NGIF ACCELERATOR

Industry Grants Program

PERFORMANCE REPORT 2023 & 2024

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Message from the CEO

NGIF Accelerator brings a step change in advancing technology development, scaling up, commercialization, and market deployment of solutions for the natural gas sector. We support startups with capital and other resources to advance their cleantech solutions through pilot projects, field trials, and industrial validation. Our results include better environmental performance, more jobs supported, and the advancement of economic prosperity for Canada.

Our differentiated value proposition includes close interaction with our 14 participant companies across the natural gas value chain. The fund recipients receive feedback directly from these companies in the industry, building up their market engagement. Recipients also get an opportunity to carry out technology demonstration projects in the natural gas industry.

The Industry Grants program has successfully attracted over $12 in additional public and private funding for every $1 invested in approved projects. The 104 projects approved to date cover a wide range of technology readiness levels (TRL), ranging from TRL 4 to 9, with 22 projects completed and 5 funded technologies now commercially available. To date, almost 400 jobs have been supported through NGIF funding.

We value our partnership with governments through our Trusted Partner co-granting model, and this cooperation has helped us achieve a financial leverage of 7x. This collaboration has proven effective in enhancing our work and delivering on our mandate.

The value proposition of natural gas is becoming more and more apparent across the globe. As the fastest-growing source of energy for multiple uses, affordable, reliable, and acceptable natural gas is fundamental to energy security, improved global environmental performance, and the well-being of citizens everywhere.

Canada is a leading producer, transporter, and consumer of natural gas, and NGIF Accelerator will continue to champion innovation for the natural gas sector through our funding support from the Industry Grants program. Our industry participants' leadership in reducing emissions will be key to market access as they show the world how to produce, transport, and deliver natural gas to the highest standards of environmental performance.

John Adams
President and CEO
NGIF Accelerator

About the NGIF Accelerator

NGIF Accelerator | Who we are

NGIF Accelerator is the not-for-profit arm of NGIF Capital and operates all technology and innovation programs. Its mandate is to de-risk and accelerate technology development and commercial deployment by supporting startups through their pilot projects, field trials, and industry validation. The goal is to accelerate the development and commercial deployment of new products or technologies to market by providing access to capital, resources, and expertise.

NGIF Accelerator provides a range of benefits through its programs, including non-dilutive grant funding, industry validation, technical peer review, operational advice, and mentorship. Our team can provide valuable guidance on their technology development scoping, financing, milestones, lower market barriers, and strategies to access the industry to support ultimate commercialization.

NGIF Accelerator also produces economic and environmental impact including increasing revenues, creating new jobs, bringing more technologies to market, reducing or eliminating GHG emissions, and increasing costs avoided due to air quality, clean water, and clean soil benefits to the energy industry and Canada.

We encourage industry, government, and academic collaboration to support startups in overcoming market barriers and accelerating technology and innovation to support the environmental and economic objectives of the natural gas industry.

NGIF Accelerator operates the Industry Grants program and administers the NGIF Emissions Testing Centre program.

It has offices in Montreal, Ottawa, and Calgary and is supported by a team of highly skilled technology and innovation professionals and corporate staff.

About the Industry Grants program

The Industry Grants program is industry-led and funded and offers non-dilutive grants through a competitive process to fund early-stage startups for technology development and field demonstration. The program specifically de-risks pre-commercial technology solutions that have the potential to increase the environmental performance of the natural gas sector. Each project in the program will accelerate technology readiness level progressions through pilot testing and field trials to advance commercialization. The Industry Grants program is operated by the NGIF Accelerator.

About the NGIF ETC Program

The NGIF Emissions Testing Centre (ETC) program involves collaboration between industry, academia, and government. It involves public support to ensure cleantech companies have a dedicated space to develop, test, and field–validate technologies to measure, monitor, and reduce methane emissions and to fast-track methane technologies to market through knowledge dissemination and fostering commercialization.

The program is unique in that it provides cleantech companies with free access to testing and commercialization support for rapid scale-up of technologies from concept to commercial–ready deployment. The NGIF ETC Program lab at the University of Calgary provides capabilities to test and de-risk technologies in a controlled environment, complemented by live field trials at the West Wolf Lake Gas Plant (jointly owned by Tourmaline Oil Corp. and Rubellite Energy), along with other Tourmaline assets. NGIF Accelerator administers the program and supports technology developers in scaling up by disseminating knowledge and providing commercialization support.

NGIF Accelerator | The Team

John Adams
President and CEO

Akhil Abat
Venture Partner

Abdul Qadir
Director, Corporate Finance and Accounting

Isaac Da Silva Aboo
Principal & Director of Legal Affairs

Ashutosh Pohary
Senior Manager, Contracts

Jose Beleno
Analyst, Technology Evaluation

Faran Razi
Lead, Contracts, Project Management & Partnerships

Samaneh Ashoori
Program Manager, NGIF ETC Program

Rosalby Guerrero Messia
Projects Coordinator

Daniely Molero
EA to the President and CEO

Ali Tarar
Manager, Finance and Accounting

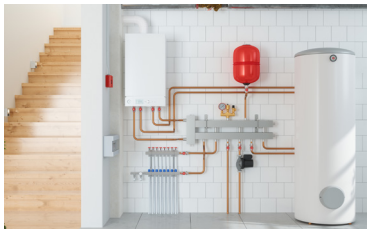
Glory Haruna
Accounting & Office Management

Ayoola Ajibare
Comms. Coordinator – Content and Events

Dini Philip
Comms. Coordinator – Digital and Graphics

NGIF Accelerator | Cleantech Categories

We invest in clean technologies that can improve all areas of environmental performance, including greenhouse gas (GHG) emissions, air, water, and soil. For example, lowering CH_4 and CO_2 emissions, reducing criteria air contaminants, reducing freshwater use, and lowering land disturbance. More specifically, we have broken down clean technology solutions into ten categories.



Energy Efficiency

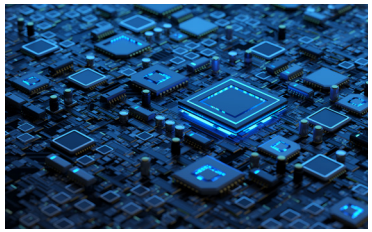
Renewable Natural Gas

Methane Mitigation

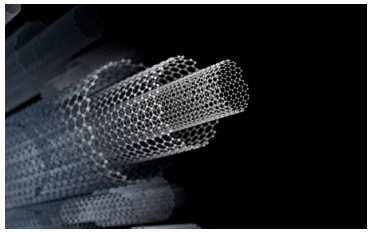
Carbon Capture, Utilization, and Sequestration

Heat and Power Generation

Water Management



Digital Transformation



Value-Added Products

Low Carbon Hydrogen

Low Emissions Transport

Industry Grants Program

Industry Grants Program | Overview

NGIF Accelerator, through its Industry Grants program, is a non-profit initiative launched in 2017 with a mandate to accelerate pre-commercial cleantech startups and SMEs to the natural gas industry through field trials and pilots.

The program is unique as it brings Canada's energy industry leadership and strong connections from every part of the gas value chain. It funds projects with a technology readiness level (TRL) between 4 and 9 to help startups and SMEs develop and demonstrate their pre-commercial clean technology solutions. Ultimately, these technologies, when commercial, should lower costs, improve competitiveness, and increase the environmental performance of the natural gas industry.

The Industry Grants program creates high-impact results through a competitive process, a technical and industry participant peer review committee, and an outcome-based operating model. NGIF Accelerator delivers the program through robust industry engagement to support their technology and innovation programs and emissions management goals. The industry participants provide NGIF Accelerator the opportunity to advance innovative approaches for emissions reduction by funding startups and SMEs for their technology de-risking and industry validation projects.

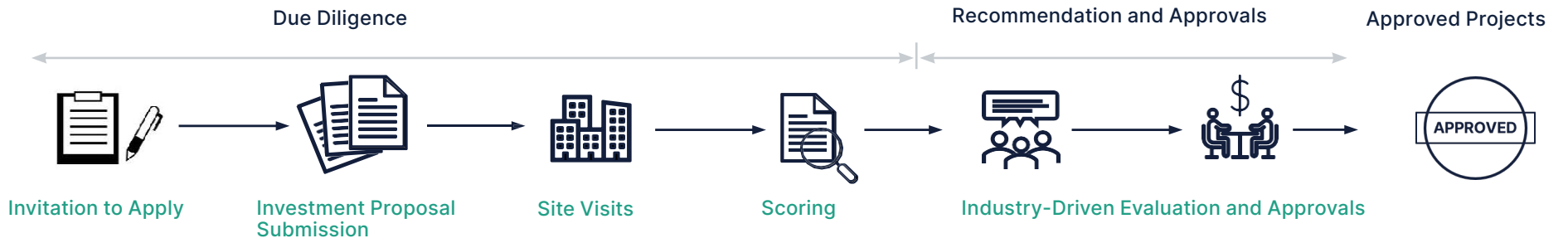
Our operating model has a stage-gated process to accelerate technology and innovation by soliciting applicants from Canada and internationally through a call for proposals. This non-dilutive funding allows NGIF Accelerator to accelerate pre-commercial solutions to market by allowing NGIF industry participants to share the risk with other industry members, government, and private funders through key development stages. The Industry Grants process allows a project to be funded over multiple year projects.

NGIF Accelerator receives its funding from the industry participants.

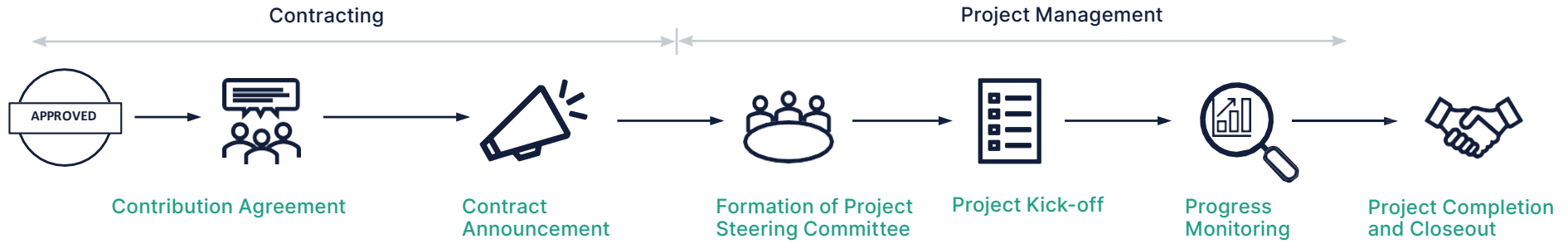
Stage-Gated Investment Process

STAGE 1 - Intake and Preliminary Screening

STAGE 2 - Evaluation and Due Diligence



STAGE 3 - Contracting and Project Management



Trusted Partnerships

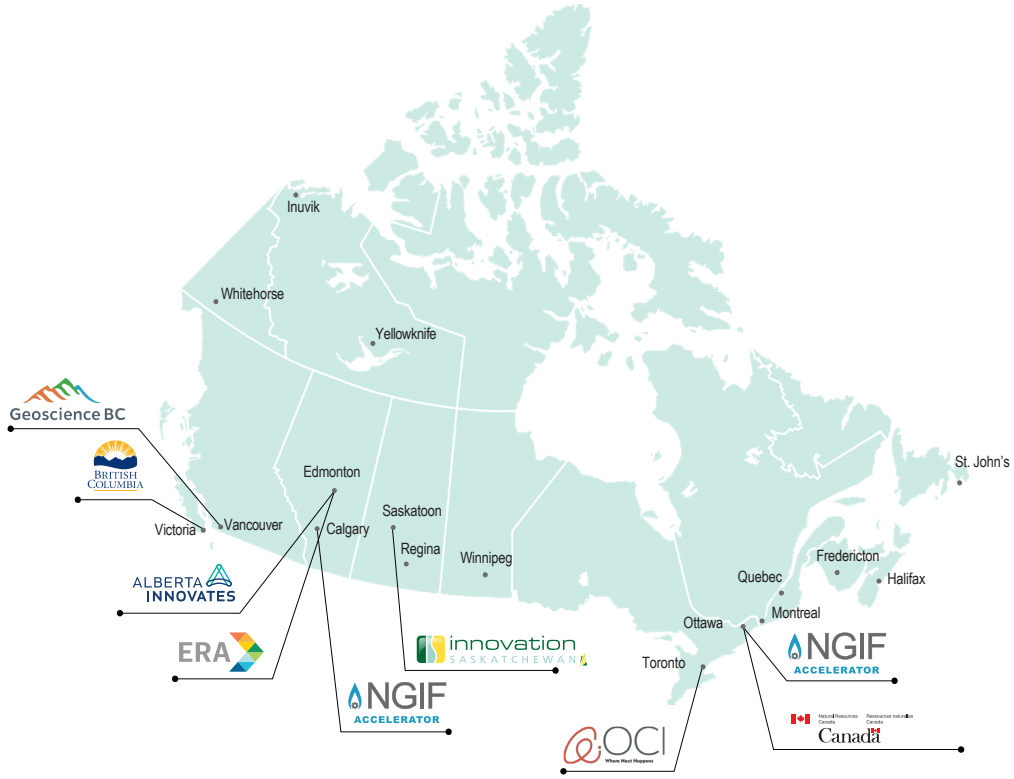
NGIF Accelerator, through its Industry Grants program, aims to enhance its impact by strategically managing, expanding, and diversifying its network of Trusted Partners to advance its mission of supporting cleantech innovation and commercialization. Trusted partners are those that fit all of the following criteria:

- Funding organizations with rigorous, fair, and transparent due diligence processes comparable in principle to NGIF's (e.g., peer review, technical experts, etc.).
- Canadian federal or provincial government departments and agencies OR organizations with strong alignment with the goals and desired outcomes to NGIF.
- Entities that have a memorandum of understanding, a service provider agreement, or other agreement with NGIF that allows for the confidential sharing of information.

