

Scotts Valley Band of Pomo Indians

**Red Hills Bioenergy Project
7130 Red Hills Road, Kelseyville
Assessor's Parcel No. 009-021-070**

**PROJECT DESCRIPTION
Revised 10/23/2019**

Property Description: Scotts Valley Band of Pomo Indians (SVBPI) through its tribally owned company, Scotts Valley Energy Company, LLC (SVEC) proposes to construct and operate a bioenergy plant on its fully owned property located at 7130 Red Hills Road, Kelseyville. This property encompasses 35.58 acres of which approximately 10.5 acres, running parallel with and adjacent to Highway 29, are designated Commercial Highway and the remaining 24.5± acres are designated Rural Residential. The site currently hosts two single-family residences, a travel trailer, a public restroom structure consisting of two discrete bathrooms, two permitted septic systems serving the fore mentioned structures and a well with two 2,000 gallon water tanks providing water to these structures plus water valves placed at strategic locations throughout the property.

Currently SVBPI has entered into a temporary lease agreement with PG&E for use of just under four acres of the property to store and chip forest material coming from its line clearance program. When the material accumulates, a tub grinder stored on site will be operated for intervals of 2-3 hours at a time. The chipped material will be stored in piles on the property and used in the Project's storage area when construction begins. The agreement is for six months with options to renew. The leased area is located south of the parking lot along the eastern edge of the property, south to the public bathroom and west to the edge of the driveway. The Lake County Community Development Department approved this activity and issued an Encroachment Permit.

History: SVBPI purchased the property 23 years ago. Prior to its ownership, the land was a commercial walnut grove, with the owners living on site. SVBPI maintained the walnut grove in its early ownership years but abandoned that effort due to the age and condition of the trees. While the vast majority of the walnut trees remain in place, the original owner's home and 2 barns have been removed because they were deemed a health, safety and fire hazard. Neither were determined to be of historical value and hence neither are registered on the NRHP as documented in an 11 page report provided by the Northwest Information Center at Sonoma State University. The report references the former archaeological survey conducted on the property. In short, page 4 of the report states, "A pedestrian survey of the project areas conducted by qualified archeologists in January 2001 also provided no evidence of historical or prehistoric archeological properties." It further states, "Our review of the submitted HPSR leads us to concur with FHWA's determination that the property at 7130 Red Hills Road is not eligible for inclusion on the NRHP under any of the criteria established by 36 CFR 60.4."

Archaeology: SVBPI is not aware of any flatland or lowland sites in Lake County that could not be a possible archaeological site given the existence of Native Americans in the area since 12,000 BCE. A blanket of shattered obsidian is prevalent on the property, which is a minor indication that obsidian may have been mined as some point in time. However, during its years of ownership, SVBPI's certified cultural monitors have surveyed the property for archaeological evidence. To date no such evidence has been found. Nevertheless, SVBPI will retain one or more of its cultural monitors, as needed, during the project's site preparation and construction phases.

Biological Report: A biological resource assessment with a botanical survey, wildlife survey and delineation of waters of the entire property was conducted by Northwest Biosurvey of Kelseyville, California in accordance with the California Department of Fish and Wildlife's protocol for floristic-level botanical surveys and Corps of Engineers' survey requirements. The purpose of this study was to provide a definitive assessment of the presence of sensitive plant and wildlife species and Waters of the U.S. The study was in two parts consisting of pre-survey research of the literature and followed by two field surveys. The report concluded there are no sensitive plant or wildlife species/habitat, and no Waters of the U.S. on the property.

Project Site: The project will be sited on less than an acre of land. Its footprint will be rectangular in dimension. The western short side will run parallel to Red Hills Road and set 140' off the edge of the road. The south long side will run adjacent to and parallel with the property's existing lane and will be 270 feet in length. The site will consist of four major elements: bioenergy plant housed within a building, outdoor storage area and new travel lanes.

Bio-Energy Plant: Each of the (2) Omni Bioenergy Artis 100kW units is a co-current fixed bed system designed to produce Syngas from most forms of carbon based biomass materials (feedstock) through a proprietary process capable of yielding industry leading energy content. The Artis systems can achieve this goal in a smaller space and at a fraction of the cost of legacy technology alternatives. In the case of the Red Hills Bioenergy Project, the feedstock will be at least 80% BioMAT Category 3 forestry-sourced waste wood that would otherwise decay in place, be open-burned or deployed to landfills.

The Artis 100 has no open flame components and is a sealed system. The units employ programmable electric heaters to achieve optimal temperatures. Once biomass enters the Artis system the biomass is heated to a level that reduces the biomass to a gas known as Syngas and a solid byproduct known as Biochar. The system uses a customized auger-based compacting system to control both feedstock throughput and Syngas production quality. Using a hybrid of pyrolysis and gasification, the oxygen and moisture in the biomass/feedstock help produce a higher energy Syngas allowing for better, more efficient energy generation. As the final step the Artis delivers a clean Syngas to a modified internal combustion engine and generator to create electricity.

The core of the Artis system is the proprietary hybrid pyrolysis and gasification unit that includes a configurable system controller, feed delivery management, feed lock hopper and gas management.

- The Artis 100 can be shipped with major components pre-assembled. Once on-site, installation moves quickly and the system can be operational in 4 to 6 weeks including additional peripherals for feedstock processing and a prime mover/generator for electricity.
- The biomass feedstock will be pre-processed to approximately 1/4 of an inch in diameter.
- Optimal moisture content of feedstock is 10-20%.
- The Artis 100 is designed to operate at a neutral atmospheric pressure, which minimizes energy input and simplifies the operational complexity of the system.
- The Artis pyrolysis/gasification process is a sealed system and releases no emissions.
- Generators used as prime movers will meet or exceed all EPA and California emissions requirements. [See spec sheet]
- By employing the sealed auger compaction approach, the Artis system operates in the near absence of air (Oxygen and Nitrogen) resulting in a much more efficient Syngas production process and cleaner, safer operation.

