

APPLICATION CHECKLIST

Use this checklist as a tool to ensure that you have all of the components of the application package. Please note, this checklist is for your use only and does not need to be included in the package.

<input type="checkbox"/>	Application
<input type="checkbox"/>	Transmittal Letter
<input type="checkbox"/>	Tax Liability Statement
<input type="checkbox"/>	Letters of Support (If Applicable)
<input type="checkbox"/>	Confidentiality Request
<input type="checkbox"/>	Business Plan (Appendix)
<input type="checkbox"/>	Historical Financial Statements (3 years) (Appendix)
<input type="checkbox"/>	Budgeted Projections (Appendix)
<input type="checkbox"/>	Loan/Loan Guarantee Application (if Applicable, Appendix)
<input type="checkbox"/>	Other Appendices (If Applicable)

When the package is completed, send an electronic version to sustainableenergy@nd.gov

For more information on the application process please visit:

<https://www.ndic.nd.gov/grant-programs/csea/clean-sustainable-energy-authority-applicant-information>

Questions can be addressed to the Industrial Commission at 701-328-3722.

Clean Sustainable Energy Authority

North Dakota Industrial Commission

Application

Project Title: Hybrid service rig

Applicant: Foremost well service

Date of Application: 8/21/2025

Amount of Request
Grant: \$1,500,000

Total Amount of Proposed Project:
\$3,000,000

Duration of Project: 3 years

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TABLE OF CONTENTS

Please use this table to fill in the correct corresponding page number.

Abstract	1
Project Description	2-6
Standards of Success	7
Background/Qualifications	8-9
Management	10
Timetable	11
Budget	12-14
Confidential Information	15
Patents/Rights to Technical Data	16
State Programs and Incentives	16
Loan/Loan Guarantee Application (if applicable)	

ABSTRACT

CSEA Grant Request: \$1,500,000

Foremost Well Service LLC proposes to undertake the first hybrid-electric retrofit of a Kremco 600 rig in North Dakota. This project directly supports the mission of the Clean Sustainable Energy Authority under N.D.C. § 54-17-40 by advancing innovative technologies that reduce emissions, lower operational costs, and strengthen North Dakota's leadership in energy innovation.

The project will displace approximately 30,000 gallons of diesel fuel per rig per year, avoiding more than 340 metric tons of CO₂ emissions annually, based on EPA 2024 Emissions Factors. These reductions will result in fuel savings of approximately \$135,000 per rig per year, along with additional operational savings from lower oil consumption and reduced brake band replacements. In total, the hybridization is expected to save more than \$175,000 annually per rig while extending equipment life, reducing noise, and improving worker safety.

This retrofit demonstration will be executed by CARE Industries in partnership with Foremost Well Service LLC and deployed in continuous 24/7 oilfield operations in North Dakota. The project will create measurable local economic value through retrofit fabrication and workforce training, while establishing a scalable model that can be replicated across multiple rigs statewide.

By demonstrating technical, environmental, and economic success in the field, this project provides a pathway for widespread adoption of hybrid-electric retrofit technology in North Dakota's service rig industry, reinforcing North Dakota's position as a national leader in clean, sustainable energy innovation. The project is further strengthened by financing support from the Bank of North Dakota (BND), ensuring financial stability throughout implementation.

PROJECT DESCRIPTION

Objectives:

Retrofit one Kremco 600 trailered rig to a hybrid-electric configuration.

Demonstrate continuous 24/7 field operation with major reductions in diesel consumption, emissions, and fuel costs.

Establish a replicable retrofit model for multiple rigs, enabling industry-wide adoption in North Dakota

Methodology:

Engineering & Build Partner: CARE Industries will execute the retrofit, adapting commercially proven hybrid rig data to the Kremco 600 trailered platform.

System Integration: Install modular battery-electric drive system, traction inverters, HVDC panel, DC/DC converter, and charger module.

Hybrid Operation: Rig operates primarily on stored battery power with regenerative braking and block descent energy recovery; an on-board generator provides redundancy and extended runtime.