Current Trusted Partners

The following federal and provincial government departments and agencies are our current trusted partnerships:

- Natural Resources Canada (NRCan)
- Emissions Reduction Alberta (ERA)
- Alberta Innovates (AI)
- Province of British Columbia Innovative Clean Energy Fund (ICE Fund)
- Geoscience BC
- Innovation Saskatchewan
- Ontario Centre of Innovation (OCI)



2017 - 2024 | At A Glance

Intake Applications to Date (10 Rounds)

1000+ general inquiries

675 applications

138 site visits

95% startup/SME led

Projects Approved (16 Rounds)

104 projects

$28.7MM from Industry Grants

$324.6MM leveraged

$353.4MM in total eligible project value

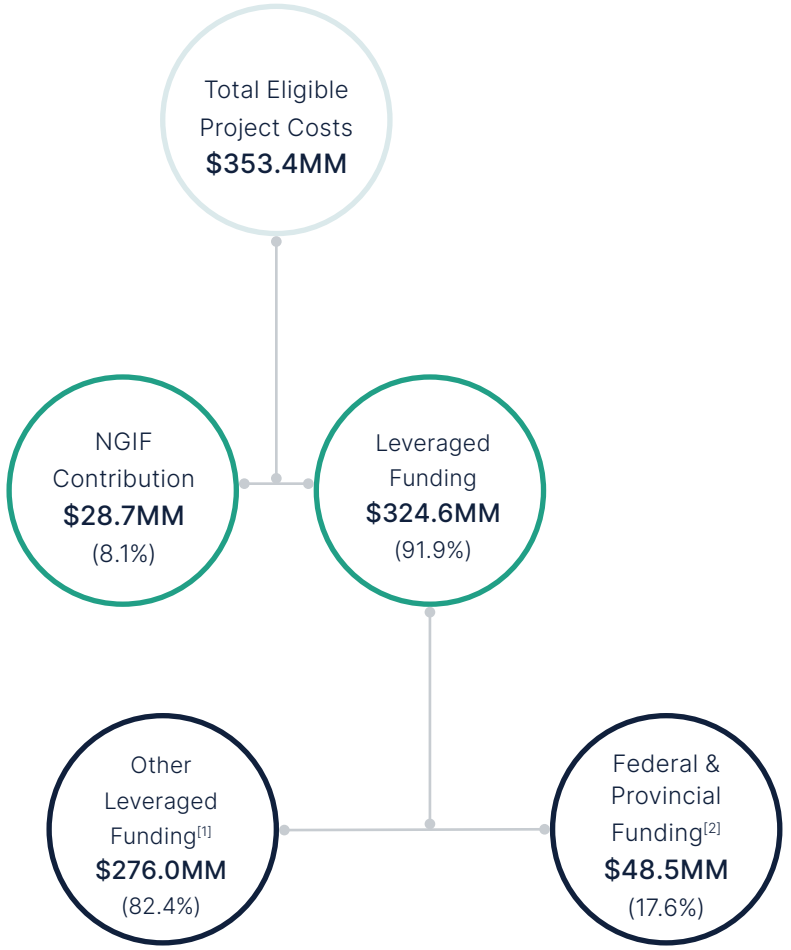
Key Performance Indicators (KPIs)

22 completed projects

5 technologies commercially available

~36 patents through active projects

~386 cleantech jobs supported through active projects



(1) Includes private capital, loans from banks, and personal savings.

(2) Includes funding from federal and provincial government partners and academia.

Governance

1 INVESTMENT COMMITTEE

Provides governance of the budget and approval of projects that have been recommended by the Innovation Committee.

Executives from Energy Company Participants

2 INNOVATION COMMITTEE

Provides technical peer review and evaluation of projects; makes recommendations to the Investment Committee for approval.

Technology or Operations representatives from Energy Company Participants

Funding Competitions

Round 8 Bridge Cleantech Challenge

The Challenge targeted grant applications with the potential to generate environmental and economic benefits in natural gas GHG reductions, sustainable operations, and natural gas applications.

5 projects were approved for funding with a total project value of $20,690,310, and NGIF approved funding of $1,313,500.

The program targeted grant applications with the potential to generate environmental and economic benefits in natural gas GHG reductions, sustainable operations, and natural gas applications.

PROJECTS APPROVED:

The following projects were approved for funding:

1. **IONADA (CCUS, ALBERTA):** Field pilot demonstration of Ionada's carbon capture technology.

Total Project Value: **$10,800,000** | NGIF Approved Funding: **$250,000**

2. **HYDRON ENERGY (RNG, BRITISH COLUMBIA):** Prototype development and testing of a low-cost and small-scale novel biogas-to-RNG upgrading system in a relevant environment.

Total Project Value: **$2,654,980** | NGIF Approved Funding: **$365,900**

3. **LUMINESCENT POWER (WASTE HEAT UTILIZATION, ISRAEL):** Prototype development and testing of Luminescent's 200kW heat engine in a relevant environment.

Total Project Value: **$4,108,230** | NGIF Approved Funding: **$370,000**

4. **CRYSTAL CLEARWATER (WATER MANAGEMENT, ALBERTA):** Prototype development and testing of a low-cost and small-scale novel biogas-to-RNG upgrading system in a relevant environment.

Total Project Value: **$2,154,700** | NGIF Approved Funding: **$227,600**

5. **AROLYTICS (DIGITAL TECHNOLOGIES, ALBERTA):** Prototype development and demonstration of an integrated emissions management platform in a relevant environment.

Total Project Value: **$972,400** | NGIF Approved Funding: **$100,000**

Round 9 Global Cleantech Challenge

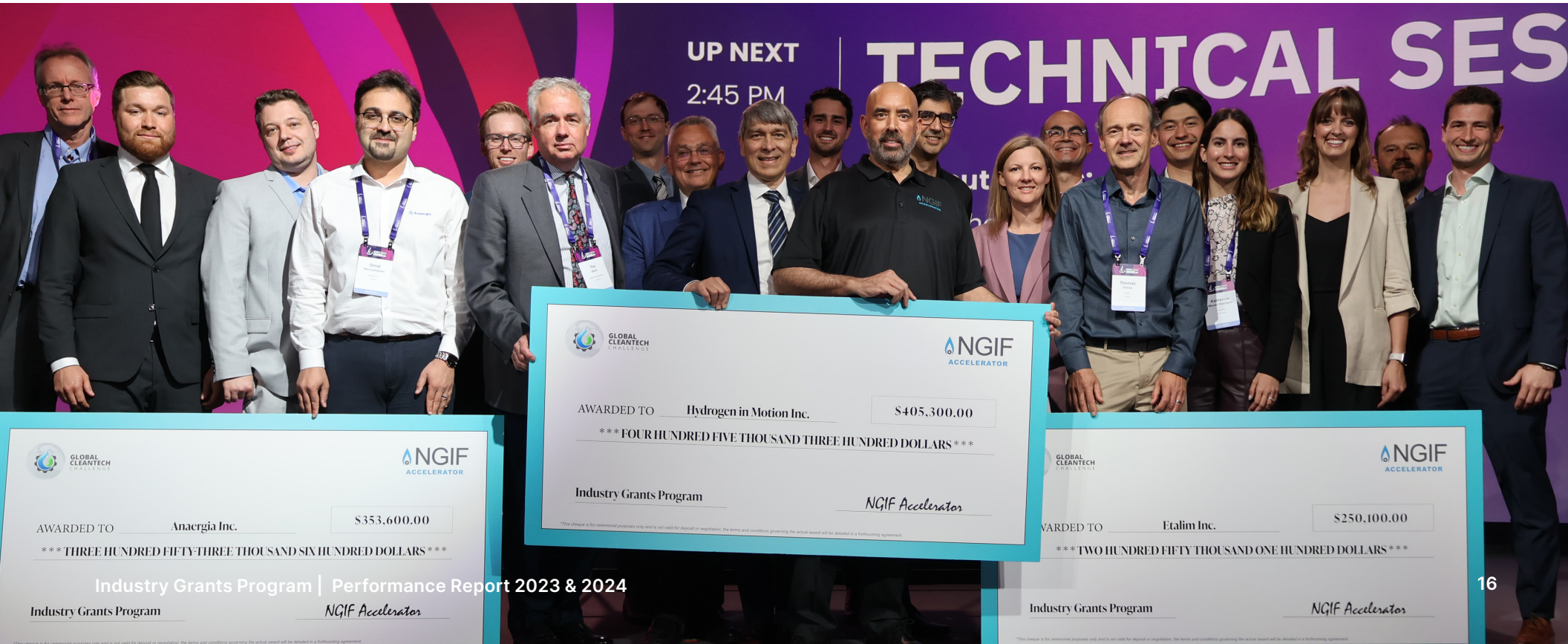
The Global Cleantech Challenge (“GCC”) was launched at the 2023 Rice Alliance Energy Venture Day in Houston on March 7, 2023, in partnership with the London-based International Gas Union (IGU).

This challenge was broken down into two parts, the first and second cohorts, and invited startups globally to develop technologies that can significantly improve the environmental performance of the natural gas sector.

Each project selected could receive up to $1MM CAD in grant funding, representing 50% of the total project budget. The challenge aimed at supporting demonstration projects in focus areas including hydrogen, carbon capture, methane mitigation, and more.

This initiative underscores NGIF Accelerator’s commitment to de-risking and advancing cleantech through pilot projects and rigorous field trials by soliciting technologies from all over the world.

The 17 finalists of the Challenge were officially announced at the International Gas Research Conference (IGRC2024) in Banff in an award ceremony.



Round 9 Global Cleantech Challenge

PROJECTS APPROVED (COHORT 1):

The following projects from Cohort 1 were approved for funding:

1. **AURORA HYDROGEN:** Microwave Pyrolysis, Process for Clean and Distributed Hydrogen Production.

Total Project Value: **$15,349,675** | NGIF Approved Funding: **$918,000**

2. **EKONA POWER:** Pilot Demonstration of Ekona's Methane Pyrolysis Solution for the Production of Clean Hydrogen and Solid Carbon.

Total Project Value: **$32,020,065** | NGIF Approved Funding: **$180,300**

3. **HYDROGEN IN MOTION:** Scale up and Certification of Hydrogen In Motion (H2M) Low Pressure Solid State Hydrogen Storage.

Total Project Value: **$3,990,525** | NGIF Approved Funding: **$405,300**

4. **POWER TO HYDROGEN:** Decarbonizing backup power with cost-effective electrolysis.

Total Project Value: **$1,954,076** | NGIF Approved Funding: **$177,000**

5. **MITICO (Formerly C-QUESTER):** Validation of an Integrated Pilot-Scale Point Source CO_2 - Capture System.

Total Project Value: **$2,033,333** | NGIF Approved Funding: **$768,300**

6. **ANAERGIA:** Converting Agricultural Waste into Pipeline-Quality RNG through Hyperthermophilic Hydrolysis.

Total Project Value: **$2,694,810** | NGIF Approved Funding: **$353,600**

7. **GREENBOX ENERGY (Formerly LASZLO ENERGY):** Cutting Residential Carbon and Utility Bills with the GreenBox Hybrid Heating Smart Controller.

Total Project Value: **$791,000** | NGIF Approved Funding: **$258,100**

8. **HARvEST SYSTEMS:** Testing and Demonstration Project for Fryer Adaptation of HARvEST (formerly POWER) Systems within a Restraurant Environment.

Total Project Value: **$149,900** | NGIF Approved Funding: **$74,450**

9. **QUBE TECHNOLOGY:** Emissions Localization and Quantification through Continuous Monitoring Systems.

