July 1st, 2022

North Dakota Industrial Commission
State Capitol – Fourteenth Floor
600 East Boulevard Avenue
Bismarck, ND 58505

To Whom It May Concern,

Re: Enerplus CSEA grant application "Geothermal Power Generation for Oil and Gas Production"

On behalf of Enerplus Resources (USA) Corporation, I submit the referenced grant application for consideration by the Clean Sustainable Energy Authority. We request a grant match of $1,098,500 for the proposed project, with a total duration 30 months. Enerplus commits to match the granted funds to complete the body of work described in our proposal for a total project proposal cost of $2,197,000.

Enerplus is proposing to commercially implement a geothermal power generation technology on the produced water stream of Enerplus facilities. Captured heat is used in an Organic Rankine Cycle ("ORC") to create renewable power on location. The created power is then used on site to offset natural gas generated power and reduce scope 1 emissions. This technology offsets the use of industrial water coolers to cool the product stream to meet pipeline specifications. At this time, implementation is not economic, therefore we are asking the CSEA for funding to help improve power generation efficiency and evaluate other heat sources on location to be considered in the ORC. Successful reduction in emissions associated with this project will provide proof of concept that can lead to field-wide deployment of facilities with the potential to reduce 5-10% of Enerplus' Scope 1 CO2e emissions.

Sincerely,

Wade Hutchings
Chief Operating Officer

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Clean Sustainable Energy Authority

North Dakota Industrial Commission

Application

Project Title: Geothermal Power Generation for Oil & Gas Production

Applicant: Enerplus Corporation (USA)

Date of Application: July 1, 2022

Amount of Request
Grant: $1,098,500
Loan: $0

Total Amount of Proposed Project: $2,197,000

Duration of Project: 30 months

Point of Contact (POC): Bonnie Ellwood

POC Telephone: (720) 279-5562

POC Email: bellwood@enerplus.com

POC Address:

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Denver, CO 80202-2805

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ABSTRACT

Objective:

Enerplus Resources (USA) Corporation ("Enerplus") is an independent North American oil and gas exploration and production company with operations both on and around the Fort Berthold Indian Reservation. Enerplus is focused on creating long-term value for its shareholders through a disciplined, returns-based capital allocation strategy and a commitment to safe and responsible operations. Enerplus is committed to reducing its Greenhouse Gas ("GHG") emissions intensity and supports North Dakota's carbon neutral by 2030 strategy.

In support of these ambitions, Enerplus proposes to replace electric fluid chillers with Sedna Sled Geothermal Systems that create geothermal power for use onsite. This proposed project will reduce fuel usage for onsite generators, reduce or eliminate utility power usage and associated GHG emissions, and increase grid resiliency on location.

Binary cycle geothermal units have been used for power generation since 1904, the majority of which are currently used in waste heat applications in engine rooms, compressor stations and factory settings. This proposed project will be the first known deployment of geothermal power units for dual purpose cooling and power generation on remote oil and gas production sites. The objective is to validate the replacement of fluid chillers with binary cycle geothermal power units in a variety of conditions. Enerplus is proposing that the North Dakota Industrial Commission Clean Sustainable Energy Authority ("CSEA") grant funds for a 30-month pilot project.

Geothermal power generation from produced fluids and the associated avoided power usage and emissions reduction has the potential to provide several benefits to the State of North Dakota, including:

- Demonstrating that the thermal resource produced as oil and water in the Williston Basin is a sustainable energy resource for oil & gas companies operating within the State
- The potential for reducing onsite natural gas generated power
- The potential for reducing the carbon intensity of oil and gas production at a greater scale through knowledge sharing efforts

Expected Results:

Based upon previous deployments of geothermal equipment in locations with similar properties, it is anticipated that the geothermal equipment will provide adequate cooling for meeting pipeline specifications. The proposed project is expected to:

- Demonstrate the ability to cool the produced water outflows from each applicable pad to the pipeline specification of no more than 165° F
- Generate baseload renewable power, including:
    - 80-100 kWe (kilowatts, electric) power generation at larger pads with initial month flows of 12,000 bwpd (barrels of water per day), and half that at pads with initial month flows of 6,000 bwpd
    - Net per pad power generation and avoided usage on larger pads of 1.1 to 1.3 GWHe
    - Project total power generation and avoided usage of close to 2 to 2.5 GWHe, enough to offset the electrical usage of 93 average American homes during the project period
- Prove the commercial feasibility of this emission reduction solution and share the results with other operators in North Dakota and beyond
- Enhance jobs in North Dakota by creating an additional product stream, heat, to be managed on oil and gas locations

Duration:

The proposed duration of this project is 30 months, split into three phases: Phase 1 is engineering design and will take five to seven months to complete. Phase 2 is the pilot of the first site with two Geothermal units and Phase 3 is expansion of the pilot to a variety of sites and operating conditions.

Total Project Cost:

The total proposed project cost is $2.197M, 50% of which is requested from the CESA, and the remaining $1.098M to be provided by Enerplus. Enerplus proposes a staged approach where funds will not be spent unless long term economic viability of the solution is still tangible.

Participants:

Enerplus is the recipient of the grant for this proposed project and is the operator of the oil and gas facilities and the owner of emissions. Enerplus has contracted Transitional Energy, a Colorado-based geothermal service company, to provide the planning, design and operation of binary-cycle geothermal power plants. Transitional Energy works closely with the preeminent American manufacturer of ORC equipment, ElectraTherm Inc., another project partner.

The proposed project will take place on Mandan Hidatsa Arikara (“MHA”) Nation land, and support is important to the proposed project’s success. On June 30, 2022, Enerplus received an email in support of this proposed project from Kenny Lyson, Director of the

MHA Nation. Enerplus is currently working with the MHA Nation to receive a formal Letter of Support that is intended to supplement this application in the future.

Economics:

The current economics of using a geothermal power generation instead of a water chiller are outlined below. The proposed pilot will save 122 mTCO2e/month per installed location. The cost of the carbon mitigation under this proposed pilot is $73.77 per mTCO2e. The commercial viability of this project is to increase the power generation and decrease the costs in combination with the potential sale of carbon credits. The carbon credit market is developing and Enerplus anticipates a carbon price of between $10 and $20 per mTCO2e for this type of technology. Full field integration of this solution would reduce emissions by 13,112 mTCO2e/year.

	Water Chiller	Geothermal Pilot	Net Impact
Monthly Rental Cost per System	$7,000	$16,000	$9,000
Power to Operate / Generated (KWe)	15	100	115
Emissions Generated / Saved (mTCO2e/month)	16	106	122
Cost of Carbon ($/mTCO2e)			$73.77

PROJECT DESCRIPTION

Objectives:

The objective of this project is to pilot the replacement of two chiller units with Sedna Sled Geothermal Systems (Sedna) with a staged increase to six. The Sedna systems include one Organic Rankine Cycle (ORC) unit manufactured by ElectraTherm and one heat exchange sled manufactured for Transitional Energy that conveys heat from produced water.

This objective of the proposed pilot supports the sustainable energy strategy of the State of North Dakota by reducing emissions through the replacement of fluid chillers. This proposed pilot has the co-benefit of generating renewable energy and avoiding fossil fuel-based power generation to operate the fluid chiller. Furthermore, this distributed renewable power generation can result in less hydrocarbon created power.

There is a known challenge of integrating the created power into the site's grid power. The objectives of the first two phases are to order two Sedna systems to install on a new high-rate oil and gas production pad in early 2023. This phase will plan the specifications and costs around the electrical integration and implementation. The intent is to evaluate the integration of the power generated to offset the emissions from onsite natural gas created power through a power marketing plan. The conclusion of these phases will include a report including the electrical evaluation to the CSEA in March of 2023.

Upon successful completion of phase 1 and 2, phase 3 includes ordering four more Sedna Geothermal Systems to be installed with the following pilot criteria being considered:

- Fluid chilling at a large volume site requiring two Sedna systems. Key pilot issues include the timing and engineering of stepping from two to one Sedna system during production decline and whether the units are operated in parallel or in series
- Fluid chilling at lower volume pads where only one Sedna system is necessary
- The engineering and operations of chilling and power generation at high decline pads, regardless of initial volume
- Locations with exceptionally low ambient winter temperatures; testing the operation of these units under various North Dakota weather conditions

The objectives of this study benefit the State of North Dakota in several ways, mainly:

- Demonstrating that the thermal resource produced as oil and water in the Williston Basin is a sustainable resource for oil and gas companies operating within the state
- Potentially greater grid resiliency through avoided load strategy
- Decreasing fuel used for power generation on oil and gas production pads

- Lowering the carbon intensity of oil and gas production in the state

Methodology:

This project will be executed in three phases:

- Phase 1: Order two Sedna Sled Geothermal System, pre-operations planning, procurement and installation. Upon meeting criteria outlined in the Management section, move to Phase 2.
- Phase 2: Install ordered Sedna systems on one location. Evaluate results and report to CSEA in March 2023. Upon meeting criteria, move to Phase 3.
- Phase 3: Order and Install four more Sedna systems at 2-4 pads.