- The Biochar produced can be deployed for net carbon sequestration of the original feedstock carbon. The Biochar is automatically delivered from the reactor for removal.
- Artis systems can be configured to optimize the interdependent factors of speed (feed rate) and temperature.
- The Artis is configurable by the preferred temperature for pyrolysis based on the highest gas profile given the feedstock type.
 - The configurable range is from 400 to about 1100° C.
 - The feed rate is adjustable in a range of 10% to 100% of an Artis unit design capacity.

The System Controller can be programmed to introduce a controlled amount of steam depending on the moisture content of the Syngas or the moisture content of the feedstock. Steam may be employed to assist in the conversion of Biochar to Syngas if the user prefers more Syngas and less, or no Biochar. The Syngas is processed through a series of heat exchangers, hydrocarbon crackers and particulate filters before being delivered to the generator.

Building: The 2,000-square foot bioenergy plant will be housed in an enclosed building and sit on a 40' x 50' six-inch thick concrete pad. The sides of the metal building will be 10' high and there will be two 18'-wide roll-up doors and one pedestrian entrance. The roll-up doors will be located on the west and east sides of the building; the pedestrian entrance on the east side. An "A" frame metal roof with a centerline apex of 16' will cover the building and pad. The roof will be supported by steel pillars. The building will be located on the project's west side and 160 feet from the edge of Red Hills Road.

Storage Area: The storage area will be sited on the east side of the plant. It will encompass approximately 28,000 square feet as shown on the Site Plan. Its function will be to process and house the production plant's feedstock. The surface of the storage area will be a 6" pad of wood chips. This is intended to ensure that soil erosion will not occur in the winter season as well as ensuring that rock and related material will not be carried to the production plant. A two-phase chipping process will be used to reduce the forest material to ¼" diameter. This activity will occur in this storage area.

Travel Lanes: 20' wide travel lanes will encircle the building in order to provide easy access to the bio-energy equipment by maintenance trucks and personnel. There will also be two 20' wide lanes bordering two sides of the forest material storage area. The first lane will parallel the south side running between the lane on the eastern side of the building and the eastern edge of the storage area. The second lane will run parallel to the eastern edge of the storage area in a north to south direction (see Site Plan). There will be a hammerhead "T" at the northern end of the lane to accommodate the turning around of the 2 – 5 ton trucks delivering the forest material. All lanes will be surfaced with either ½" gravel or with a new composite material consisting of dirt and cement, if the applicator machinery can be secured.

Operations: The operation plan assumes 2 – 5 trucks in the 2 – 5 ton range delivering forest material daily. It will arrive chipped or unchipped. In both cases the trucks will unload in piles in the storage area. The chipped material will be further reduced in size by processing through a hammer mill to ¼-inch in diameter. Unchipped material will be run first through a chipper, and then transferred via a front loader or conveyor belt to the hammermill. Once through the hammermill, the material will be transferred to the plant's hopper or stockpiled. It is anticipated that the hopper will be loaded twice a day in early morning and early evening. The biochar will be transferred from the production plant to large sacks and stored on pallets. When five tons of biochar is accumulated, it will be shipped to a soil amendment wholesaler located in the Central Valley.

The plant will operate 24 hours per day, seven days per week except when it is shut down for scheduled maintenance on average one day per week. The operation is highly automated with system safeguards in place to shut the operation down in the event of a malfunction. Consequently, the plan calls for a full-time employee working 5.5 hours per day, seven days a week on a split-shift schedule. The operator will be responsible for chipping feedstock, feeding the hopper, packaging biochar and monitoring the plant's operation. Equipment employed in the storage area includes one front loader, one hammermill, and possibly two conveyor belt units placed between the chipper and the hammermill and the hammermill and the hopper.

Grading: The project's only grading will be to create a level base for setting the building's concrete pad, i.e., 2000 square feet. The first step will be to remove six walnut trees (of which one is a stump) from the pad area. The next step is to address the grade differential. The current differential for the building's proposed siting is on average 2.5' running from a high on the south side to a low on the north side. The elevation running west to east is constant. To create a level base, scraping to a depth of one foot will start on the south side and the material will be moved to the north side. It is anticipated that the cut volume will equal the fill volume, resulting in no import or export of soil. It is estimated that the soil movement will not exceed 45 cubic yards of material.

There are an additional 19 walnut trees (of which 4 are dead or stumps) situated in the proposed storage and lane areas. These trees will be cut down and stumps ground away. Thereafter, the areas will be scraped to remove the weeds grass and bushes in preparation for the respective base material as noted above.

Drainage: Historically, drainage is not an issue within the property. There is a small drainage swale located not less than 100' from the eastern edge of the lane adjacent to the eastern edge of the storage area. This swale functions to infiltrate and dissipate water coming from the southeast section of the property (upslope). Due to high infiltration rates of site soils, it is not anticipated that the project area will add to nor need to use this swale to accommodate the natural runoff that currently occurs within the project footprint. However, there will be two gutters installed on the east-west sides of the building's roof. Each gutter will have a downspout at each end of the building or 4 downspouts. The down spouts will be connected to 4" diameter underground drainage pipe and the pipe will be extended north to a distance of 20' past the building's adjacent lane and released into the open field. Rocks of various sizes will be placed at the exit point to dissipate the released water and prevent ground erosion.

Construction Duration: The construction phase is estimated to take not more than 8 to 12 weeks. This includes: site grading, forming and completing an egress apron, setting rebar and pouring the plant's pad, installing roof supports and roof, digging drains and connecting downspouts, trenching water line and electrical line, and installing production equipment. The number of workers will include: 2 workers during grading, and 4-6 workers for remaining work. There will be 1 tractor/grader used to grade the site, 1 compactor to compact area for the pad, storage area and new travel lanes, 1 water tanker to suppress dust during grading, approximately 10 truck trips hauling road base at 5 cubic yards per trip, 8 cement truck trips hauling 5 cubic yards in each trip.