Total Project Value: **$1,758,892** | NGIF Approved Funding: **$402,000**

PROJECTS APPROVED (COHORT 2):

The following projects from Cohort 2 were approved for funding:

10. **HYDROGEN OPTIMIZED INC.:** Commercial-scale Demonstration of Clean Hydrogen Production and Clean Deuterium oxide Co-production.

Round 9 Global Cleantech Challenge

Total Project Value: **$955,000** | NGIF Approved Funding: **$113,200**

11. **SPHERICAL ROTORS:** Development and Commercialization of a Modular Zero-Emissions Natural Gas Expander System.

Total Project Value: **$1,513,133** | NGIF Approved Funding: **$102,500**

12. **GEOTEKNICA:** Continuous Real-time Emissions Quantification: Demonstration of a Massively Scalable Laser Scanner for Leaks Smaller than 100g/h.

Total Project Value: **$1,293,639** | NGIF Approved Funding: **$196,800**

13. **MANTEL CAPTURE:** Decarbonizing Natural Gas Fired Steam Boilers Using Novel Molten Borates.

Total Project Value: **$24,767,312** | NGIF Approved Funding: **$368,600**

14. **OSMOSES:** Producing Low-Carbon, Cost-Effective Renewable Natural Gas with High-Performance Membranes.

Total Project Value: **$1,260,000** | NGIF Approved Funding: **$609,750**

15. **AYRTON ENERGY:** Hydrogen LOHC: Scaling Next-Gen Technology for Hydrogen Storage & Transportation.

Total Project Value: **$2,072,053** | NGIF Approved Funding: **$552,300**

16. **CIELO CARBON SOLUTIONS:** Point Source Carbon Capture for Upstream Compressors.

Total Project Value: **$2,200,000** | NGIF Approved Funding: **$591,300**

17. **ETALIM:** Thermo-Acoustic Wellsite Electrification for Methane Abatement

Total Project Value: **$4,825,000** | NGIF Approved Funding: **$250,100**

18. **COOLL SUSTAINABLE ENERGY SOLUTIONS B.V.:** Gas Adsorption Heat Pump.

Total Project Value: **$1,150,000** | NGIF Approved Funding: **$375,000**

NGIF Success Stories

NGIF Success Stories

EKONA POWER

Ekona Power Inc. is a Burnaby, BC-based company founded in 2017 that is developing clean hydrogen through a methane pyrolysis technology that effectively converts natural gas into hydrogen and solid carbon.

GRANT FUNDING

NGIF Accelerator awarded $60K in grant funding to Ekona in 2018 through its Industry Grants program to develop and test a proof-of-concept pulsed methane pyrolysis (PMP) reactor for low-cost clean hydrogen production. Upon a successful proof of concept, NGIF Accelerator awarded another $500k grant to Ekona in 2022 so they could further develop and test the PMP process. Ekona Power received additional grant funding from various funding partners, supporting the ongoing reactor development and the expansion of their Burnaby Pilot Plant–a 200-kilogram-per-day clean hydrogen production testing facility.

INVESTORS

In early 2022, NGIF Capital, through its Cleantech Ventures Fund I, made an equity investment in Ekona as part of a CAD $79MM funding round. Other investors included Baker Hughes, Mitsui, ConocoPhillips, TransAlta, Continental Resources, ARC Resources, and BDC Capital.

PARTNERSHIPS

In January 2024, Ekona announced the first field deployment of its methane pyrolysis solution for clean hydrogen production. Partnering with ARC Resources (ARC), one of NGIF Accelerator's Industry Grants program participants and NGIF Capital's Limited Partner, Ekona is working to deploy a one-tonne-per-day field demonstration at ARC's Gold Creek Natural Gas Plant in Alberta.

RECOGNITION

Ekona continues to be recognized for its innovation. The company was selected as a 2022 Global Cleantech Company from over ten thousand nominated applicants and made the 2023 list. Ekona has also made Foresight Canada's list of the country's most investable cleantech ventures since 2021. In May 2024, Ekona was announced as a Global Cleantech Challenge finalist at the International Gas Research Conference (IGRC) 2024 in Banff, Alberta.

SUMMARY

These layers of grant funding, equity investments, deployment, partnerships, and recognition highlight the impact of NGIF's strategic approach to advancing clean energy technologies and illustrate how dedicated funding and partnerships can drive significant progress in the natural gas sector.

> "NGIF Accelerator and NGIF Capital have been active supporters of Ekona and our technology vision for several years, and we are grateful for the ongoing support.
>
> Our technology unlocks the potential of natural gas for clean hydrogen production without the need for carbon-dioxide sequestration. It demonstrates a compelling way to use Canada's natural gas resources and existing infrastructure to help meet global demand for hydrogen, decarbonized natural gas, and reduced greenhouse gas emissions.
>
> Chris Reid, CEO, Ekona Power."

NGIF Success Stories

INNOVATIVE FUEL SYSTEMS

Innovative Fuel Systems (IFS) Ltd. is a privately held company that designs, develops, installs, and services their patented and proprietary Multi Fuel Technology Platform (MFTP™) to reduce GHG emissions and fuel costs for heavy-duty engines. MFTP™ is a retrofit system that can be used on existing trucks, and it allows a diesel engine to offset diesel fuel usage with cleaner-burning fuels.

GRANT FUNDING

In 2021, NGIF Accelerator recognized the potential of IFS' MFTP and provided funding of $150,000 through the Industry Grants program to support the commercial demonstration of this technology. The funding was critical as it allowed IFS to validate its technology and showcase its potential in real-world applications.

PARTNERSHIP

The collaboration with NGIF Accelerator accelerated IFS' commercialization journey, enabling a comprehensive project within a large fleet of heavy-duty trucks based in Alberta. Over 22 months, six trucks were equipped with the MFTP technology, affirming its operational viability and addressing the pressing demand for alternative fuel solutions following stringent regulations.

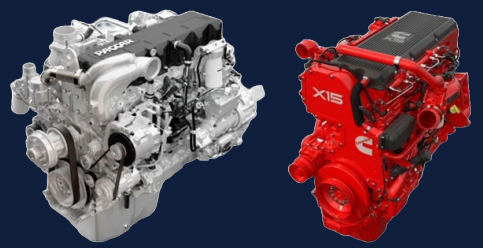
Additionally, strategic collaboration with major players such as Enbridge, an Industry Grants program participant, is anticipated to further extend the technology's presence across North America.

RECOGNITION

The project results show that IFS' MFTP transitioned from Technology Readiness Level (TRL) 7 to TRL 9, indicating its readiness for widespread market adoption. IFS reported a 40% reduction in diesel fuel usage and over 13% CO_2 emissions reduction—a significant achievement in their mission for cleaner transportation solutions. The commercial response has been equally promising, with the partnership to reduce emissions in Certarus' heavy-duty fleet vehicles in the USA and Canada and a purchase order of $1MM from KAG, North America's largest bulk hauler, initiating a broader rollout of their technology.

SUMMARY

NGIF Accelerator and IFS' partnership is an example of how strategic funding can accelerate innovation in developing cleantech solutions for the natural gas industry. With a validated technology and increasing market presence, IFS stands ready for continued success, transforming fuel efficiency and environmental performance.



> "NGIF Accelerator's support was instrumental in validating our technology and facilitating its real-world demonstration across a large fleet of heavy-duty trucks in Alberta.
>
> Their partnership helped in advancing the commercial readiness of our patented MFTP technology and showcasing our commitment to cleaner transportation solutions. Together, we are redefining fuel efficiency and environmental performance in the HD trucking industry.
>
> Leland Oberst, President and CEO, Innovative Fuel Systems."

NGIF Success Stories

POINT 3 BIOTECH

Point 3 Biotech (PT3) is a privately held Canadian corporation whose main areas of research are terpenes and zero-waste agriculture. PT3's project aimed to process manure blends and convert them into renewable natural gas (RNG) and high-value co-products.

GRANT FUNDING

In 2020, NGIF Accelerator played a pivotal role in supporting PT3's mission by providing $300,000 in grant funding through its Industry Grants program. This financial support was necessary for PT3 to harness the potential of agricultural waste to reduce emissions, provide an alternative energy source, and tackle energy and environmental challenges.

PARTNERSHIP

PT3 collaborated with the Hallam Lab at the University of British Columbia to conduct advanced studies on microbial community movements in anaerobic digestion processes. This partnership provided valuable insights into optimizing the performance of reactors that convert manure into RNG and high-value co-products, like organic fertilizers.

RECOGNITION

The project's outcomes garnered attention for their environmental benefits, receiving funding and support from Abbotsford Community Foundation in 2021 to target capabilities to combine dairy, poultry, and hog manures, producing biogas, fertilizers, and other co-products.

SUMMARY

The successful partnership between NGIF Accelerator and PT3 showcases the power of innovation and collaboration in the natural gas industry. As PT3 seeks candidates for its first biorefinery, it is set to transform Canadian farmers' participation in the clean energy landscape, addressing 12 of the 17 United Nations Sustainable Development Goals. This partnership's actions demonstrate a commitment to developing a cleaner future for Canada and the world.

> We are grateful for the support of NGIF for this work that serves to eliminate emissions from Canada's energy systems while also advancing the environmental and economic sustainability of Canadian farms.
>
> Sensor deployment, coupled with advanced life sciences (microbial community mapping), will allow us to make more gas (RNG) from available on-farm feedstock and dramatically increase the opportunity profile for carbon-negative fertilizers. There is even more than the coveted triple bottom line with this. On-farm biogas, with nutrient recovery, can impact at least 12 of the 17 UN Sustainable Development Goals.
>
> James Irwin, CEO, Point 3 Biotech Corp.

NGIF Success Stories

RADMAX – TAKENERGY

RadMax Technologies, a Washington-based developer of multiple improved axial vane-type rotary devices, and TAKEnergy, a Calgary-based developer of small-scale green power solutions, partnered to generate electrical power using a natural gas expander. The technology: the RadMax Expander-Generator (RXG) is a solution for reducing methane emissions at natural gas wellheads and pressure letdown stations while generating electrical power.

GRANT FUNDING

In 2021, NGIF Accelerator's Industry Grants Program provided crucial funding of $72,460 to RadMax. This financial support was instrumental in enabling the company to accelerate its product development and testing activities for their patented "common rotary core" technology.

PARTNERSHIP

The partnership between NGIF Accelerator and its Industry Grants program participants allowed RadMax and TAKEnergy to derisk their RXG technology. ATCO, one of NGIF Accelerator's 14 energy company participants, provided their distribution facility as a demo host ground for the pilot project where RadMax and TAKEnergy successfully completed over 4,200 runtime hours of data collection and analysis. The project captured the energy typically lost during pressure letdowns and converted it into a reliable source of electricity—delivering clean electrical power ranging from 2 to 5 kW.

RECOGNITION

The outcomes of the project showcased operational efficiency with stable speeds across varying pipeline pressures and electrical loads. The RXG demonstrated the ability to significantly reduce emissions while operating at minimal costs, eliminating the need for external fuel or gas preheating. The project is also a testament to how NGIF Accelerator sources solutions from around the world to come to Canada to improve environmental performance.

SUMMARY

The successful collaboration between NGIF Accelerator, RadMax, and TAKEnergy highlights the effectiveness of strategic partnerships in developing clean technology solutions for the natural gas industry. With the extensive data and insights gathered from the pilot project, the RXG is now on the path to commercialization, providing a clean solution for emissions reduction and clean power generation.

> "RadMax is grateful for NGIF's sponsorship and support in providing an invaluable opportunity to test a prototype product and collect real-time data in an actual working environment. This project has helped us to better understand the requirements of the natural gas production and distribution community.
>
> The collected data will help move the product into the final stages of commercialization. We look forward to further working with the oil and gas industry to test additional products at the wellhead or other pressure letdown locations.
>
> Paul Porter, President and CTO, RadMax."

NGIF Success Stories

KINITICS AUTOMATION

Kinitics Automation Limited develops and applies shape memory alloy (SMA) technology, a unique material that changes shape when an electric current is applied. This innovation became the basis for their flagship product, the Kinitics Valve Actuator (KVA), which is designed to replace methane-venting pneumatic actuators in the natural gas industry.

GRANT FUNDING

In 2021, NGIF Accelerator provided a funding contribution of $209,000 through its Industry Grants program, helping Kinitics to develop the zero-bleed KVA at natural gas production facilities. The support enhanced the technology deployment and provided insights into industry-specific challenges.

INVESTORS

In 2022, Kinitics received an equity investment from NGIF Capital, through the Cleantech Ventures Fund I, which propelled their operations and prepared them for scaling their actuator technology. Recognizing the potential of Kinitics' solution, NGIF Capital made a follow-on investment in 2023 alongside a syndicate of angel investors and venture capital funds to support their transition to full-scale commercialization.

PARTNERSHIP

A significant benefit of the NGIF partnership was access to the NGIF ETC Program at the University of Calgary and a Tourmaline Oil Corp. gas production site. These facilities allowed Kinitics to test and validate their KVA prototypes and commercial samples in both laboratory and real-world settings. The rigorous testing processes helped Kinitics gather important data, enhance its commercial product design, and enhance customer confidence.