Project Phase Descriptions

Phase 1 and 2 – Pre-Operations Planning - Description

The first two phases of this project will last approximately 7 months and consists of:

- Engineering design and detailed cooling and power modeling
- Manufacturing and installation of the two Sedna systems
- Electrical engineering design and power planning
- Geothermal leasing
- Permitting with NDIC (North Dakota Industrial Commission) Oil and Gas Commission

Ordering & Procurement - Following grant funding approval, the lead time for ORC manufacture and delivery from ElectraTherm's manufacturing facility is approximately six months. Supply chain constraints could impact this timeframe. The bulk of the engineering design and detailed cooling and power modeling will take place prior to ordering the heat exchanger sled and ORCs. Also in this timeframe, geothermal permitting, electrical engineering design, and power market planning will occur.

The project team will evaluate the drilling and completion schedule to determine the best locations to place units to meet the project objectives. The pipeline specifications will also be evaluated at each site to determine whether the Sedna systems need to be placed in series or in parallel to achieve the primary cooling goal.

The project team plans to deploy the six units across four to six pads, both on and off the Fort Berthold Indian Reservation. Some potential pad locations contain up to 10 wells, necessitating two Sedna systems, while others are smaller and need only 1 system. Each ORC unit generates power from an input temperature range between 150°-270° F and a flow range of 47-360 gallons per minute (gpm).

Electrical Engineering – Interconnection between the Sedna system and the power on location will be completed by RM Power Solutions, a qualified electrical engineering design firm. Elements of the electrical engineering work include matching power phase and voltage and power isolation as well as the safety aspects of islanding.

Power Marketing Planning – The proposed project is planned to generate 200-300 kWe load at full capacity, and over its project period of performance will generate 2 – 2.5 GWHe of power. Therefore, the project team will create a power marketing plan to utilize the power generated on site.

Permitting – As this proposed project beneficially utilizes thermal resources, the project team will permit the project appropriately with the Oil and Gas Division of the NDIC, BLM and BIA.

Leasing - As this proposed project beneficially utilizes thermal resources, the project team will ensure that the thermal resource is leased appropriately with any thermal resource owners. Thermal resources are owned by the surface estate.

Project Associated Expense	Phase 1 Costs Total	Phase 2 Costs Total	Phase 3 Costs Total	Total
Sedna Sled Geothermal System Rental Fee	$0	$224,000	$1,728,000	$ 1,952,000
Permitting	$10,000	$0	$0	$10,000
Project Design Work	$100,000	$0	$0	$100,000
Interconnection work	$85,000	$0	$0	$85,000
Installation	$0	$25,000	$25,000	$50,000
Total	$195,000	$249,000	$1,793,000	$2,197,000
Completion Date	1/1/2023	3/1/2023	7/1/2024	

Phase 2 – Operations - Description

Following manufacturing and delivery of the ORC and Sedna systems, the units will be installed on the selected locations and placed in service. When in service, they will require minimal maintenance and are expected to achieve very high uptimes of greater than 85%.

At times when the Sedna systems are not producing electricity, they will still perform the primary task of fluid cooling.

Anticipated Results:

Modeling of the Sedna Sled Geothermal System with two systems running in series shows that the two units together on a pad with an initial flow volume of 10,500 barrels of water per day will adequately cool the produced water to below the pipeline specification of 165° F.

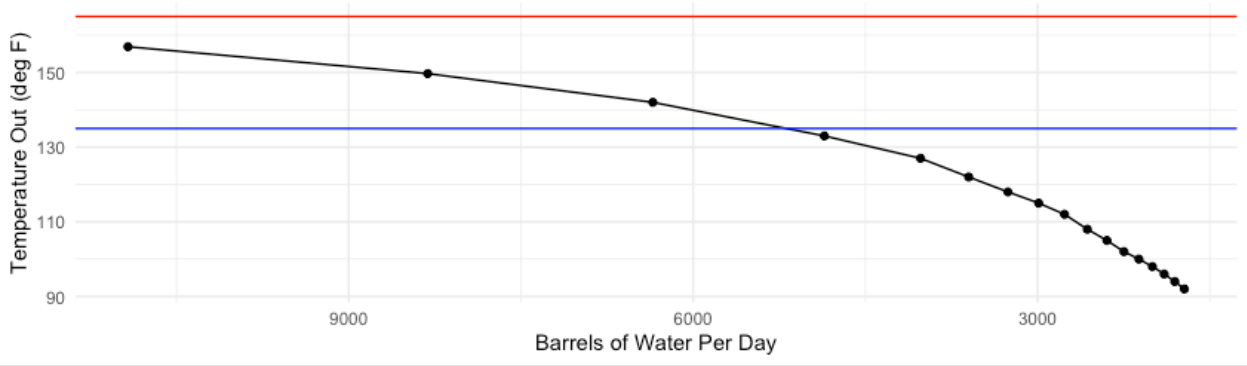


Figure 1. For a high flow pad, this plot of barrels of water per day versus temperature out shows that even at high flows, the temperature output from the ORC is below the maximum temperature specification of the pipeline depicted by the red line.

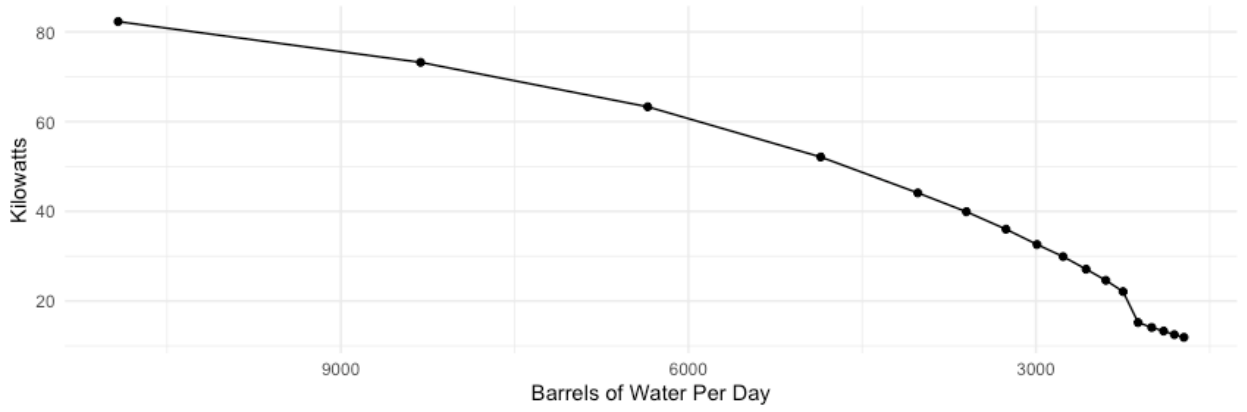


Figure 2. Electrical energy produced by the ORC in the same application as shown in the previous figure.

Specifically, the project is expected to result in power generation benefits, including:

- 80-100 kWe (kilowatts, electric) power generation at larger pads with initial month flows of 12,000 bwpd (barrels of water per day), and half that at pads with initial month flows of 6,000 bwpd

- Net per pad power generation and avoided usage on larger pads of 1.1 to 1.3 GWHe
- Project total power generation and avoided usage of close to 2 to 2.5 GWHe, enough to offset the electrical usage of 93 average American homes during the project period.

In terms of CO_2 emission reductions, this equates to:

- Net per pad CO_2 emissions avoidance on larger pads of 1,000 to 2,000 mTCO2e/year from power generation
- Proposed project total CO_2 emission avoidance of 6,000 to 13,000 mTCO2e/year

These emission reduction estimates are based on current (2021) US Energy Information Administration (EIA) numbers both on the North Dakota power generation portfolio (available at https://www.eia.gov/state/?sid=ND) and the EIA values for pounds of CO2 per kWh for various electrical fuel sources (available at https://www.eia.gov/tools/faqs/faq.php?id=74&t=11).

Facilities:

Transitional Energy's Sedna system includes both an ORC and an intermediate heat exchanger sled. The heat exchanger sled's purpose is to transfer heat from the briny and sometimes corrosive produced water to a clean fluid and then pump that to the ORC.

This proposed project replaces fluid chillers with Sedna systems and associated equipment in a one-for-one or one-for-two approach. Each pad will have one or two of the units viewed in Figure 3. The Sedna system is built on ruggedized sleds and are inherently modular.

Figure 3. Drone imagery of an Electratherm AC800 ORC unit with six liquid loop radiator cooling fans on the left. Flexible hoses connect the ORC unit to the Sedna Sled Geothermal System on the right. For scale, note the people on the bottom of the image. Photo by Transitional Energy.