Construction Period Storage: Construction vehicles, equipment and materials will be staged either along the south side of the property's existing lane or in the storage area once the trees have been removed.

Greenhouse Gas Emissions:

Construction Phase: Normal emissions from construction vehicles, graders, trenchers, compactors and concrete curing.

Operating Phase: Standard emissions from a diesel powered front end loader operating 6-8 hours per day. Standard emission from a diesel powered wood chipper and hammer mill, although purchase of electric powered versions will be investigated as well. Trace level emissions to below detectable levels from the sealed-system Artis gasifier. The Syngas delivered from the gasifier to a combustion engine electricity generator is primarily Hydrogen and Carbon Monoxide, with less than 10% by volume being Methane and Carbon Dioxide. The electricity generator will meet all EPA and regional air quality board standards with an emission level cleaner than a natural gas generator. Emissions testing will be done as part of project startup and commissioning activities. The Artis 100 systems have zero emissions and the generators we are proposing to use will all meet appropriate EPA and air quality board emission requirements.

Impervious Surfaces: The primary impervious surface from the project is 2,000 square feet in the form of a concrete pad on which the production plant building will be placed. Water diversion from the roof is presented under "Drainage." Secondary areas include the 20' wide lanes surrounding the pad and the additional lanes on two sides of the storage area. The property's soil percolates easily as demonstrated by its history of no soil erosion.

Dust Control: Dust that may occur during land re-leveling or construction will be controlled by the dispersal of water. The water used for this activity will come from the site's existing water line or water tender, whichever is most efficient. Any dust created during the operational phase will be managed with water application, tarping/cover, and good feedstock management practices.

Electricity: There are three electrical needs. The first and foremost is the transmission line between the plant's co-generator and the PG&E pole to the north west of the concrete pad and adjacent to and between the property's boundary line and Red Hills Road. This transmission line will be overhead as required by PG&E. It will connect the co-generator units, set on the west side of the building, to a transformer set towards the top of the pole as installed by PG&E's employees. The second electrical need will be lighting in the plant. This lighting will be LED with lights set above the bottom of the roof line as to prevent glare emanating to surrounding properties. The source of this light will come from the plant itself and only activated when needed to conduct monitoring or maintenance activities. The third electrical need will be light poles placed on the perimeter of the two lanes that parallel the storage area.

Water Supply: The property has its own agriculture well and pump located at the north end of the property. Water is pumped to the south end of the property and stored in (2) 2,000-gallon tanks that are located between the public bathroom and the two existing homes. The tanks serve all three units plus water outlets strategically placed on the property. The well pump, water tanks and distribution system are maintained by SVBPI's Housing staff. An additional ¾- to one-inch water line will be added to the production plant to supply the 5-10 gallons of water daily. The water source for this need will be the existing PVC water line that runs north to south between the property's well and water storage tanks. Connection will be made by cutting into and setting a "T" connector at the most logical access point. The water will be transmitted to the northeast corner of the concrete pad via a ¾" schedule 40 PVC pipe, and buried to the depth required by code. An eye wash unit will be installed adjacent to the faucet. A standard commercial grade hose will be used to connect and supply water to the production units.

Hazardous Materials: The operation will require diesel fuel to operate the chipper and loading tractor. Diesel will be provided by a fueling service. Cleaning solvents will be held in small quantities, no more than 2-gallon containers each, and all kept in a fireproof storage cabinet secured by lock and key. There are no historical records documenting the dumping or uses of hazardous material on the site; hence, no hazardous materials mitigation efforts needed.

Trash Disposal: The operation and its staff will generate a very limited amount of trash. This trash will be disposed of in standard trash and recycling bins. The bins will be rolled to the edge of the property and placed along side of the current residential bins for a weekly pick-up. The bins will be kept adjacent to the concrete pad in a location that presents no sight line to neighbors nor traffic on Red Hills Road. Thus, no additional trash enclosure is planned nor required.

Fencing: 3' high chain link fencing encompasses the perimeter of the entire 35.58 -acre property. In addition, an 8' high chain link fence will be installed around the perimeter of the lanes surrounding the building. This fencing will have two large locked gate openings. The first will be on the east side of the building and allow access for movement of chipped material from the storage areas to the bioenergy equipment inside the building. The second will be on the south side to allow for access by staff and maintenance vehicles. There will also be placed on the south side a pedestrian gate. There is one main gate or entrance to the property at large, normally kept open but can be locked, if needed.

Lighting: As noted above under “electricity”, there are two exterior lighting elements. The first is overhead lighting beneath the roof and above the bioenergy plant. This lighting will be standard LED units, which will be placed to avoid glare emanating beyond the perimeter of the concrete pad. The second element will be street lighting. Up to 4 poles will be placed along the two lanes that border the forest material area. The poles will be of the same style as the existing poles on the main lane through the property. The light will be down casting again as to minimize light impacting the neighboring properties.

Parking: Parking for staff and maintenance personnel will occur on the south and west lanes adjacent to the building. Additional parking exists in the paved parking lot and throughout the property if needed.

Landscaping: The Red Hills property is in an agriculture setting. Accordingly, no formal landscape plan is proposed for the project. Rather the surrounding area will be retained in its current natural state.

Visibility/Aesthetics: The attached photos were taken at various locations on Red Hills Road and Soda Bay Road, with the southernmost place being the entrance of the Beckstoffer vineyard, to the northernmost place being the first rise on Soda Bay Road north of Highway 29, approximately ½ mile in both directions. The photos show a minimum visual impact from these vantage points, primarily because of the existing foliage both on the property and adjacent property.

Odors: The system has no emissions or odors.

