

Projects Selected For Funding Through DE-FOA-0003256: Methane Emissions Reduction Program—Oil & Gas Methane Monitoring And Mitigation

The US Department of Energy (DOE) and the US Environmental Protection Agency (EPA) have selected the following projects to receive federal funding to reduce, monitor, measure, and quantify methane emissions from the oil and gas sector.

Area of Interest 1: Methane Emissions Reduction from Existing Wells and Infrastructure

Area of Interest 1a: Reducing Methane Emissions from Marginal Conventional Wells

Collaborative Approach to Reducing Emissions for Marginal Conventional Wells (MCWs) — **Colorado State University** (Fort Collins, CO) intends to create a funding program where small operators of MCWs can enroll their MCW sites for methane emissions mitigation funding. Mitigation targets will be prioritized using on-site methane leak assessments and a regionally tuned marginal abatement cost curve analysis to maximize the cost-effectiveness of mitigation actions. The project team will identify solutions and services for operators to deploy at the operator sites. Wide community outreach will seek operator and solutions in disproportionately impacted communities for enrollment and incubation. Training programs will build capacity through community colleges and online classes.

Federal Funding: \$299,999,930

Non-federal Funding: \$0

Total Value: \$299,999,930

Area of Interest 1b: Reducing Methane Emissions from Small Operators' Wells and Other Oil and Natural Gas Assets

Well Emissions and Leakage Limitation Check (WELL Check) — **GTI Energy** (Des Plaines, IL) intends to create WELL Check to accelerate the mitigation of methane emissions by installing emissions reduction technologies for high-priority emission sources; implementing education and training programs designed for small operators on mitigation and measurement best practices; and implementing industry best practices programs to identify and repair leak sources.

Federal Funding: \$209,999,996

Non-federal Funding: \$0

Total Value: \$209,999,996

Area of Interest 1c: Reducing Methane Emissions from Marginal Conventional Wells and Oil and Gas Assets on Tribal Lands

Sovereignty and Sustainability: A Tribal-Owned Methane Reduction Program — **Tribal Energy Consortium** (Jemez Pueblo, NM) intends to create a program that uses advanced technologies ranging from satellites, airplanes, drones, and trucks to hand-held devices and information technology systems to identify and address gas leaks on Tribal lands. The project intends to raise awareness, enhance decision-making sophistication at the Tribal executive level, and foster workforce development.

Federal Funding: \$50,000,000

Non-federal Funding: \$0

Total Value: \$50,000,000

Area of Interest 2: Accelerating Deployment of Methane Emissions Reduction Solutions

Area of Interest 2a: Field Deployment of Engine and Compressor Methane Reduction Technologies

Daphne and Williams Methane Slip Abatement Plasma-Catalyst Scale-Up — **DaphneTech USA, LLC** (Houston, TX) intends to create the Daphne and William Plasma-Catalyst Slip Abatement Scale Up (SlipPure) to permanently install a novel exhaust gas cleaning system that abates methane pollution in exhaust gas emitted from natural gas-fueled engines. The study will explore how to make this technology an economically viable solution across multiple engine types and operating conditions.

Federal Funding: \$4,534,773

Non-federal Funding: \$1,276,561

Total Value: \$5,811,334

Electrically Heated Methane Oxidation Catalysts for Robust, Efficient Exhaust Methane Abatement on Gas-Fired Engines — **MAHLE Powertrain** (Plymouth, MI) intends to demonstrate the viability of electrically heated methane oxidation catalysts for exhaust methane abatement on gas-fired engines.

Federal Funding: \$6,000,000

Non-federal Funding: \$1,500,000

Total Value: \$7,500,000

SO₂-robust Catalytic Methane Emissions Elimination at Gas Engine Exhaust — The **University of Kentucky Research Foundation** (Lexington, KY) intends to develop and field test a methane emissions reduction technology at a permanent installation. In addition to reducing methane emissions, the project is expected to provide potential hazard information to area first responders and contribute to future economic growth in Kentucky.

