PRIMA
Advanced Materials Moving Forward

A **SUCCESS** STORY

DEVELOPING **BIOSOURCED MATERIALS** FOR THE LOW-CARBON CONSTRUCTION INDUSTRY

The building sector makes up approximately 3% of Canada's GDP and contributes 19% of its GHG emissions. Currently, only the building's operating energy is considered when assessing its energy efficiency. Internationally, however, and particularly in France, new energy transition standards now consider the embodied energy of materials. Operating energy is linked to the operation of buildings throughout their life cycle. It involves the optimization of energy upon its use (air conditioning, heating, hot water, lighting, etc.). The need to limit the embodied energy associated with materials increases as operating energy efficiency improves. Embodied energy, or grey energy, is the amount of energy required throughout the material or product's life cycle: production, extraction, transformation, manufacturing, transport, implementation, maintenance and, finally, recycling, with the notable exception of use.

This project seeks to develop products that directly address the issues surrounding the embodied energy of envelope materials used in building construction. This research project, led by **Professor Pierre Blanchet of Université Laval**, in collaboration with **Kruger Biomaterials Inc.**, sought to develop low-carbon biosourced construction materials with lower embodied energy. More specifically, the project sought to develop materials for use in building envelopes. The work focused on developing two building envelope components: membranes and insulation. Weatherproof and vapour-barrier membranes were developed using cellulose filaments. For insulation, rigid boards and sprayed insulation were primarily considered. The research has enabled the advancement of knowledge on the integration of cellulose filaments in the development of biosourced construction materials.

This collaboration has laid the foundations for the development of weather barrier membranes, vapor barriers and insulating foams incorporating the company's cellulose filaments. However, additional work is needed before commercial development can take place. The project also provided training for seven students, including three postdoctoral students, two doctoral students, one master's student, and one undergraduate intern.

It is thanks to initiatives like Professor Pierre Blanchet's research project, as well as support from PRIMA Québec, that innovative and effective solutions can be developed to fight climate change. At Kruger Biomaterials, we are proud to take part in initiatives that help advance research while training the next generation. Cellulose filaments (CF) are a highly versatile biomaterial; this project helped us explore new CF-related avenues with tremendous potential while increasing our knowledge in the field of construction.

- **Joëlle Berthier**,
Eng. F., Kruger Biomaterials Inc.
Manager, Bioproducts and Sustainability

SECTORS
Construction, Environment

APPLICATIONS
Buildings

TRL
Start 2, end 3-4

DURATION
60 months (2019-2023)

UNIVERSITÉ LAVAL

Kruger
Biomatériaux
Biomaterials