Noise: The Level 2 Housed Gen-Set that power the system will be enclosed in full aluminum weather protection and superior sound attenuation for specific low noise application. This includes a critical grade muffler. The generators will be located on the west side of the production plant, over 140 feet from the County Road, over 200 feet from residences on the property, and over 800 feet from the nearest off-site residence. Outdoor chipping operations will take place approximately 2-3 hours per day, 5 days per week, and are also set back from nearby residences. The operation is expected to comply with County noise requirements.

See attached Omni BioEnergy, LLC Artis gasification specifications sheets.



Waste To Clean Energy Solutions

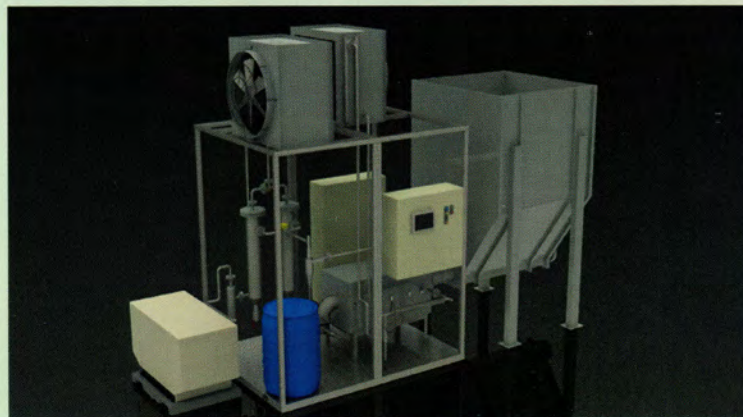
www.omnibioenergy.com
415.302.1245

omni BioEnergy, LLC

Omni Bioenergy is a Green Energy Solutions company formed to expand and commercialize innovative solutions for renewable energy generation, fuels and storage. Omni provides cutting edge systems, consulting services, engineering, support, procurement and construction services to its development partners and customers. Omni has the capability to validate, commercialize, procure and extend next generation renewable energy and fuel solutions that facilitate 24x7 or "on demand" energy generation opportunities

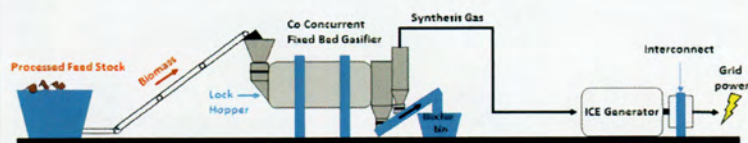
Our Products - ARTIS Gasification

- Type: Co-Current Fixed Bed - VariTemp and Speed /Active feed
- Size: 50kW to 500kW - Systems can be combined
- Product: Syngas
- Reactor Conditions: Pressure (atm): 1
- Operating Cycle: up to 24hrs/330DPY as required
- Utilities Per 100kW system:
- Electricity Consumption: ~30 kW
- Water Consumption: Minimal
- Electrical Connection: 240v / 3 Phase /100amp
- Capable of remote operation and monitoring
- Smart Grid and Micro Grid capable



(ARTIS 50kW system)

PROCESS FLOW DIAGRAM

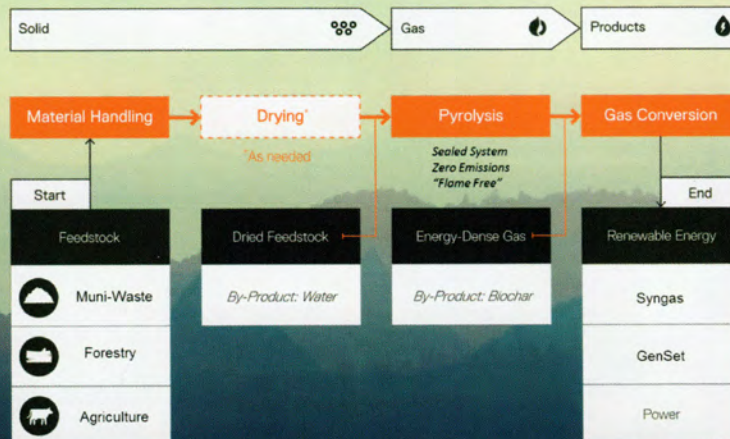


- Waste to Renewable Power
 - Gasifier produces uniform gas and biochar in a sealed reactor designed to thermally process biomass without open flame or emissions
 - Biochar is separated for use or sale
 - Internal combustion engine (ICE) generator produces electricity for use on site and or export to the grid

Typical Syngas composition from untreated wood

- Hydrogen 44.3%
- CO 44.6%
- Carbon dioxide 2.9%
- Methane 5.5%
- C2 Trace BDL
- Oxygen 0%
- Nitrogen Trace BDL
- Chlorine Trace BDL
- Sulfur Trace BDL
- H₂O 2.4%
- Total: 100%

- ARTIS Gasifiers are a renewable energy power solution with significant advantages over other available gasification systems. Our modular systems and highly configurable design, operational flexibility and "clean" systems approach makes us a lower cost solution and puts us at the forefront of a rapidly growing market. Some examples of our "best in breed" solution include:
- More efficient and cost effective
- 90% Biomass agnostic
- Fully Programmable
- Carbon Neutral to Negative
- "Hyper Clean" process
- Prime, Backup or on Demand power
- Highly configurable to customer needs
- Produces high quality, clean energy syngas
- Syngas can be converted to 99.999 hydrogen
- Building block for complete grid independent solution



- Carbon footprint of biomass power plants is generally neutral as determined by US EPA and DoE
- CARB states, fuels made from diverted organic waste are carbon negative due to methane capture and reduced fossil fuel use
- ALL peripherals used in Omni Bioenergy deployments meet EPA and Regional air quality standards

mni BioEnergy, LLC

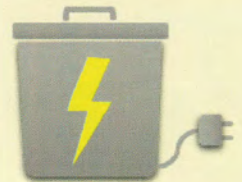
Multiple Income/Savings Opportunities

Omni's approach to waste to green energy projects afford our clients multiple paths to RRoI (Rapid Return on Investment) and profitability. The ability to work off grid, leverage utility tariff programs, grants, subsidies, behind the meter and or net metering gives us wide flexibility when looking at project economics. Secondary revenue streams such as Biochar and Hydrogen production serve to not only enhance the overall economic upside of these projects but allow the operator to achieve carbon neutral to negative status.