Federal Funding: \$5,999,826
Non-federal Funding: \$1,500,865
Total Value: \$7,500,691

Field Deployment of Reciprocating Internal Combustion Engine Methane Reduction Technology — **Radical Combustion Technologies NG, LLC** (Vienna, VA) intends to deploy a reciprocating internal combustion engine methane reduction technology to demonstrate significant reductions in methane slip and nitrogen oxide emissions while reducing other pollutants such as carbon monoxide, volatile organic compounds, and formaldehyde. In addition to delivering environmental and economic benefits including a reduction in methane slip emissions by 60% or more, the project is expected to reduce energy burdens through deployment of clean energy technologies, provide limited-term jobs with competitive wages, and increase access to workforce training programs.

Federal Funding: \$5,307,547
Non-federal Funding: \$1,394,969
Total Value: \$6,702,516

High-Efficiency, Durable Low-Temperature Catalytic Methane Oxidation System for On-Site Natural Gas Generators Powering LNG Compressors — The **University of California, Riverside** (Riverside, CA) intends to develop a commercially scalable palladium (Pd)-based catalysts in catalytic converters for controlling natural gas generator methane emissions by engineering Pd sites and support materials at the atomic level using high-temperature shock technology. The approach is expected to strengthen U.S. capabilities in sustainable energy and environmental technology and create new workforce opportunities.

Federal Funding: \$6,000,000
Non-federal Funding: \$1,500,000
Total Value: \$7,500,000

Full Scale Validation and Field Deployment of Comprehensive Methane Reduction Solution for NG Pipeline Engine Compressor Sets — **Colorado State University** (Fort Collins, CO) intends to develop an ultra-low methane emissions retrofit system for gas compression packages in the natural gas transmission and gathering sectors to reduce methane emissions from natural gas engines and eliminate normal compressor vent gas emissions. The project is expected to reduce engine methane emissions to less than 0.5% of the methane supplied in the fuel and eliminate normal compressor vent gas emissions.

Federal Funding: \$4,669,746
Non-federal Funding: \$1,168,031

Total Value: \$5,837,777

R&D and Deployment of the Methane Mitigation System — **West Virginia University** (Morgantown, WV) intends to deploy a prototype methane mitigation system at active natural gas compression sites to demonstrate the immediate benefits that can occur on medium and large displacement engines. Additional benefits include recruitment of faculty, staff, and students from underrepresented minorities in science, technology, engineering and mathematics; improvement of commercialization success and rural opportunities in the Marcellus Shale region; and increased public access to data on methane emissions and reduction opportunities.

Federal Funding: \$2,221,648

Non-federal Funding: \$583,382

Total Value: \$2,805,030

Advanced Retrofit Technologies for Methane Emission Mitigation from Compressor Stations: Multiple Field Deployments and Demonstrations — **New Mexico Institute of Mining and Technology** (Socorro, NM) intends to deploy and demonstrate advanced retrofit technologies for methane emissions mitigation from compressor stations across host locations including the Permian Basin, the Appalachian Basin, and the Southern California Region. The project intends to ensure safety, enhance climate resilience, and engage local communities through targeted training and support.

Federal Funding: \$5,989,635

Non-federal Funding: \$1,497,957

Total Value: \$7,487,592

Methane Mitigation Demonstration Using Linear Motor Compressor — **GTI Energy** (Des Plaines, IL) intends to deploy and test a novel, low-cost linear motor methane mitigation compressor to capture a variety of leaks across the natural gas value chain. The project will engage communities to communicate the benefits of the technology; identify mitigation measures for potential impacts; and create a workforce development strategy.

Federal Funding: \$5,079,569

Non-federal Funding: \$1,270,165

Total Value: \$6,349,734

Field Deployment of New Low Methane Technology on Natural Gas Integral Two-Stroke Engines — **Texas A&M Engineering Experiment Station** (College Station TX) intends to deploy technology that reduces methane emissions from lean burn two-stroke integral compressor engines in natural gas pipelines by modifying existing technology. Involving industry and university-based research and development, the project will

support workforce development by creating opportunities for disadvantaged and low-income communities.

