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September 20, 2023

Uniting forces to create AI-solutions for a greener global supply chain

People worldwide rely on the maritime sector every day. Food, medicine, technology, fuel, and building materials are shipped across oceans from port to port, connecting markets around the globe. Ships move 90% of global product-based trade and ports serve as vital nodes in this intricate supply chain.

International shipping is the backbone of the global economy, but it comes at an environmental cost because the industry generates around 3% of global greenhouse gas emissions. To improve sustainability across the shipping industry and ensure urgent climate action remains a priority, the International Maritime Organization and its 175 member states recently committed to reaching net-zero GHG emissions by 2050.

To get there, players in the maritime space must team up and face the decarbonization challenge together.

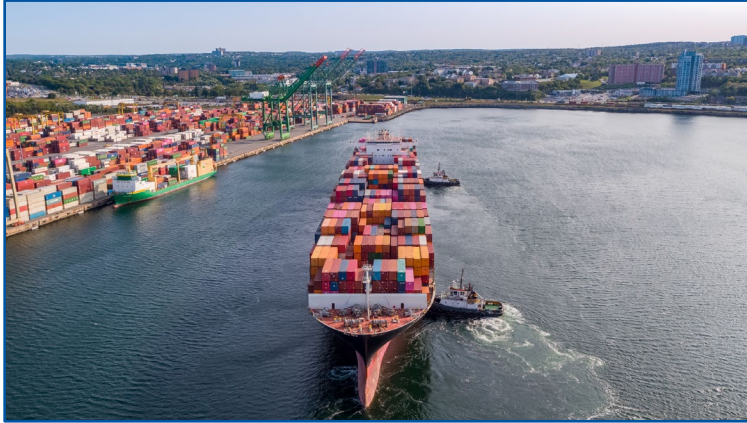
"Collaboration is the foundation of operating the Port of Halifax," says Mike Davie, Vice President of Operations and Technology for the Halifax Port Authority (HPA). "We're uniquely positioned to bring partners together to find efficiencies and get everyone on their path to decarbonization."

The Data Enhancement Framework 2 (DEF2) project does just that. HPA has partnered with BlueNode (an Everstream AI company), PSA Global, Port Saint John, Canada's Ocean Supercluster, and Sentient Hubs to implement an AI platform that monitors on-site emissions in near real-time.

The DEF2 collaboration is navigating the complexity of supply chain data to build a digital solution that will help organizations reduce their carbon footprints, supporting UN Sustainable Development Goals 9, 11, 12, 13, and 17.

"This project shows how much you can do to accelerate change with a small group that has big ideas," says Davie.

DEF2 is an **International Association of Ports and Harbours Sustainability Awards finalist** in the **Digitalization** category. [Click here to vote for Halifax Port Authority's Data Enhancement Framework 2 project. Polls close at 7 p.m. ADT on Saturday, September 23, 2023 / 12 a.m. CEST on Sunday, September 24, 2023.](#)



Using data and AI to decarbonize

BlueNode is a technology partner on the DEF2 project specializing in data enrichment software for the global supply chain. The company, headquartered in The PIER at HPA, was recently acquired by US-based Everstream AI.

"The port is a really interesting place to start a carbon intensity analysis because it's a nexus of operations," says BlueNode Vice President Louis Beaubien. "We can get a baseline understanding of the supply chain activity here, then from this starting point expand our understanding to include a larger scope of the global supply chain."

Using data sources associated with HPA and PSA's cargo handling processes, BlueNode has developed technology that monitors the CO₂ emissions generated through those activities in near real-time. But it doesn't stop there. The built-in artificial intelligence can recommend courses of action to achieve desired outcomes while minimizing carbon intensity. Known as prescriptive modelling, this capability informs both strategic infrastructure decisions and more tactical daily operational choices, explains Beaubien.

For instance, when comparing different cargo handling equipment, it's easy to assume that large, diesel-powered machines are the obvious culprits behind high CO₂ emissions. BlueNode's analysis, however, considers an effort-to-emissions ratio that can reveal more covert contributors. Say a piece of equipment that produces fewer emissions is used frequently. It may be driving more carbon intensity in the long run, even though at face-value, it's a cleaner machine.

"Now you have a real understanding of where the carbon intensity is coming from," says Beaubien. "It's meant to introduce objectivity into decision making."

The next phase of the DEF2 project will focus on developing the capability of trade route optimization and risk planning. The goal is to add a layer of external factors into the data analysis, enabling the technology to plan routes that minimize carbon intensity while considering specific cargo transit risks, like hurricanes or a labour strike.

Solving big problems together

The DEF2 project is one example of the collaborative problem-solving that occurs daily within The PIER innovation ecosystem. As a global centre of excellence for supply chain innovation, The PIER serves as a living lab where a range of expert teams from industry, government and academia come together to test solutions in a real-world environment.

"Decarbonizing the supply chain is a challenge larger than any one organization or business," says David Thomas, the Executive Director of The PIER. "We have to use The PIER to tackle these problems that are bigger than any one of us."

Inside of The PIER ecosystem is a diverse mix of startups, SMEs, major supply chain multinationals, industry associations, university researchers, and government agencies. Supply chain partners can approach The PIER with a particular pain-point and then a curated group of members with the right skills, expertise, and experience gets to work on a solution. The environment is designed to take the pressure off any one entity to solve problems alone, resulting in a more efficient and equitable path toward sustainable growth.

"Most of the problems that we look to present to PIER members are those we feel locally, but are global in nature," explains Thomas. "That way, solutions developed here can support supply chains around the world and drive economic growth in Nova Scotia."

In addition to the DEF2 project, PIER members are actively engaged in the marine electrification of fleets, exploring hydrogen as an alternative fuel, deploying drone technology for remote inspections, developing environmentally friendly anti-fouling vessel coatings, and more.

A successful chain reaction

Both Beaubien and Davie agree that meaningful sustainability practices can start with small wins that are built upon over time to achieve greater successes. That's why the DEF2 project is perfecting its methods and technology at the port-level first. Its success is the first step to understanding how a similar approach can be applied to other touchpoints in the global supply chain.

"Projects like DEF2 are small and complicated, but they have so many potential offshoots that help us move through larger problems," says Davie. "We have to focus our energy and funding on projects that can empower change."