- Energy sales
- Operating expense reduction
- Elimination of tipping fees
- Biochar sales
- Hydrogen sales

WASTE TO ENERGY

- ✓ Reduce Greenhouse Gas Emissions
- ✓ Qualify for Class I/II Renewable Energy Credits
- ✓ Reduce Electricity Demand from the Grid



Services

Omni offers a wide array of services including:

- System design and engineering
- Site locations and development
- Pro Forma economic analysis
- Permitting and agency approvals
- Construction planning and execution
- Site operation
- Ongoing product support
- Full life-cycle development

Projects Focus

Our primary focus is on 3 verticals: Agriculture, forestry and municipal waste processing operations. Having a wide range of scale-able solutions as well as a broad portfolio of peripheral options to select from gives Omni the ability to serve a broad range of clients while delivering the best possible solutions for their needs. Omni will consider ANY carbon based feedstock option for potential projects.



ENERGY FROM WASTE

Smart Planet Stewardship

Excellence as a Standard

Omni Bioenergy is not just a business to us. Green Energy is not just a solution. Planet Stewardship is not just a marketing pitch. We believe that you are what you leave behind for the children. Their future is WHY we work as hard as we do to design, build and deploy the best systems we can for each and every customer we work with. Its not just an obligation.

It's a love.



For more information call us at

415.302.1245 or

Email us at info@omnibioenergy.com

Omni Bioenergy LLC
623 Oakdale Avenue
Corte Madera, CA 94925



GILLETTE GENERATORS

LIQUID COOLED DIESEL ENGINE GENERATOR SET

Model	HZ	STANDBY	PRIME
		130°C RISE	105°C RISE
T4D-1500-60 HERTZ	60	150	150

60 HZ MODEL
T4D-1500



All generator sets are USA prototype built and thoroughly tested. Production models are USA factory built and 100% load tested.



UL1446, UL508, UL142, UL498



NFPA 110, 99, 70, 37

All generator sets meet NFPA-110 Level 1, when equipped with the necessary accessories and installed per NFPA standards.



NEC 700, 701, 702, 708



NEMA ICS10, MG1, ICS6, AB1



ANSI C62.41, 27, 59, 32, 480, 40Q, 81U, 360-05

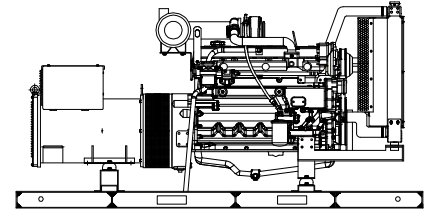


ASCE 7-05 & 7-10

All generator sets meet 180 MPH rating.

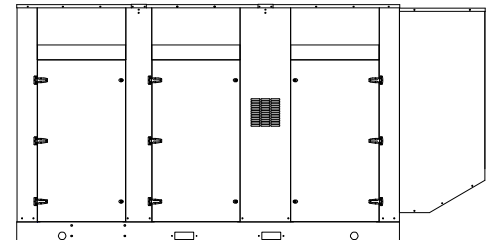


EPA 40CFR Part 60, 89, 1039, 1048, 1054, 1065, 1068



“OPEN” GEN-SET

There is no enclosure, so gen-set must be placed within a weather protected area, uninhabited by humans or animals, with proper ventilation. Silencer not supplied, as installation requirements are not known. However, this item is available as optional equipment.



“LEVEL 2” HOUSED GEN-SET

Full aluminum weather protection and superior sound attenuation for specific low noise applications. Critical grade muffler is standard.

GENERATOR RATINGS

GENERATOR MODEL	VOLTAGE		PH	HZ	130°C RISE STANDBY RATING		105°C RISE PRIME RATING	
	L-N	L-L			KW/KVA	AMP	KW/KVA	AMP
T4D-1500-1-1	120	240	1	60	150/150	625	150/150	625
T4D-1500-3-2	120	208	3	60	150/187	521	150/187	521
T4D-1500-3-3	120	240	3	60	150/187	451	150/187	451
T4D-1500-3-4	277	480	3	60	150/187	225	150/187	225
T4D-1500-3-16	346	600	3	60	150/187	180	150/187	180

RATINGS: All three phase gen-sets are 12 lead windings, rated at .8 power factor. 130° C “STANDBY RATINGS” are strictly for gen-sets that are used for back-up emergency power to a failed normal utility power source. This standby rating allows varying loads, with no overload capability, for the entire duration of utility power outage. 105° C “PRIME RATINGS” are strictly for gen-sets that provide the prime source of electric power, where normal utility power is unavailable or unreliable. A 10% overload is allowed for a total of 1 hour, within every 12 hours of operation, on every PRIME RATED systems. All gen-set power ratings are based on temperature rise measured by resistance method as defined by MIL-STD 705C and IEEE STD 115, METHOD 6.4.4. All generators have class H (180°C) insulation system on both rotor and stator windings. All factory tests and KW/KVA charts shown above are based 130°C (standby), and 105°C (prime) R/R winding temperature, within a maximum 40°C ambient condition. Generators operated at standby power ratings must not exceed the temperature rise limitation for class H insulation system, as specified in NEMA MG1-22.40. Specifications & ratings are subject to change without prior notice.