Generally speaking, an ORC works like an air conditioner in reverse - heat is exchanged from the oil and gas flowline to a refrigerant that circulates in a closed loop. The heat exchange with the produced water vaporizes the refrigerant. As it vaporizes, it attempts to expand in volume. As it is stuck in a closed loop, the expansion generates an increase in pressure that is directed at a screw mechanism. This screw rotates a shaft in the generator, producing electricity. On the backside of the closed loop, the vapor is then cooled down to recondense the refrigerant into a liquid by an air-cooled liquid closed-loop radiator. The refrigerant goes around and around the cycle with no associated emissions. ElectraTherm uses R245fa, a non-toxic refrigerant.

The modeled temperature decrease at 6,000 barrels of water per day (bwpd) is approximately 40 degrees and increases as flow decreases. Each unit would produce 40-50 kWe at 6,000 bwpd depending on the ambient air temperature experienced by the liquid loop radiators. At lower winter temperatures, cooling will be more efficient than during summer daytime conditions.

Project partner ElectraTherm has been manufacturing twin-screw based ORC units since 2007. They have deployed over 100 units in active service in various waste heat applications globally. These waste heat applications include compressor stations, steel

mills, mortuaries, marine engine rooms, and combined-cycle and power bottom-cycle power generation. Transitional Energy's Blackburn, Nevada site and the proposed Transitional Energy DOE grant deployment at Blackburn, Nevada, are the only ElectraTherm ORC units in oilfield service. The only major components sourced from outside the U.S. are the screws themselves, which are manufactured by their parent company, Bitzer Group, in Germany.

Resources:

Enerplus plans to utilize a range of resources to execute the proposed Sedna system pilot project. Enerplus will be providing data and support to Transitional Energy's team as they design six Sedna systems for the proposed new drill activity in 2023 and 2024. Permitting will be led by Enerplus with information and support provided by Transitional Energy. Electrical design and power marketing will be executed by Transitional Energy and its subcontractors in collaboration with Enerplus engineering staff.

Techniques to Be Used, Their Availability and Capability:

For the ORC equipment, Enerplus will be using Transitional Energy's Sedna Sled Geothermal System which includes ElectraTherm's Power Module75 with an Active Cooler and Transitional Energy's patent pending Sedna Sled. The Sedna Sled was built to transmit heat from the produced fluids from Enerplus' wells to the ORC. Both pieces of equipment are highly mobile, emissions free, and can generate anywhere from 80 to 100 gross kW of geothermal energy.

ElectraTherm is the primary manufacturer of ORC equipment in the United States with more than a hundred of units in service. ORC technology has been used for power generation since 1904. The first geothermal system was installed in 1967 in the Soviet Union and since then has spread across the world and in many different types of industries. This grant would enable this technology to be used for the first time as both a cooling and power generation application for horizontal wells in North Dakota.

Enerplus will use existing local suppliers, contractors, and procurement chains for equipment associated with the installation of the Sedna systems. Geothermal power generation (or moving hot water) and electrical hookup are entirely within the existing capabilities of the company and its contractors.

Environmental and Economic Impacts while the Proposed Project is Underway:

Each Sedna Sled Geothermal System will occupy Enerplus' existing well pads with no anticipated need for additional surface disturbance. The footprint of the equipment is relatively insignificant in size and can nestle into existing flowback operations and early

well operations. This system will be on each pad for a period of three to twelve months and will then be transported to a new high production well pad.

Successful operation will rely upon electrical connection to the power supply. Local electricians and vendors will be used to perform this necessary step.

Depending on the power use at each horizontal well pad, there is a strong possibility that excess geothermal power will be generated from this project. This clean, renewable energy could be net-metered back to the grid to help North Dakota reach its Renewable Portfolio Standard of 10% of all retail electricity originating from renewable energy sources.

Ultimate Technological and Economic Impacts:

The Sedna system will be a first of its kind, portable geothermal power generation and cooling solution in one. If proven successful, this system could be placed on thousands of wells in North Dakota and beyond to generate renewable energy from heat waste in the oilfield. As the world move towards a renewable energy dominated electrical grid, we need distributed, baseload sources of electricity. Geothermal is the only renewable energy source that is truly baseload and can use thermal waste heat from oil and gas to power local needs.

Why the Project is Needed:

At present, Enerplus is using large chillers to cool their produced water to meet pipeline specifications. These chillers use line power to operate, and each emit 84 tons of CO2 per year. Cooling can instead be achieved by using ORC technology to create emission free electricity. This electricity can be used on well pads to reduce both Scope 1 (replacing natural gas generators) and Scope 2 (coal-based electricity) greenhouse gas emissions. Providing this two-in-one combination of cooling and geothermal energy production will improve the sustainability of continued oil and gas production, which is critical to the future of the state of North Dakota. Proving this type of geothermal solution will help demonstrate the State’s leadership and efforts in reducing its carbon intensity footprint.

STANDARDS OF SUCCESS

Preservation of Data & Documentation of Results – Each combination of ORC unit, Sedna Sled Geothermal System, and weather monitoring station at each location has approximately 140 channels of data that write to Transitional Energy's cloud-based, Amazon Web Services relational database. With data collected and written at intervals as tight as 10 seconds during operation, this database is a secure, machine-readable platform from which to create analysis and documentation of the results of this proposed project.

Emissions Reduction – The replacement of fluid chillers with ORC units generates baseload renewable energy as well as avoids grid power usage, creating a double upside for the project.

Increased Energy Sustainability – By demonstrating the replacement of fluid chillers with Sedna systems for both fluid cooling and baseload renewable power generation, Enerplus continues its mission to be known as an energy sustainability leader.

Value to North Dakota – The Williston Basin in North Dakota is an ideal location for piloting geothermal technology in an oilfield setting because of cold winters and moderate summertime temperatures that maximize the difference in temperature between the produced fluids and the ambient air temperature. As a result, the successful piloting of the sled system by Enerplus in this application will demonstrate the commerciality of this application for other operators. This will pave the way for North Dakota to be a distributed power geothermal energy leader and redefine oil and gas pads as subsurface energy pads.

Explanation of Public & Private Sector Usage of Results – Although some aspects of the Sedna system will remain proprietary, low-temperature geothermal concepts and technology are not proprietary to Enerplus or Transitional Energy. The project team is eager to share general facility design and runtime data with the NDIC as well as through peer-reviewed and mass media publication outlets. This wide sharing of results should allow other oil and gas operators to utilize these concepts and technology.

Potential Commercialization of Results – Enerplus intends to assess full commercialization of the Sedna Sled Geothermal System of all long-term production and flowback operations across all its assets in North Dakota if economically viable.

How the project will enhance the research, development and technologies that reduce environmental impacts and increase sustainability of energy production and delivery of North Dakota's energy resources - Valuable information will be gained by supporting demonstration projects in early stages targeting geothermal resources. While this project will begin as pilot operation with a research and development focus, the

most valuable information will be gained by taking this project through to full commercialization.

How it will preserve existing jobs and create new ones - Furthering emission reductions are a critical component of ensuring continued oil and gas production in the Williston Basin. Jobs will be created during installation and maintenance of the Sedna systems. A ‘geothermal pumper” role could be a newly created job type. With commercialization and adoption by other oil and gas operators, the job impacts could be material to the State. Support services across a range of supply chains will find new opportunities to support geothermal energy activities in the State.

How it will otherwise satisfy the purposes established in the mission of the Program - The proposed project meets all standards of success set by the Clean Sustainable Energy Authority. With success, the proposed application of Sedna systems to replace fluid chillers will:

- Reduce GHG emissions from current and future oil and gas operations
- Decrease the environmental impacts associated with fluid cooling
- Provide a pathway for decarbonization of other equipment, applications, settings, and industries
- Increase energy sustainability by reducing Scope 1 and 2 GHG emissions within oil and gas operations and produce lower carbon intensity fuel
- Establish the State as a leader in supporting the development of clean energy technologies

BACKGROUND/QUALIFICIATIONS

Project Participants

Prime Recipient – Enerplus Resources (USA) Corporation - Enerplus will utilize highly skilled internal facilities and environmental engineering to direct all stages of the geothermal chiller replacement project. Throughout Enerplus development within the Williston Basin, the company has successfully implemented several technologies to address greenhouse gas emissions, such as bitcoin mining and portable natural gas processing skids as well as a recently initiated carbon capture hub.

Transitional Energy - Transitional Energy is a majority women-owned and Iñupiaq-led geothermal service provider based in Denver, Colorado. The management team has over 100 years of combined oil and gas engineer and geoscience experience they bring to bear in planning, installing, and operating geothermal units in oilfield settings. For electrical engineering design, Transitional Energy relies on RM Power Systems, a Denver-based electrical engineering design firm with deep experience in oilfield electrical engineering. Their website is transitionalenergy.us.

Key Transitional Energy personnel are:

- **Salina J. Derichsweiler, CEO** - Salina is co-founder and CEO of Transitional Energy, a geothermal development company that converts oilfield heat waste to clean baseload power. During her 23-year career in the oil and gas industry, Salina gained expertise in waterflood management, directional drilling, development and exploration, evaluations, and resource management.

