Key services included pipeline route development; environmental permitting services including state, local and railroad permitting; pipeline hydraulics; survey and project management.



RENEWABLE ENERGY EXPERIENCE

Brightmark Energy

Standard Dairy Injection Site
Renewable Natural Gas Facility

FNI provided design and environmental permitting services for a typical Standard Gas Injection Site to be used as a prototype for multiple Brightmark Dairy RNG sites. The initial design included services at the Athena Dairy in Minnehaha County, South Dakota. The prototype design will allow future projects to be designed with minimal adjustments to required equipment, and will typically include an inlet separator, compressor package, backup generator, odorant injection system discharge gas coalescer, heater fuel gas system, slop lube oil tanks, metering skid, fuel processing skid and launcher and receiver set. FNI supplied all design and drafting including a plot plan, piping and instrumentation plans and construction drawings. Key services included site grading, drainage, equipment specification and procurement, pipe design, electrical controls and instrumentation programming and geotechnical engineering.



MUNICIPAL RENEWABLE NATURAL GAS

Microgy, Inc.

Huckabay Ridge
Renewable Energy Plant

FNI provided permitting assistance (liquids and solids) for Microgy's Huckabay Ridge Liquid Waste Facility in Erath County. The project included eight thermophilic digesters, each 0.92 MG, with top-mounted turbine mixers. FNI prepared the facility's Texas Land Application Permit (TLAP) application with the necessary soil sampling, topographic mapping and agronomic nutrient balances. We also prepared the facility's solid waste permit application so Microgy could accept and co-digest high-strength trucked wastes, including grease trap wastes. The project objective was to clean the gas and inject it into a nearby pipeline.



Terrabon, Inc.

MixAlco Biomass
Pilotration Facility

FNI provided design and construction management services for Terrabon's MixAlco Biomass Pilotration Facility in Brazos County. Phase I included site civil and structural design of a fermentation building and feedstock storage facility, as well as design of liner systems, filtration and aeration system, leachate collection and recirculation, fermentation pile pumping and associated electrical systems. Phase II consisted of design for material handling/processing equipment, chemical feed/piping, chemical and liquid storage with associated process piping and other supporting structures. The facility serves as the pilot plant for future full-scale production. The Integrated Pilot-Scale Biorefinery project encompasses the planning, engineering, design, construction and operation of a facility that, when scaled up, will convert 55 dry tons of a blended feedstock comprised of post-sorted municipal solid waste, sewage sludge and recycled paper into approximately 1.3 million gallons per year of renewable hydrocarbon gasoline.



TerraFuels, Inc.

Alvin Biorefinery Facility

FNI provided design and construction phase services for a new \$80 million integrated biorefinery facility in Galveston County. The project included anaerobic digesters, screw presses, dissolved air flotation and proprietary chemical processes to convert municipal solid waste into fuels such as gasoline and jet fuel. Key services included civil engineering, utilities, architecture, structural, MEP and process-unit operations.



RENEWABLE ENERGY EXPERIENCE

Terrabon, Inc.

Alternative Fuels
Demonstration Facility

FNI provided engineering, procurement and construction (EPC) management services in support of Terrabon's continued development of its facilities that will convert various feedstocks into biofuels. The \$10 million expansion of the existing Alternative Fuels Demonstration Facility in Brazoria County included design of a new feedstock receiving area, a 10-foot-diameter by 73-foot-tall fermenter, receiving tanks, paving, containment walls, piping, pumps, electrical and controls to facilitate the fermentation of the feedstock and transfer of the material from the fermentation area to the filtration area. A new hillside type screen, ultrafiltration unit and reverse osmosis unit was added along with all associated pumps, piping, tankage and controls. A new metal canopy was constructed over the equipment.



COMPRESSED NATURAL GAS

Zeit Energy

Pensacola Energy
Compressed Natural Gas
Fueling Facility

FNI provided turnkey design, construction and operation and maintenance services for this large time-fill and retail fast-fill compressed natural gas (CNG) facility in Pensacola, Florida. The station services 90 vehicles from a local municipal refuse company with time-fill dispensers through an interlocal agreement. Key design services included civil, structural, mechanical and electrical engineering.