RECOGNITION

The strategic support from the NGIF ecosystem—including financial backing, industry connections, testing expertise, and strategic guidance—has significantly accelerated Kinitics' technology development and commercialization efforts. In 2024, the firm successfully launched its KVA product in North America. Kinitics customers include ATCO and BP.

SUMMARY

Kinitics has made remarkable strides in the natural gas industry through strategic funding and partnerships, particularly with the NGIF Accelerator, NGIF ETC Program, and NGIF Capital, the company has validated and commercialized its KVA technology.

> NGIF Capital and the NGIF Accelerator's Industry Grants program have provided Kinitics with a fantastic opportunity to engage natural gas companies to tackle big problems that the industry is facing.
>
> Through this successful commercial product trial, the KVA38 has been validated for widespread deployment and adoption. This initial deployment is estimated to reduce CO_2e emissions by 91 tonnes annually, and we continue to place additional units in the field to eliminate methane venting from the landscape.
>
> Dean Pick, President and CEO, Kinitics Automation.

NGIF Success Stories

WESTGEN TECHNOLOGIES

Westgen Technologies specializes in developing innovative solutions for remote power generation, notably their Engineered Power On Demand (EPOD) units. These units offer a cost-effective, reliable, and environmentally sustainable alternative for instrument air compression at wellsite locations.

GRANT FUNDING

Initially funded by NGIF Accelerator in 2020, Westgen received a significant investment of $1.3 MM as part of a joint Natural Gas Challenge with NGIF's Trusted Partner, Emissions Reduction Alberta, accelerating the development and deployment of their EPOD units. In the same year, NGIF Accelerator approved $136,000 for Westgen, supporting the commercial demonstration of their technology to eliminate methane emissions.

INVESTORS

Subsequently, in 2022, through NGIF Capital's Cleantech Ventures Fund I, NGIF continued to support Westgen, providing an equity investment alongside ARC Financial and Idea Well Capital Partners to advance their technology. This strategic investment enabled Westgen to expand their market presence and drive innovation in the field of remote power generation.

PARTNERSHIP

Collaboration has been essential to Westgen's success. They tested the EPOD units in a live operating environment at one of NGIF Accelerator's Industry G program participant sites, Tourmaline, through the NGIF ETC Program. This partnership not only highlights the importance of strategic alliances in the cleantech space but also reinforces NGIF Accelerator's commitment to supporting innovative solutions in the natural gas industry.

RECOGNITION

Westgen's continued advancements in EPOD technology have not gone unnoticed. They have successfully deployed their technology over ~600 sites, including ARC Resources, Crew Energy, and Cenovus Energy.

SUMMARY

In summary, Westgen is dedicated to driving innovation in remote power generation through their EPOD units. With continued support from NGIF Accelerator and NGIF Capital, Westgen has been able to further develop and commercialize their EPOD technology, solidifying their position in the clean energy market.

> Thanks to NGIF's commitment to driving innovation and their support, we are proud to have deployed our EPOD technology at over 15 sites, making meaningful strides toward a cleaner energy future.
>
> We look forward to continuing this journey together, creating clean technological solutions for Canada and the world.
>
> Ben Klepacki, President & CEO, Westgen Technologies.

NGIF Success Stories

KUVA SYSTEMS

Kuva Systems is a leading provider of continuous methane monitoring technology for oil and gas operators, helping them see, size, and solve their emissions challenges, enhancing operational efficiency through patented infrared cameras, root cause analysis, and SCADA workflow integration.

GRANT FUNDING

In 2022, Kuva received $66,354.09 from NGIF Accelerator as part of a larger $360,000 project co-funded by Emissions Reduction Alberta, a Trusted Partner, highlighting the shared vision of advancing methane detection technologies in Alberta and Canada. The project aimed to demonstrate the effectiveness of its low-cost, automatic methane imaging solution. In 2024, Kuva also received $4MM in federal funding from PrairiesCan to support their market expansion.

INVESTORS

Climate Innovation Capital, Draeger, Launchpad Ventures, and others made a Series A investment of USD 11.3MM in 2023 to accelerate the growth of Kuva's gas cloud imaging platform to find, fix, and prevent methane emitters and accelerate the reduction of methane emissions.

PARTNERSHIP

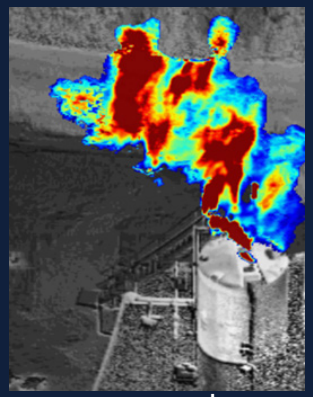
Kuva Systems strategically partnered with NGIF Accelerator's Industry Grants program participants, facilitating field tests across approximately 40 gas wells and plant sites to monitor tanks, allowing Kuva to gather invaluable data and feedback on its technology. Kuva also partnered with the NGIF ETC Program to test and validate their technology, enhancing their field deployment systems and strengthening the overall effectiveness of their monitoring solution.

RECOGNITION

The collaboration between NGIF Accelerator and Kuva Systems has garnered recognition for its impact on the energy sector. The technology has been commercially deployed across North America, Australia, and Brazil with over 30 customers from publicly traded supermajors and large independents to smaller private oil and gas companies.

SUMMARY

Kuva Systems' innovative approach to methane monitoring, supported by strategic partnerships and funding from NGIF Accelerator, has transformed the landscape of emissions management in the oil and gas industry.



> "At Kuva, we are grateful for the support we have received from NGIF Accelerator in our mission to make methane emissions measurable and manageable. Our collaboration with NGIF has been instrumental in refining our low-cost methane imaging solution, helping us to address one of the challenges in the natural gas industry.
>
> Stefan Bokaemper, CEO, Kuva Systems."

NGIF Success Stories

STONE MOUNTAIN TECHNOLOGIES (SMTI) - ANESI

Stone Mountain Technologies Inc. (SMTI), a Tennessee, USA-based company focused on heating and cooling technology, developed an innovative single-unit system designed specifically for residential and small- to medium-sized commercial applications.

GRANT FUNDING

In 2020, NGIF Accelerator, (formerly known at the Natural Gas Innovation Fund program at the Canadian Gas Association) announced a funding contribution of $434,144 to develop SMTI's single-unit heating and cooling system. In 2021, NGIF provided another contribution of $600,000 to develop their high-efficiency thermally driven heat pump (TDHP) system. In 2024, NGIF yet again made another contribution of $348,728 to develop their hybrid gas-electric heat pump for residential heating, cooling, and domestic hot water.

INVESTORS

Enbridge Gas, one of NGIF Accelerator's Industry Grants program participants, made a seed round investment while Beckett Thermal Solutions, Southern California Gas Company, and Energy Impact Partners made a Series A investment of $15MM to commercialize a new generation of highly energy-efficient heating products, reducing heating bills and emissions.

PARTNERSHIP

With NGIF's funding, SMTI began field trials in collaboration with industry partners like Napoleon, resulting in the successful development of the TDHP system. Five systems in Alberta were planned for field testing, focusing on verifying performance, assessing homeowner satisfaction, and refining system design for optimum energy savings.

RECOGNITION

SMTI's breakthrough technologies resulted in the launch of their Anesi Comfort System, achieving its first milestone of shipping 100 units across North America. The system integrates a natural gas absorption heat pump technology. The recent partnerships with ten premier manufacturer representatives in North America showcase the momentum built through NGIF's support.

SUMMARY

SMTI's success illustrates the impact of strategic partnerships and funding on energy-efficient technologies. As SMTI continues its commercialization journey, NGIF Accelerator is committed to supporting solutions that enhance affordability, reliability, and environmental performance.

> "NGIF Accelerator's contributions have been vital across multiple phases of our technology development. With their help, we have been able to commercialize the Anesi Comfort System and set the stage for continued growth and success in delivering affordable and reliable energy solutions for Canadian homes and businesses."
>
> Michael Garrabrant, Founder and CEO, SMTI.

NGIF Success Stories

IONADA

In 2010, Ionada began its pursuit of zero-discharge exhaust gas scrubbing technology, and by 2013, their research team had developed the first operational membrane scrubber, leading to patented innovations in DeSOx, DeNOx, Particulate Matter, and Carbon Capture technologies.

GRANT FUNDING

In 2021, NGIF Accelerator announced a $150,000 grant funding for Ionada's modular carbon capture system, aimed at offering a compact, cost-effective solution for the energy and marine sectors. This support demonstrated Ionada's ability to remove and capture CO_2 from flue gas generated by LNG combustion, showcasing the potential to significantly lower emissions.

INVESTORS

In 2021, NGIF Capital, through its Cleantech Ventures Fund I, made an equity investment in Ionada as the company advanced in developing its membrane technology, which can remove up to 99% of CO_2 from flue gases. In 2023, Ionada also secured investment from Yinson Production, Dorian LPG, and Archrock in their Series A investment round, along with a group of marine and offshore investors.

PARTNERSHIP

The partnership between Ionada and NGIF Accelerator has advanced the commercialization of carbon capture technologies. NGIF' Accelerator's funding and strategic guidance provided Ionada with industry validation and customer creation pathways, enabling real-world applications of their technology. Ionada has also partnered with Carbon Circle, B.C. Biomass Network Consortium, and the Norwegian Green Shipping Programme in a bid to advance their technology.

RECOGNITION

In 2019, the company secured commercial orders for various carbon capture projects for oil and gas LNG compression and marine on-board carbon capture for multipurpose container vessels and Ro-Ro passenger ships. Ionada has expanded its operations into Germany and Norway, establishing a strong international presence. Ionada was also awarded the Most Promising Company at the 2023 Rice Alliance Energy Venture Day.

SUMMARY

Ionada and NGIF Accelerator stand as examples of how innovation, strategic partnerships, and a commitment to environmental stewardship can converge to drive progress in the cleantech sector.

> NGIF Capital and NGIF Accelerators' support has been instrumental in our journey toward transforming carbon capture technology. Their strategic guidance, funding, and investment have not only validated our mission but have also accelerated our ability to develop and commercialize solutions that reduce emissions in the energy and marine sectors.
>
> Edoardo Panziera, CEO, Ionada.

Appendix A: Completed Projects

Project Completion and Results

SALTWORKS

Saltworks

PROJECT TITLE

Demonstration of an innovative Produced Water Management System at a Natural Gas Production Site.

PROJECT SCOPE

Saltworks' AirBreather Pilot uses excess heat from natural gas production to treat produced water on-site. Produced water is water that flows to the surface with gas and oil during the production process - AirBreather converts it to clean water or water vapour. The project tested their evaporation system on saline (salty) produced water samples collected from natural gas operations in the BC Montney.

PROJECT RESULTS

- Treated water met BC Aquatic Life Water Quality Guidelines, with slight traces of mineral metals introduced during the post-treatment tests readily prevented.
- Solid salt produced for two of the three water samples met Transport Canada's road salt specification as defined by ASTM International ("ASTM"): >95% calcium-sodium chloride without 'deleterious' substances.
- Naturally occurring radioactive material ("NORMs") pre-treatment was successfully implemented.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

The Saltworks has now shipped two SaltMaker MVR crystallizers and a SaltMaker ChilledCrys to the electric vehicle (EV) battery industry – these systems play an essential role in the production of lithium and nickel.

TECHNOLOGY CATEGORY:
Water Management

TECHNOLOGY READINESS LEVEL (TRL) START: 7

TRL AT COMPLETION: 8

PROJECT START:
January 2019

PROJECT COMPLETION:
May 2022

PROJECT BUDGET:
$700,000

INDUSTRY GRANTS FUNDING:
$185,994

PROJECT PARTICIPANTS:
Chevron, Shell Canada, Tourmaline

ENVIRONMENTAL BENEFITS: Water treatment, GHG reduction

Project Completion and Results

EKONA POWER

PROJECT TITLE

Development and Testing of a Prototype Tri-Generation Pyrolysis (TGP) Platform for Low-Cost Green Hydrogen Production.

PROJECT SCOPE

Ekona had to show a proof-of-concept for the Pulse Methane Pyrolysis (PMP) reactor and a Direct Carbon Fuel Cell to validate the technology for TRL3 and inform subsequent prototype, brass-board, and field trial development.

PROJECT RESULTS

Ekona was able to demonstrate a proof-of-concept for the PMP reactor. Additionally, the DCFC button cell testing demonstrated Ekona's unique cell architecture. Specifically, it demonstrated continuous carbon delivery in a molten carbonate slurry to a porous anode for power generation and that a porous anode in a unique flow-through configuration can be used as a filter to accept carbon fuel from a continuous slurry. Further, it demonstrated that the carbon directly reacts at the anode to produce pure CO_2, rather than gasifying to CO.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

Through NGIF's support, Ekona has been able to de-risk their technology from a research endeavour to a prototype and pilot-scale deployment. Further, partnership with NGIF has been essential for Ekona to develop strategic relations with NGIF industry partners, who would also be the customers for Ekona's hydrogen production technology.