Monitoring & Diagnostics: Real-time monitoring of battery health, electrical systems, and performance metrics will support predictive maintenance and operational reporting.

Deployment: Upon commissioning, the rig will be deployed in North Dakota oilfield operations to validate fuel, emissions, and maintenance savings in real-world 24/7 conditions.

Facilities:

The retrofit project will utilize the fabrication and assembly facilities of CARE Industries Ltd. in Red Deer, Alberta. CARE operates modern fabrication shops with API 4F-certified manufacturing capability, welding bays, and assembly lines specifically designed for oilfield equipment. All retrofit modules will be fabricated, tested, and certified at this facility before delivery.

Final assembly, outfitting of field equipment, and commissioning will be conducted by Foremost Well Service LLC at its operational base in Dickinson, North Dakota. This ensures the Kremco 600 trailered rig is fully integrated and field-ready under North Dakota conditions, supported by Foremost's experienced mechanics and operators.

Resources:

The project team brings together Foremost Well Service, which contributes the Kremco 600 rig, field operators, mechanics, and training infrastructure, with CARE Industries, which provides engineering, fabrication, and commissioning resources.

To ensure maximum efficiency and performance, the retrofit will incorporate modern battery technology sourced from leading global manufacturers, delivering the latest advances in energy density, safety, and lifecycle performance. Central to the retrofit is an 800-horsepower electric motor engineered to power the draw works, replacing diesel-driven hoisting with fully electric operation. This enables significant reductions in fuel use, emissions, and mechanical wear during continuous rig service.

Financial resources are secured through a \$1.5M Clean Sustainable Energy Authority grant and a \$1.5M Bank of North Dakota loan, ensuring the \$3M project is fully funded. Additional support resources include operator training programs, emissions monitoring tools, and API/OSHA-compliant safety systems.

Techniques to Be Used, Their Availability and Capability:

The retrofit will apply commercially available hybrid-electric technologies adapted for service rig applications:

- Electric draw works drive system integration using an 800 hp electric motor.
- Regenerative braking to reduce brake band wear and recover energy.
- Hybrid auxiliary power systems to reduce idling and fuel use.
- Advanced control software and automation for seamless operator interface.

All components are readily available from established suppliers and will be engineered for compatibility with the Kremco 600 rig. CARE Industries has full capability to fabricate, assemble, and certify these components under API 4F standards, while Foremost Well Service provides operational validation in continuous oilfield service.

Environmental and Economic Impacts while Project is Underway:

During fabrication and retrofit, environmental impacts are minimal and limited to standard shop operations (welding, machining, testing) under existing environmental permits. Economic impacts during this stage are positive, including job creation in fabrication, assembly, and operator training.

Once deployed, the retrofitted rig will displace 30,000 gallons of diesel annually, reducing emissions by more than 340 metric tons of CO₂ per year, while lowering operating costs by approximately \$175,000 annually per rig.

In addition, Foremost Well Service will expand its workforce by 17 full-time positions to staff and operate the hybrid rig. These new roles include rig operators, and support staff, providing high-quality jobs in North Dakota's energy sector. The expansion strengthens local economies through wages, benefits, and secondary economic activity, while also enhancing the state's reputation as a hub for innovative, sustainable energy development.

Ultimate Technological and Economic Impacts:

This project represents the first hybrid-electric retrofit of a workover rig in North Dakota, establishing a technological benchmark that can be replicated across fleets. The demonstration will prove that hybridization is not only technically viable but also financially self-sustaining, with a payback period of less than two years through operational savings.

At scale, deployment across just 10 rigs would eliminate more than 300,000 gallons of diesel consumption annually, avoid over 3,400 metric tons of CO₂ emissions, and deliver cost savings exceeding \$1.75 million per year. Expanded statewide adoption has the potential to transform emissions performance in North Dakota's service rig fleet while strengthening the competitiveness of local operators.

Beyond fuel and emissions reductions, the project will generate durable economic benefits. Foremost Well Service will expand its workforce, creating new high-wage, full-benefit jobs for North Dakota residents, while CARE Industries contributes to regional manufacturing strength. This synergy ensures that both economic and environmental value are retained locally.