Federal Funding: \$4,098,755

Non-federal Funding: \$1,070,433

Total Value: \$5,169,188

Field Deployment of Scalable Solutions for Emission Reduction and Performance Enhancement of Integral Reciprocating Compressors — The **University of Oklahoma** (Norman, OK) intends to deploy and validate a low-cost emissions reduction retrofit kit for integral reciprocating compressors that will reduce emissions, improve operational efficiency, and stabilize combustion. The project will provide a transformative solution that enhances environmental sustainability, drives operational cost savings and efficiency improvements, and helps small operators upgrade inventory and retain workforce, especially in underrepresented communities.

Federal Funding: \$3,863,736

Non-federal Funding: \$969,144

Total Value: \$4,832,880

Area of Interest 2b: Field Deployment of Gas Flaring Reduction Technologies Validation and Verification of Field Deployment of Novel Flare and Emissions Monitoring Technologies — The **University of Michigan** (Ann Arbor, MI) intends to demonstrate a combination of novel flare burner and emissions monitoring technologies for continuous mitigation of methane emissions in low-pressure low-flow flares at well sites. The project will provide the first continuous flare emissions data demonstrating methane emissions mitigation from utility flares. It will also create meaningful internship opportunities around areas with significant oil and gas plays and provide accessible information on the benefits of improving utility flares particularly to historically disadvantaged communities, including Tribal communities.

Federal Funding: \$1,473,654

Non-federal Funding: \$368,416

Total Value: \$1,842,070

Low-Cost Solution for Upcycling Flare Gas to Fertilizer — **Windfall Bio, Inc.**, (San Mateo, CA) intends to deploy a methane bioconversion technology as a flare replacement system on an operating oil production site to reduce methane emissions caused by unwanted gas flaring. The approach is intended to reduce flaring and carbon emissions and provide meaningful participation of workforce organizations, including labor unions, underserved groups, and disadvantaged communities, including federally recognized Tribal Nations.

Federal Funding: \$5,999,629

Non-federal Funding: \$2,946,934

Total Value: \$8,946,563

Zero-Emission Sweetening and Stabilization Production Facilities for Sour Sites — Pioneer Energy, Inc. (Lakewood, CO) intends to address elimination of flaring and related emissions from oil and gas production through deployment of equipment that achieves better separation between gas and oil while eliminating nearly all emission sources. The approach is also intended to serve as a testbed for how to find, train, onboard, and support the underserved community of adults on the autism spectrum for jobs in the clean energy economy.

Federal Funding: \$6,000,000

Non-federal Funding: \$1,500,000

Total Value: \$7,500,000

Methane Emission Mitigation through Onsite Methanol Synthesis — Pioneer Energy, Inc. (Lakewood, CO) intends to eliminate flaring and related emissions from oil and gas production with a technology designed to use mass produced internal combustion engines as compressors and chemical reactors. The project will also serve as a testbed for how to find, train, onboard and support the underserved community of adults on the autism spectrum for jobs in the clean energy economy.

Federal Funding: \$6,000,000

Non-federal Funding: \$1,500,000

Total Value: \$7,500,000

Advancing Low Cost CH₄ Emissions Reduction from Flares through Large Scale Deployment of Retrofittable and Adaptive Technology — Baker Hughes Energy Transition LLC (Houston, TX) intends to advance a highly scalable, cost-effective, integrated methane emissions reduction system for flares based on optical gas imaging and estimation algorithms combined with process optimization using virtual models. The project could result in workforce training, creation of jobs, and wellbeing among disadvantaged communities.

Federal Funding: \$5,962,561

Non-federal Funding: \$1,515,302

Total Value: \$7,477,863

Hyllion's KARNO Generator Repurposes Flare Gas in Oil fields to Generate Near zero Emissions Electricity — Hyllion Inc., (Cedar Park, TX) intends to deploy and demonstrate its KARNO generator that transforms raw oil field gas into clean electricity,

reducing methane emissions. The project is intended to help drive economic growth, job creation, and improved air quality.

Federal Funding: \$6,000,000

Non-federal Funding: \$2,395,817

Total Value: \$8,395,817

*Efficient Compact Combustors for Methane Mitigation — **Advanced Cooling***

Technologies, Inc. (Lancaster, PA) intends to develop, deploy and demonstrate a low-cost, compact, and efficient enclosed combustion emissions control system for methane emissions mitigation in the oil and gas industry. The project will provide communities access to knowledge about methane reduction technologies and create a workforce development pipeline to prepare qualified workers needed for broad deployment of the technology.