TECHNOLOGY CATEGORY:
Low Carbon Hydrogen

TECHNOLOGY READINESS LEVEL (TRL) START: 2

TRL AT COMPLETION: 7

PROJECT START:
April 2019

PROJECT COMPLETION:
March 2022

PROJECT BUDGET:
$1,805,000

INDUSTRY GRANTS FUNDING:
$60,000

PROJECT PARTICIPANTS:
ATCO, Enbridge, FortisBC, PNG

ENVIRONMENTAL BENEFITS:
CO_2 reduction

Project Completion and Results

EFFECT HOME BUILDERS

PROJECT TITLE

Off-Electrical-Grid Office Demonstration of Micro-Combined Heat and Power.

PROJECT SCOPE

The Effect Home Builders office space – a 1940s-era two-story home – was retrofitted using clean technologies and natural gas together to create an ultra efficient office space disconnected from the electrical grid, with lower costs and lower GHG emissions.

PROJECT RESULTS

- From the demonstration and successful completion of the project by Effect Home Builders, the company now builds eight to ten customized energy-saving homes per year in the Edmonton area.
- With net zero homes that Effect Home Builders has subsequently built, electricity is harvested in the summer, and that goes back into the electrical grid for a credit, which is then drawn from the grid in the winter, with the credits intended to even out over the year.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

- The Canadian Home Builders Association selected the Belgravia residence constructed by Effect Homes as the national and provincial winner of the Green Home Award.
- The data collected during this project highlights the overall excellent performance of the deep-retrofit and off-electric-grid, natural gas-fueled mCHP mechanical system. With a model in place to evaluate feasibility in other builds, Effect Homes is well positioned to adopt certain components from this pilot into their features portfolio.

TECHNOLOGY CATEGORY:
Energy Efficiency

TRL START: 7

TRL AT COMPLETION: 9

PROJECT START:
January 2017

PROJECT COMPLETION:
October 2020

PROJECT BUDGET:
$190,000

INDUSTRY GRANTS FUNDING:
$95,000

PROJECT PARTICIPANTS:
ATCO, Enbridge, FortisBC, PNG

ENVIRONMENTAL BENEFITS:
CO_2 Reduction

Project Completion and Results

G4 INSIGHTS

PROJECT TITLE

G4 Power to Gas Demonstration Project.

PROJECT SCOPE

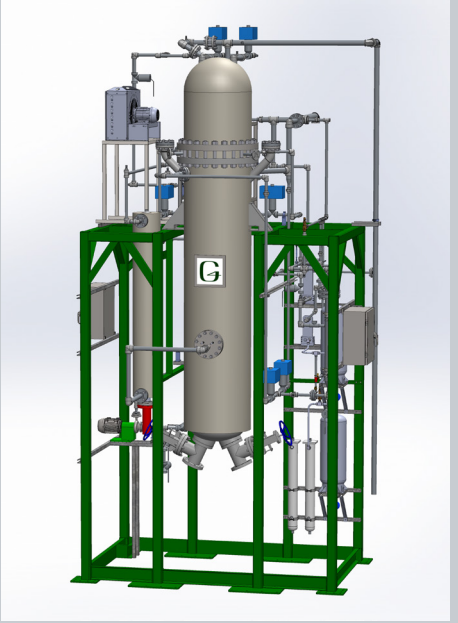
The G4 Power to Gas (P2G) showed the use of G4 PyroCatalytic Hydrogenation (PCH) technology to utilize renewable grid power and forestry waste to produce renewable natural gas (RNG). The project objectives included the design and build of G4 P2G equipment, RNG production using steady-state grid power, and RNG production using intermittent grid power.

PROJECT RESULTS

G4 Insights was able to produce over 300 hours of demonstration, and testing was conducted using a variety of commercially available wood particles and residue supplied through FPInnovations, creating RNG that was directly injected into ATCO's natural gas distribution system.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

- The activities contributed to the achievement of the project objective by scaling up the G4 technology to a pilot demonstration plant for renewable natural gas and the development of subsystems to support full continuous operation using forestry biomass.
- This technology has the potential to diversify Canada's energy portfolio, reduce greenhouse gas emissions, improve industrial efficiencies, and create an economically viable application for underutilized biomass residues.



TECHNOLOGY CATEGORY:
Renewable Natural Gas

TRL START: 3

TRL AT COMPLETION: 5

PROJECT START:
July 2016

PROJECT COMPLETION:
October 2019

PROJECT BUDGET:
$2,270,000

INDUSTRY GRANTS FUNDING:
$890,090

PROJECT PARTICIPANTS:
ATCO, FortisBC, PNG

ENVIRONMENTAL BENEFITS:
GHG reduction

Project Completion and Results

CHAR TECHNOLOGIES

PROJECT TITLE

Demonstration of a Novel Activated Biochar for H_2S Removal.

PROJECT SCOPE

NGIF funding enabled CHAR Technologies to demonstrate the scale-up of its SulfaCHAR production system to continually produce 1 Tonne/day of SulfaCHAR with at least 30% by weight H_2S and a surface area of at least 250 m^2/g.

PROJECT RESULTS

CHAR started the commissioning and operation of the production unit and the full-scale demonstration of SulfaCHAR at removing H_2S at a biogas facility and testing the spent SulfaCHAR as a soil conditioner and fertilizer.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

Four years after CHAR Technologies opened its demonstration plant in London, Ontario, it expanded and moved its operation to the Niagara Region. Now, with new interest from the steel industry and a purchase order for over 900 tonnes of CHAR's bio coal, the company pulled up its London roots and moved to a bigger facility in Thorold, south of St. Catharines. The location gives the plant better access to the steel industry in Hamilton.

With the interest from the steel industry, CHAR closed a $6.6M financing from ArcelorMittal, one of the world's leading steel and mining companies, to advance deployments of their facilities. CHAR is also expanding the Thorold facility to both produce more biocarbon and start the production of RNG. CHAR is advancing additional projects, including one near Nipigon, Ontario, with First Nations partners, as well as a biomass-to-green hydrogen project in Saint-Félicien, Québec.

TECHNOLOGY CATEGORY:
Renewable Natural Gas

TRL START: 3

TRL AT COMPLETION: 5

PROJECT START:
July 2016

PROJECT COMPLETION:
October 2019

PROJECT BUDGET:
$2,270,000

INDUSTRY GRANTS FUNDING:
$890,090

PROJECT PARTICIPANTS:
ATCO, FortisBC, PNG

ENVIRONMENTAL BENEFITS:
GHG reduction

Project Completion and Results

iGEN

PROJECT TITLE

Self-powered Natural Gas Furnace (Micro Combined Heat and Power) National Demonstration.

PROJECT SCOPE

The i2 Hybrid Smart Furnace (HSF) has a unique, patented system that uses natural gas to generate both heat and electricity for use in the home. The self-powered i2 HSF is intended to be installed as a replacement for traditional residential natural gas furnaces with no extra connections.

PROJECT RESULTS

iGEN completed fabrication and assembly of one working prototype of its i2 furnace to be used as the manufacturing template for the products to be certified and completed CSA and UL certification. It also developed the manufacturing protocol for the implementation of the i2 furnace.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

NGIF facilitated securing financial support as well as general acceptance and support from the utility and industry players. Having the backing from this standpoint aided iGEN in further de-risking commercialization efforts, navigating government, utility, and partner channels, and defending the i2 unit value proposition.

iGEN hopes to empower end-users to expect more out of their furnace and leverage the ability for existing third party renewable energy technologies to dovetail into the i2 in a brand-agnostic fashion, further compounding overall efficiency, energy freedom, and resiliency.

TECHNOLOGY CATEGORY:
Heat and Power Generation

TRL START: 4

TRL AT COMPLETION: 7

PROJECT START:
January 2018

PROJECT COMPLETION:
June 2020

PROJECT BUDGET:
$637,650

INDUSTRY GRANTS FUNDING:
$165,000

PROJECT PARTICIPANTS:
ATCO, FortisBC, PNG, SaskEnergy

ENVIRONMENTAL BENEFITS:
GHG reduction

Project Completion and Results

ENERSION

PROJECT TITLE

A Green Cooling Technology That Uses Heat Instead of Electricity.

PROJECT SCOPE

Enersion had to develop and demonstrate an adsorption-based chiller that ranges from 1 tonne to more than 10 tonnes of cooling power. Enersion successfully finalized the prototype design and installed its chiller in the data centre.

PROJECT RESULTS

The chiller produced significantly more than 5KW of cooling and produced a lower temperature than 15^{0}C. In a few of the tests, cold water as low as 9.5^{0}C and cooling power of around 15KW were successfully observed. Since this project was completed in 2019, Enersion's chiller size capacity has increased, ranging between 20 tonnes and 400 tonnes of cooling power.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

NGIF collaborated with its Trusted Partner, Emissions Reduction Alberta (ERA), to leverage $1.8 MM in funding opportunity for the second phase of Enersion's project with NGIF. Currently, Enersion is working on a natural-gas-powered system for an indoor farm in Alberta and is in discussions with some indoor farms in the United Arab Emirates and Saudi Arabia.

TECHNOLOGY CATEGORY:
Energy Efficiency

TRL START: 4

TRL AT COMPLETION: 7

PROJECT START:
January 2018

PROJECT COMPLETION:
April 2019

PROJECT BUDGET:
$400,000

INDUSTRY GRANTS FUNDING:
$200,000

PROJECT PARTICIPANTS:
Enbridge, ATCO, FortisBC, PNG, SaskEnergy

ENVIRONMENTAL BENEFITS:
GHG reduction

Project Completion and Results

WESTPORT FUEL SYSTEMS

PROJECT TITLE

Development and Demonstration of Conformable CNG Storage Technology.

PROJECT SCOPE

Westport Fuel Systems' innovative conformable CNG storage system demonstrates the value proposition of natural gas and renewable natural gas (RNG) by advancing a technology that can deliver lower transportation emissions in the Canadian truck market. The project focused on the development, design verification, safety certification, and vehicle integration and testing of a novel new conformable Compressed Natural Gas (CNG) tank technology that replaces the bulky CNG cylinders typically associated with natural gas vehicles. The initial target application is pickup trucks.

PROJECT RESULTS

- The full-scale design was flexible to meet package needs, and it demonstrated a 50% enhancement over conventional cylinders in spare-wheel replacement example.
- Sub-scale prototypes were produced using proprietary manufacturing processes.
- Burst, environmental, and extreme temperature cycling tests were met.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

Given the shift in interest from natural gas and biomethane towards hydrogen, Westport expects that significant CNG and hydrogen development and manufacturing synergies need to be found to take the next steps in the development, demonstration, and commercialization of this promising technology.

TECHNOLOGY CATEGORY:
Low Emissions Transport

TRL START: 6

TRL AT COMPLETION: 7

PROJECT START:
December 2018

PROJECT COMPLETION:
December 2021

PROJECT BUDGET:
$2,472,890

INDUSTRY GRANTS FUNDING:
$500,000

PROJECT PARTICIPANTS:
ATCO, Enbridge, FortisBC, PNG

ENVIRONMENTAL BENEFITS:
Emissions/Efficiency

Project Completion and Results

GHGSAT

PROJECT TITLE

Field Pilot of GHGSat's Satellite-aircraft hybrid system in BC, Montney.

PROJECT SCOPE

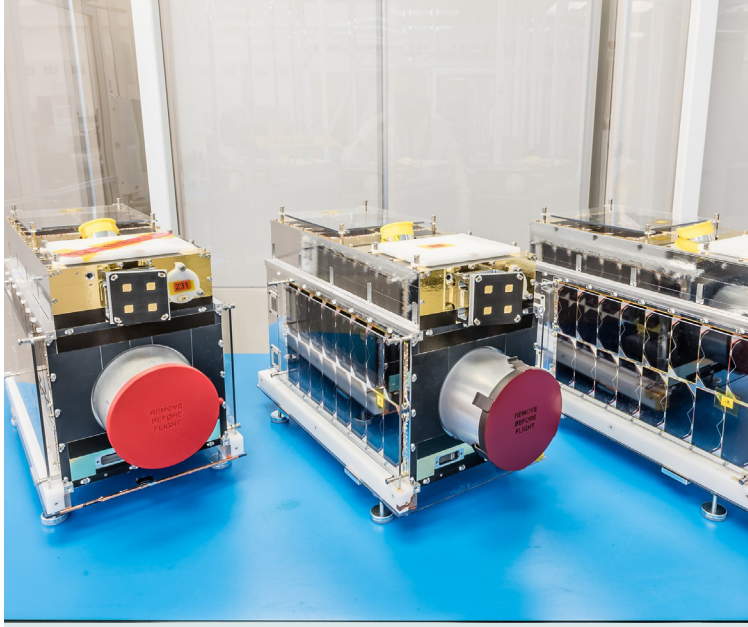
GHGSAT WAF P 1200x800. GHGSat offers a compelling alternative to Optical Gas Imaging (OGI) surveys, combining proprietary analytics with satellite, aircraft, and ground monitoring of methane emissions in a hybrid solution. GHGSat demonstrated equivalent annual methane leak mitigation compared to OGI surveys, while detecting big leaks at least three times faster, all at a lower cost to operators. GHGSat's solution is based on its innovative Fabry-Perot imaging spectrometer, deployed on both satellite and aircraft platforms.