APPLICATION & ENGINEERING DATA FOR MODEL T4D-1500-60 HZ

GENERATOR SPECIFICATIONS

Manufacturer..... Stamford Generators
Model & Type..... UCDI274K-311, 4 Pole, 4 Lead, Single Phase
..... UCI274G-311, 4 Pole, 12 Lead, Three Phase
..... UCI274G-17, 4 Pole, 12 Lead, 600V, Three Phase
Exciter..... Brushless, shunt excited
Voltage Regulator..... Solid State, HZ/Volts
Voltage Regulation..... ½%, No load to full load
Frequency..... Field convertible, 60 HZ to 50 HZ
Frequency Regulation..... ± ½% (1/2 cycle, no load to full load)
Unbalanced Load Capability..... 100% of standby amps
One Step Load Acceptance..... 100% of nameplate rating
Total Stator and Load Insulation..... Class H, 180°C
Temperature Rise..... 105°C R/R, prime rating @ 40°C amb.
3 Ø Motor Starting @ 30% Voltage Dip (208-240V)... 1500 kVA
3 Ø Motor Starting @ 30% Voltage Dip (480V-600V) 2300 kVA
Bearing..... 1, Pre-lubed and sealed
Coupling..... Direct flexible disc.
Total Harmonic Distortion..... Max 3½% (MIL-STD705B)
Telephone Interference Factor..... Max 50 (NEMA MG1-22)
Deviation Factor..... Max 5% (MIL-STD 405B)
Alternator..... Self ventilating and drip-proof
Ltd. Warranty Period..... 24 Months from start-up date or
..... 1000 hours use, first to occur.

GENERATOR FEATURES

- World Renown Stamford Electric Generator having UL-1446 certification.
- Full generator protection with **Deep Sea 7420** controller, having UL-508 certification.
- Automatic voltage regulator with over-excitation, under-frequency compensation, under-speed protection, and EMI filtering. Entire solid-state board is encapsulated for moisture protection.
- Generator power ratings are based on temperature rise, measured by resistance method, as defined in MIL-STD 705C and IEEE STD 115, Method 6.4.4.
- Power ratings will not exceed temperature rise limitation for class H insulation as per NEMA MG1-22.40.
- Insulation resistance to ground, exceeds 1.5 meg-ohm.
- Stator receives 2000 V. hi-potential test on main windings, and rotor windings receive a 1500 V. hi-potential test, as per MIL-STD 705B.
- Full amortisseur windings with UL-1446 certification.
- Complete engine-generator torsional acceptance, confirmed during initial prototype testing.
- Full load testing on all engine-generator sets, before shipping.

ENGINE SPECIFICATIONS AND APPLICATIONS DATA

ENGINE

Manufacturer..... VOLVO-PENTA
Model and Type..... TAD871VE, 4 cycle, liquid Cooled
Aspiration..... Turbo After Cooler, Air to Air
Charged Air Cooled System..... Air to Air
Cylinder Arrangement..... 6 Cylinders, In-Line
Displacement Cu. In. (Liters)..... 470 (7.70)
Bore & Stroke in (Cm)..... 4.33 x 5.31 (11.0 x 13.5)
Compression Ratio..... 17.5:1
Main Bearings..... Tin Overlay with Babbit Backing
Cylinder Head..... Cast Iron with overhead Cam
Pistons..... Aluminum Alloy with Graphite Coating
Crankshaft..... Induction Hardened, Heat Treated Forged
Valves..... Heat Treated and Hardened Exhaust Valve
Governor..... Electronic, EMS 2.2
Frequency Regulation..... ± 1/4%
Air Cleaner..... Dry, Replaceable Cartridge
Engine Speed..... 1800 rpm
Max Power, bhp (kwm) Standby..... 252 (185)
BMEP: psi (MPa) Standby..... 331 (2.3)
Ltd. Warranty Period..... 2 Year or 1000 hrs, first to occur

FUEL SYSTEM

Type..... Diesel Fuel Oil (ASTM No. 2-D)
Combustion System..... Direct Injection
Fuel Injection Pump..... Electronic, Delphi E3
24 VDC Coolant heaters..... Optional Equipment
Fuel Filter..... Yes with Water Separator

FUEL CONSUMPTION

GAL/HR (LITER/HR)	STANDBY	PRIME
100% LOAD	11.5 (43.5)	11.5 (43.5)
75% LOAD	9.62 (36.5)	9.62 (36.5)
50% LOAD	6.81 (25.8)	6.81 (25.8)
DEF Consumption is 6% of fuel consumption		

OIL SYSTEM

Type..... Full Pressure
Oil Pan Cap. W/ filter qt. (L)..... 28.5 (27)
Oil Filter..... 3, Replaceable Cartridge type

ELECTRICAL SYSTEM

Ignition System..... Electronic
Eng. Alternator/Starter: 24 VDC, negative ground, 110 amp/hr.
Recommended battery to -18°C (0° F):(2) 12 VDC, BCI# 31,
Max. Dimensions: 14"lg x 6 3/4" wi x 10" hi, with standard
round posts. Min output 1000 CCA. Battery tray (max. dim. at
15"lg x 7"wi). This model has (2) battery trays, (2) hold down
straps, (2) sets of battery cables, and (1) battery charger.
Installation of (2) 12VDC starting batteries connected in series
for 24VDC output is required, with possible higher AMP/HR
rating, as described above, if the normal environment
temperature averages -13° F (-25°C) or cooler.

CERTIFICATIONS

All engines are EPA emissions certified. All non-emergency
stationary diesel engines are Tier IV Final compliant.

APPLICATION & ENGINEERING DATA FOR MODEL T4D-1500-60 HZ

COOLING SYSTEM

Type of System	Air to Air, Charged Air Cooler
Coolant Pump	Pre-lubricated, self-sealing
Cooling Fan Type	Pusher
Fan Diameter inches (cm)	35.1 (89)
Fan drive ratio	1.04:1
Ambient Capacity of Radiator °F (°C)	131 (55)
Engine Jacket Coolant Capacity gal. (L)	8.70 (33)
Radiator Coolant Capacity gal. (L)	16.0 (60)
Water Pump Capacity gpm (L/min)	122 (462)
Heat Reject Coolant: Btu/min	12,682
Air to Air Heat Reject, BTU/min.	11,715
Heat Radiated to Ambient, BTU/min	4,253
Low Radiator Coolant Level Shutdown	Standard
Note: Coolant temp. shut-down switch setting at 228°F (109°C) with 50/50 (water/antifreeze) mix.	