  Salina seeks to make the world a better place and believes energy security doesn't have to come at a cost to the environment. She believes inclusivity of people and integration of ideas will be the solution to balancing environmental justice and energy security.

  Salina is Iñupiat and was the first in her family to graduate high school, attend college, and earn advanced degrees. She holds her Bachelor of Science degree in Chemical Engineering and Petroleum Refining from Colorado School of Mines and an MBA in Finance from Pepperdine University. She focuses her volunteer time and charitable giving to programs such as KIPP, Goodwill Industries, and SPE philanthropy opportunities that focus on mentoring students in at-risk communities to build resilience through education for future generations.

- **Johanna Ostrum, COO** – Johanna has fifteen years within the oil and gas industry in a wide variety of positions and basins. She holds a Bachelors of Science in

Geological Engineering from Montana Tech. Johanna's most recent role was Regulatory Manager at Extraction Oil & Gas which allowed her to build critical relationships and be the point contact communicating with local communities, municipalities, and state agencies. She also participated in rulemakings in several cities and counties across the front range in Colorado. Johanna began her career as a development geologist in reservoirs in Kansas, Oklahoma, and Texas. She later transitioned to a production engineer, where her focus was on enhancing production from the Codell and Niobrara formations in Colorado. Johanna also spent time working in the Bakken as a Reservoir and Reserves Engineer. Her prior companies include Noble Energy, SM Energy, and Extraction Oil & Gas

- **Benjamin C. Burke, CTO** - Ben is a geoscientist and manager with 3 years of environmental consulting and 15 years of upstream oil and gas experience with majors, public independents, and private equity-backed companies, in addition to more than 2 years in the geothermal space as co-founder of Transitional Energy. Fluent in R and SQL, and proficient in Python, he also leads data science for the company. He holds an AB *magna cum laude* from Bowdoin College in Geology, MBA from Texas A&M University, and a PhD from Dartmouth College in Earth Sciences.

  Water is his passion. From mucking about as a kid in creeks and developing a passion for geoscience and earth surface processes from that young age, water has been the theme in his career: remediation of water resources early in his career, the use of stable isotopes in water to understand petroleum systems, and now to the harvesting of geothermal resources from water.

ElectraTherm – ElectraTherm is the major US manufacturer of heat recovery solutions. Founded in 2005 in Reno, Nevada, and relocated to Flowery Branch, Georgia, upon its acquisition by Bitzer Group in 2011, they have over 100 ORC units in the field in active service around the world. They design and manufacture their range of ORC equipment at their facility in Flowery Branch, Georgia. Their website is electratherm.com.

Background on ORC Deployments in Geothermal Applications

The organic Rankine cycle is named after William Rankine (1820-1872), a Scottish professor of physics and mechanical engineering at Glasgow University who worked in the field of thermodynamics. He described the eponymous cycle as a method for making a heat engine work, similar to the Carnot cycle engines which had been described by a French polymath of the same name.

ORC engines were first used for power generation in Larderello, Italy, in 1904, with a 10 kW unit. In the United States, power generation from geothermal heat started at The

Geysers in California and has steadily grown to over a gigawatt of load produced at several sites throughout the western United States. The overall trend in geothermal technology development follows temperatures downwards from dry steam power generation at temperatures above 500° F, wet steam development at slightly lower temperatures, and finally to what is considered today as low-temperature resources by the US Geological Survey of 150-300° F. The widespread development of low temperature resources for geothermal power generation allows for geothermal power to be considered a resource in every major oil and gas basin in the United States, not just the point sources of medium- and high-temperature geothermal in the volcanic regions of the far western US.

Low-temperature geothermal piloting and development was explored during the energy crises of the 1970s. The US Geological Survey published the first nationwide assessment of geothermal resources in 1978, but the developed of geothermal resources in the United States at that time focused on high temperature resources.

Low-temperature geothermal piloting began in earnest in the United States around 2010 with a deployment in the Williston Basin by Continental Resources, the University of North Dakota, and other stakeholders in a US Department of Energy-funded study (US DOE grant DE-EE0002854). That study did not result in any power generation but was valuable from the perspective of understanding site management and project management. The Rocky Mountain Oilfield Test Center near Casper, Wyoming, ran two ORC units for a period of several years generating long-term production data. More recently, the Canadian Federal government has funded DEEP Earth Energy Ltd to drill several geothermal production wells near Torquay, Saskatchewan, and use ORC technology to generate 140 MW of baseload renewable energy from site conditions that are like Enerplus locations. More information about their company and project is available at deepcorp.ca.

MANAGEMENT

Enerplus will rely on in-house project management expertise and software tools to ensure timelines and budget are met. The staged approach is designed to maintain fiscal conservation for both the state and Enerplus as we explore the potential emission reductions and associated costs.

The important evaluation points to be used in the proposed project are:

Phase 1 – Pre-Operations Planning requires the completion of 6 evaluation points in order to proceed to operations.

- Timely order placement and procurement of two Sedna Sled Geothermal Systems
- Completion of deployment location planning and detailed power modeling
- Completion of electrical engineering of the planning connection location in order to safely interconnect the equipment to the site power
- Completion of the power marketing planning in order to determine how the power will be used
- Successful permitting with the NDIC Oil and Gas Division
- Successful leasing of geothermal resources, if necessary.

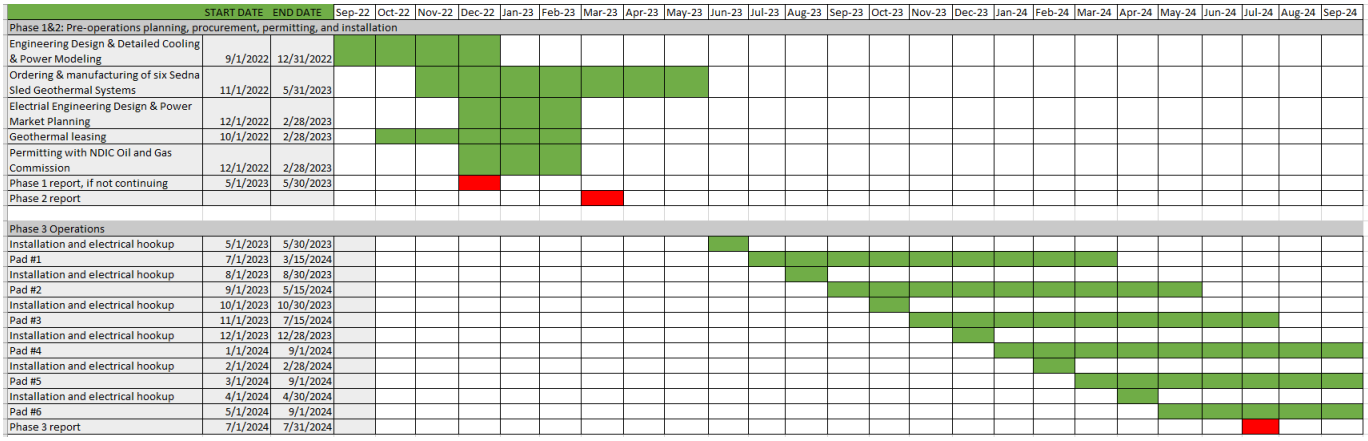
Phase 2 – Prove the installed two sled pilot is operational to design specs and determine commercial viability of other locations and then order four more Sedna Sled Geothermal Systems

- Track the results of the power marketing plan to ensure the power is being utilized on site
- Verify actual emission reductions
- Verify power created both instantaneous and cumulative from the ORC
- Provide engineering results of phase 1 and 2 in a report to the CSEA by March 2023

Phase 3 – Order four more Sedna Sled Geothermal Systems

- Determine specific locations for further pilot considerations as outlined on page 6
- Provide results of extensive pilot considerations in a report to the CSEA

TIMETABLE



	START DATE	END DATE	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
Phase 1&2: Pre-operations planning, procurement, permitting, and installation																											
Engineering Design & Detailed Cooling & Power Modeling	9/1/2022	12/31/2022																									
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Phase 1 report, if not continuing	5/1/2023	5/30/2023																									
Phase 2 report																											
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Pad #3	11/1/2023	7/15/2024																									
Installation and electrical hookup	12/1/2023	12/28/2023																									
Pad #4	1/1/2024	9/1/2024																									
Installation and electrical hookup	2/1/2024	2/28/2024																									
Pad #5	3/1/2024	9/1/2024																									
Installation and electrical hookup	4/1/2024	4/30/2024																									
Pad #6	5/1/2024	9/1/2024																									
Phase 3 report	7/1/2024	7/31/2024																									

BUDGET

Project Associated Expense	NDIC Grant	NDIC Loan	Applicant's Share (Cash)	Other Project Sponsor's Share	Total
Sedna Sled Geothermal System Rental Fee	$976,000	0	$ 976,000	0	$ 1,952,000
Permitting	$5000	0	$5000	0	$10,000
Project Design Work	$50,000	0	$50,000	0	$100,000
Interconnection work	$42,500	0	$42,500	0	$85,000
Installation	25,000	0	$25,000	0	$50,000
Total	$1,098,500	0	$1,098,500	0	$2,197,000

Lease rates of the Sedna Sled Geothermal System are based upon negotiations between Enerplus and Transitional Energy. Additional project expenses are based on estimates prepared by Enerplus and Transitional Energy and include necessary project scoping, permitting, and electrical installation and commissioning work.

