



TECHNOLOGY PROVIDER TECHNOLOGY INFORMATION REQUEST

Technology/Service: Clean Energy Project Developer

Information by: Andy Dvoracek

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COMPANY INFORMATION

Company: Camco International Group, Inc ("Camco")

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TECHNICAL CONTACT

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State: Colorado

Zip Code: 80104

DEMONSTRATION SITE CONTACT

Site Name: There are several Camco demonstrations sites available, depending upon the customer's interest

Contact: Andy Dvoracek

Title: Vice President

Phone: 720 897 6688

Email: Andy.Dvoracek@camcocleanenergy.com

Address: 333 Perry Street, Suite 301

City: Castle Rock

State: Colorado

Zip Code: 80104

INITIAL TECHNOLOGY OVERVIEW

This information is to guide in the development of a more specific and detailed Technology Information Request. Please answer the following questions for each Technology or Service Provided.

What is the name of the technology or service you provide?

Camco is an experienced clean energy project developer working with a network of qualified technology partners to develop, construct, deliver and operate digester systems and clean energy technologies for dairy farms and other sectors.

Describe how this technology is used in a larger Nutrient Management System. Please be as detailed as possible.

Camco specializes in manure to biogas **Digester Project Development and Asset Management**, including pre-project studies, feasibility, development, finance, and asset management/optimization. Camco also specialize in monetizing complementary environmental attributes including carbon offset credits, renewable energy certificates (RECs), renewable identification numbers (RINs) and Low Carbon Fuel Standard (LCFS) credits.

How many systems do you have installed on dairy farms or other livestock operations?

| SYSTEMS | NUMBER OF SITES | SIZE OF INSTALLATIONS |
|---------|-----------------|-----------------------|
| Dairy | 25 | 250 KW to 4.5 MW |
| Pork | 1 | 600 KW |
| Poultry | | |
| | | |

What's the smallest and largest farm using your system?

Dairy farms range from 400 to 20,000 cows and Pork operations in excess of 30,000 pigs

Does this technology have a 12-month record of reliable performance on at least three dairy farms?

Camco's biogas digester systems have excellent annual performance and reliability for on farm operations.

Do you have a preferred region or area for the location of projects?

North America

Input and output of your unit/system – do you have a mass balance analysis?

If a mass balance is available, please include below or attach as a separate document.

Camco develops projects that convert manure waste streams from dairies and other livestock operations into clean energy, fertilizer and soil amendment, animal bedding and environmental attributes that can be monetized. Mass balance and economic models are available for each product.

Input material description and characteristics:

For example: raw manure, digestate, screened digestate, suitable non-farm feedstocks, other.

Input material to the system is raw manure only or manure mixed with food waste and other organic substrates. Examples include:

- Manure, wash water and used bedding from dairy cows, chicken and swine pig
- Food waste and organic substrates
- Food processing plant waste water (e.g. palm oil, tapioca, sugar cane)
- Municipal solid waste

Does the technology treat the full manure stream for a farm or a fraction of the stream?

The technology is designed to economically treat the full manure stream from raw manure and flush water to manure mixed with food waste and organic substrates.

Do you consider this a mature system or ongoing farm development?

Biogas clean energy systems are mature technologies with several hundred systems operating in the country.

Any weather constraints? Yes ☐ No ☒ *If so, please describe.*

Any bedding constraints? Yes ☐ No ☒ *If so, please describe.*

Output material description and characteristics:

Please include the % of the total stream for each material, i.e. 10% fiber and 90% screened liquid by weight.

Output products include > 100 cubic feet of biogas/cow/day, pathogen solids separated as animal bedding, fertilizer and soil amendments. Camco also monetizes the system's environmental attributes, including carbon offset credits, renewable energy certificates (RECs), renewable identification numbers (RINs) and Low Carbon Fuel Standard (LCFS) credits

Do the Outputs of the process have a resale market identified? Yes ☒ No ☐

If so, under what brand name or who is the contract with?

In the development of dairy digester projects, Camco seeks economically viable markets for offtake products that are commercially recognized and offer lower price risk long-term. For example, the biogas energy produced can be cleaned and:

- Sold to the grid as renewable energy, typically enjoying higher tariffs depending on national policy
- Used on-site to displace higher GHG emission fuel, e.g. diesel, coal, etc.
- Sold as renewable gas, i.e. compressed natural gas for use in transport, cooking, or portable energy supply

Camco has the track-record and infrastructure to assist its partners and clients generate and market environmental attributes, understand their value, and to sell them into established liquid, niche markets.