COOLING AIR REQUIREMENTS

Combustion Air cfm (m ³ /min)	1,646 (46.6)
Max Air Intake Restrictions:	
Clean Air Cleaner, KPA (psi)	5 (1.5)
Radiator Cooling Air, SCFM (m ³ /min)	29,894 (846)

EXHAUST SYSTEM

Exhaust Outlet Size	5"
Max. Back Pressure in KPA (in. H ₂ O)	8 (32)
Exhaust Flow, at rated KW, CFM (m ³ /min)	886 (25.1)
Exhaust Temp, (Stack) °F (°C)	709 (376)

SOUND LEVELS MEASURED IN dB(A)

	Open Set	Level 2 Encl.
Level 2, Critical Silencer	98	83
Level 3, Hospital Silencer	93	78

Note: Open sets (no enclosure) have optional silencer system choices due to unknown job-site applications. Level 2 enclosure has installed critical silencer with upgrade to Level 3 hospital silencer. Sound tests are averaged from several test points and taken at 23 ft. (7 m) from source of noise at normal operation.

DERATE GENERATOR FOR ALTITUDE

3% per 1000 ft. (305m) above 3000 ft. (914m) from sea level

DERATE GENERATOR FOR TEMPERATURE

2% per 10°F (5.6°C) above 104°F (40°C)

DIMENSIONS AND WEIGHTS

	Open Set	Level 2 Enclosure
Length in (cm)	132 (335)	162 (412)
Width in (cm)	52 (132)	52 (132)
Height in (cm)	65 (165)	80 (203)
Net Weight lbs (kg)	5777 (2620)	7547 (3424)
Ship Weight lbs (kg)	6052 (2745)	7892 (3580)

DEEP SEA 7420 DIGITAL MICROPROCESSOR CONTROLLER



Deep Sea 7420

The “7420” controller is an auto start mains (utility) failure module for single gen-set applications. This controller includes a backlit LCD display which continuously displays the status of the engine and generator at all times.

The “7420” controller will also monitor speed, frequency, voltage, current, oil pressure, coolant temp., and fuel levels. These modules have been designed to display warning and shut down status. It also includes: (11) configurable inputs • (8) configurable outputs • voltage monitoring • mains (utility) failure detection • (250) event logs • configurable timers • automatic shutdown or warning during fault detection • remote start (on load) • engine preheat • advanced metering capability • hour meter • text LCD displays • protected solid state outputs • test buttons for: stop/reset • manual mode • auto mode • lamp test • start button • power monitoring (kWh, kVAr, kVAh, kVArh)

This controller includes expansion features including RS232, RS484 (using MODBUS-RTU/TCP), direct USB connection with PC, expansion optioned using DSENet for remote annunciation and remote relay interfacing for a distance of up to 3300FT. The controller software is freely downloadable from the internet and allows monitoring with direct USB cable, LAN, or by internet via the built in web interface.



Further expansion is available by adding the optional “WebNet” gateway interface module. This device will allow comprehensive monitoring of the generator via the cloud including identification, location, and status. Some advantages of this module include: reduced site visits and maintenance costs • remote fuel management • fault analysis • asset tracking • automatic system alerts • maximized system up-time.

STANDARD FEATURES FOR MODEL T4D-1500-60 HZ

STANDARD FEATURES

CONTROL PANEL:

Deep Sea 7420 digital microprocessor with logic allows programming in the field. Controller has:

- STOP-MANUAL-AUTO modes and automatic engine shutdowns, signaled by full text LCD indicators:
- Low oil pressure
- High engine temp
- Low Radiator Level
- Three auxiliary alarms
- Battery fail alarm
- Engine fail to start
- Engine over speed
- Engine under speed
- Over & under voltage

Also included is tamper-proof engine hour meter

ENGINE:

Fuel filter • Full flow Oil filter • Air filter • Fuel pump • Oil pump • Solenoid type starter motor • Hi-temp radiator • Jacket water pump • Thermostat • Pusher fan and guard • Exhaust manifold • Electronic Governor • 24 VDC battery charging alternator • Flexible fuel and exhaust connectors • Vibration isolators • Open coolant recovery system with 50/50 water to anti-freeze mixture • flexible oil & radiator hose • Shut-down sensors for low oil pressure, high coolant temp., low coolant level, high ambient temp.

Design & specifications subject to change without prior notice. Dimensions shown are approximate. Contact Gillette for certified drawings. DO NOT USE DIMENSIONS FOR INSTALLATION PURPOSES.

AC GENERATOR SYSTEM:

AC generator • Shunt excited • Brushless design • Circuit Breaker installed and wired to gen-set • Direct connection to engine with flex disc • Class H, 180°C insulation • Self ventilated • Drip proof construction • UL Certified

VOLTAGE REGULATOR:

1% Voltage regulation • EMI filter • Under-speed protection • Over-excitation protection • total encapsulation