CONFIDENTIAL INFORMATION

Enerplus and Transitional Energy have developed the project proposal using a combination of confidential, technical, commercial, and financial information. The power model output figures in the Anticipated Results section are considered information. There is no request for confidentiality in this grant application.

PATENTS/RIGHTS TO TECHNICAL DATA

ElectraTherm maintains patents and trademarks for the range of ORC equipment it manufactures and sells. The Sedna Sled Geothermal System is patent-pending design that is contract manufactured for Transitional Energy.

STATE PROGRAMS AND INCENTIVES

Enerplus has not applied for any other state programs or incentives for a geothermal solution. Enerplus was awarded a grant on May 23, 2022 for $1,000,000 through the Clean Sustainable Energy Authority for a carbon capture technology. This grant application is for another emerging technology, Geothermal, to lead to lower emission intensity hydrocarbon production than what is required by regulations.

Appendix A
Tax Liability Statement

Industrial Commission

Tax Liability Statement

Applicant:

Enerplus Resources (USA) Corporation

Application Title:

Geothermal Power Generation

Program:

- ☐ Lignite Research, Development and Marketing Program
- ☐ Renewable Energy Program
- ☐ Oil & Gas Research Program
- ☑ Clean Sustainable Energy Authority

Certification:

I hereby certify that the applicant listed above does not have any outstanding tax liability owed to the State of North Dakota or any of its political subdivisions.

Kathy Lawrence

_____

Signature

Manager, US Accounting

_____

Title

6/27/2022

_____

Date

Appendix B
Business Plan

Enerplus Resources (USA) Corporation

CSEA Business Plan

Executive Summary

Enerplus Resources (USA) Corporation ("Enerplus") proposes to replace six chiller units being used on well pads within the Fort Berthold Indian Reservation with six Sedna Sled Geothermal Systems. This replacement pilot has the dual benefit of both generating renewable energy and avoiding fossil-fuel based grid power to run the chiller. Currently, new well sites use temporary chillers to cool water prior to it entering the midstream pipelines. This project will involve installing six heat exchanger sleds and Organic Rankine Cycle (ORC) skids on horizontal well pads, a first of its kind dual chilling and renewable power generation pilot.

Enerplus is an independent North American oil and gas exploration and production company focused on creating long-term value for its shareholders through a disciplined, returns-based capital allocation strategy and a commitment to safe, responsible operations. The company operates on and around the Fort Berthold Indian Reservation.

Our planned approach is to take geothermal technology developed by Transitional Energy, a majority women owned and Indigenous led company, through this demonstration phase and into full-field implementation. ORC technology is not new, but the oilfield application and dual purpose of this process is a novel application for this technology.

This Business Plan incorporates the elements necessary to ensure the success of this geothermal cooling and renewable power generation project. Executing this project will require a thoughtful and planned approach to ensure a successful project.

Business Overview

For a successful project, both cooling and renewable power generation must work in tandem. This Business Plan considers cooling and renewable power generation.

Cooling Success

<u>Unique Application for a Proven Technology</u>

At present, Enerplus is using large chillers to cool their produced water prior to it entering a pipeline. These chillers use on site generated power to operate and each emit 84 tons of CO_2 per year of Scope 2 emissions. Cooling can be achieved using ORC technology and that same technology can be used to create emission free electricity. This electricity can be used on well pads to reduce both Scope 1 (replacing natural gas generators) and Scope 2 (coal-based electricity) greenhouse gas emissions. Providing this two in one

combination of cooling and geothermal energy will improve the sustainability of continued oil and gas production, which is critical to the future of the state of North Dakota. Proving this type of geothermal solution will help demonstrate the State's leadership and efforts in reducing its carbon intensity footprint.

Geothermal Energy Success

Heat Waste to Power

The Williston Basin in North Dakota is an ideal location for piloting geothermal technology in an oilfield setting because of the cold winters and moderate summertime temperatures that maximize the difference in temperature between the produced fluids and the ambient air temperature. As a result, the successful piloting of Sedna by Enerplus in this application will demonstrate the wide feasibility of this application for other operators. This will pave the way for North Dakota to be a distributed geothermal energy leader and redefine oil and gas pads as subsurface energy pads.

The Sedna Sled Geothermal System will be a first of its kind, portable geothermal power generation and cooling solution in one. If proven successful, this system could be placed on thousands of wells in North Dakota and beyond to generate renewable energy from heat waste in the oilfield. As the world move towards a renewable energy dominated electrical grid, we need distributed, baseload sources of electricity. Geothermal is the only renewable energy source that is truly baseload and can use thermal waste heat from oil and gas to power local grids.

Enerplus is highly experienced in engineering process improvements and driving down costs within oil and natural gas operations. With firm engineering standards of operation and deep knowledge of facilities design, Enerplus believes full-field repeatability is possible.

Operations and Maintenance

Enerplus will be the operator of the well pads with Transitional Energy providing the Sedna Sled Geothermal System. Transitional Energy will provide engineering and planning expertise for installation of the Sedna system. Transitional Energy personnel will be onsite during initial commissioning through each of the proposed stages and provide real time data monitoring.

Enerplus Expertise

Enerplus has set up a team to implement all phases of the geothermal and cooling project. Below is a subset of the team identifying critical members:

Jeff Neubeker – Manager, Corporate Sustainability

Jeff has a Bachelor of Management in Finance from the University of Lethbridge and a CFA Institute Charterholder. Jeff has worked for Enerplus for over 16 years and currently leads the Corporate Sustainability program at Enerplus. He is critical in determining the financial commercial viability of the geothermal power generation for oil and gas production full development plan.

Scott Mason – Team Lead, Environment

Scott has a Bachelor of Science in Water Management Resources from the University of Wisconsin-Stevens Point. He has over 30 years of experience in environmental management and has been with Enerplus for over 9 years. Scott leads all environmental programs including GHG reductions and compliance. Scott is critical in leading the feasibility and execution of the geothermal power generation for oil and gas production plan.

Bonnie Ellwood – Senior Environmental Engineer

Bonnie has a Bachelor of Science in Geosystems Engineering and Hydrogeology from the University of Texas. Bonnie has over 18 years of experience in Petroleum Operations Engineering and has been with Enerplus for over 5 non-consecutive years. She leads the Emission Reduction Projects at Enerplus and her technical background in Operations is critical in the execution of the geothermal power generation for oil and gas production plan.

Shane Henry – Manager, Government and Regulatory Affairs

Shane has a Bachelor of Arts in Political Science from Colorado Mesa University and a Masters in Public Policy and Administration from University of Colorado-Denver. He has over 20 years of experience in corporate government affairs and is celebrating his 10-year milestone at Enerplus. Shane leads the company in external stakeholder engagement and is critical in Enerplus' relationship with the tribal leaders on Fort Berthold Indian Reservation. Shane is critical in communications with the tribe and other stakeholders through the execution of this project.

Jacob Everhart – Regulatory Compliance Advisor

Jacob has a Bachelor of Science in Biology/Biological Sciences and a Masters of Business Administration in Strategic Planning from the University of the Southwest. He also has a Masters of Science in Environmental Policy and Management from the University of Denver. Jacob is currently enrolled in a Juris Doctor Degree at the University of Denver. He has over 5 years of experience in regulatory matters and has been with Enerplus for over 3 years. Jacob is critical in the application and feasibility of the geothermal power generation for oil and gas production project.

Josh Ruffo – West Region Field Coordinator

Josh has a Bachelor of Science in Wildlife and Fisheries from Penn State University. He has over 15 years of experience in environmental coordination with over 10 years with Enerplus. Josh is responsible for being Enerplus' liaison with MHA Energy. Josh is critical in engaging MHA Energy through the execution of this project.

Ryan McLaughlin – Team Lead, Facilities and Construction

Ryan has a Bachelor of Science in Mechanical Engineering from Colorado State University. He has over 15 years of experience in oil and gas process engineering and has been with Enerplus for over 9 years. Ryan currently leads all facility construction for the US operations and is instrumental in the successful deployment of the geothermal power generation for oil and gas production project.

Heidi Hande – US Legal Counsel

Heidi has a Bachelor of Science in Political Science, Environmental Natural Resources/Psychology from the University of Wyoming. She also received her Juris Doctor Degree from the University of Wyoming. Heidi has over 15 years of experience in environmental law and has been with Enerplus for over 2 years. Heidi is the US legal counsel for Enerplus and is critical in legal considerations for applying for this grant and execution of the geothermal power generation for oil and gas production project.