PROJECT RESULTS

The project enabled GHGSat to verify and validate its solution through a field pilot of GHGSat's satellite-aircraft hybrid system in the BC Montney shale play. The satellite-aircraft hybrid system developed during this project included one demonstration satellite (GHGSat-D), two commercial satellites (GHGSat-C1 and C2), as well as one airborne variant instrument (GHGSat-AV1). GHGSat will expand this tiered system with an increasing fleet of satellite and airborne instruments, along with enhanced analytics services.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

GHGsat was one of 12 Canadian companies that made it onto Cleantech Group's Global Cleantech 100 list for 2023. With clients in oil and gas, coal mining, waste management, government, power generation, and agriculture, GHGSat offers a clear image of where the top problem spots in the world are and where the small, remote ones are too. And with six more satellites on the way, the image it provides will only get clearer.



TECHNOLOGY CATEGORY:
Methane Mitigation

TRL START: 7

TRL AT COMPLETION: 8

PROJECT START:
October 2019

PROJECT COMPLETION:
March 2022

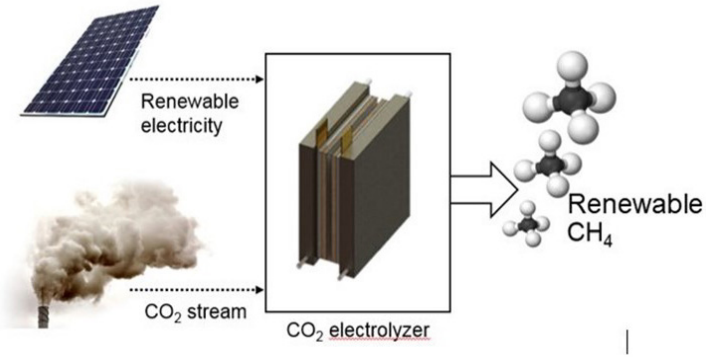
PROJECT BUDGET:
$3,095,459

INDUSTRY GRANTS FUNDING:
$257,963

PROJECT PARTICIPANTS:
Birchcliff Energy, Shell Canada, Tourmaline

ENVIRONMENTAL BENEFITS:
CH_4 reduction

Project Completion and Results



UNIVERSITY OF TORONTO

PROJECT TITLE

Renewable Natural Gas Through Electrocatalytic CO_2 Conversion.

PROJECT SCOPE

This project is the first phase of a three-path roadmap towards the commercialization of a new technology for renewable natural gas synthesis from waste carbon dioxide. This project will advance electrocatalytic technology and demonstrate a prototype system that converts CO_2 into methane at metrics that enable cost-competitive RNG production, as low as $10/GJ. This project will be carried out in three related research and development thrusts that will include catalyst materials engineering, systems design, and prototype demonstration.

PROJECT RESULTS

The series of publications that resulted from this project have significantly improved the state-of-the-art in CO_2 electroreduction to renewable natural gas technologies and have offered improvements to selectivity, rate, and stability, ultimately advancing TRL and providing a foundation for further improvement. The work completed during this project also brought to light carbon losses that result in low single-pass conversion efficiencies, an outcome that was not previously considered closely prior to this project.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

Future steps to bring this technology to market should shift the primary focus from catalyst design to reactor engineering to prioritize full-cell energy efficiency improvements and scaling of prototype electrode scale.

TECHNOLOGY CATEGORY:
Renewable Natural Gas

TRL START: 3

TRL AT COMPLETION: 4

PROJECT START:
April 2018

PROJECT COMPLETION:
March 2022

PROJECT BUDGET:
$1,590,000

INDUSTRY GRANTS FUNDING:
$150,000

PROJECT PARTICIPANTS:
ATCO, Enbridge, FortisBC, PNG

ENVIRONMENTAL BENEFITS:
CO_2 Utilization

Project Completion and Results

COMBUSTION & ENERGY SYSTEMS (CONDEX)

PROJECT TITLE

Micro-Box ConDex Condensing Economizer.

PROJECT SCOPE

The technology aims to improve boiler and other fired equipment's fuel efficiency by up to 95% and reduce CO_2 emissions. It recovers and reuses waste heat energy from exhaust gas, reducing fuel consumption and achieving 93%-97% fuel efficiency.

PROJECT RESULTS

The measurement and verification (M&V) final third-party report prepared by Armco Solutions Inc. showed significant results, including an average natural gas savings of 10.6% and a CO_2 savings of 91.29 tonnes per year. This project marks a significant milestone in energy efficiency and emission reduction in the small boiler market.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

By efficiently recycling heat, this technology significantly reduces the demand for electricity, natural gas, and other energy sources, resulting in enhanced environmental performance and financial benefits, making it a valuable investment for industry.

TECHNOLOGY CATEGORY:
Heat and Power Generation

TRL START: 4

TRL AT COMPLETION: 5

PROJECT START:
February 2015

PROJECT COMPLETION:
August 2022

PROJECT BUDGET:
$110,000

INDUSTRY GRANTS FUNDING:
$57,130

PROJECT PARTICIPANTS:
Enbridge

ENVIRONMENTAL BENEFITS:
CO_2 reduction

Project Completion and Results

QUADROGEN POWER SYSTEMS

PROJECT TITLE

Landfill Biogas Clean-up & Upgrading System for Commercialization.

PROJECT SCOPE

Quadrogen plans to develop a prototype for a Landfill Gas Clean-Up and Upgrading System, demonstrating the technical and commercial viability of producing RNG from landfill gas at Village Farms, Delta, BC. The technology will generate up to 40,000 gigajoules of RNG per year and will be injected into the FortisBC pipeline.

PROJECT RESULTS

Quadrogen's Integrated Biogas Clean-up System (IBCS), utilizing its patented C3P Process, sets a new standard in biogas treatment by achieving contaminant removal down to unmatched parts-per-billion (ppbv) levels. This innovative system converts biogas into high-value outputs and has proven to upgrade landfill gas with up to 17% nitrogen from Vancouver Delta Landfill to meet FortisBC's stringent biomethane quality specifications for pipeline injection. With renewable gas now supplied to FortisBC, a participant of the Industry Grants program, the IBCS demonstrates strong commercial viability and industry impact.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

Quadrogen's Landfill Gas Clean-Up and Upgrading System transforms landfill gas into Renewable Natural Gas (RNG) that meets pipeline standards, addressing reliability issues and lowering costs. By producing high-value RNG from CO_2 and green hydrogen, it enhances project economics while significantly reducing GHG emissions and air pollutants, driving sustainability in the natural gas industry.

TECHNOLOGY CATEGORY:
Renewable Natural Gas

TRL START: 6

TRL AT COMPLETION: 8

PROJECT START:
August 2018

PROJECT COMPLETION:
September 2022

PROJECT BUDGET:
$2,750,000

INDUSTRY GRANTS FUNDING:
$265,532

PROJECT PARTICIPANTS:
ATCO, FortisBC, PNG

ENVIRONMENTAL BENEFITS:
GHG reduction

Project Completion and Results

STONE MOUNTAIN TECHNOLOGIES (SMTI) - ANESI

PROJECT TITLE

Development of a Hybrid Gas-Electric Heat Pump for Residential Heating, Cooling, and DWH.

PROJECT SCOPE

The project aims to develop a gas-fired absorption heat pump-1.5 RT electric air conditioner with a heating COP of 1.45 and a cooling COP of 3.8, suitable for medium-sized homes and new construction, offering a year-round heating-cooling solution with strong energy savings.

PROJECT RESULTS

The project allowed SMTI to develop and demonstrate both the smaller heating capacity and a year-round heating-cooling solution in an installation-cost-competitive manner that features strong energy savings. The integrated Beta prototype achieved a heating COP of 1.42 at the design condition, which exceeded the project milestone of 1.40. The chiller portion of the Beta prototype achieved a COP of 3.0 vs. the goal of 3.7 at the design condition.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

SMTI's technology offers fuel-efficient technology for Canadian homes and businesses. The platform offers a cost-competitive "all-in-one" product that provides space heating, space cooling, and water heating.

TECHNOLOGY CATEGORY:
Heat and Power Generation

TRL START: 3

TRL AT COMPLETION: 4

PROJECT START:
September 2019

PROJECT COMPLETION:
December 2022

PROJECT BUDGET:
$898.588

INDUSTRY GRANTS FUNDING:
$434,144

PROJECT PARTICIPANTS:
SaskEnergy, Enbridge, FortisBC, PNG

ENVIRONMENTAL BENEFITS:
GHG reduction, Energy savings

Project Completion and Results

HYPERION GLOBAL ENERGY

PROJECT TITLE

Development and demonstration of a tandem carbon recycling system for carbon capture and utilization from exhaust flue gas stream.

PROJECT SCOPE

The project scope is to showcase a unique 1 Tonne CO_2/day carbon capture and utilization system, demonstrating its scalable commercial application. The system, a drop-in design, captures CO2 from flue stacks and converts it into profitable minerals like calcium carbonate.

PROJECT RESULTS

Hyperion successfully installed and tested a system to process CO_2 from a cement flue gas stream at Lafarge, producing PCC mineral product at a flow rate range of 1 to 3 T CO_2/day. The system exceeded the target of 98% purity and specs at 98.7% $CaCO_3$, with potential for further optimization and testing.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

- A lower cost of production, with the use of waste chemicals inputs as well as creating offtake revenue from sale of valuable mineral components that offer permanent CO_2 storage.
- A significantly improved carbon footprint, since the input chemicals are regenerated from waste streams.
- Less waste products.

TECHNOLOGY CATEGORY:
CCUS

TRL START: 5

TRL AT COMPLETION: 7

PROJECT START:
April 2022

PROJECT COMPLETION:
June 2023

PROJECT BUDGET:
$1,654,000

INDUSTRY GRANTS FUNDING:
$425,000

PROJECT PARTICIPANTS:
ATCO, Enbridge, FortisBC, Tourmaline Oil, Birchcliff, CNRL

ENVIRONMENTAL BENEFITS:
CO_2 reduction

Project Completion and Results

KINITICS AUTOMATION

PROJECT TITLE

Demonstration of a shape memory alloy-based valve actuator for zero bleed valves at natural gas production facilities.

PROJECT SCOPE

The Kinitics project aims to develop and demonstrate a replacement for methane-venting pneumatic control devices at Alberta production well sites. The project will advance the industrial deployment of shape memory alloy technology to provide effective process control within standard wellsite infrastructure. The project will integrate market-ready actuators into control systems at operating pilot sites across Alberta's natural gas facilities, reducing greenhouse gas emissions.

PROJECT RESULTS

Six models of the KVA38 were successfully developed and commercialized for the Canadian energy market. AC and DC power options are available across three stroke lengths. Product performance targets were met or exceeded.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

As a result of project deployments, 91 tonnes of CO_2e are abated annually. Kinitics has added 6 full-time positions to support the project, including sales, product development, and production staff. Over the course of the project, Kinitics worked directly with five different contracted firms, including equipment integrators, on-site trades, and EPCs. As a result, these firms have gained the knowledge needed to successfully integrate KVA38s into gas facility infrastructure in addition to a more general understanding of electrified wellsites.

TECHNOLOGY CATEGORY:
Methane Mitigation

TRL START: 6

TRL AT COMPLETION: 9

PROJECT START:
March 2021

PROJECT COMPLETION:
April 2024

PROJECT BUDGET:
$2,668,833

INDUSTRY GRANTS FUNDING:
$209,081

PROJECT PARTICIPANTS:
Perpetual Energy, Petronas
Tourmaline Oil, CNRL

ENVIRONMENTAL BENEFITS:
Emissions reduction

Project Completion and Results

POINT 3 BIOTECH

PROJECT TITLE

Dairy/Poultry/Hog Co-digestion to Enable Community Scale Digester Development.

PROJECT SCOPE

Mixed manure blends will be processed via anaerobic digestion (AD) to exploit poultry manure's potential. A Canadian team, including pioneers in on-farm biogas, has assembled reactors in four-scale groups. This project aims to unite farms and remove barriers to building systems.