Most importantly, this project positions North Dakota as the national leader in sustainable oilfield service innovation, a state that embraces clean energy solutions without compromising on reliability, safety, or economic growth. The retrofit will serve as a replicable, scalable model for the broader oil and gas industry across North America, reinforcing the state's reputation for energy leadership well into the future.

Why the Project is Needed:

Service rig technology has remained largely unchanged since the 1980s. While drilling rigs and production systems have advanced significantly with digital controls, automation, and emissions-reduction technologies, service rigs continue to rely almost entirely on diesel-driven mechanical systems. This makes them one of the last areas of the oil and gas industry to undergo meaningful modernization.

The lack of innovation in service rig design has several consequences:

- High fuel consumption due to continuous diesel operation, even during idling or low-load tasks.
- Excessive emissions, with each rig burning ~30,000 gallons of diesel annually, generating more than 340 metric tons of CO₂.
- Increased maintenance costs, particularly frequent brake band replacement and engine oil changes, leading to downtime and higher operating costs.
- Missed opportunities for safety and ergonomic improvements, leaving rig operators exposed to higher noise, heat, vibration, and repetitive strain conditions that make long-term careers less sustainable.

This project addresses these gaps directly by deploying the first hybrid-electric retrofit for a service rig in North Dakota. The Kremco 600 trailered rig retrofit will:

- Demonstrate cleaner and more efficient technology applied to one of the most widely used—but least modernized—pieces of oilfield equipment.
- Significantly reduce operator exposure to noise, vibration, and exhaust, improving ergonomics and long-term workforce sustainability.
- Deliver verifiable fuel savings, emissions reductions, and maintenance improvements in continuous 24/7 operations.
- Serve as a platform for bolt-on electrification of auxiliary systems, multiplying the benefits beyond the rig itself:
 - Electric pipe wranglers powered directly from the rig, eliminating standalone diesel units.
 - Remote light plants tied into the rig's electric system, displacing portable diesel generators.
 - Each small diesel engine replaced typically consumes 10–30 gallons of fuel per day, equivalent to up to 111 metric tons of CO₂ per year eliminated per unit.

By proving technical performance, economic payback, emissions reductions, and better working conditions, this project ensures that service rigs the “workhorses” of the oil patch are no longer left behind in the evolution toward cleaner, safer, and more sustainable energy systems. Moreover, the retrofit provides a scalable platform for full site electrification, where every bolt-on module displaces another diesel engine and compounds North Dakota's environmental and economic gains

STANDARDS OF SUCCESS

The success of this demonstration project will be measured by verifiable performance data and its ability to serve as a replicable model for the broader service rig fleet. Specific standards of success include:

- **Emissions Reduction:**
 - Each retrofitted rig will displace 30,000 gallons of diesel annually, avoiding more than 340 metric tons of CO₂ per rig per year.
 - Additional bolt-on electrification (pipe wranglers, light plants, auxiliary engines) offers the potential to eliminate another 50–111 metric tons of CO₂ per unit annually.
- **Reduced Environmental Impacts:**
 - Lower diesel usage reduces particulate matter, NO_x, and noise pollution, directly improving air quality and community health in rural and urban service areas.
 - Extended maintenance intervals decrease oil consumption and waste (saving ~70% of oil change volume and reducing brake band waste by >70%).
- **Increased Energy Sustainability:**
 - Integration of an 800-horsepower electric draw works motor and modern battery systems demonstrates a pathway to hybrid-electric field operations.
 - Establishes a replicable framework for electrifying auxiliary rig functions, moving toward full-site electrification and reduced dependence on fossil fuel generators.
- **Value to North Dakota:**
 - Enhances the competitiveness and sustainability of the state's energy sector while reinforcing its reputation as a clean energy innovation leader.
- **Public and Private Sector Utilization:**
 - Public sector agencies (NDIC, CSEA) gain real-world emissions and cost data for policymaking and future incentive structures.
 - Private sector operators can replicate the retrofit model across their fleets, reducing costs and emissions at scale.
- **Commercialization Potential:**
 - CARE Industries and Foremost Well Service will establish a repeatable, commercial retrofit package that can be marketed to other operators in North Dakota and beyond.
- **Advancement of R&D and Technology:**
 - Demonstrates practical application of hybrid-electric drive systems in continuous 24/7 oilfield service.
 - Provides data for future research into battery systems, regenerative braking, and electrified auxiliary rig equipment.
- **Job Preservation and Creation:**
 - Maintains existing service rig operations while creating 17 new full-time positions for rig operators, mechanics, and support staff in North Dakota.
 - Supports skilled trades at CARE Industries' fabrication facilities.
- **Alignment with Program Mission:**
 - The project satisfies CSEA's mission by reducing emissions, advancing sustainable energy technology, and creating economic benefits for North Dakota residents.
 - Demonstrates how innovation in legacy oilfield equipment can simultaneously improve environmental performance and economic competitiveness.