Is this process scalable and to what extent (top and bottom limits)? Yes ☒ No ☐ *If so, please describe.*

Camco's projects can economically benefit a full spectrum of dairies with 1000 or more cows depending on physical locations and markets.

Do you have a known scaling factor? Yes ☐ No ☒ *If so, please describe.*

Sizing and scaling factors are not a matter of technology but of economics.

Does this technology require any air input? Yes ☐ No ☐

Air to supply the motor generators

What is the preferred air connection? *For example: psi, fitting size, air quality.*

If not distributed by the system, please list each connected device.

Ambient air

Does this technology require any water input? Yes ☒ No ☐ *If so, please describe.*

Engine cooling make-up water

What is the preferred water connection? *For example: psi, fitting size, water quality, gpm.*

If not distributed by the system, please list each connected device.

Standard commercial water systems

Does this technology require any electrical input? Yes ☒ No ☐ *If so, please describe.*

Standard commercial electricity supply for engine/generator sets controls and other equipment

What is the preferred electrical connection? *For example: phase #, voltage, full load amps.*

If not distributed by the system, please list each connected device.

Three-phase power may be required and grid interconnection if electricity is sold to the utility supplier.

Does this technology require any mechanical input? Yes ☐ No ☒ *If so, please describe.*

What is the preferred mechanical connection? *For example: horsepower, connection, rpms.*

If not distributed by the system, please list each connected device.

Per design and operating specification of purchased mechanical equipment

Does this system require any special plumbing? Yes ☐ No ☒ *If so, please describe what is required.*

All plumbing, electrical and mechanical designed and provided by Camco's technology partners

Does this system require any special foundations or pads? Yes ☒ No ☐ *If so, please describe.*

Digester systems may require concrete or in-ground vessel and the engine/mechanical building that has normal concrete foundations

Do you consider this technology part of a larger system that you provide? Yes ☒ No ☐ *If so, please describe.*

The digester can be designed as a stand-alone system or can incorporate solids separation, heat recovery and a variety of bedding recovery and nutrient extraction systems

Does your system require any other components that you do not provide or are not included in your proposal? Yes ☐ No ☒ *If so, please describe.*

Additional components can be included such as receiving tanks, filters, separators, scrubbers, etc.

How is the system delivered to the site? *For example: skid mounted, assembled on site, constructed on site.*

Assembled on site with additional on-site construction

Is this system portable or configured in such a way that it could be easily transported for use in several locations?

Yes ☐ No ☒ *If so, please describe.*

Has your technology been accepted by the NRCS and is it included into a practice standard? Yes ☒ No ☐ *If so, please describe if necessary.*

Digesters are an approved NRCS standard practice

Are there any unusable or hazardous byproducts of this process? Yes ☐ No ☒ *If so, please describe the product and recommended means of disposal.*

Spare parts are industry standard and available

What spare parts and redundant components are included with the system?

Camco's partners can provide O&M services, parts and training.

How is the system controlled and what are the components and capabilities of the control system?

The system is monitored and controlled 24/7 for automated operation using on-line SCADA and PLC systems.

What is the usable life of the system?

With continued O&M servicing, the system should allow for a 20 to 30-year expectancy.

What is the salvage value at the end of the usable life?

Major mechanical components have salvage value.

What is the educational and technical level of competence for the operation of the system?

Camco's partners offers complete operational and maintenance services. Local qualified labor can be trained to operate the system

What level of maintenance is required for the system?

Please indicate if rebuilds or major components must be replaced and what the frequency is for these components.

Daily walk-through inspection, component parts replacement schedule and periodic response to system alert notifications.

Are consumables used in the process? Yes ☐ No ☒

Please provide the nature and purchase relationship for these consumables. For example: proprietary, special contract, generally available.

Some routine maintenance consumables such as oil and parts.

Which of these NRCS codes would your technology be classified under? *Check all that apply. Add if necessary.*

| CODE | NRCS DESCRIPTION | CHECK ALL THAT APPLY |
|------|------------------|-------------------------------------|
| 472 | Access Control | <input type="checkbox"/> |
| 560 | Access Road | <input checked="" type="checkbox"/> |

