NRC·CNRC

Solving industry's challenges

Bioenergy systems for viable stationary applications

National Research Council Canada
Conseil national de recherches Canada

Canada

Customized solutions to get the most from your biomass

The National Research Council Canada (NRC) is well-positioned to help Canadian industry capitalize on a growing demand for bioenergy. We help our clients overcome the technical, economic and regulatory barriers to integrating locally-sourced biomass into stationary heat and power systems. NRC's vast expertise and specialized facilities provide the means for technology adaptation and efficiency optimization, allowing our clients to validate systems, reduce risk and ultimately reduce costs.

Solving Industry's Challenges

NRC's program is designed to work with clients to implement bio-based alternatives to conventional fossil fuels. Our experience providing performance-specification and feasibility advice enables industry partners to realize long-term, sustainable economic benefits.

Specifically, through our research efforts, we aim to reduce the cost of producing market-ready biofuel to <$25/GJ, and to adapt existing conventional fuel power systems to work with biofuel in a reliable and cost competitive manner. This has the potential to double the penetration of bioenergy in the Canadian stationary energy market, from 4.7% today to 10% in 2024.

We will achieve these gains by engaging companies throughout the bioenergy systems value chain and addressing key challenges for the biofuels industry, including:

- Increasing the efficiency of biomass conversion technologies;
- Optimizing processes for biofuel upgrading;
- Resolving biofuel power plant compatibility issues;
- Lowering capital and operating costs for bioenergy systems; and,
- Supporting deployment with techno-economic analysis, staged demonstration activities and testing services.

Our Expertise

When you work with NRC's Bioenergy program, you will have access to some of the industry's foremost experts and facilities:

- Our capabilities for enhancing the performance of reciprocating and gas turbine engines and their components help clients to enhance fuel-flexibility, improve operability, support integrated systems-level cycle optimization, and reduce emissions and maintenance costs. Potential projects include: increasing efficiency through corrosion resistant and high-temperature materials and coatings, reliable and cost-effective syngas clean-up and conditioning, as well as low-cost manufacturing methodologies.
- We test and customize pre-treatment and biomass conversion technologies (microbial processes, torrefaction, pyrolysis and gasification) aimed at reducing costs and enhancing conversion efficiency and energy density.

The Bioenergy Market: From Supplier to End-user

Feedstock suppliers | **Technology developers** | **Power and heating systems** | **System integrators** | **Energy for end-users**

- Our mobile anaerobic digestion unit along with our gasification and power generation pilot facilities provide companies with the infrastructure to reduce the technical risks and costs associated with scale-up of new processes. We also provide validation prior to full-scale installation.
- Our techniques for upgrading gaseous and liquid biofuels, and improving the combustion of dual fuel mixtures help to both lower costs and reduce the environmental impacts of traditional energy systems. These upgrading objectives are achieved through blending and fuel processing to meet quality standards, such as viscosity, lubricity and total suspended particles.
- We provide support for technology demonstration through testing, performance reporting and optimization analyses. In addition, we participate in the development of codes and standards for biofuels and related equipment, and work with clients to understand the regulatory landscape.

The NRC Competitive Advantage

Talk to us. The breadth of NRC's expertise and equipment facilitates a multidisciplinary approach, resulting in maximum added value for our clients' investment. We connect our clients with capabilities in adjacent programs, like: construction, energy storage, mining, aerospace, water treatment and environmental impact reduction. And, NRC's capabilities in bioenergy are complemented by collaboration and working relationships with other government departments and agencies.

A fresh take on clean energy

The world's cleanest landfill gas is being produced in British Columbia by Quadrogen Power Systems. They've developed the only known technology capable of removing virtually all harmful impurities from biogas used in downstream equipment.

To become a market leader in the competitive bioenergy sector, Quadrogen relied on NRC. From engineering to mechanical design to standardized testing procedures and reporting, NRC helped Quadrogen overcome some of their greatest technical hurdles.

Bioenergy systems for viable stationary applications

Customized solutions to get the most from your biomass.

Let our team help you succeed

Our skilled researchers, outstanding facilities and unsurpassed technological advantage are all available to you. Partnering with NRC is your key to success.

" Our seven-year journey from a single-person start up to a global player in bioenergy would not have been as successful without NRC's help. "

– Alakh Prasad, President and CEO, Quadrogen Power Systems

CONTACT

Jonathan Martin
Program Leader
Tel.: 604-221-3069
Jonathan.Martin
@nrc-cnrc.gc.ca

www.nrc-cnrc.gc.ca/bioenergy

NR16-210/2018E-PDF
ISBN 978-0-660-25622-1 PDF
ISBN 978-0-660-25624-5 PAPER

March 2018
Également disponible en français