BACKGROUND / QUALIFICATIONS

Applicant (Operator/Sponsor):

Foremost Well Service is a locally owned-and-operated oilfield services company headquartered in Dickinson, North Dakota. Established in 2016, Foremost operates 24/7 workover completions and production rig fleets including eight 550-series rigs and two 750-series rigs delivering expert services such as completions, production, drill-outs, clean-outs, down-hole pumping, and more (foremostwellservicellc.com).

Foremost's operations are built on a culture of safety and reliability, with rigorous hazard identification, API-compliant safety procedures, and strong adherence to OSHA and NDIC regulations. The company has earned a strong reputation for operational excellence by prioritizing safety, reliability, and efficiency in all phases of its field work.

Foremost Well Service LLC – Executive Leadership

Brian O'Toole, Founder and President, leads the organization with decades of deep field experience. His career spans drilling, pulling unit operations, and oilfield consulting, culminating in the establishment of Foremost during the industry downturn of 2015–2016. His leadership is rooted in real-world operational expertise and a steadfast commitment to employees, clients, and the long-term success of North Dakota's energy sector.

Brad Hartigan, a mechanic by trade, brings extensive experience in both drilling and workover operations. His technical background ensures practical, field-proven insights throughout every retrofit phase, with responsibility for mechanical integrity, operational execution, and ensuring continuous 24/7 field readiness.

Together, O'Toole and Hartigan align strategic oversight with day-to-day operational excellence combining real-world leadership and technical execution to ensure the success of this first-of-its-kind project.

CARE Industries Ltd. – Engineering & Fabrication Partner

CARE Industries, based in Red Deer, Alberta, is a premier manufacturer of drilling and workover rig packages, including masts, substructures, and pump systems—produced under API 4F certification—and fully supported through Level IV recertification and custom fabrication (careindustries.ca, cosssd.com). Founded in the late 1990s, CARE has earned accolades such as the New Exporter Award and Business of the Year Award, and holds an API Monogram license (4F-0108) for high-quality fabrication (oilmonster.com).

Mike MacKenzie, Vice President of Operations, joined CARE Industries in 2001 and brings over 25 years of manufacturing leadership. He oversees all manufacturing activities, including fabrication, welding, mechanical assembly, and quality assurance. A certified Welding Supervisor through the Canadian Welding Bureau (CWB) and an inter-provincial Journeyman Welder, MacKenzie also worked in power generation equipment manufacturing with Hitachi Canadian Industries, providing both technical breadth and strategic insight.

Brody St. Louis, Project Manager, joined CARE in 2011 with nearly 20 years of experience in welding and fabrication. He began his apprenticeship with Arnett & Burgess Pipeline Ltd before moving to CARE, where he now leads project planning, execution, and delivery. His deep fabrication knowledge and project management expertise ensure high-quality retrofit design and on-time completion.

Corporate Expertise & Technical Leadership

Together, Foremost and CARE combine local operational capacity with manufacturing excellence:

- Foremost brings deep field experience, safety leadership, and ND-based logistics.
- CARE provides rig-specific engineering, custom fabrication, quality assurance, and API-certified parts.

