

## Summer 2025 Sustainability Scholars Program Internship Opportunity

The UBC Sustainability Hub is pleased to offer current UBC graduate students the opportunity to work on sustainability internship projects. Successful candidates work under the guidance of a mentor from the partner organization, and are immersed in real world learning where they can apply their research skills and contribute to advancing sustainability across the region. The pay rate for the summer 2025 program is \$31.25/hour or \$7,812.50 for a 250-hour project.

- Visit the [Sustainability Scholars Program website](#) to learn [how the program works](#) and to [apply](#).
- Be sure to review the application guide on the Apply page to confirm your eligibility before applying.

**Applications close at 11:59 pm on Sunday January 26, 2025.**

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### **Project title: Heat Pump Performance in Part 9 Residential Homes Across Climate Zones**

#### **Project Background & Overview:**

In 2018, the BC Building Code included the option for municipalities to adopt the BC Energy Step Code (ESC), allowing Authorities Having Jurisdiction to support energy efficiency requirements for new homes in their communities. In 2023, the Zero Carbon Step Code (ZCSC) was added to the BC Building Code, targeting greenhouse gas emissions from new homes. These new regulations brought a major shift in how we design and build new homes, including modernized mechanical system selections to support compliance with these requirements.

A key technology that has proven itself helpful for both ESC and ZCSC compliance is heat pumps. Heat pumps are not a new technology; however, their use has not been typical for new homes in British Columbia, until recently.

While most new homes are designing in heat pumps to satisfy heating and mandatory cooling needs, municipalities are seeing, in a large percentage of cases, heat pumps combined with a natural gas furnace. When industry was asked why they are combining two mechanical systems to serve one purpose, heating the home, they responded that they are worried about heat pumps not being able to keep temperature in the peak of winter.

It is acknowledged that in the past, or in certain circumstances, heat pumps, alone were not able to maintain temperature and required either electric resistance heating or natural gas burning systems as a top-up in cold weather; however, this study contemplates if that is still the case in an effort to simplify design options and cost to build new homes and ensure that the building permitting process is not over complicated due to a lack of understanding how heat pumps work in British Columbia.

#### **Project description**

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This study will examine typically available heat pumps in British Columbia, ranging from consumer grade to high-end, including cold climate heat pumps, and analyse at what temperatures back-up systems are required. Builders will be able to make more informed choices on what type of heat pump they should select for their next project and if they need to allocate additional resources for back up heating systems, rather than designing in combination systems by default at a cost to the potential homeowner, and risk challenges with building permit processing with overly complex systems.

The Township of Langley has conducted a preliminary examination into this topic and the report can be used as a starting reference point for this project.

## Project scope

- Review the BC Building Code with particular focus on indoor temperature requirements, energy efficiency, and carbon emissions, and summarise the compliance requirements.
- Review BC's climate zones and note the major cities within them
- Based on the list of major cities, identify twenty or more, large to small, HVAC contractors that serve these cities and inventory their websites to identify which heat pump models are available for purchase in BC.
  - The inventory should include a number of key aspects including models, brands, those applicable to Part 9 homes, etc. Research will focus on a minimum of 10 manufacturer brands with a target of 50 heat pump models or types.
  - Contact heat pump manufacturers or vendors by phone or by email to source specifications sheets with performance curves/data for all heat pumps.
- Create a database of key data points, including manufacturer, model name, number of stages/speeds, noise rating, size, performance (COP) at a number of temperatures, cut-off temperature, etc.
  - Drawing on the data collected identify the most suitable heat pump for each city based on the cut-off temperature and when top-up heating is required. This analysis should factor in buffer sizing and be consistent with reasonable industry practice or engineering principles.
  - Prepare a report that summarises the research by municipality and climate zone to show:
    - Which heat pumps can operate independently (no top-up) in any given city in BC
    - Which heat pumps meet design temperatures
    - Which heat pumps cannot meet design temperatures
    - Which heat pumps will require top-up in which cities
    - Other data observations, including noise performance of different heat pumps

## Deliverables

- A final report containing a summary of the work completed

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- A final report for the online public-facing [Scholars Project Library](#).
- A presentation delivered online to our building community, facilitated/coordinated by the Township of Langley.

## Time Commitment

- This project will take 250 hours to complete
- This project must be completed between May 1 to August 15.
- The Scholars is to complete their hours between 9 am and 5 pm, Monday to Friday, approximately 17 to 20 hours per week.

## Required/preferred Skills and Background

- Excellent research and writing skills
- Demonstrated interest in sustainability
- Detail oriented and very accurate collecting data from online sources
- Familiarity with research methodologies and survey techniques
- Strong analytical skills
- Ability to work independently
- Deadline oriented
- Project management and organizational skills
- Strong technical and drafting skills
- Demonstrated experience working with data
- Comfortable reaching out to strangers to collect information
- Familiarity with the BC Building Code, building heating/cooling, mechanical systems, building construction, would be an asset

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Apply here: [Click here to apply](#)

Contact Karen Taylor at [sustainability.scholars@ubc.ca](mailto:sustainability.scholars@ubc.ca) if you have questions

## Useful Resources

We are holding a special **resume preparation workshop for prospective Scholars** on January 21, 2025. [Click here for details and to register.](#)

Below are some links to useful resources to help you with your resume and cover letter (there are many more online). Some of these resources also provide information on preparing for your interview.

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<https://students.ubc.ca/career/career-resources/resumes-cover-letters-curricula-vitae>  
<https://www.grad.ubc.ca/current-students/graduate-pathways-success>  
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