PROJECT RESULTS

The project achieved maximum functional poultry manure utilization recipes for production modelling. It provided more knowledge about reactor processes and function, guiding biogas-enhancing solutions. Sensors provided advanced warning of threats, ensuring reliable performance. Sensors used in the project demonstrated the capacity to increase annual biogas production by 10-20% through consistency/reliability alone, based on the early warning function provided. Point 3 Biotech and the consortium are seeking candidates for the first biorefinery.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

Point 3 Biotech has developed digester management tools to enable biogas opportunities in Canada. The British Columbia government has commissioned a study on biogas clusters, aiming for net-zero GHG emissions by 2050. This project reduces risk and allows nascent projects to advance.

TECHNOLOGY CATEGORY:
Renewable Natural Gas

TRL START: 5

TRL AT COMPLETION: 7

PROJECT START:
November 2020

PROJECT COMPLETION:
February 2023

PROJECT BUDGET:
$1,000,000

INDUSTRY GRANTS FUNDING:
$300,000

PROJECT PARTICIPANTS:
ATCO, Enbridge, FortisBC, PNG, SaskEnergy

ENVIRONMENTAL BENEFITS:
GHG reduction

Project Completion and Results

WESTGEN TECHNOLOGIES

PROJECT TITLE

Unlocking EPOD Economic Zero Bleed Pneumatic Instrument Air Retrofit Solution.

PROJECT SCOPE

Westgen Technologies is promoting Engineered Power On Demand (EPOD) technology as a cost-effective solution for remote power generation, specifically targeting instrument air compressors. The project aims to establish a proven track record and develop EPOD-Lite, a more affordable variant with a 50% lower cost. The project will also minimize economic uncertainties associated with instrument air retrofits.

PROJECT RESULTS

The project achieved a significant reduction of 9,027 tCO_2e/year from the 12 deployed units, marking a noteworthy contribution to Alberta's emissions reduction target as well as much greater impacts when considering the deployment of Westgen's product that was enabled by this project (now over 550 units deployed).

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

Westgen provides upstream producers with a turnkey solution for methane venting from pneumatic devices. The EPOD product provides material cost savings, provides a measurable reduction in GHG emissions, and allows for immediate compliance with state, provincial, and federal regulations on methane venting.

TECHNOLOGY CATEGORY:
Methane Mitigation

TRL START: 6

TRL AT COMPLETION: 9

PROJECT START:
March 2021

PROJECT COMPLETION:
March 2023

PROJECT BUDGET:
$4,000,000

INDUSTRY GRANTS FUNDING:
$136,446

PROJECT PARTICIPANTS:
Petronas, Perpetual Energy, Tourmaline Oil, CNRL

ENVIRONMENTAL BENEFITS:
Emissions reduction

Project Completion and Results

ETALIM

PROJECT TITLE

Demonstration of a highly reliable remote power generation solution, featuring no sliding or rotating parts in the core engine.

PROJECT SCOPE

The project involved designing, assembling, testing, and piloting a remote power unit based on Etalim's thermo-acoustic technology, 1GEN, to generate 24VDC power for six months in a wellsite electrification application.

PROJECT RESULTS

Two successful field pilots were conducted at two independent producers, where a 5-well and a 9-well pad were powered by Etalim's 1GEN for over 5,675 hours during extreme temperatures, ranging from -35°C to +33°C. Continuous remote insights, including uptime, power consumption and fuel usage, were provided to the producers to help optimize future wellsite operations and system design.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

Etalim's 1GEN (700W continuous power, 2,400W peak) was tested for wellsite electrification, which aims to cost-effectively reduce methane venting emissions in the Canadian oil and gas industry by wellsite electrification.

TECHNOLOGY CATEGORY:
Methane Mitigation

TRL START: 7

TRL AT COMPLETION: 8

PROJECT START:
April 2022

PROJECT COMPLETION:
September 2024

PROJECT BUDGET:
$1,441,000

INDUSTRY GRANTS FUNDING:
$149,829

PROJECT PARTICIPANTS:
Petronas, Perpetual Energy, Tourmaline Oil, Birchcliff

ENVIRONMENTAL BENEFITS:
Emissions reduction

Project Completion and Results

HYDROGEN OPTIMIZED

PROJECT TITLE

Development of Large-scale Green Hydrogen Production using Rugged Cell Water Electrolysis.

PROJECT SCOPE

The project aims to generate hydrogen gas purity data for a water electrolysis cell using solar panels, simulated electrical grid connections, and simulated wind system connections.

PROJECT RESULTS

The project successfully achieved or exceeded all goals, with the solar cell operating continuously outdoors for over a year, and the RuggedCell™ demonstrating its dynamic capabilities and ease of operation during intermittent loading, achieving hydrogen purity of >99.9%.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

The RuggedCell™ is designed to operate under high currents, which maximize hydrogen production while maintaining a compact and robust cell structure. The company's vision is to make large-scale green hydrogen economically feasible for industrial applications by leveraging its novel RuggedCell™ technology.

TECHNOLOGY CATEGORY:
Low Carbon Hydrogen

TRL START: 4

TRL AT COMPLETION: 6

PROJECT START:
August 2021

PROJECT COMPLETION:
December 2023

PROJECT BUDGET:
$900,000

INDUSTRY GRANTS FUNDING:
$300,000

PROJECT PARTICIPANTS:
ATCO, Enbridge, FortisBC, PNG, SaskEnergy

ENVIRONMENTAL BENEFITS:
CO_2 reduction

Project Completion and Results

INNOVATIVE FUEL SYSTEMS

PROJECT TITLE

Demonstration of Advanced Dual-fuel System for Class 8 Heavy Trucks.

PROJECT SCOPE

Innovative Fuel Systems (IFS) has developed a dual fuel technology that enables heavy-duty truck engines to replace up to 50% of diesel fuel with cleaner natural gas, resulting in up to 30% fuel cost savings and 9% GHG reduction (increased to 13% since the completion of the project).

PROJECT RESULTS

- Average diesel fuel displacement close to 50%.
- Dual fuel performance equal to diesel-only engine performance.
- No “check engine” lights during commercial runs.
- No issues related to dual fuel operation.
- More than 9% CO_2 emissions reductions.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

IFS’ solution transforms heavy-duty diesel engines into dual-fuel engines that blend natural gas with diesel fuel. This technology allows fleet operators to achieve significant fuel cost savings of up to 30% and reduce greenhouse gas (GHG) emissions by more than 9%.

TECHNOLOGY CATEGORY:
Low Emissions Transport

TRL START: 7

TRL AT COMPLETION: 9

PROJECT START:
March 2021

PROJECT COMPLETION:
September 2024

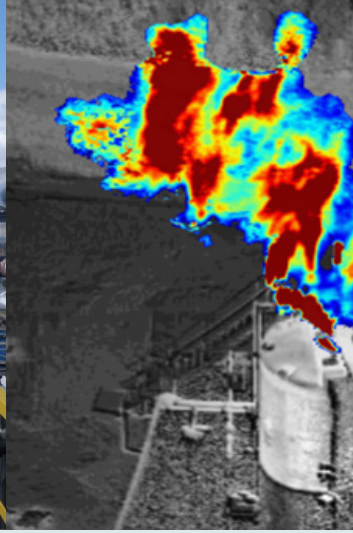
PROJECT BUDGET:
$2,761,302

INDUSTRY GRANTS FUNDING:
$150,000

PROJECT PARTICIPANTS:
ATCO, Enbridge

ENVIRONMENTAL BENEFITS:
GHG reduction

Project Completion and Results



KUVA SYSTEMS

PROJECT TITLE

Methane Imaging Detection, Quantification, Work Order Deployment, and Repair Validation Solution for Tank Venting.

PROJECT SCOPE

The project aims to demonstrate a cost-effective and automated methane imaging solution for detecting and quantifying emissions at 40 natural gas upstream sites with tanks.

PROJECT RESULTS

- New tower designed, field tested, and proven.
- Major changes in software (Kuva platform), including a 300% increase in viewing capability (now increased to 600%) for full 360 degree panoramic viewing.
- Completed well site inspections of a minimum of 2 weeks/site in all seasons and provided reports to operators of detected and measured emissions from tanks, flares, etc.
- UI expanded for customers to easily evaluate detections from sites and developed emissions rate reporting using Kuva's quantification.

VALUE FOR INDUSTRY / ORGANIZATIONAL GROWTH

- Fast detection, quantification and root cause analysis of methane & VOC emissions for improved methane mitigation.
- Continuous monitoring leads to more emissions reduction, retained product, safety, opportunities for operational efficiencies, and regulatory compliance.
- Improved monitoring for tanks and other challenging equipment like flares and compressors.

TECHNOLOGY CATEGORY:
Methane Mitigation

TRL START: 8

TRL AT COMPLETION: 9

PROJECT START:
April 2022

PROJECT COMPLETION:
July 2024

PROJECT BUDGET:
$360,000

INDUSTRY GRANTS FUNDING:
$66,354

PROJECT PARTICIPANTS:
Tourmaline, Shell Canada, Birchcliff Energy, Rubellite Energy, Petronas, Mitsubishi

ENVIRONMENTAL BENEFITS:
Methane & VOC emissions reduction

Appendix B: Project Summary

Overall Project Portfolio

Number	Recipient	Year	Round	Location	Technology Category	NGIF Contribution	Project Title
1	Anaergia	2023	Round 9-GCC1	Ontario	RNG	$353,600.00	Converting Agricultural Waste into Pipeline-Quality RNG through Hyperthermophilic Hydrolysis.
2	Anodyne Chemistries	2022	Round 8	British Columbia	Value-added Products	$122,000.00	Bio-electrochemical Conversion of Natural Gas and CO_2 into Methanol .
3	Apogee Ceramics	2021	Round 7	Ontario	Heat and Power Gen.	$160,000.00	High Efficiency Natural Gas Fueled Solid Oxide Fuel Cell Micro-CHP Development.
4	Arolytics	2022	Round 8	Alberta	Digital Technologies	$100,000.00	Development and Demonstration of an Integrated Emissions Management Platform.
5	Aurora Hydrogen	2023	Round 9-GCC1	Alberta	Hydrogen	$918,000.00	Microwave Pyrolysis Process for Clean and Distributed Hydrogen Production.
6	Ayrton Energy	2023	Round 9-GCC2	Alberta	Hydrogen	$552,300.00	Hydrogen LOHC: Scaling Next-Gen Technology for Hydrogen Storage & Transportation.
7	BKR Energy	2022	Round 8	Ontario	Digital Technologies	$93,250.00	Smart Fuel Switching Controller for Residential Homes.
8	C-Quester	2023	Round 9-GCC1	California	CCUS	$768,300.00	Validation of an integrated pilot-scale point source CO_2-capture system.
9	Carbon Upcycling Technologies	2019	Round 5	Alberta	CCUS	$200,000.00	Prototype Development and Testing of CO_2 Membrane for Carbon Capture.
10	CHAR Biocarbon	2020	Round 6	Ontario	RNG	$300,000.00	Demonstration of high temperature Pyrolysis to RNG.
11	CHAR Technologies	2017	Round 0	Ontario	RNG	$350,000.00	Demonstration of a Novel Activated Biochar for H_2S Removal.
12	Cielo Carbon Solutions	2023	Round 9-GCC2	British Columbia	CCUS	$591,300.00	Point Source Carbon Capture for Upstream Compressors.
13	Clean Energy Fuels	2021	Round 7	Alberta	Transportation	$309,782.51	Commercial demonstration of a CNG refueling station.

Overall Project Portfolio

Number	Recipient	Year	Round	Location	Technology Category	NGIF Contribution	Project Title
14	CleanO2 Carbon Capture Technologies	2017	Round 0	Alberta	CCUS	$100,000.00	Development of CleanO2's Carbon Capture Technology to Soap.
15	Combustion & Energy Systems (CONDEX)	2017	Round 0	Ontario	Heat and Power Gen.	$57,130.00	Micro-Box ConDex Condensing Economizer.
16	Crystal Clearwater Resources	2023	Round 8 Bridge	Texas	Water Management	$227,600.00	Field pilot of Crystal Clear Resources' (CCR) LTDis® Technology.
17	Effect Home Builders	2018	Round 2	Alberta	Energy Efficiency	$95,000.00	Net-zero Home Demonstration of Micro Combined Heat and Power.
18	Ekona Power	2018	Round 3	British Columbia	Hydrogen	$60,000.00	Development and Testing of a Proof-of-Concept Tri-Generation Pyrolysis (TGP) Platform for Low-Cost Green Hydrogen Production.
19	Ekona Power	2019	Round 5	British Columbia	Hydrogen	$500,000.00	Development and Field Testing of a Tri-generation Pyrolysis (TGP) System for Low-cost, Clean Hydrogen Production.
20	Ekona Power	2023	Round 9-GCC1	British Columbia	Hydrogen	$180,300.00	Pilot Demonstration of Ekona's Methane Pyrolysis Solution for the Production of Clean Hydrogen and Solid Carbon.
21	Enersion	2017	Round 1	Ontario	Heat and Power Gen.	$200,000.00	A Green Cooling Technology That Uses Heat Instead of Electricity.
22	Enersion	2020	Round 6	Ontario	Heat and Power Gen.	$300,000.00	Demonstration of Natural Gas Powered Quad-generation with a 41% GHG Reduction.
23	Enviro Power	2019	Round 4	Connecticut	Heat and Power Gen.	$292,500.00	Demonstration of natural gas based SmartWatt Boiler 6.0 micro-combined heat and power (mCHP) system for residential applications.
24	Etalim	2020	Round 6	Alberta	Methane Mitigation	$149,829.41	Pilot Demonstration of a Natural Gas Engine without Sliding or Rotating Parts for Remote Power use.