This joint management structure ensures tactical field expertise, accountable leadership, and manufacturing precision. Foremost directs day-to-day management and field deployment, while CARE provides engineering execution and technical support to deliver a first-of-its-kind hybrid-electric retrofit in North Dakota.

MANAGEMENT

The project will be managed jointly by Foremost Well Service and CARE Industries, leveraging complementary expertise in oilfield operations and engineering/fabrication.

- **Foremost Well Service – Project Lead**
 - Responsible for overall project management, coordination with NDIC, and compliance with state regulatory and reporting requirements.
 - Provides the Kremco 600 trailer rig to be retrofitted.
 - Oversee operator training, safety compliance, and integration of the hybrid-electric rig into continuous 24/7 field operations in North Dakota.
 - Maintains responsibility for quarterly and final reporting to NDIC, including validated data on fuel displacement, CO₂ reductions, and cost savings.
- **CARE Industries – Engineering & Fabrication Partner**
 - Responsible for engineering design, fabrication, and integration of hybrid-electric retrofit components.
 - Executes system assembly, quality assurance, and compliance with API 4F certification standards.
 - Provides technical support during rig integration and commissioning.
 - Assists with documentation, operator training, and technical validation of performance data.

The joint management structure ensures that the project benefits from both tactical field expertise and manufacturing precision. Foremost Well Service will direct day-to-day management and field deployment, while CARE Industries provides technical execution and engineering support together, these organizations provide the full range of expertise required to deliver a successful first-of-its-kind hybrid-electric retrofit in North Dakota, ensuring NDIC funding produces measurable, verifiable, and replicable results.

TIMETABLE

The proposed hybrid-electric retrofit will be executed over an estimated 36-month period, with key milestones as follows:

Narrative Milestones

- **Q1 2026 – Project Launch & Engineering**
 - Finalize engineering design package for Kremco 600 trailered retrofit.
 - Order long-lead components (electric drive systems, regenerative braking assemblies).
- **Q2–Q3 2026 – Fabrication & Assembly**
 - CARE Industries completes fabrication of retrofit modules.
 - Subsystem integration and quality assurance checks under API and OSHA standards.
- **Q4 2026 – Rig Integration & Testing**
 - Installation of retrofit package on Foremost rig.
 - Commissioning and functional validation of hybrid system.
 - Initial safety and performance testing under continuous operation.
- **Q1–Q2 2027 – Field Deployment & Data Collection**
 - Rig placed into 24/7 field service in North Dakota operations.
 - Ongoing monitoring of fuel consumption, emissions, and operational performance.
 - Quarterly reports submitted to NDIC.
- **Q3–Q4 2027 – Evaluation & Interim Reporting**
 - Comprehensive evaluation of economic and environmental results.
 - Submission of interim performance and financial reports to NDIC.
 - Demonstration project results shared with ND operators to encourage replication.
- **Q1–Q4 2028 – Extended Demonstration & Final Reporting**
 - Continuous demonstration; performance tracking (fuel, CO₂, uptime, safety).
 - Project wrap-up; data analysis; scalability assessment.
 - Final report and close-out presentation to NDIC

BUDGET

Funding for this project will total \$3,000,000, structured as a \$1,500,000 Clean Sustainable Energy Authority grant matched by a \$1,500,000 Bank of North Dakota loan. These funds will support the complete modernization of a Kremco 600 trailered service rig, with costs allocated to engineering design, component procurement, fabrication, final assembly, and continuous field deployment. The financing structure ensures full coverage of project expenses while balancing public investment with private-sector commitment.

The requested funds will directly support:

- Engineering and fabrication of the electric drive system, regenerative braking components, and auxiliary hybrid systems.
- Installation, integration, and testing of the hybrid retrofit on an active Kremco 600 trailer rig.
- Operator training, safety validation, and documentation to ensure reliable 24/7 field operations in North Dakota conditions.