Federal Funding: \$3,859,507

Non-federal Funding: \$964,942

Total Value: \$4,824,449

*Long-duration Fleet Deployment of Modular Plant for Flare Elimination and Low-Carbon Methanol Production — **M2X Energy Inc.*** (Rockledge, FL) intends to deploy two modular gas-to-methanol plants to convert stranded associated gas (i.e., natural gas that is economically unrecoverable) that is currently flared into low-carbon methanol at two oil well sites. The project includes establishment of a local advisory board for community engagement and feedback, identification of potential technology deployment within Tribal lands, and assessment of local skill gaps and workforce development plans.

Federal Funding: \$5,999,720

Non-federal Funding: \$1,600,000

Total Value: \$7,599,720

*Methane Emission Mitigation by Field Deployment of Innovative Controlled Combustion Technology — **New Mexico Institute of Mining and Technology*** (Socorro, NM)

intends to deploy and validate two new combustion control devices that address methane slip from suboptimal flare performance by ensuring flare stability. In addition to a reduction of methane emissions, the project is intended to provide a model for similar reduction projects, support creation of high-quality jobs, and promote equity within the community.

Federal Funding: \$5,999,265

Non-federal Funding: \$1,499,836

Total value: \$7,499,101

Advanced Methane Reduction System: Integrating Infrared and Visual Imaging to Assess Net Heating Value at the Combustion Zone and Determine Combustion Efficiency to Enhance Flaring Performance — Encino Environmental Services (Katy, TX) will develop and deploy an advanced continuous emissions monitoring system designed to reduce methane emissions from flaring and enhance flare monitoring. The project is also intended to create jobs and training opportunities for underserved communities through collaboration with academia and private sector partners.

Federal Funding: \$6,000,000

Non-federal Funding: \$2,171,000

Total Value: \$8,171,000

Area of Interest 2c: Field Deployment of Emissions Reduction Technologies at Oil and Gas Production Facilities

Leak Detection and Reduction Software to Identify Methane Emissions and Trigger Mitigation at Oil and Gas Production Facilities Based on SCADA Data — Envana Software Solutions (Houston, TX) intends to improve its Recon software to conduct highly accurate, low-cost, and broad coverage of methane emissions monitoring to reduce methane emissions from monitored operations via swift on-site mitigation repairs/retrofits. The project will also develop partnerships with local universities and organizations to develop internship programs, support workforce development, and advance environmental justice.

Federal Funding: \$4,209,348

Non-federal Funding: \$1,052,337

Total Value: \$5,261,685

Methane Emissions Abatement Technology for Low-Flow and Intermittent Emission Sources — Capwell Services Inc. (Houston, TX) intends to deploy and field-test a methane abatement unit for capturing methane from multiple point sources, eliminating or channeling collected methane, and addressing leaks at sites with reliable sunlight exposure for solar input. In addition to significant reduction in methane emissions, the project is intended to improve air quality and health outcomes for communities near production facilities and establish field technician internships for local residents and underrepresented communities.

Federal Funding: \$3,348,578

Non-federal Funding: \$837,145

Total Value: \$4,185,723

Zero-Emission Drop-In Replacement Production Facilities for Marginal Conventional Wells — **Pioneer Energy Inc.** (Lakewood, CO) intends to advance a new well pad processing technology to achieve better separation between gas and oil, replacing existing equipment while eliminating nearly all emissions sources. The project is also intended to serve as a testbed for how to find, train, onboard, and support the underserved community of adults on the autism spectrum for jobs in the clean energy economy.

Federal Funding: \$5,000,000

Non-federal Funding: \$1,250,000

Total Value: \$6,250,000

Method to Mitigate Methane Lost During Liquids Unloading — **Onboard Dynamics, LLC** (Bend, OR) intends to advance technology that will enable natural gas producers to capture methane that would traditionally be vented into the atmosphere while removing accumulated liquids from the wellbore. In addition to the direct impact of improving local air quality, the focus of the project will also be on how to identify and address issues related to investment in the workforce.