Zeit Energy

Southwestern Energy
Compressed Natural Gas
Fueling Facility

FNI provided consulting, procurement, engineering and construction management services for the design of a fast-fill fueling facility in the Fayetteville Shale area of Arkansas. The station is one of the largest publicly accessible retail CNG facilities in the United States, servicing the client's 200+ service vehicles and the service vehicles of its vendors. FNI designed the drainage, paving, fueling islands and the electrical components to support the CNG compression equipment and six fast-fill Gilbarco dispensers. The design also included electrical and mechanical infrastructure to support one gas dryer, three SFCM compressors and six gas storage tanks.



SOLAR AND MICROGRIDS

Tarrant County College District

Center of Excellence
for Energy Technology

FNI provided design and construction phase services for a new two-story 88,000 SF educational facility for renewable energy technologies. The building received LEED® Platinum certification, supporting one of the project's primary objectives — net zero energy use. 416 photovoltaic arrays provide one-third of the building's energy, while a geothermal system offsets the heating and cooling provided by a central plant chilled water system. Two wind turbines provide an alternate energy source if grid power is lost. Sustainable components include a bioretention/rain garden, tree reforestation and a green roof system, reducing the operational cost of the facility.



RENEWABLE ENERGY EXPERIENCE

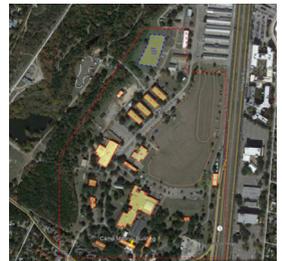
Texas Military Department
Camp Swift Energy Resilience
and Conservation Investment
Program Microgrid

FNI is providing design and construction phase services for an Energy Resilience and Conservation Investment Program (ERCIP) Microgrid at the Camp Swift military installation in Bastrop, Texas. The microgrid will be capable of islanded operation and will provide energy resiliency and energy conservation to the eastern portion of Camp Swift during power outages, brown outs, emergencies and natural disasters. FNI is designing the microgrid to reduce the risk to mission critical operations and lower energy costs. Key design services include civil, utilities, photovoltaic, geotechnical, structural and mechanical and electrical engineering.



Texas Military Department
Camp Mabry Energy Resilience
and Conservation Investment
Program Microgrid

FNI is providing design and construction phase services to develop a resilient microgrid energy system at the Camp Mabry military installation in Austin, Texas. The microgrid will be capable of islanded operation to survive a grid outage of at least 14 days and provides energy resiliency and continuity of critical operations in times of power outages, emergencies and natural disasters. Key services include site civil, structural, electrical and geotechnical engineering, geotechnical and plumbing design.



SERVICES AND CAPABILITIES

RENEWABLE NATURAL GAS

- Project Management
- Pipeline and Injection Point Location Development
- Environmental and Permitting
- Engineering and Design
- Pipelines – Routing and Drawings
- Gas Upgrading for Dairy
- Compressor Site
- Gas Injection Site
- Construction Management
- Bid Packages
- Inspection
- Operation and Maintenance Manuals

GEOHERMAL

- Feasibility Studies
- Design
- Optimization

COMPRESSED NATURAL GAS

- Municipal and Private Fleet
- Feasibility and Cost Analysis
- Design through Construction
- Permitting
- Garage Requirements
- Fueling and Hedging Strategies
- Operating Plans
- Revenue Opportunities Working with Nearby Fleet Managers
- Possible Fueling Contract Services

SOLAR AND WIND

- System Feasibility
- Design Consulting
- Project Management
- Construction Management

WATER GENERATION

- Planning and Permitting
- Studies and Analyses
- Design and Rehabilitation
- Instrumentation and Monitoring
- Construction Management and Support
- Facility Reviews and Evaluation
- Water Reuse
- Rainwater Collection Systems

GREENHOUSE GAS

- Emission Baseline Assessment
- Combustion Emissions Analysis
- Electrical Power Emissions Analysis
- Future Planning Development

INTEGRATED FACILITY AND CAMPUS SOLUTIONS

- Preliminary Assessments and Audits
- Energy Master Planning
- Asset Management – BUILDER and Installation Status Reports (ISR)
- Directed Energy Studies
- Active Energy Management Studies
- Smart Building Systems
- Microgrid Feasibility and Design
- LEED® Consulting, Feasibility and Design

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