

## Summer 2022 Sustainability Scholars Program Internship Opportunity

The UBC Sustainability Initiative (USI) is pleased to offer current UBC graduate students the opportunity to work on funded sustainability internship projects. Successful candidates work under the mentorship of a partner organization, and are immersed in real world learning where they can apply their research skills and contribute to advancing sustainability across the region.

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

**Applications close at midnight on Sunday January 30, 2022.**

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### **Research project title: Comparative Life Cycle Analysis of Heavy-duty Vehicles (Class 7/8) Fueled by Renewable Diesel, Electricity or Hydrogen Fuel Cells.**

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

As part of the City of Vancouver's Climate Emergency Action Plan, the City has a target to cut carbon pollution in half by 2030 and become carbon neutral by 2050. The City of Vancouver has a large fleet of vehicles to support a range of core services, and in recent years there has been a deliberate shift to zero-emission vehicles.

The City has taken significant steps to integrate light and medium duty electric vehicles into the fleet, and pursue renewable fuel alternatives such as Renewable Diesel into heavy duty vehicles. With continuous advancement in technology it is imperative to review the direction of heavy-duty vehicles within the City's fleet with all of Renewable Diesel, Electric Battery Powered, and Hydrogen Fuel Cell options entering the market. With a Life Cycle Analysis, the advantages and disadvantages can be explored for each technology to determine the most sustainable option for the City of Vancouver in the heavy-duty category.

#### **Project description**

The City of Vancouver would like to learn and compare the environmental impact and more specifically CO<sub>2</sub>-equivalent emissions produced by three similar sized vehicles each operated off of a different fuel source. The three fuel sources in question are Renewable Diesel, Battery Electric, and Hydrogen Fuel Cells.

Part of the project will be to analyze the fuel source available to the City of Vancouver, and consider the environmental impact of the fuel delivered to the City of Vancouver as well as the life cycle analysis of the varying components required for the three types of drivetrains.

The outcome of this project will help with strategic decision making around fleet asset replacement in the heavy duty category, and has the potential to further solidify decisions to pursue renewable diesel, battery electric, or expand into hydrogen fuel cells.

#### **Project scope**

- Literature review of fuel sources, and their environmental impact, as well as the material differences between the drivetrain options.

# SUSTAINABILITY SCHOLARS PROGRAM

- Comparative analysis of the life cycle environmental impacts of the Class 7/8 vehicle utilizing each of Renewable Diesel, Battery Electric, and Hydrogen Fuel Cell. The scholar will collect data from research papers and reviewing current industry standards, as well as from the data sources listed below. The end goal will be to produce the CO<sub>2</sub> equivalent and/or the emissions per Energy Production (g/GJ or g/kWh):
  - GHGenious a Life Cycle Assessment (LCA) model for analyzing current and future fuels for transportation applications in Canada.
  - GREET (Greenhouse gases, Regulated Emissions, and Energy use in Technologies) Model by Argonne National Laboratory – Life Cycle Assessment Tool and database.
  - Current fuel usage, and average mileage of Class 7/8 vehicles for the City's can be collected from internal databases.
  - Additional product and manufacturing information may be supported through vendor contacts and information requests.
- Internal review working with City staff to understand how we currently calculate emissions and deploy renewable biodiesel in our heavy-duty vehicles.
- Conduct interviews with technical experts to further understand the basis for renewable diesel and hydrogen fuel cells in the heavy-duty category, and the production / distribution of each fuel.
- Technology scan: identify various technologies that could be utilized to support the pursuit of alternative powered heavy duty vehicles, or limitations that would discourage pursuit.

## Deliverables

- A final report containing a summary of the work completed
- A final report (or executive summary) for the online public-facing [Scholars Project Library](#).
- Presentation on final results to internal City staff

## Time Commitment

- This project will take 250 hours to complete.
- This project must be completed between May 2, 2022 and August 12, 2022
- The scholar is to complete 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
- Strong analytical skills
- Ability to work independently
- Deadline oriented
- Project management and organizational skills
- Demonstrated experience in Mechanical Engineering
- Comfortable interacting with strangers to conduct public/in person surveys
- An interest/background in mechanical engineering an asset
- Previous knowledge of mechanical equipment is an asset

# SUSTAINABILITY SCHOLARS PROGRAM

Applications close **midnight Sunday January 30, 2022**

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 19. [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.

<https://students.ubc.ca/career/career-resources/resumes-cover-letters-curricula-vitae>

<https://www.grad.ubc.ca/current-students/graduate-pathways-success>

<https://www.grad.ubc.ca/cover-letter-cv-resume-templates-ubc-career-services>