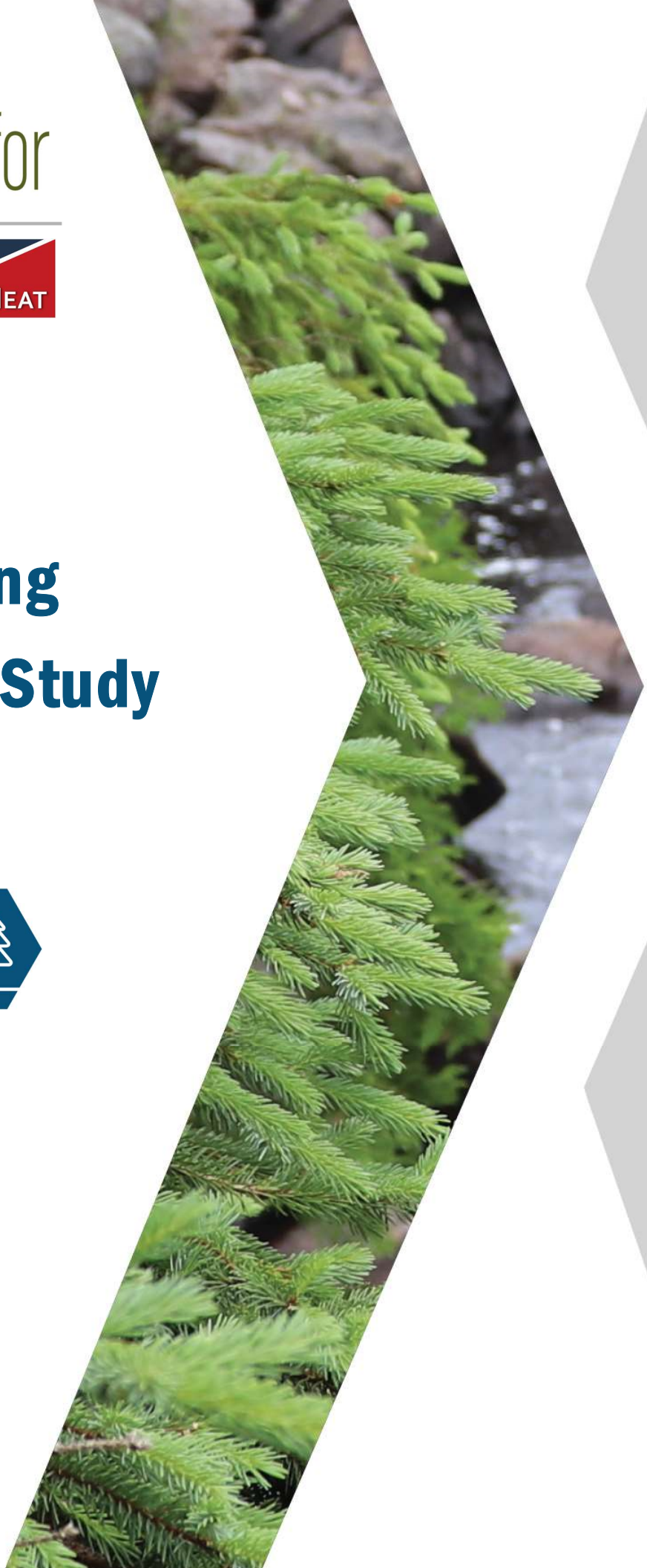
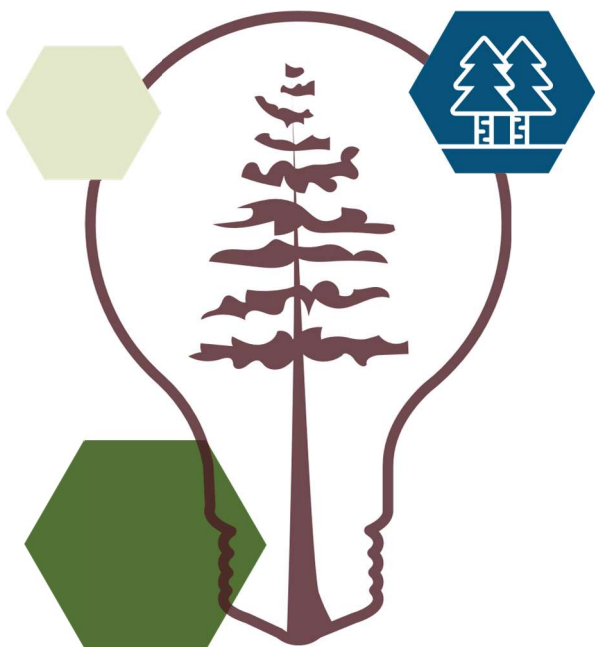




District Heating Prefeasibility Study

Northwestern Ontario Working Group



Kozar Engineering Inc. (KEI) has been retained by the Center for Research and Innovation in the Bio-Economy (CRIBE) to determine if a biomass district energy system is a viable option to replace fossil fuels (natural gas) for heating in the downtown north core of Thunder Bay, ON. The intent of the prefeasibility study is to provide CRIBE and the City of Thunder Bay with the necessary information to make an informed decision on the environmental and economic impact the implementation of this project would have on the City of Thunder Bay. The City of Thunder Bay has recognized that we are in a climate emergency and is being proactive with their approach to become a carbon neutral city. Efforts are in place to reduce greenhouse gas emissions and a 2050 net-zero strategy has been undertaken. The proposed district energy system will compliment this strategy while creating meaningful employment opportunities for the local economy.

The project will consist of the following phases:

Phase 1 - Assess opportunities for building efficiency in the properties to be connected to the heat network, which in turn would reduce Capex and Opex of the heat network. KEI will assess various building and identify the top buildings to focus the study on. The heat load, the existing infrastructure and age of the building will be assessed.

