University of Victoria | Civil Engineering | EIC ENERGY IN CITIES

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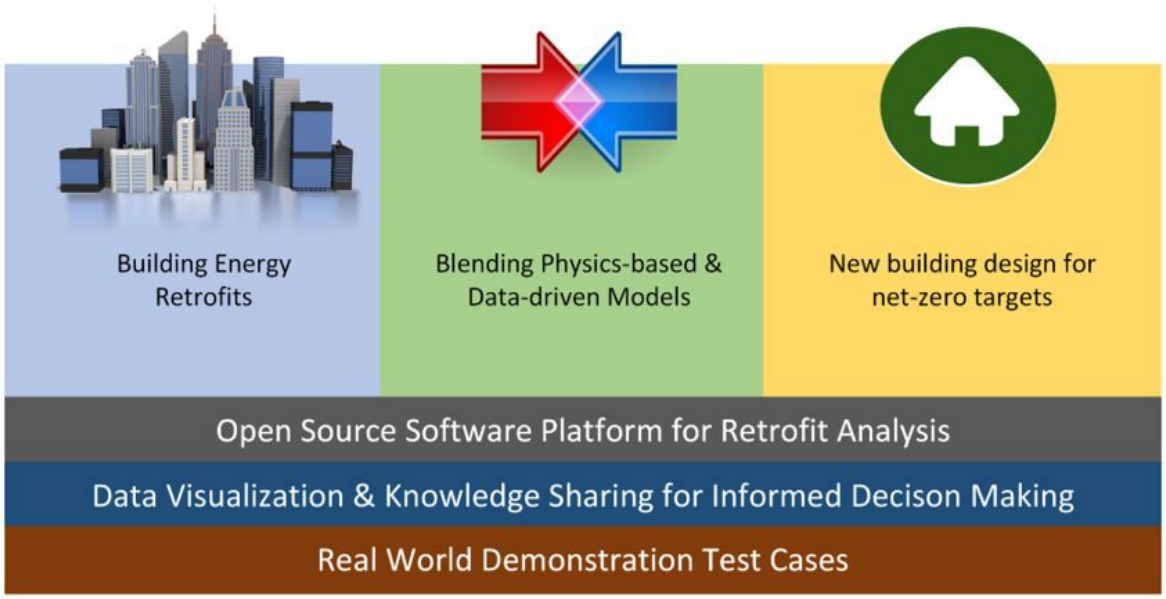
Project: Tools for municipalities to meet carbon targets

A partnership between the ReBuild Initiative, the Pacific Institute for Climate Solutions and the City of Victoria



Position available at Masters, PhD or Post-doctoral level

Urban planners, policymakers and municipalities face significant challenges when identifying building energy efficiency opportunities and developing strategies to achieve efficient and sustainable urban environments. Urban Building Energy Modeling (UBEM) is often used to quantify building energy use and to understand the building stock. UBEMs make use of physical properties of individual buildings and employ building energy simulation tools to model and simulate the use of a single building archetype, thus representing the actual building stock. Data-driven urban energy modeling methods employ machine learning techniques to quantify the urban building stock in the absence of certain input data.
Stakeholders often require building stock data to calculate accurate energy performance of buildings at a large scale. Another important challenge is to identify intelligent retrofit recommendations that can improve the building energy performance. This project will develop simple, flexible software tools to analyze the impact of building retrofits. This will help municipalities identify and prioritize climate solutions that will meet their stringent obligations. The tools will be reusable across other municipalities in the future.

There are two open research positions in the project:

1. **Intelligent recommendation systems for archetype-based building stock analysis**
   Building stock data can be combined with archetype modelling to obtain retrofit policies highly targeted to specific building types, evaluated for the building inventory of the City of Victoria.
   Tasks: Identification of building archetypes; Development of building energy models; Identify required datasets; Exploration of established retrofit solutions; Integration into climate solutions pathways.

2. **An urban emissions reduction framework bridging buildings and transportation**
   There is a need for a framework to allow municipalities to identify and prioritise climate solutions that span the domains of buildings and transportation, to enable the fair comparison of disparate solutions. **Tasks**: Development of a municipal-level emissions modelling framework; Integration of building and transportation solutions; Exploration of future scenarios; Integration into climate solutions pathways.

The positions will be supervised by Dr Ralph Evins in the Energy in Cities research group. The project is a part of the ReBuild Initiative with the Pacific Institute for Climate Solutions and City of Victoria as joint partners. The work will be carried out in the stimulating multi-disciplinary environment of the Institute for Integrated Energy Systems (IESVic) and the new green Civil Engineering department at the University of Victoria on Vancouver Island in beautiful British Columbia, Canada.

How to apply

General requirements

Experience with either building energy simulation or machine learning is required. A good working knowledge of Python is highly desirable for all positions (for an exceptional candidate an expert level in another programming language could be acceptable). Proficiency in the written and verbal use of English is required.

A start date of September 2022 is preferred for **PhD** and **Master** students. **Post-docs** can apply on a rolling basis and could start as soon as possible. Positions are funded at a level comparable with NSERC scholarships (Master's; Doctoral; Post-doctoral). Holders of these or similar fellowships are eligible for significant top-up funding.

The Energy in Cities group specifically encourages applications from persons with disabilities, visible minorities, Aboriginal Peoples, people of all sexual orientations and genders, and others who may contribute to the further diversification of the University.

Please apply on the ReBuild website under Vacancies.

If you have previously applied for a position, do not reapply.
Only apply for one position - you will be considered for all open positions.