



MONTROSE

ENVIRONMENTAL



Biogas Solutions

We can
handle the
big projects.

Montrose Environmental Group (Montrose) is a leading environmental services company focused on supporting private, commercial, and government organizations. Montrose trades on the New York Stock Exchange (NYSE) as MEG and demonstrates financial capacity and strength with over 1,700 employees across 70 locations around the world. We have industry-leading experience in agricultural manure and food waste renewable natural gas (RNG) and electrical generation projects. Our biogas team consists of industry pioneers who bring decades of field experience to projects. We build multi-disciplinary project teams that consists of certified engineers, operators, and construction staff that encompass the comprehensive suite of design and construction services necessary to identify, design, build, operate, and maintain facilities.

WWW.MONTROSE-ENV.COM

Leaders in Biogas Design & Construction



Paul Greene

Paul, a technology specialist with more than 30 years of experience, is a founding member of the U.S. biogas industry. He helped establish the American Biogas Council (ABC), an organization dedicated to advancing anaerobic digestion technology and organics diversion, and served as its first chairman. Paul is our go-to leader to help private companies with community-based anaerobic digestion waste-to-energy projects, and brings to bear vast technical experience with biogas treatment and gas upgrading solutions.



Bernard Sheff, PE

Bernie is a high-profile contributor to the US biogas industry. He currently serves as the Chairman of the Board of the American Biogas Council (ABC) and is recognized as a top national figure in bringing customized manure handling and digester approaches to US dairy farms. He has been designing and building biogas digesters for almost three decades and proudly boasts his first one is still operating after 30 years in western MI. He is a registered PE in 10 states and has his MS CE from Michigan State and currently serves as the firm's VP of Biogas Engineering. He is the lead instructor of the ABC's Operator Training School.



Daniel Waineo, PE

Dan has as much or more technical experience in biogas upgrading technology as any other US expert. He has participated in over 20 complex landfill and digester biogas projects over the past 24 years. He is highly expert in all aspects of gas handling, conveyance, drying, compression and upgrading. Dan has his degree in Civil and Environmental Engineering from UC Irvine and is a registered Professional Engineer.



Patrick Hirl, PE, PhD

Pat is the firm's Director of Engineering and is responsible for project delivery of all major biogas design and construction efforts for the firm. He is highly skilled at process technology selection and design optimization and is the author of over 40 technical articles on such topics. All project deliverables including schedules, budgets and submittals fall under his purview. Pat has his PhD in Environmental Engineering from Notre Dame University and holds several process patents and is a Registered Professional Engineer. Interestingly, Pat is a former Naval Officer having served on nuclear submarines.



Steve Buttles

Steve is the firm's Director of Construction Services and has built some of the industries' most high-profile biogas digester projects. Steve has been building anaerobic digesters of varying types for over 20 years and is expert at cost estimating, project scheduling and local subcontracting to get projects build on time and within budget.

We deliver the solutions.

Montrose's comprehensive environmental services platform is well-capitalized and built for growth. We combine deep local knowledge with an integrated approach to design, engineering, and operations, enabling us to respond effectively and efficiently to the unique requirements of each project. Montrose services over 5,000 unique clients from both the public and private sector across a wide range of markets and industries. From comprehensive air measurement and laboratory services to regulatory compliance, permitting, engineering, and remediation, Montrose delivers innovative and practical solutions that keep our clients on top of their immediate needs – and well ahead of the strategic curve.



Our experience sets us apart.

The biogas team leads in turnkey design, engineering, procurement, and construction (EPC) of facilities for greenfield projects. Our strong engineering and design capabilities, management, and industry relationships provide the optimal foundation for providing customized solutions to our clients.

WE KNOW BIOGAS

- We have helped over **50+** farms along their RNG project journey
- We hold and **value key relationships** across the industry for strategic teaming and partnering
- We offer a streamlined approach from engineering to integration that is designed for **speed to market**

PROJECTS DESIGNED FOR SPECIFIC NEEDS

- We listen to our clients and our team values staying nimble and flexible to your project scope.

SPECIALIZE IN DAIRY FARMS

- Early-stage farm & manure assessments
- Owner's/Independent Engineer Reviews
- System Rehabilitation & Upgrade Assessments
- Detailed Capital & Operating Cost Estimates
- Electricity-to-RNG Project Conversions
- RNG Collection, Pipeline Injection, & Virtual Pipelines
- EPC & Full Project Turnkey Contracting
- Long-term Operations & Maintenance

Comprehensive Services



In addition to our comprehensive Engineering Procurement Construction (EPC) solutions, we also lead the way in providing a wide range of other project support services that span the entire life cycle of a project—operations and maintenance, environmental permitting, laboratory sampling and testing, and regulatory reporting—which allow us to serve as a long-term project partner.