Financial Plan

CSEA grant funds are a critical component of the financial plan for this proposed project. Without CSEA grant funds, the extent of this project would not be possible. In 2020, Enerplus established an internal Emission Reduction Budget The purpose of this fund is to implement emission reduction projects that may not meet internal economic hurdles for execution. The Enerplus Emission Reduction Fund will be earmarked for this project to ensure it is funded properly.

Conclusion

No industry is better suited to execute a geothermal power generation and cooling project than the oil and gas industry. Our internal expertise is properly suited for each stage of execution and our external engineering support for geothermal energy is exemplary. The extent of this project is not possible without CSEA funding.

Appendix C
Enerplus Financial Statements

Appendix D
Budgeted Projections

Budgeted Projections

Project Associated Expense	NDIC Grant	NDIC Loan	Applicant's Share (Cash)	Other Project Sponsor's Share	Total
Permitting Phase 1	$5,000	0	$5,000	0	$10,000
Project Design Work Phase 1	$50,000	0	$50,000	0	$100,000
Interconnection work Phase 1	$42,500	0	$42,500	0	$85,000
Total Phase 1	$97,500		$97,500		$195,000
Sedna Sled Geothermal System Rental Fee for Phase 2	$112,000	0	$ 112,000	0	$224,000
Installation Phase 2	$12,500	0	$12,500	0	$25,000
Report Phase 2	$0	0	$0	0	$0
Total Phase 2	$124,500	0	$124,500	0	$249,000
Order more systems Phase 3	$864,000	0	$864,000	0	$1,728,000
Installation Phase 3	$12,500	0	$12,500	0	$25,000
Total Phase 3	$876,500		$876,500		$1,753,000
Total	$1,098,500	0	$1,098,500	0	$2,197,000

	Anticipated Timing	NDIC Grant	Applicant's Share (Cash)	Total
Stage 1 Planning	1/1/2023	$97,500	$97,500	$195,000
Stage 2 Install one location	3/1/2023	$124,500	$124,500	$249,000
Stage 3 Order 4 more systems	7/1/2024	$876,500	$876,500	$1,753,000

	START DATE	END DATE	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
Phase 1: Pre-operations planning, procurement, permitting, and installation																											
Engineering Design & Detailed Cooling & Power Modeling	9/1/2022	12/31/2022																									
Ordering & manufacturing of two Sedna Sled Geothermal Systems	11/1/2022	5/31/2023																									
Electrial Engineering Design & Power Market Planning	12/1/2022	2/28/2023																									
Geothermal leasing	10/1/2022	2/28/2023																									
Permitting with NDIC Oil and Gas Commission	12/1/2022	2/28/2023																									
Phase 1&2 report	5/1/2023	5/30/2023																									
Stage 2: Order four more Sedna Sleds and Operations																											
Installation and electrical hookup	5/1/2023	5/30/2023																									
Pad #1	7/1/2023	3/15/2024																									
Installation and electrical hookup	8/1/2023	8/30/2023																									
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Installation and electrical hookup	4/1/2024	4/30/2024																									
Pad #6	5/1/2024	9/1/2024																									
Phase 2 report	7/1/2024	7/31/2024																									

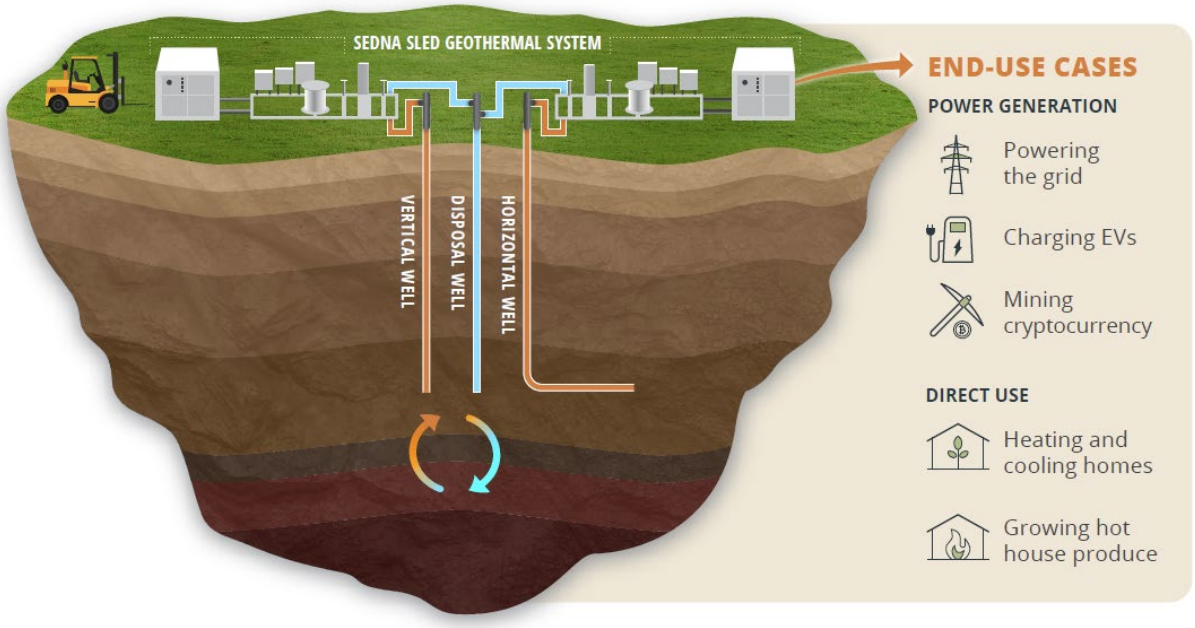
Appendix E
Transitional Energy

info@transitional.energy
https://transitionalenergy.us

With deep roots in the oilfield and over 100 years of experience in operations and subsurface geology, Transitional Energy works with oil and gas companies to turn hot fluids into baseload renewable electricity. The majority women-owned and Indigenous-led team uses a practical, low-capital approach that can be implemented at the wellhead or production facility quickly and easily, to reduce well pad carbon emissions from operations and electricity generation and help operators meet ESG goals.

Transitional Energy's Proprietary Process

We install portable, ruggedized, small-footprint geothermal equipment at oil and gas well sites and nearby infrastructure to generate clean electricity from the hot fluids that flow from the wellbore, creating a hybrid energy source at well pads that eliminates the expense and carbon emissions of on-site generators or wireline power. Our patent pending system is called the Sedna Sled Geothermal System.



Transitional Energy's unique process and proprietary technology creates several benefits over traditional geothermal development:

- More Availability: We can develop geothermal in basins with temperatures as low as 180°F, which increases availability of geothermal resources. There are one million wellbores in the United States with an estimated generation potential of 250 gigawatts

of geothermal electricity – enough to power every home in the U.S. with electricity left over!

- Capital-Efficient Production: We integrate into existing oil and gas operations and leverage proprietary data analysis tools indicating where the geothermal resources are located, to accelerate the process.
- Less Carbon Emissions: Our system only requires about 45 seconds of outside electric power generation to start the system, before it becomes a self-sustaining process that produces emissions free electricity, while eliminating carbon emissions from alternative sources of well pad power.
- ESG Support: Our system can be used as a proof point to demonstrate performance against carbon-reduction goals.
- Minimized Disturbance: The Sedna Sled Geothermal System fits on most existing sites with no additional land disturbance due to compact size.

Transitional Energy is Leading the Way

In May of 2022, Transitional Energy was the first majority women-owned and Indigenous-led geothermal energy developer in the United States to generate electricity from an oil field in Nevada using privately raised dollars. As electric utilities grapple with the rising demands for clean power, our unique process can put more renewable energy on the grid without the intermittency issues of wind and solar.

Image of Sedna Sled Geothermal System installed at the Blackburn Oilfield in Nevada.

Earlier this year, Transitional Energy was awarded a $2.5M grant from the U.S. Department of Energy, Geothermal Technologies Office (GTO) to generate 1MW of renewable, baseload power from an operating oilfield located in Nevada. TE also won an Advanced Industries Grant from the Colorado Office of Economic Development and International Trade (OEDIT) for $500,000.

With these grants and other funding, TE is quickly deploying our Sedna Sled Geothermal System into oil and gas fields.

Leadership

Salina Derichsweiler, CEO

During her 21-year career, Salina has held various roles in technical leadership & management, engineering, and planning in private, public, and energy start-up companies. Salina is sought out for her expertise in reservoir management of water and steam floods, operational planning and execution, and business development. She currently owns her own consulting business providing asset valuations, reservoir and operations engineering support, and expert witness testimony to a variety of clients such as financial investment firms, family trusts, and oil & gas operators. She has worked extensively in environmentally and culturally sensitive areas in California, Colorado, Utah, Wyoming, Michigan, and New Mexico, with a focus on building strong relationships with stakeholders in government, local communities, and Native Tribes.

Salina overcame great adversity in her life and is a first-generation high school and college graduate. She was the first Native American in Aurora Public Schools in Colorado to graduate valedictorian, and earned the prestigious full-ride, merit-based Boettcher Scholarship. She holds her Bachelors of Science degree in Chemical Engineering and Petroleum Refining from Colorado School of Mines and an MBA in Finance from Pepperdine University.