Overall Project Portfolio

Number	Recipient	Year	Round	Location	Technology Category	NGIF Contribution	Project Title
25	Etalim	2023	Round 9-GCC2	British Columbia	Heat and Power Gen.	$250,100.00	Thermo-Acoustic Wellsite Electrification for Methane Abatement.
26	G4 Insights	2017	Round 0	British Columbia	RNG	$890,089.99	PyroCatalytic Hydrogenation of Woody Biomass for RNG Production.
27	G4 Insights	2020	Round 6	British Columbia	RNG	$300,000.00	Demonstration Project for G4 PyroCatalytic Hydrogenation (PCH) Reactor Scale Up Validation.
28	GeoTeknica	2023	Round 9-GCC2		Emissions Monitoring	$196,800.00	Continuous Real-time Emissions Quantification: Demonstration of a Massively Scalable Laser Scanner for Leaks Smaller than 100g/h.
29	GHGSat	2019	Round 4	Quebec	Emissions Monitoring	$257,963.00	Field Pilot of GHGSat's Satellite-aircraft hybrid system in the BC Montney.
30	Gradient Thermal	2021	Round 7	Alberta	Hydrogen	$269,709.00	Prototype Development of a Hydrogen-fueled End-user Heating Appliance. SyncFURNACE uses a premix burner system designed for natural gas combustion.
31	Great Northern Power Corp	2021	Round 7	Alberta	Waste Heat Utilization	$50,000.00	Field pilot of "EXPANDER-175" – a 175 kW, modular, Organic Rankine Cycle (ORC) waste heat recovery system for natural gas compressors.
32	GreenBox Energy	2024	Round 9-GCC1	Ontario	Digital Technologies	$258,100.00	Cutting Residential Carbon and Utility Bills with the GreenBox Hybrid Heating Smart Controller.
33	HARVEST Systems	2018	Round 2	Ontario	Energy Efficiency	$263,340.00	Demonstration Project for the Pizza Oven Waste Energy Recovery (POWER) System within Restaurant Environments.
34	HARVEST Systems	2023	Round 9-GCC1	Ontario	Waste Heat Utilization	$74,450.00	Testing and Demonstration project for fryer adaption of HARVEST (formerly POWER) system within a restaurant environment.

Overall Project Portfolio

Number	Recipient	Year	Round	Location	Technology Category	NGIF Contribution	Project Title
35	Highbury Energy	2022	Round 8	Ontario	RNG	$500,000.00	Techno-Economic Assessment to displace Natural Gas with Renewable Fuel Gas at the Cariboo Pulp & Paper mill at Quesnel, BC.
36	Hiller Truck Tech	2019	Round 4	Ontario	Transportation	$250,000.00	Optimization and Demonstration of Efficient Dual Fuel Technology on Heavy Duty Vehicles (Diesel Fuel Displacement with Natural Gas).
37	Homy Building Solutions	2022	Round 8	Ontario	Heat Pump	$462,000.00	Customization and modification of a first in-kind residential Gas Absorption Heat Pump (GAHP) technology for the North American market.
38	Hydrogenics Corporation	2017	Round 0	Ontario	Hydrogen	$200,000.00	Power-to-Gas Renewable Integration and Decarbonization of Natural Gas.
39	Hydrogen in Motion	2023	Round 9-GCC1	British Columbia	Hydrogen	$405,300.00	Scale up, Certification & Demonstration of Hydrogen In Motion (H2M) Innovative Low Pressure Solid State Hydrogen Storage.
40	Hydrogen Optimized	2020	Round 6	Ontario	Hydrogen	$300,000.00	Development of large-scale Green Hydrogen Production using Rugged Cell Water Electrolysis.
41	Hydrogen Optimized	2024	Round 9-GCC2	Ontario	Hydrogen	$113,200.00	Commercial-scale demonstration of clean hydrogen production and clean deuterium oxide co-production.
42	Hydron Energy	2023	Round 8 Bridge	Ontario	RNG	$365,900.00	Waste to Fuel: Accelerating commercialization of the lowest cost & smallest scale novel biogas-to-RNG upgrading system.
43	Hyperion Global Energy	2019	Round 5	Ontario	CCUS	$425,000.00	Development and demonstration of a tandem carbon recycling system for carbon capture and utilization from exhaust flue gas stream.
44	iGEN Technologies	2017	Round 0	Ontario	Heat and Power Gen.	$165,000.00	i2 Hybrid Smart Furnace.
45	Innova Cleantech	2022	Round 8	British Columbia	Hydrogen	$397,000.00	Hydrogen production via catalytic pyrolysis with near-zero GHG emissions.

Overall Project Portfolio

Number	Recipient	Year	Round	Location	Technology Category	NGIF Contribution	Project Title
46	Innovative Fuel Systems	2020	Round 6	Alberta	Transportation	$150,000.00	Demonstration of Advanced Dual-fuel system for class 8 Heavy Trucks.
47	Ionada Incorporated	2020	Round 6	Ontario	CCUS	$150,000.00	Pilot demonstration and deployment of membrane contactor technology to capture carbon from emission sources.
48	Ionada Incorporated	2023	Round 8 Bridge	Ontario	CCUS	$250,000.00	Bison Low Carbon Ventures/Tidewater Carbon Capture Project. Net Zero Natural Gas Production using Modular Membrane Decarbonization.
49	Kinitics Automation	2019	Round 5	British Columbia	Methane Mitigation	$209,081.00	Demonstration of a shape memory alloy-based valve actuator for zero bleed valves at natural gas production facilities.
50	Kuva Canada	2020	Round 6	Alberta	Emissions Monitoring	$66,354.09	Methane Imaging Detection, Quantification, Work Order Deployment and Repair Validation Solution for Tank Venting.
51	Luminescent Solar Power	2023	Round 8 Bridge	Israel	Waste Heat Utilization	$370,000.00	Reciprocating Engine Gas Compressor Waste heat recovery Heat Engine.
52	Luxmux Technology Corporation	2019	Round 4	Alberta	Emissions Monitoring	$85,620.00	Demonstration of Accurate Remote Monitoring System for Emissions Measurement at Gas Production Sites.
53	Mantel Capture	2024	Round 9-GCC2	Massachusetts	CCUS	$368,600.00	Decarbonizing Natural Gas Fired Steam Boilers Using Novel Molten Borates.
54	Mitis	2021	Round 7	Belgium	Heat and Power Gen.	$92,359.30	Technology development and validation of a 1 KWe mCHP-HP system.
55	Molten Alloy Technology	2021	Round 7	Alberta	Hydrogen	$411,371.10	Molten Alloy Reactors for Methane Pyrolysis and Carbon Dioxide Decomposition.
56	New Wave Hydrogen	2019	Round 5	Alberta	Hydrogen	$872,017.00	Development and Demonstration of Supersonic Compression-based Natural Gas Reforming for Clean Hydrogen production.

Overall Project Portfolio

Number	Recipient	Year	Round	Location	Technology Category	NGIF Contribution	Project Title
57	Nuionic Technologies	2021	Round 7	Alberta	Hydrogen	$316,841.53	Low Carbon Hydrogen Utilizing Microwave Catalytic Reforming.
58	Osmoses	2024	Round 9-GCC2	Massachusetts	RNG	$609,750.00	Producing Low-Carbon, Cost-Effective Renewable Natural Gas with High-Performance Membranes.
59	Point 3 Biotech	2019	Round 5	British Columbia	RNG	$300,000.00	Dairy/Poultry/Hog Co-digestion to Enable Community Scale Digester Development.
60	Power to Hydrogen	2023	Round 9-GCC1	Ohio	Hydrogen	$177,000.00	Decarbonizing backup power with cost-effective electrolysis.
61	Prahbu Labs	2022	Round 8	California	Methane Mitigation	$225,000.00	Oxiperator for Vents and Flare Reduction.
62	Quadrogen Power Systems	2018	Round 2	British Columbia	RNG	$265,532.00	Landfill Biogas Clean-up & Upgrading System for Commercialization.
63	Qube Technologies	2023	Round 9-GCC1	Alberta	Emissions Monitoring	$402,000.00	Emissions Localization and Quantification Through Continuous Monitoring Systems.
64	RadMax Technologies	2019	Round 4	Washington	Heat and Power Gen.	$72,460.00	Demonstration of Electrical Power Generation with Positive Displacement Rotary Expander at Natural Gas Production Letdown Point.
65	Saltworks Technologies	2019	Round 4	British Columbia	Water Management	$185,994.00	Demonstration of Innovative Produced Water Management System at Natural Gas Production Sites.
66	SCFCan	2021	Round 7	Alberta	Water Management	$100,000.00	Carbon Dioxide Extraction System for the Recovery of Oil from Cuttings.
67	Smarter Alloys	2021	Round 7	Ontario	Waste Heat Utilization	$304,058.38	Prototype Testing in relevant environment to develop and pilot a commercial, modular 5 – 10 kW SMA core and generator.
68	Solistra Corporation	2019	Round 5	Ontario	Hydrogen	$100,000.00	Solar Conversion of Carbon Dioxide and Natural Gas into Synthesis Gas.
69	Spherical Rotors	2024	Round 9-GCC2	Alberta	Heat and Power Gen.	$102,500.00	Development and Commercialization of a Modular Zero-Emissions Natural Gas Expander System.

Overall Project Portfolio

Number	Recipient	Year	Round	Location	Technology Category	NGIF Contribution	Project Title
70	Stone Mountain Technologies	2018	Round 2	Tennessee	Heat Pump	$434,144.00	Development of a Hybrid Gas-Electric Heat Pump for Residential Heating, Cooling and DWH.
71	Stone Mountain Technologies	2020	Round 6	Tennessee	Heat Pump	$600,000.00	Demonstration of Thermally Driven Heat Pumps for Residential Heating Applications.
72	Stone Mountain Technologies	2022	Round 8	Tennessee	Heat Pump	$348,728.00	Phase 2: Development of a Hybrid Gas-Electric Heat Pump for Residential Heating, Cooling and DWH.
73	TerraFixing	2020	Round 6	Ontario	CCUS	$100,460.61	Direct Air Capture of CO_2 using Adsorbents.
74	ThermoLift	2019	Round 4	New York	Heat Pump	$525,000.00	Demonstration of an Advanced Natural Gas-Driven Heat Pump & Air Conditioner.
75	The University of British Columbia	2022	Round 8	British Columbia	Hydrogen	$435,000.00	Deployment of Low-Cost, Low-Emission Hydrogen Plant from Natural Gas Pyrolysis.
76	True Energy	2018	Round 3	Ontario	RNG	$335,600.00	Mobile Pilot for Treatment of Sewage Sludge and Other Organics.
77	Universal Matter	2022	Round 8	Ontario	Hydrogen	$500,000.00	Natural Gas Co_nversion to Graphene by Flash Joule Heating Process.
78	University of Alberta/ Aurora Hydrogen	2020	Round 6	Alberta	Hydrogen	$150,000.00	Development of Microwave pyrolysis of natural gas to produce blue hydrogen.
79	University of Toronto	2018	Round 4	Ontario	RNG	$150,000.00	Renewable Natural Gas Through Electrocatalytic CO_2 Conversion.
80	Vortis Carbon	2022	Round 8	Alberta	CCUS	$100,000.00	Novel Carbon Capture through motion separation
81	Westport Power	2017	Round 1	British Columbia	Transportation	$500,000.00	Renewable Natural Gas Through Electrocatalytic CO_2 Conversion.
82	Westgen Technologies	2019	Round 5	Alberta	Methane Mitigtion	$136,446.00	Unlocking EPOD Economic Zero Bleed Pneumatic Instrument Air Retrofit Solution.

Overall Project Portfolio

Number	Recipient	Year	Round	Location	Technology Category	NGIF Contribution	Project Title
83	ZEET	2020	Round 6	Alberta	Waste Heat Utilization	$53,909.02	Compressor Engine Exhaust Heat Recovery Demonstration.

Questions?

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