Federal Funding: \$3,995,743

Non-federal Funding: \$998,935

Total Value: \$4,994,678

Scaling Solar Compressors Deployment for Methane-Free Pneumatic Solutions — **Blue Mountain Operations** (Rock Springs, WY) intends to deploy and monitor a compact, fully integrated and solar-powered technology for remote oil and gas sites without grid power, designed to eliminate methane emissions and other secondary emissions. The project will also focus on investments in the development of a skilled workforce as well as a reduction in local pollution.

Federal Funding: \$3,831,370

Non-federal Funding: \$987,435

Total Value: \$4,818,805

Field Demonstration of Advanced Autonomous Solar Powered Hydraulic jack to Mitigate Methane Emission from Oil and Gas Wellheads — **Southern Methodist University** (Dallas, TX) intends to test an advanced rigless, solar-powered, real-time autonomous jack system designed for interventions and mitigation of methane emissions from compromised marginal wells. The project is also intended to ensure that disadvantaged communities benefit from air and water quality improvement, job creation, and educational opportunities.

Federal Funding: \$4,997,222
Non-federal Funding: \$2,308,000
Total Value: \$7,305,222

Remote Emissions Investigation System — **MultiSensor Scientific Inc.**, (Cambridge, MA) intends to demonstrate a remote emissions investigation system that is designed to reduce methane emissions at 175 oil and gas production sites. The project is also intended to result in workforce training, job creation, and improved health among disadvantaged communities.

Federal Funding: \$4,999,932
Non-federal Funding: \$1,249,984
Total Value: \$6,249,916

Distributed Methane Abatement at Low-Producing Wells with No Access to Power — **Electricore Inc.**, (Valencia, CA) intends to deploy and demonstrate a technology for methane mitigation emissions caused by point source natural gas-driven process controllers with no access to power. The project will implement a communications plan, invest in job quality, expand training and internship programs, and execute a strategy for access to job opportunities for underrepresented workers.

Federal Funding: \$5,000,000
Non-federal Funding: \$1,252,775
Total Value: \$6,252,775

Field Validation of Novel Fixed Position Optical Sensor for Fugitive Methane Emission Detection Quantification and Location with Real-Time Notification for Rapid Mitigation — **Blue Sky Measurements** (Houston, TX) intends to field test an optical sensing technology at six well sites in the Permian Basin that can provide daily monitoring of a well site or a gather center, and automatically scan for fugitive methane emissions. The project is also intended to lead to new high paying clean energy jobs in communities that surround oil and gas fields as well as a substantial reduction in methane emissions.

Federal Funding: \$2,726,297
Non-federal Funding: \$683,000
Total Value: \$3,409,297

Advancing Methane Emissions Reduction through Innovative Technology — **Encino Environmental Services** (Katy, TX) intends to develop and deploy a technology incorporating sensors and composite materials to address emissions originating in storage tanks. The project is also intended to create jobs and training opportunities for underserved communities through academic and private sector partnerships.

Federal Funding: \$5,000,000
Non-federal Funding: \$1,994,000
Total Value: \$6,994,000

Area of Interest 3: Accelerating Deployment of Methane Monitoring Solutions
Area of Interest 3a: Improving Access to Monitoring Data for Impacted Communities

Comprehensive Oil and Gas Pollution and Emissions Research Network in California's Underserved San Joaquin Valley Communities — **Sonoma Technology Inc.**, (Petaluma, CA) intends to deploy an air quality framework technology in the San Joaquin Valley to provide air pollution monitoring and mapping information and emission detection from oil and gas sources. The project also intends to lead community engagement for capacity building activities leading to effective collaboration and knowledge transfer across the community.

Federal Funding: \$9,999,878
Non-federal Funding: \$0
Total Value: \$9,999,878

Methane Emissions Training, Reporting and Information for Communities — **GTI Energy** (Des Plaines, IL) intends to deploy multi-modal methane monitoring technologies in the Appalachian region, disseminate the results of measurement campaigns, and improve emissions inventories. The project is also intended to provide experimental learning and training at schools and foster engagement between operators and local communities.