Benjamin Burke, CTO

Ben has a diverse geoscience and business background in oil & gas, environmental consulting, and precious metal consulting—with the common thread being a focus on understanding the source, migration, preservation, and fate of fluids flowing in porous rocks. He was the sole geoscientist and then geoscience manager at Fifth Creek Energy, a DJ Basin Colorado-focused startup from 2015-2018. Post acquisition by Bill Barrett Corp to form HighPoint Resources, he stayed on as geoscience manager and advisor. His previous experience includes western US geoscience for Noble Energy and Fidelity Exploration. He has consulted for gold and silver mine operators in Washington State and has also worked international projects for the ExxonMobil Upstream Companies based from Houston. He began his career with Woodard & Curran environmental consultants in Cheshire, Connecticut. He holds an AB in Geology and Russian language magna cum laude from Bowdoin College, an MBA from Texas A&M University, and a PhD in Earth Sciences from Dartmouth College.

Ben sits on the Board of Directors for the Denver Earth Resources Library. Ben is also an Affiliate Professor at Colorado School of Mines and a Collaborating Professor at Iowa State University in the Department of Atmospheric and Geologic Sciences.

Johanna Ostrum, COO

Johanna has fifteen years in the energy industry in a wide variety of positions. She holds a Bachelors of Science in Geological Engineering from Montana Tech. Johanna's most recent role was Regulatory Manager at Extraction Oil & Gas which allowed her to build critical relationships

and be the point contact communicating with local communities, municipalities, and state agencies. She also participated in rulemakings in several cities and counties across the front range in Colorado. Johanna began her career as a development geologist in reservoirs in Kansas, Oklahoma, and Texas. She later transitioned to a production engineer, where her focus was on enhancing production from the Codell and Niobrara formations in Colorado. Johanna also spent time working in the Bakken as a Reservoir and Reserves Engineer. Her prior companies include Noble Energy, SM Energy, and Extraction Oil & Gas.

Johanna currently volunteers her time as the Diversity, Equity, and Inclusion Task Force Chair at Geothermal Rising. Johanna also sits on the Board of Directors for the Energy Leadership Institute.

Sarah Harford, CFO

Sarah Hartford is the CFO at Transitional Energy. She brings over 20 years of experience in the energy industry in a variety of rolls including reserves management, financial planning and process implementation. She holds Finance and International Business degrees from the University of Oklahoma.

Sarah knows that energy transition is the future and is honored to be part of the movement. She believes in a vision of abundant, affordable, renewable energy. Sarah is proud to be a leader in a company that is setting this vision in motion.

In her spare time, Sarah like to spend time traveling with her family, swimming with her dogs and volunteering with various community organizations.

Lia Sedillos, SVP of Operations

Serving as the SVP of Operations, Lia Sedillos plays a major role in Safety, Operations, and Engineering Design. Before joining the Transitional Energy team she lead operations activity for Noble Energy in both the DJ and Appalachian basins, was VP of Technical Sales for Covia Corporation and most recently as a Strategic Sales leader for Workrise. Lia holds a master's degree in Petroleum Engineering from the Colorado School of Mines, and an MBA from Tulane University. Outside of the office, Lia enjoys family, cycling, skiing and is a LEGO brick specialist.

June 28, 2022

Clean Sustainable Energy Authority
North Dakota Industrial Commission
State Capitol – 14th Floor
600 East Boulevard Ave Dept 405
Bismarck, ND 58505-0840

To Whom it may Concern,

It is my pleasure to send you this letter of support for the Grant Application submitted by Enerplus Resources (USA) Corporation. Enerplus will utilize Transitional Energy's Sedna Sled Geothermal System for this grant opportunity. We are highly encouraged by the work of the Transitional Energy team and their innovation in developing electricity-based generation from geothermal resources in oilfield wells. We understand and applaud the potential application of this technology across the state and the globe. Geothermal energy has a huge potential as a baseload renewable energy source, and utilizing existing resources makes it that much more sustainable by not incurring additional environmental impacts.

Specifically, ElectraTherm will:

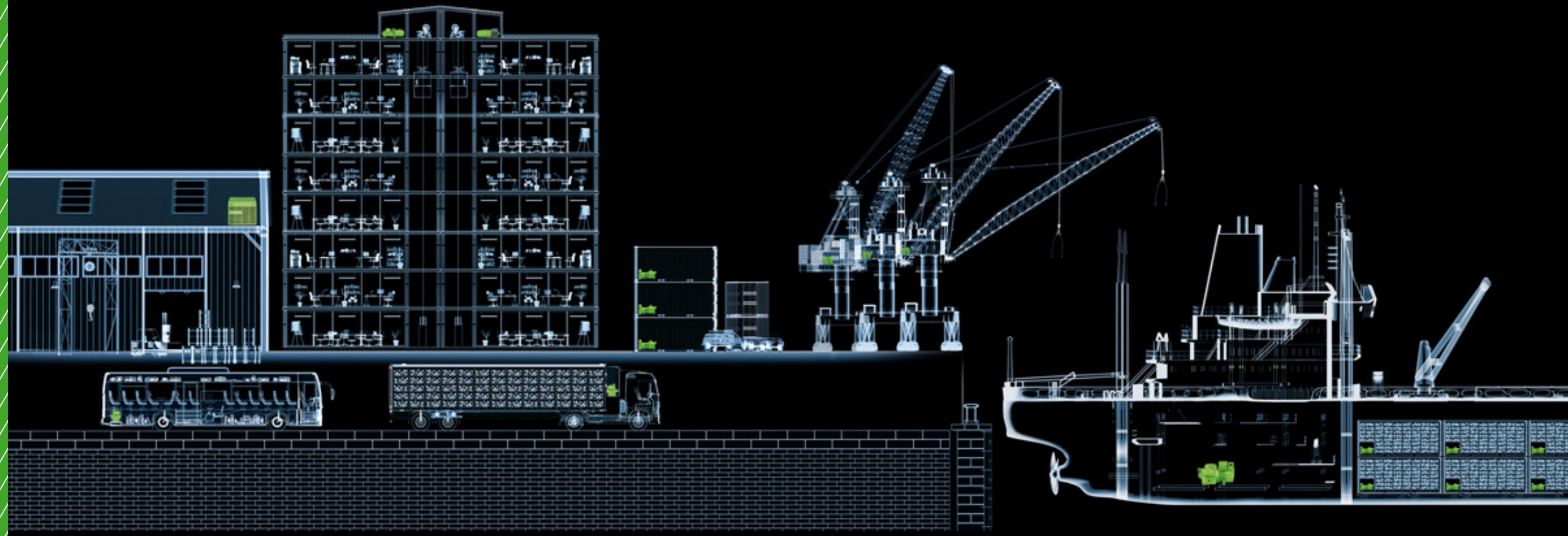
1. Dedicate detailed modeling of the different resources being evaluated on the project.
2. Be prepared to run on our test cell the conditions that are at the site to validate performance and electrical output.
3. Host a tour of our factory test cell with specified conditions on an operating ORC to further validate performance.
4. Assist with specifying or selecting other related topside components, for example, interface heat exchangers and liquid loop radiators.

We look forward to the development of this pilot installation to validate this application of sustainable energy. Feel free to contact me with questions by email or by telephone at 678-267-7700.

Sincerely,

Tom Brokaw

Engineering Manager
ElectraTherm
4080 Enterprise Way
Flowery Branch, GA 30542
678.267.7700 office
775.737.3470 cell
tbrokaw@electratherm.com



ELECTRATHERM PRODUCT OVERVIEW

CONVERTING EXCESS HEAT INTO CLEAN ELECTRICITY

THE FUTURE OF ENERGY EFFICIENCY

ElectraTherm
BY BITZER GROUP

4080 Enterprise Way // Flowery Branch, GA, USA // sales@electratherm.com // www.electratherm.com

ElectraTherm
BY BITZER GROUP

WHO WE ARE

Since our establishment in 2005 and the commercial release of the Power+ Generator in 2011, ElectraTherm has been an industry-leader of low temperature heat recovery systems using Organic Rankine Cycle technology. After many years of design adaptations, performance upgrades, successful demonstrations, and happy customers, we are pleased to provide the world solutions that we confidently stand behind.

100+ INSTALLATIONS WORLDWIDE

IN **14** COUNTRIES

OVER **2,000,000** OPERATING HOURS

BACKED BY BITZER

In 2016, ElectraTherm was acquired by BITZER, the world's largest independent manufacturer of refrigeration compressors and the centerpiece of our ORC solutions. Represented at 64 locations across the globe with over 3,400 employees generating sales approaching $1 billion USD, BITZER is recognized as an industry leader in all their industries served.

The combined advantage of ElectraTherm's engineering along with the value of being supported by BITZER allows the ElectraTherm team to continue developing and delivering industry leading waste heat recovery technology.