Evaluate the installation of an expandable centralized biomass plant (location TBD) to provide sustainable heating to large heating load buildings and install the buried piping while the City of Thunder Bay completes the water and sewer work in the downtown north core.

Phase 2 - Evaluate the expansion of the District Energy System (DES) to heat additional buildings that were identified in Phase 1.

Phase 3 - Evaluate the expansion of the DES to provide heat to all large downtown north core buildings.

The project is expected to be completed by December 2021.

The prefeasibility study will address the following questions and will provide a path forward to the continuation of the project.

1. What are the current heat demands of the buildings in the downtown north core?
2. What are the expected costs to connect the buildings identified in Phase 1-3 to the proposed DES?
3. Where are the potential locations of the biomass heating plant?
4. Is a reliable supply of biomass (wood fibre) available to meet the heat demand?
5. What is the carbon footprint and GHG impacts of utilizing biomass and district energy?

Kozar Engineering has teamed with worldwide leading experts in the fields of sustainable biomass heating and district energy system implementation to provide the most economical solution to the City of Thunder Bay. KEI, along with Biothermic Wood Energy Systems based in Thunder Bay and Nordic Heat based in Stockholm, Sweden will leverage our combined competencies to deliver an accurate prefeasibility study.

REIMAGINING ONTARIO'S FOREST PRODUCT SECTOR

In support of *Sustainable Growth: Ontario's Forest Sector Strategy*

CRIBE

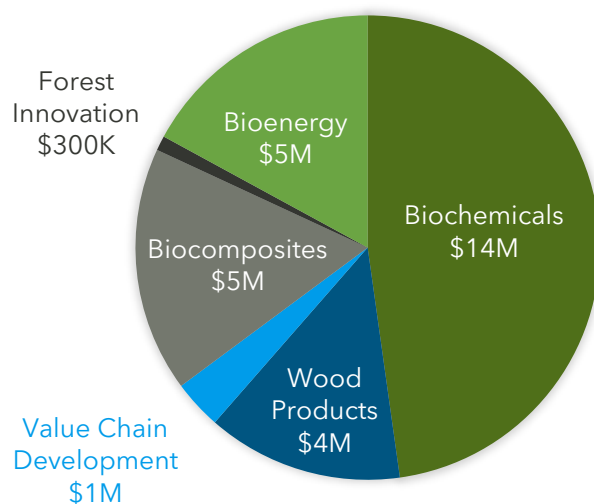
The Centre for Research & Innovation in the Bio-Economy

CRIBE is an Ontario based (Thunder Bay) independent non-profit formed in 2009 that supports innovation to commercialization activities for Ontario's forest bio-economy sector.

Since 2009 CRIBE has invested over

\$27 Million

of Ontario funding to partners in the province to support the forest bio-economy.



Nextfor

CRIBE's Collaboration Network

In 2019, CRIBE launched Nextfor - an Ontario forest-based innovation and collaboration network. With over 80 registered partner organizations and over 200 participating organizations, Nextfor represents an open, inclusive and interactive platform created to identify opportunities and overcome barriers to success (i.e. commercialization of innovative products and technologies). Through facilitated forums, industry leaders and other stakeholders roadmap common goals and actions, develop challenges and demonstrations to overcome/address impediments and gaps, and share results.

In the immediate term, Nextfor is focused on targeted interactions in four areas:

Forest Innovation



High-Performance Lignin-Based Products



Biocomposites



Biocarbon for Heavy Industry



Join the industry leaders of the future.

nextfor.ca/register

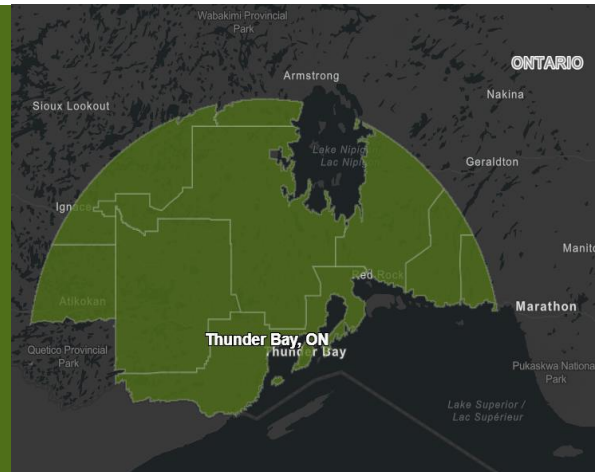


ROAD TO 2030

Defining Opportunities for Northwestern Ontario

CRIBE will work with regional partners to identify innovative biomass-based solutions, quantify merchantable and unmerchantable timber supply and product recovery to promote economic development in Northwestern Ontario, with a focus on Thunder Bay.

Regional stakeholders will have the opportunity to benefit from our challenge funding and are invited to join the conversation by becoming a Nextfor member.



OUR OBJECTIVES

SUPPORT CASE STUDIES AND TRIALS



DEFINE WOOD SUPPLY



IDENTIFY NEW REGIONAL OPPORTUNITIES



THE PROCESS

- Identify innovative biomass-based solutions and technologies;
- Support identifying operationally available wood supply opportunities;
- Quantify merchantable and unmerchantable timber supply and product recovery to promote economic development in Northwestern Ontario;
- Work with regional stakeholders to understand fibre flow in the context of the regional wood supply;
- Understand product recovery and how they may be affected by trialing solutions;
- Quantify private land inventories.

We need regional stakeholders who can...

- *actively participate in case studies;*
- *validate estimates of available biomass and fibre supply;*
- *participate in trials to improve product recovery rates;*
- *collaborate to identify solutions for the region*

Join the industry leaders of the future.

nextfor.ca/register

