Technologies could reduce shipping pollution in Arctic by 60 percent or more

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New research led by the University of Delaware evaluates the potential cost and effect of technologies aimed at reducing emissions from marine shipping, especially when targeting the Arctic.

The multi-university effort provides the first technology assessment to directly inform policy decisions on shipping emissions and the sensitive region, which earned the focus of world leaders at the December 2010 United Nations Framework Convention on Climate Change (UNFCCC) in Cancun.

“Evidence of global warming is in no place more obvious than in the Arctic,” Arctic Council Chair Lene Esperson told UNFCCC attendees. “Shipping activity in the region is on the rise, including tourism and exploration activities.”

Taking up what Esperson called an “urgent common challenge,” the study, “An Assessment of Technologies for Reducing Regional Short-Lived Climate Forcers Emitted by Ships with Implications for Arctic Shipping,” was led by James J. Corbett, professor of marine science and policy at UD. He collaborated with colleagues at the Rochester Institute of Technology and Energy and Environmental Research Associates, in Pittsford, N.Y. The article was published in the second issue of the new journal *Carbon Management*.

The researchers looked at six black carbon emissions reductions technologies when used alone or in combination. Black carbon, or soot, is one of the most potent types of air pollution in diesel emissions from ships.

"It is known as a 'short-lived climate forcer,' meaning that it contributes to climate change but over much smaller time scales than carbon dioxide," explained James J. Winebrake, coauthor and dean of Rochester Institute of Technology's College of Liberal Arts.

The team found that the most cost-effective strategy is a combination of technologies, which can reduce black carbon from ships by about 60 percent.

"This translates to avoiding emissions corresponding to some 9-70 million metric tons of CO_2equivalent," Corbett said. "In other words, the cost to achieve these reductions in CO*2* equivalent terms is about US$15-30 per metric ton of CO*2* equivalent. This compares competitively with other climate strategies in terms of cost."

The tiny particles of carbon are especially impactful when emitted in or transported to the Arctic, where they absorb sunlight and contribute to the melting of snow and ice. Because ships operating in or near the Arctic release black carbon into one of the most sensitive regions for climate change, control of black carbon in the Arctic could be especially important.

"Managing emissions from increased shipping activity within and near the Arctic may be part of a needed mitigation strategy," Corbett said.

Among the first to use this research will be policy makers working to lessen shipping's contribution to climate change, as they need timely information on what management action options may achieve and what their costs may be. Industry can use this work to begin to focus on the expected costs, and the key factors that may reduce investment uncertainty. The new research also provides an analytical framework that policy makers and others can apply in the future and in other emissions control contexts besides shipping.

The current edition of *Carbon Management*, including this research article, will be available with open access until Feb. 28.

Corbett and Winebrake, experts on marine shipping emissions and goods movement sustainability, also recently collaborated on research that found increased shipping in the Arctic is likely to accelerate climate change. They also contributed to the 2009 Arctic Marine Shipping Assessment (AMSA) report by the Arctic Council.

Provided by University of Delaware

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