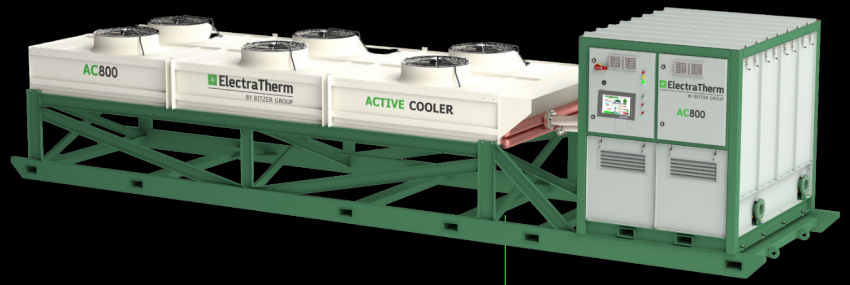
Together, we bring a proven solution.

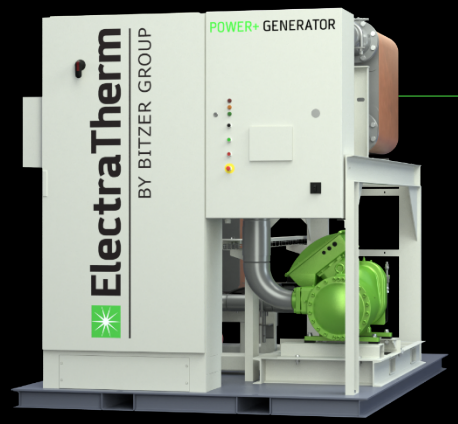
BITZER'S SEMI-HERMETIC TWIN SCREW EXPANDER, CENTERPIECE OF THE ELECTRATHERM ORC SYSTEM.

PRODUCT LINE

POWER MODULE75

// Up to 75 kWe





POWER+ GENERATOR

6500B / 6500B+

// Up to 150 kWe*

ACTIVE COOLER

AC-800 (Up to 800 kWth) //

Up to 75 kWe

AC-1800 (Up to 1800 kWth)

// TBD

* For 50Hz systems, maximum gross output is 125 kWe

HOW IT WORKS

ElectraTherm's heat to power and cooling to power solutions utilize a closed-loop Organic Rankine Cycle (ORC) to convert excess heat into electricity, with no additional emissions or fuel consumption. It's simple really, the ORC exploits the temperature difference between hot and cold water to generate electricity.

DIVERSE HEAT SOURCES
NUMEROUS APPLICATIONS

Low temperature heat sources between 150-300°F are ideal for ORC power generation. Higher temperature heat sources such as exhaust gases require an additional heat exchanger.

// Net-zero cooling to power

// Compression Heat Recovery

// Industrial Process Heat Recovery

// Engine Waste Heat Recovery

// Flare Reduction / Elimination

// Micro-Geothermal Power Generation

// Biomass / Biogas Power Generation

// Combined Heat and Power











CURRENT US INSTALLATIONS

// Unalaska (Dutch Harbor, AK) – Engines (3)

// Wisewood (Quincy, CA) – Biomass / CHP

// Port Richmond (Staten Island, NY) – WWTP

// Air Burners (California) – Biomass (2)

// Air Burners (Florida) – Biomass

// Pharmacutical (Virginia) – Industrial

// US Naval Academy (Maryland) – Engine

// BHSL (Maryland) – Incinerator

// University of Louisiana – Solar

Wisewood / Quincy, CA

Waste Water Treatment Plant / Staten Island, NY

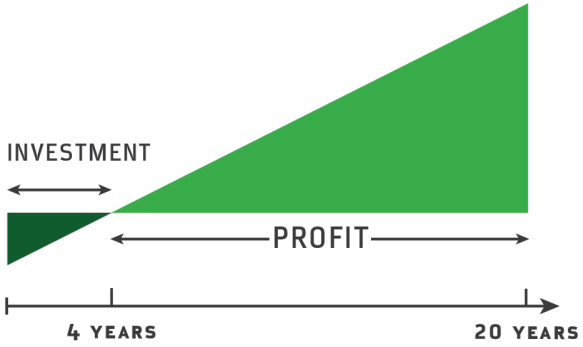
RETURN ON INVESTMENT

CASE STUDY

// 800 kW engine + AC800
// 8000 hours of operation per year
// Power Output: 35 kW
// Radiator Offset: 8 kW
// Total Annual Output: 344 MWh

COST SAVINGS

// $34,400 per year at $0.10/kWh
// $51,600 per year at $0.15.kWh

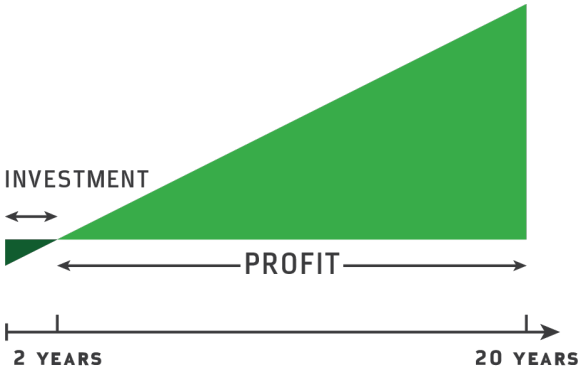


CASE STUDY

// 1.1 MW engine + 6500B
// 8000 hours of operation per year
// Power Output: 95 kW
// Radiator Offset: 15 kW
// Total Annual Output: 880 MWh

COST SAVINGS

// $88,000 per year at $0.10/kWh
// $132,000 per year at $0.15.kWh



ROI is based on kW output, load offset, and annual runtime.

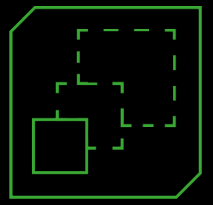
INCENTIVIZED TECHNOLOGY

ORC technology can provide clean energy, increase efficiency, reduce emissions and fuel consumption, and eliminate flaring. Operators may be eligible for various incentives promoting sustainability and energy efficiency improvements.

The Consolidated Appropriations Act 2021 grants a 26% tax investment credit to waste heat recovery projects in the U.S. that commence construction by 2023.

GOOD FOR **BUSINESS...**

ElectraTherm
BY BITZER GROUP



SIMPLE

Our robust systems can be adjusted to fit the needs of any application. A modular and scalable design allows for easy integration with existing processes.

PROFITABLE

Our systems use an existing resource as fuel, keeping operating costs minimal. This increases efficiency up to 10%, significantly reducing energy consumption and reliance on the grid.

RELIABLE

Every ElectraTherm product goes through a rigorous testing process at our world-class R&D center to ensure output prior to shipment. Our technicians and dedicated global partners offer full support for any issues you many encounter.

SUSTAINABLE

Approximately 50% of all energy across the globe is lost as heat. Increasing energy efficiency with an ORC is the single easiest way to generate clean energy and offset emissions. With ElectraTherm you can make a measurable reduction of your carbon footprint.

WHAT CAN 5 ACTIVE COOLERS DO FOR YOU?*

CLEAN ELECTRICITY PRODUCED

By recycling waste heat into clean power, you generate 3,285 MWh of emission-free electricity annually. Enough to power 280 U.S. homes year-round.

CARS NOT DRIVEN

Your annual pollution offset is equivalent to taking 500 cars off the road, or reducing gasoline consumption by 260,000 gallons.

CO2 ELIMINATED

By using a waste heat recovery system to achieve net-zero cooling with power generation, you effectively offset the equivalent of 2,330 metric tons of carbon dioxide annually.

CARBON ABSORBED BY TREES

Your annual pollution offset is equivalent to the carbon sequestered by a 2,850-acre forest, or 100,000 mature trees.

SOURCE: EPA GREENHOUSE GAS EMISSIONS
*CALCULATIONS BASED ON (5) ACTIVE COOLERS GENERATING 65 KW NET AND OFFSETING 10 KW EACH.

AFTERMARKET SERVICES, LEAD TIMES, FINANCING

// Service contracts available. (remote monitoring with contract)

// 24/7 support from the BITZER Green Point global services.

// Manufactured in USA, ships from Flowery Branch, Georgia.

// Volume purchase discounts available.

// Financing available – 24 months with 30% down.

THANK YOU!

SALES@ELECTRATHERM.COM

ElectraTherm
BY BITZER GROUP

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Appendix G
MHA Nation Support

Three Affiliated Tribes
MHA Nation Energy Division
305 4TH Ave, Suite 3100
New Town, ND 58763
Phone: 701.627.5154
Fax: 701 .627.5105

Greetings,

I, MHA Energy Director Kenny Lyson, have reviewed Enerplus' Geothermal Power Generation Plan.
MHA Energy would like to commend Enerplus on their commitment to lowering emissions and flaring through renewable energy sources. MHA Energy supports and looks forward to seeing the results of this pilot.

Again, thank you for your continued efforts.

Respectfully,

Kenny Lyson
MHA Energy Director