ALBERTA INNOVATES

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RENEWABLE AND ALTERNATIVE ENERGY – CLEAN POWER AND HEAT

Enhanced Wind Modeling at the Red Deer Polytechnic Campus

Wind flow in built environments is an important consideration in placement of small-scale wind generation systems, as well as HVAC ventilation which, in turn, affects building energy efficiency and local air quality. Red Deer Polytechnic (RDP) is partnering with the University of Alberta and Flexible Machines Corp.(FMC) to validate FMC's open-source, machine learning tool for automated windflow mapping of complex urban geometries in the built environment. This tool will be validated using real-time wind data from installed anemometers. The resulting windflow map will support RDP in siting small-scale wind generation on campus and optimizing HVAC ventilation. The tool will enhance RDP living lab service offerings at the Energy Innovation Centre to the benefit of students, researchers and small-scale wind and clean energy technology innovators.

FUNDING DETAILS

RECIPIENT:
Red Deer Polytechnic

PARTNERS:
Flexible Machines Corp., University of Alberta

TOTAL BUDGET:
$730,000

AI FUNDING:
$230,000

PROJECT DATES:
JAN 2025 – DEC 2026

PROJECT TRL:
Start: 4
End: 7

APPLICATION

Beyond RDP campus, the windflow mapping tool offers a cost-effective alternative for geometrically complex urban and built environments, compared to conventional tools geared to utility-scale wind farm planning. This automated mapping tool provides a scalable, efficient solution for urban planners, engineers and clean energy service providers, enhancing urban energy modeling systems and deployment of small-scale wind and ventilation systems in built environments.

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PROJECT GOALS

- Develop and validate an efficient & open-source wind flow mapping tool.
- Map wind flow around Red Deer Polytechnic's campus.
- Validate the tool using data from anemometers around the campus. Integrate the tool into Red Deer Polytechnic's data sharing alliance.
- Share results and lessons learned through workshops, info session, demonstration in the annual Energy Innovation Fair at RDP and white papers

BENEFITS TO ALBERTA

- Create jobs for skilled professionals, and foster workforce development through student engagement.
- Position Alberta as a leader in smart wind flow tools.
- Provide a testing ground at RDP for innovators to test wind energy prototypes.
- Strengthen the opportunity for low emissions, small-scale wind deployment in the built environment.
- Enhance urban planning efficiency and outcomes in low emissions demand-side wind generation, energy efficiency and local air quality.
- Optimize HVAC ventilation for energy efficiency and local air quality for buildings, including data centres.
- Enhance commercial opportunities in product licensing and consulting, thereby contribution to development of Alberta's low carbon economy.

3 Publications

2 Students Trained

11-100 Future Jobs

2 New Products/Services

1 Spinoff Company

Enabling Future GHGs Reductions

CURRENT STATUS

MAY 2025

Project is under way. Current activities include development and integration of key components of automated modelling and mapping tools, early-stage wind flow model development for RDP, and initial testing. Anemometers being deployed across RDP campus for real time data collection and integration with the wind model.