| | | |
|------|--|-------------------------------------|
| 309 | Agrichemical Handling | <input checked="" type="checkbox"/> |
| 371 | Air Filtration and Scrubbing | <input checked="" type="checkbox"/> |
| 591 | Amendments for the Treatment of Agricultural Waste | <input type="checkbox"/> |
| 366 | Anaerobic Digester | <input checked="" type="checkbox"/> |
| 672 | Building Envelope Improvement | <input type="checkbox"/> |
| 372 | Combustion System Improvement | <input checked="" type="checkbox"/> |
| 317 | Composting Facility | <input type="checkbox"/> |
| 554 | Drainage Water Management | <input type="checkbox"/> |
| 375 | Dust Control from Animal Activity on Open Lot Surfaces | <input type="checkbox"/> |
| 373 | Dust Control on Unpaved Roads and Surfaces | <input type="checkbox"/> |
| 374 | Farmstead Energy Improvement | <input type="checkbox"/> |
| 512 | Forage and Biomass Planting | <input type="checkbox"/> |
| 561 | Heavy Use Area Protection | <input type="checkbox"/> |
| 516 | Livestock Pipeline | <input checked="" type="checkbox"/> |
| 590 | Nutrient Management | <input checked="" type="checkbox"/> |
| 521A | Pond Sealing or Lining, Flexible Membrane | <input type="checkbox"/> |
| 533 | Pumping Plant | <input type="checkbox"/> |
| 588 | Roof Runoff Structure | <input type="checkbox"/> |
| 367 | Roofs and Covers | <input type="checkbox"/> |
| 318 | Short-Term Storage of Animal Waste and By-Products | <input type="checkbox"/> |
| 570 | Stormwater Runoff Control | <input type="checkbox"/> |
| 606 | Subsurface Drain | <input type="checkbox"/> |
| 635 | Vegetated Treatment Area | <input type="checkbox"/> |
| 601 | Vegetative Barrier | <input type="checkbox"/> |
| 360 | Waste Facility Closure | <input type="checkbox"/> |
| 632 | Waste Separation Facility | <input type="checkbox"/> |
| 313 | Waste Storage Facility | <input type="checkbox"/> |
| 634 | Waste Transfer | <input type="checkbox"/> |
| 629 | Waste Treatment | <input checked="" type="checkbox"/> |
| 359 | Waste Treatment Lagoon | <input type="checkbox"/> |
| | | <input type="checkbox"/> |
| | | <input type="checkbox"/> |
| | | <input type="checkbox"/> |

Can you provide an estimate of the capital required for the installation of this technology?

Please include all components and designate if provided by you or others.

Estimated capital costs are provided on a project by project basis.

Can you provide an estimate of the operational costs required for this technology?

Please include all costs and designate if provided by you or others.

Estimated annual operations and maintenance costs on a project by project basis.

Is there financing available for this system? Yes ☒ No ☐ *If so, what are the conditions for this financing?*

Financing options are available on a project by project basis

Is the system available for lease? Yes ☐ No ☒ *If so, please describe.*

What sort of warrantee or guarantee do you provide with this technology?

Do you provide any performance guarantees or strictly defects in parts and materials?

Warrantees are available and warranty discussion are on a project by project basis

Explain how this system is unique or transformative and how does it improve upon or go beyond other technologies that are currently available.

Camco offers asset management services for projects it has developed/owned as well as assets developed, operated and owned by 3rd parties. The asset management services do not include the physical operations of the project. Resources and efforts focus on strategic asset planning, optimization and decision making. This approach to asset management is unique that it allows Camco to be specialized and offer services that include but are not limited to the following:

- Permitting and ongoing environmental management
- Engineering oversight Interconnection and utility interaction (biogas and power)
- Host interaction and management of commercial relations
- Commodity sales channel management/strategic decision making
- Banking and accounting oversight needed for auditing and lending support
- Management of contracted operating services

Would you be willing to provide a location for a site visit by Newtrient? Yes ☒ No ☐ *If so, please provide location.*

Green Meadows Dairy, Michigan. A case study is available:

<http://www.camcocleanenergy.com/case-studies/biogas-to-energy-in-michigan-case-study>

TECHNOLOGY REFERENCES

Please provide customers with whom we can discuss this technology and its performance.

Include a company name, location, contact name and contact information.

Reference 1

| | |
|----------------------|--|
| Company Name: | |
| Company Location: | |
| Contact Name: | |
| Contact Information: | |

Reference 2

| | |
|----------------------|--|
| Company Name: | |
| Company Location: | |
| Contact Name: | |
| Contact Information: | |

Reference 3

| | |
|----------------------|--|
| Company Name: | |
| Company Location: | |
| Contact Name: | |
| Contact Information: | |

Reference 4

| | |
|----------------------|--|
| Company Name: | |
| Company Location: | |
| Contact Name: | |
| Contact Information: | |

Are there any other facts about this technology that you feel should be included in this document?