The economic case for this demonstration is compelling:

- Each retrofitted rig will save more than \$175,000 annually in combined fuel, oil, and brake maintenance costs.
- The retrofit will displace approximately 30,000 gallons of diesel fuel per year per rig, avoiding over 340 metric tons of CO₂ annually (EPA 2024 Emissions Factors).
- When scaled across 10 rigs, the annual savings exceed \$1.75 million, with avoided emissions greater than 3,400 metric tons of CO₂.
- The payback period is projected at less than two years, making this technology both financially and environmentally sustainable.

CSEA funding will allow Foremost to validate this retrofit as a first-of-its-kind demonstration in North Dakota, producing verifiable data that will accelerate adoption across the state’s service rig fleet. By de-risking this initial deployment, NDIC funding ensures that long-term operational savings, workforce benefits, and emissions reductions will remain in North Dakota and support the state’s leadership in clean, sustainable energy innovation.

*Please use the table below to provide an **itemized list** of the project’s capital costs; direct operating costs, including salaries; and indirect costs; and an explanation of which of these costs will be supported by the financial assistance and in what amount. The budget should identify all other committed and prospective funding sources and the amount of funding from each source. **Please feel free to add columns and rows as needed.** Higher priority will be given to projects with a high degree of matching private industry investment.*

Project Associated Expense	NDIC Grant	NDIC Loan	Applicant’s Share (Cash)	Other Project Sponsor’s Share	Total
Hybrid drivetrain modules & batteries	\$800,000	\$800,000	\$0	\$0	\$1,600,000
Retrofit labor & assembly (CARE)	\$450,000	\$300,000	\$0	\$0	\$750,000
Testing, certification & training	\$200,000	\$200,000	\$0	\$0	\$400,000
Monitoring & data systems	\$50,000	\$200,000	\$0	\$0	\$250,000
Total	\$1,500,000	\$1,500,000	\$0	\$0	\$3,000,000

Budget Justification:

Foremost Well Service LLC requests a Clean Sustainable Energy Authority (CSEA) grant of \$1,500,000 to complete the hybrid-electric retrofit of a Kremco 600 trailer rig. This funding will cover the design, fabrication, integration, and deployment of the retrofit package, executed by CARE Industries in partnership with Foremost.

The requested funds will directly support:

- Engineering and fabrication of the electric drive system, regenerative braking components, and auxiliary hybrid systems.
- Installation, integration, and testing of the hybrid retrofit on an active Kremco 600 trailer rig.
- Operator training, safety validation, and documentation to ensure reliable 24/7 field operations in North Dakota conditions.

Economic and environmental justification:

- Each retrofitted rig will save more than \$175,000 annually in combined fuel, oil, and brake maintenance costs.
- The retrofit will displace approximately 30,000 gallons of diesel fuel per year per rig, avoiding over 340 metric tons of CO₂ annually (EPA 2024 Emissions Factors).
- When scaled across 10 rigs, the annual savings exceed \$1.75 million, with avoided emissions greater than 3,400 metric tons of CO₂.

CONFIDENTIAL INFORMATION

This application does not contain confidential or proprietary information requiring redaction. Should any proprietary data be generated during the project (including technical specifications of the retrofit package), Foremost Well Service LLC and CARE Industries will provide NDIC with a clear, redacted public version of any reports or submissions.

All financial figures, emissions reduction estimates, and cost savings calculations contained herein are provided for public review and verification.

PATENTS/RIGHTS TO TECHNICAL DATA

No patents are required for the execution of this project. Foremost Well Service LLC and CARE Industries will utilize existing, commercially available technologies and components in the retrofit. Should any new intellectual property be generated as a result of this demonstration project, ownership and licensing will be determined in accordance with applicable North Dakota law and NDIC guidelines.

Any patents or rights that the applicant wishes to reserve must be identified in the application. If this does not apply to your proposal, please note that below.

STATE PROGRAMS AND INCENTIVES

The project has not received funding from other North Dakota state programs. No duplicative state support will be sought. The proposed retrofit demonstration will be funded through the requested CSEA grant of \$1,500,000, supported by a Bank of North Dakota (BND) loan. This ensures clear accountability, transparency, and alignment with the mission of the Clean Sustainable Energy Authority.