Federal Funding: \$9,999,522
Non-federal Funding: \$0
Total Value: \$9,999,522

Creating Accessible and Actionable Methane Emission Data for Oklahoma Communities — The **University of Oklahoma** (Norman, OK) intends to create accessible and actionable methane emissions data for Oklahoma's rural and urban communities with a focus on underserved communities and Tribal Nations. The project is also intended to provide training and education programs through Oklahoma's Career Tech institutions to equip the next generation with skills in environmental monitoring and data analysis.

Federal Funding: \$10,000,000
Non-federal Funding: \$0
Total Value: \$10,000,000

Community-Oriented Methane and Co-Pollutant Emission Measurements in the Appalachian Region — **Pennsylvania State University** (University Park, PA) intends to monitor and simulate emissions of methane and co-emitted pollutants in communities that are intertwined with oil and gas production in the Appalachian Region. The project is also intended to create educational modules for universities, industry employees, and community groups and provide hands-on training for regional high school and university students and community scientists.

Federal Funding: \$10,000,000

Non-federal Funding: \$0

Total Value: \$10,000,000

Area of Interest 3b: Regional Methane Emissions Characterization

End-to-End, Multi-modal, High Resolution Methane Inventory Quantification — **International Business Machines (IBM) Corporation** (Yorktown Heights, NY) intends to demonstrate a superior methane emissions characterization process using transformative, near real-time measurements, high resolution daily satellite data, and a novel AI-enabled data fusion approach to significantly speed-up and improve the accuracy of inversion modeling over the Western United States. The project will engage students and community members from disadvantaged areas and actively integrate the results into leak detection and repair practices by sharing emission data with oil and gas operators.

Federal Funding: \$19,736,446

Non-federal Funding: \$0

Total Value: \$19,736,446

Methane Management through Multi-scale Measurements: From Measurement to Mitigation in South Central Production Regions — The **University of Texas at Austin** (Austin, TX) intends to develop multi-scale methane emission measurement approaches for the Permian, Anadarko, Arkoma, and San Juan basin production regions focused on gathering transmission pipelines, industrial meters, and excavation emergencies; collect, validate, and disseminate point source methane emission inventories; develop hazard- and risk-based approaches for estimating and reducing large emission events; develop emissions estimates along natural gas supply chains; and develop education and training programs and workforce development opportunities for stakeholders in industry and government.

Federal Funding: \$20,000,000

Non-federal Funding: \$0

Total Value: \$20,000,000

Southeastern Methane Emissions Quantification — **GTI Energy** (Des Plaines, IL) intends to develop a measurement-informed regional methane emission estimation approach that accounts for the inherent spatio-temporal variabilities of oil and gas source categories; collect and disseminate measurement data to improve energy efficiencies for gathering and transmission pipelines, distribution pipeline damage from excavation activities, and vented emissions from industrial gas meters; and accelerate the deployment of various methane monitoring solutions at different scales. The project will focus on assessing community benefits with an emphasis on disadvantaged communities, share the findings with the communities, and prepare the local workforce for future jobs and talent pipelines.

Federal Funding: \$20,000,000

Non-federal Funding: \$0

Total Value: \$20,000,000

Comprehensive Facility to Basin Scale Methane Emissions Measurements and Measurement Informed Inventory Development in the Northeast US — The **University of Texas at Austin** (Austin, TX) intends to create regional, multi-scale methane emissions measurements using ground-based source and site-level surveys; aerial-based source, site, and regional surveys; satellite and tower-based regional and basin surveys; and on-site operational data collection. The project will also create measurement-informed inventory models to inform state and federal inventories; fill gaps in existing inventories; and demonstrate a scalable framework for future measurements. The project will focus on disadvantaged and rural communities through education, training, and workforce development programs.

Federal Funding: \$20,000,000

Non-federal Funding: \$0

Total Value: \$20,000,000

North-Central Methane Center — **Colorado State University** (Fort Collins, CO) intends to develop consistent, accurate, granular, and transparent multi-scale methane emission measurements focused on the region's producing basins that will inform state and federal emission inventories for the North-Central region, including a focused effort on gathering and transmission pipelines, distribution damage, and industrial meters.

Federal Funding: \$20,000,000

Non-federal Funding: \$0

Total Value: \$20,000,000