- Preliminary Project Evaluation & Troubleshooting
- Technology Screening & Selection
- Detailed End-to-End & Integrated System Design
- Full Project Engineering & Equipment Procurement
- Installation & Construction Management
- System Start-Up & Commissioning
- Long-Term Operations & Maintenance
- Ongoing Owner's Representative & Project Management

“In this complex space of converting cow manure into RNG there are only a couple of firms I would trust that can handle the whole project, of which Montrose is one of them”

- Mark Stoermann – COO Newtrient

Project Experience



PALOMA DAIRY - GILA BEND, AZ - 10,000 MILKING COWS

SCOPE

Montrose is providing a comprehensive manure handling system and full anaerobic digestion and gas upgrading system with injection to the Southwest Gas pipeline. We are providing all process equipment.

GAS FLOW RATE

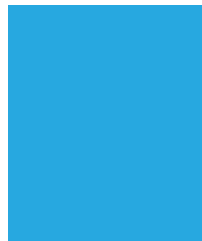
700 SCFM

TECHNOLOGIES INCLUDE

Mix Digesters (3), Carbon filtration for H₂S, Membrane Gas upgrading, Gas compression to pipeline injection, Covered lagoon digester

SERVICES

Engineering, All Equipment Procurement, Process Guarantee for gas quantity and gas quality, Schedule Guarantee, Construction Management, Long Term O&M, Project Permitting, CI scoring



FOOD WASTE DIGESTERS

SCOPE

These are two of the highest profile food waste digesters in the country. Montrose entered the project part-way through the build to replace the original EPC hired. We upgraded most original process equipment on a Design Build basis and are now the long term site operator with a dozen staff at each site.

GAS FLOW RATE

400 SCFM each

TECHNOLOGIES INCLUDE

Total Mix Digesters, Scott's Thor hammermill depackagers, Carbon filtration for H₂S, Caustic Scrubbers, CHP Units - 3-5 MW, Screw Press digestate dewatering, Membrane Bioreactor Digestate Nutrient removal, Digestate solids thermal dryers

SERVICES

Feedstock receiving and processing, Engineering, Equipment Procurement, Design and build all project system upgraders, Permitting, System Commissioning, Construction Management, Long Term O&M

Project Experience



CAL BIO - NETWORKS UP AND DOWN CALIFORNIA

SCOPE

Detailed engineering design services and Owner's Engineer for California's leading dairy RNG project development company who develops dairy farm clusters. Gas is sent through vast network of gathering piping sized by Montrose to a gas upgrader. All sites use lagoon digesters for flush manure collection. Also designed systems to treat biogas for use in fuel cells.

GAS FLOW RATE

200, 400, 800 SCFM Standard Sizes

TECHNOLOGIES INCLUDE

Carbon Filtration, Pipe networks, Compression, Drying, Instrumentation and controls

SERVICES

Concept Engineering, Detailed design to fabrication drawings, Owners Engineer

SEVANA BIOFUELS - CEDAR RIDGE DIGESTERS - IDAHO - 20,000 MILKING COWS

SCOPE

Upgrades for digester mixing and manure handling and conveyance. Conversion of site from CHP to membrane gas upgrading to make RNG.

GAS FLOW RATE

700 SCFM

TECHNOLOGIES INCLUDE

Mix Digesters (6), Boiler system, Carbon filtration for H₂S, Membrane Gas upgrading, Gas compression to pipeline injection, Covered lagoon digester

SERVICES

30% Engineering Package, Cost Estimating to get through final funding, CI Scoring

Project Experience



Check out
drone footage of the site:
<https://vimeo.com/492293646>

KLICKITAT, WA PUBLIC UTILITY DISTRICT - LANDFILL GAS

SCOPE

We have supported this client, the third largest landfill in the US, for over 10 years. Over time we have installed many different gas cleaning unit operations and have supported the project as it morphed from making electricity to now making RNG.

