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.

Research project title: Estimating the whole life carbon contribution of the construction and operation of parking spaces in the City of Vancouver

Project Background & Overview:

The Parking Management Branch is working to revise its off-street parking regulations in order to eliminate minimum parking requirements and introduce parking maximums for new developments. This work will support both the Climate Emergency Action Plan Big Move 2, with a goal of two-thirds of all trips to be made on foot, by bike, or on transit by 2030, as well as Big Move 5, which aims for a 40% reduction in embodied carbon emissions in new buildings by 2030 compared to the 2018 baseline. This project will directly inform ongoing work to remove minimums and develop parking maximums, as well as review the potential to introduce fees for embodied and operational carbon from parking construction and use in new buildings.

Underground parking structures can account for 12 to 20% of the embodied carbon in a new building. Parking space reductions not only lower the overall embodied carbon of a building but also support reduced rates of private vehicle ownership. The Embodied Carbon Strategy, part of the 2020 Climate Emergency Action Plan, will create low-carbon code requirements and target reductions in embodied emissions for new buildings as well as potentially facilitate less overall parking space in new buildings through embodied carbon fees.

Minimum parking standards require developers to construct parking spaces, which in turn contribute to the cost of construction and subsequently housing affordability, regardless of whether a renter or homebuyer has a vehicle. The money used to pay for parking is often greater than expenditures on transportation infrastructure for those with the fewest resources and the greatest needs. Lower income residents are also much less likely to own vehicle, meaning that these residents subsidize wealthier drivers. The added expense and demand for an underground space can also make some smaller scale development physically or financially infeasible, reducing developers' interest in constructing rental and social housing.

Minimum parking requirements also assume the city knows best how much parking is needed for every new development, rather than allowing it to be determined by residents and developers who know their own needs. This results in oversupply of parking across almost all land uses. Finally, the GHG contributions and air pollution from parking construction and use must be borne by everyone, with vulnerable populations often the most affected.

Project description

The goal of the project is to determine the whole life carbon contribution of the construction and operation of parking in new multi-storey developments in the Downtown area of the City of Vancouver where there are no minimum parking requirements. For the project, the scholar will be asked to review current City policies and plans on the assessment of embodied and operational carbon from parking construction and use, conduct a literature review of whole life carbon assessment approaches and GHG contributions of parking, develop calculations for the embodied and operational carbon contribution to GHGs from parking spaces, as well as create estimates of the embodied and operational carbon contribution of parking in new Downtown developments since January 2019.

The Parking Management Branch could be going to Council as early as spring 2023 with amendments to remove parking minimums city-wide from the parking by-law and expand parking maximums. The research conducted by the scholar will provide important support to underpin these recommendations.

Project scope

This project will include the following research:

- Review current City of Vancouver policies and plans regarding assessment of embodied and operational carbon in the construction of new buildings for the purposes of developing a calculation for the embodied and operational carbon contribution of underground and surface parking
- Conduct a literature review of relevant whole life carbon assessment (construction of buildings) approaches of 5-6 leading jurisdictions as well as literature on the embodied and operational contribution to GHGs of underground and surface parking
- Develop a calculation of the embodied carbon contribution for the construction of underground and surface parking spaces
- Develop a calculation of the yearly operational carbon contribution of below ground parking (maintenance, heating, ventilation, groundwater management)
- Time permitting, develop a calculation of the yearly embodied carbon contribution of vehicles (EV or ICE) associated with the use of underground and surface parking spaces
- Estimate the life cycle carbon contribution (embodied and operational carbon) of underground parking construction and vehicle use for developments in the Downtown area approved since January 2019 (*approximately 20 buildings*), with and without parking minimums
- Develop recommendations on removing parking minimums to help reduce the embodied and operational carbon impact of parking, accounting for embodied and operational carbon from the construction of parking in new buildings.

Deliverables

- A final research report summarizing:
  - The whole life carbon assessment approaches of leading world cities
  - Summary of calculations and assumptions for determining the embodied and operational carbon contribution of the construction and operation of parking spaces
  - Estimate of the life cycle carbon contribution of the construction and use of below ground parking spaces for developments approved since 2019 in the Downtown area (*approximately 20*), with and without minimum parking requirements
- Recommendations to the City of Vancouver on:

  - How the removal of parking minimums in the Downtown area since January 2019 will help reduce the embodied and operational carbon impact of below ground parking construction in new buildings
  - Accounting for embodied and operational carbon from the construction of below ground parking in new buildings.
- A final report (or executive summary) for the online public-facing Scholars Project Library.

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
☒ Familiarity with research methodologies and survey techniques
☒ Statistical analysis
☒ Strong analytical skills
☒ Ability to work independently
☒ Deadline oriented
☒ Project management and organizational skills
☒ Programming skills
☒ Familiarity with benchmarking methods and tools
☒ Familiarity preparing feasibility studies
☒ Familiarity with carbon/GHG benchmarking/measurement, an asset

Applications close **midnight Sunday January 30, 2022**
Apply here: Click here to apply
Contact Karen Taylor at 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