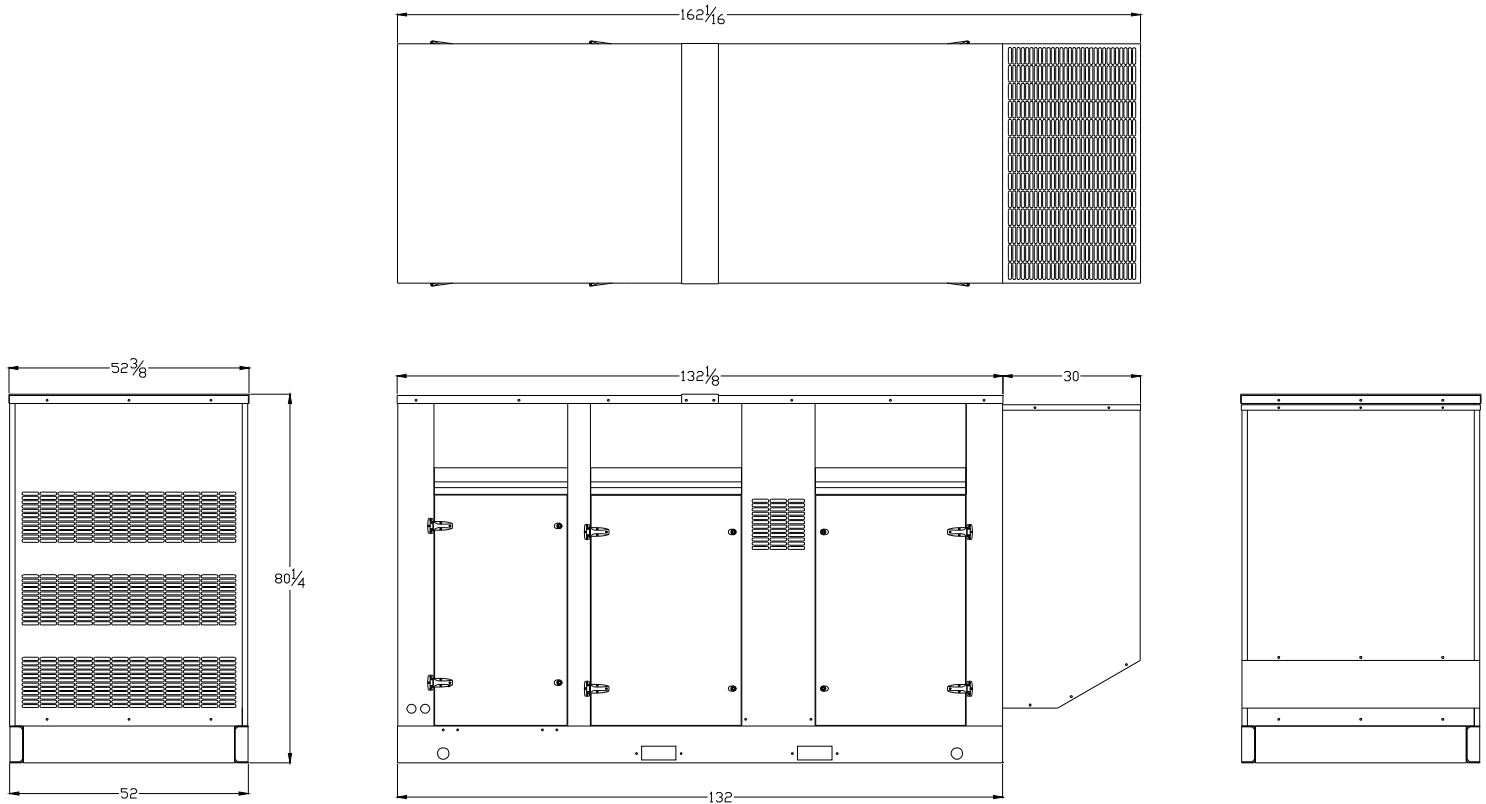
DC ELECTRICAL SYSTEM:

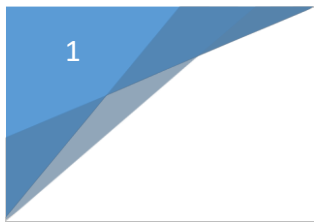
Battery trays • Battery cables • Battery hold down straps • 3-stage battery charger with float, absorption, & bulk automatic charge stages

WEATHER / SOUNDPROOF ALUMINUM HOUSING:

Corrosion Resistant Protection consisting of:

- (9) Heated and Agitated Wash Stages
- Zinc Phosphate Etching-Coating Stage
- Final Baked on Enamel Powder Coat
- 18/8 Stainless Steel Hardware





Omni BioEnergy, LLC

Artis 100 Gasifier Fact Sheet – 2019

Gasifier Unit:	Artis 100 kW
Technology:	Co-Current Fixed Bed - VariTemp and Speed / Active feed
Emissions:	Carbon Neutral, Zero Emissions Platform
Process Data:	
Type:	Co-Current Fixed Bed – VariTemp and Speed / Active feed
Size:	GEP: 330 kW, Net Energy Output 102 kW
Feed Stock:	Untreated Wood
Moisture:	Assumed 9.6%
Product:	Syngas
Feed Stock Rate:	21.2 gms/sec: 1.83 MTPD
Reactor Conditions:	Pressure (atm): 1 - Temperature (C) – 750
Liquid waste flowrate (from dryer scrubber):	Dependent on Feed Stock Moisture
Biochar Production:	12.3% - 0.23 MTPD
Ash Content:	~1.34%
Design gas output rate:	(scfm): ~65
Operating gas output rate (Nm ³ /kg feed):	57.1 scfm (1.271 m ³ / kg feed)
HHV	321 Btu/scf
LHV	294 Btu/scf
Gas Exit Temp (oC):	750
Heating value (kJ/m ³):	11.96 MJ/m ³
Heavy metals content:	N/A – Varies with feed stock
Particulate content (g/Nm ³):	MERV 7-8
Tar content (g/Nm ³):	N/A - Feedstock and Temp dependent

Omni BioEnergy, LLC

Artis 100 Gasifier Fact Sheet – 2019

Product:

Hydrogen	44.3%
CO	44.6%
Carbon dioxide	2.9%
Methane	5.5%
C2+	Trace BDL
Oxygen	0%
Nitrogen	Trace BDL
Chlorine	Trace BDL
Sulfur	Trace BDL
<u>H2O</u>	<u>2.4%</u>
Total:	100%

Bi Products: Syngas, BioChar, H2O

Design gas output rate: (scfm): ~65

Operating Cycle: 24hrs/350 DPY

Utilities:

Electricity per 100kW Energy required: ~30 kW

Water per 100kW Minimal TBD

Electrical Connection 240v / 3 Phase / 100amp