

Building a set of tools for integrative policy towards decarbonising Canada's maritime shipping industry

Amanda Giang

About the projects

"Maritime shipping is an industry that is undergoing major changes and shifts in terms of environmental regulation," says Dr. Amanda Giang, assistant professor at UBC's Institute for Resources, Environment and Sustainability and the Department of Mechanical Engineering.

In April of 2018, the International Maritime Organization (IMO) announced their target of cutting carbon dioxide emissions from international shipping by at least 50 per cent by 2050, compared to 2008 levels. The IMO has been taking action on greenhouse gas emissions and the emissions of other air pollutants through legally binding energy-efficiency measures, sulfur-in-bunker fuel limits and NOx engine emissions standards.

Giang works with Phd students Imranul Laskar and Rivkah Gardner-Frolick with funding from Canada's Marine Environment and Observation Prediction and Response network. Together, the team uses their expertise in examining the interaction of air quality and climate change to investigate how changes in technology, fuels, and operation might help achieve the IMO's decarbonisation goals and also reduce human exposure to harmful air pollutants.

To build an integrated assessment framework that looks at both greenhouse gases and air pollution, Laskar is working on developing emissions scenarios, and then doing air quality and health modeling. Gardner-Frolick is developing, improving and expanding on modelling tools specifically for air pollution and environmental justice analysis for application in Canada. Laskar will then apply these modeling tools to analyse the specific emissions scenarios.

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"The maritime shipping industry and their container ships at Burrard Inlet are a huge part of the landscape of Vancouver. Being exposed to the Naval Architecture and Marine Engineering program at UBC really made me think a lot more about the environmental implications of shipping."

- Dr. Amanda Giang



Project Highlight:

An integrated assessment framework that looks at both greenhouse gases and air pollution can help with the decarbonization of Canada's maritime shipping industry.

The Team:

- Amanda Giang, Assistant Professor, Institute for Resources, Environment and Sustainability and the Department of Mechanical Engineering
- Imranul Laskar, Phd Student, IRES
- Rivkah Gardner-Frolick, Phd Student, Department of Mechanical Engineering



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Ideally, the framework will benefit the governance landscape — ship owners, operators, insurance companies, regulators and civil society — by informing their decision making with evidence-based results.

“Many of the sources of greenhouse gas emissions are also major sources of health harming air pollutants,” says Giang. One key example is black carbon, which is emitted from ships and has large warming effects.

“If you’re targeting a source for climate reasons or air quality reasons, you may also get an air quality co-benefit or a climate co-benefit,” says Giang. “Oftentimes in policy making, the conversation is siloed and we lose out on opportunities to capitalise on the synergies or to be mindful of the potential negative tradeoffs between air quality and climate change.”

An additional positive of considering co-benefits is their effectiveness in making policies appeal to different groups. In climate discourse, air pollution co-benefits have been shown to be powerful motivators for climate action due to their local health benefits.

Policies that protect human health can bring people together. Giang’s team has brought together various collaborators, including Environment & Climate Change Canada and Clear Seas: Center for Responsible Marine Shipping. Through these partners, more uptake of tools developed in this project and future possibilities for collaboration are possible.