GAS FLOW RATE

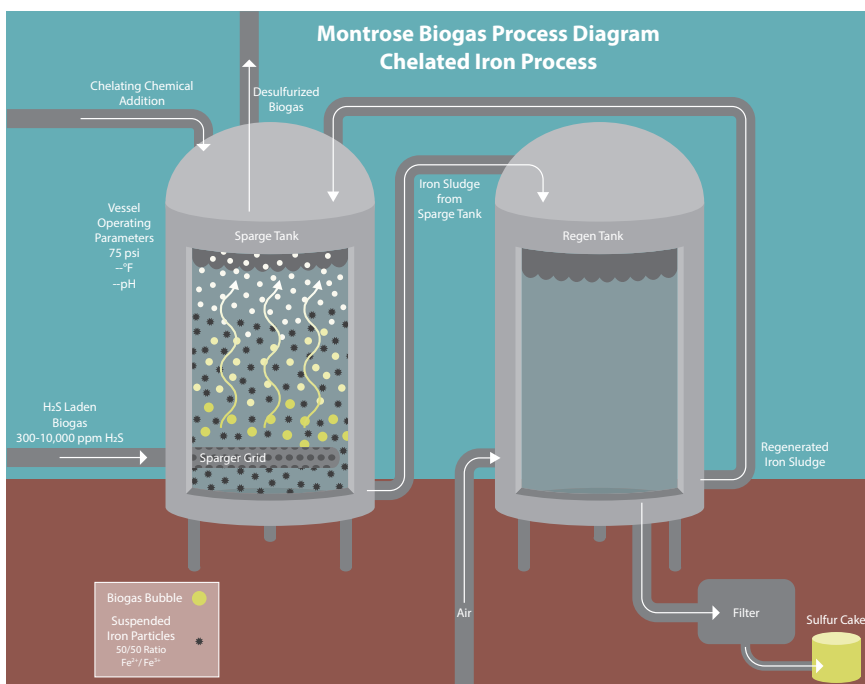
8000 SCFM - One of the largest in the country

TECHNOLOGIES INCLUDE

2 Stage Selexol System, Compression and Drying with 9 screw compressors, Cryogenic Gas Upgrading (Nitrogen removal), Gas compression to pipeline injection, Iron Chelate H₂S Removal, Amine CO₂ Polishing, TSA dehydration System, Recuperative Thermal Oxidizer, Cold Water Dehydration, 2x Solar Mars Gas Turbines, Cogeneration Steam Turbine

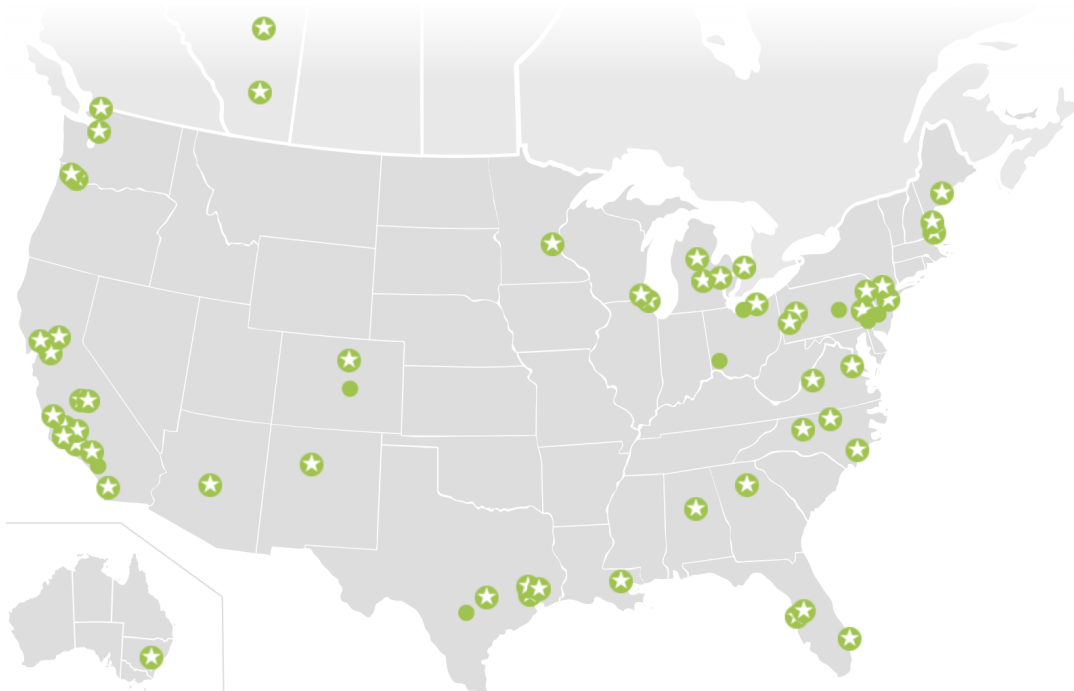
SERVICES

Engineering, Equipment Procurement, Construction Management, Long Term Ongoing support, Process Engineering, Control System Design, SCADA, PLC Programming, Startup



Our in-house Chelated Iron
Technology = Effective on the
toughest H₂S removal projects

Reach Out



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Director of Project Development

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WE'RE READY TO GET STARTED.

We look forward to speaking with you about how Montrose can make the difference for your next project.

For more information, please visit,
www.montrose-env.com/services/biogas-solutions

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