OPINION

Dreams of Canada-EU hydrogen trade are a sinking ship

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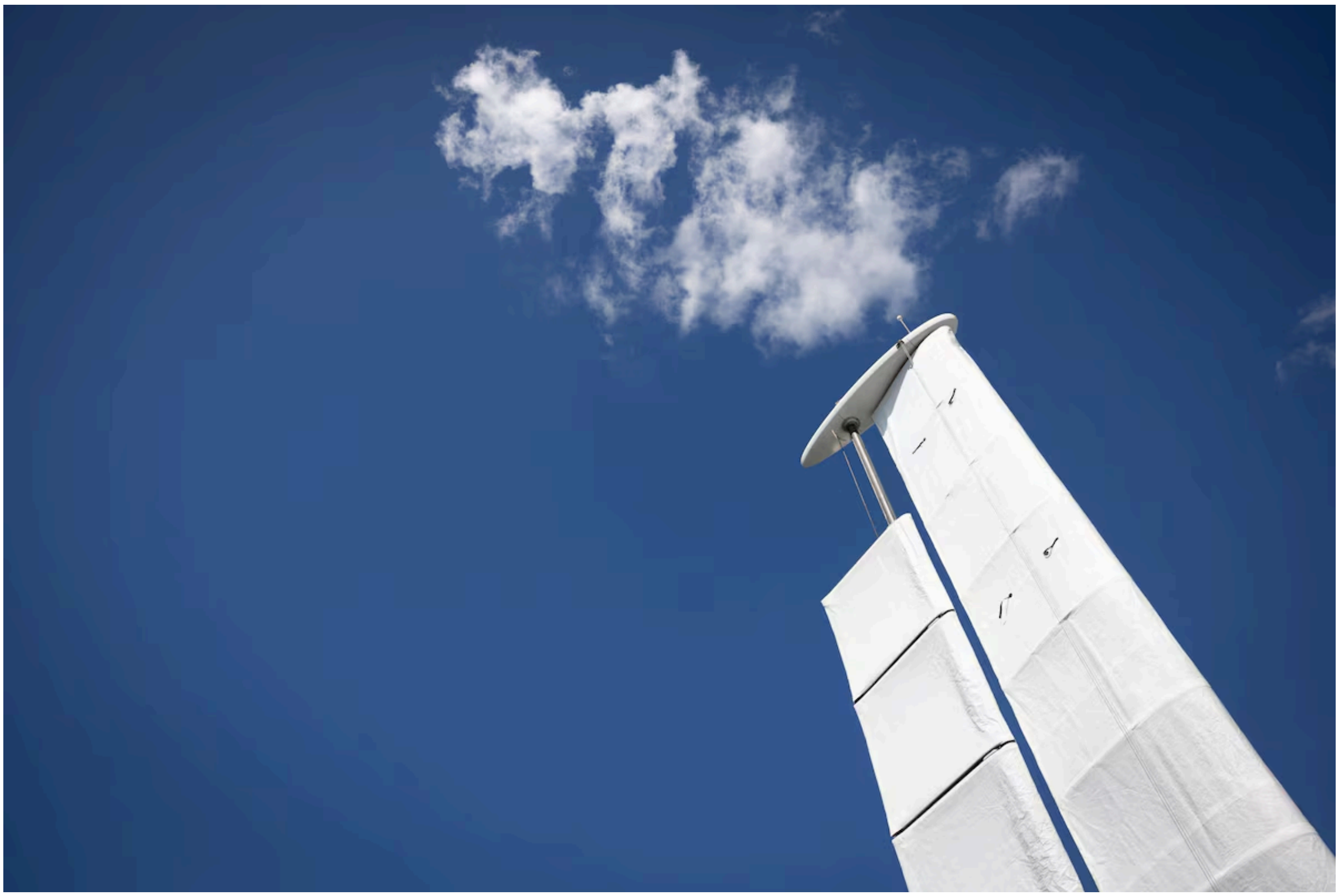
SPECIAL TO THE GLOBE AND MAIL
PUBLISHED 9 HOURS AGO



The OceanWings on the Energy Observer, the first hydrogen-powered, zero-emission vessel to be self-sufficient in energy, while it is moored at Pier Sixty Six Marina in Fort Lauderdale, Fla. on Feb. 27.

MARCO BELLO/GETTY IMAGES

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Desperate for a lifeboat with which to ride out the global energy transition, Canadian politicians and the industry have latched onto hydrogen as a clean-energy solution. In 2022, amid an energy crisis in Europe and with aspirations of becoming a leader in the export of clean and reliable energy, Canada signed its first major agreement to ship green hydrogen made from renewable electricity to Germany by 2025.

Yet as this inaugural shipment date looms, it has become increasingly clear that plans to develop a transatlantic hydrogen supply chain between Canada and the European Union are destined to flounder, then sink – dragging Canadian climate ambitions and the economy with it.

The physics of the situation makes plain an inconvenient reality: The birth of a global hydrogen export market, where made-in-Canada hydrogen is loaded onto ships destined for distant European ports, is simply not coming.

Hydrogen is indeed useful, but in much smaller amounts and more targeted applications than current industry conversation suggests. It will not be used for transport or heating around the world, with electrification able to heat homes and power transport for just a fraction of the energy and cost. Despite its outsize role in media coverage and government plans, hydrogen will represent just 2 per cent of global energy consumption by 2050, according to the Intergovernmental Panel on Climate Change (IPCC), with it often being more risky, expensive, energy inefficient or emissions-intensive than already available alternatives such as electrification.

This is because green hydrogen, the only near-zero-emission form of hydrogen and the one that is sought by countries such as Germany, takes vast amounts of renewable electricity in the form of wind or solar power to produce. As a result, it costs four to six times the price of natural gas. Europe isn't interested in the majority of Canada's current higher-emission hydrogen production, made from fossil fuels with partial carbon capture.

In fact, no hydrogen export industry exists anywhere in the world in 2024, despite a long list of trade deals, and large-scale transport of hydrogen has yet to become a reality. Moving hydrogen across long distances involves huge energy losses, as simply liquefying it for transport consumes as much as 30 per cent of its energy, while transport involves further daily losses. Even if industry turns to shipping hydrogen as ammonia, the crux of the issue remains. If Canadian ammonia were to be used to make electricity at a final destination in Europe, just 23 per cent of the original energy input would remain at the end of the process. This is a highly unalluring deal European partners are unlikely to entertain long term.

Any negligible benefit to the climate does not make up for the inherent wastefulness of transatlantic shipping. Hydrogen is a small molecule, and it leaks. Hydrogen amplifies the effects of other greenhouse gases, with a global-warming potential as much as 35 times that of carbon dioxide in the first 20 years. Exporting it in alternative forms, such ammonia, risks other environmental challenges, such as highly toxic leaks.

Make no mistake: This is a bad deal for Canadians too. Prime wind and solar capacity for hydrogen production could be better used to provide local homes and businesses with clean and affordable energy.

Canadians will be destined to pay large subsidies to the hydrogen industry for the indefinite future, to allow green hydrogen to compete economically with fossil-derived hydrogen. In the end, the country also risks being saddled with regrettable stranded assets in the form of hydrogen production and export infrastructure once Europe advances its own production capacity.

Canada should look to other countries betting on hydrogen export, such as Australia, for warning. There, a plan to export hydrogen to Japan is on the rocks amid a lack of willingness from Japanese customers to sign up for long-term deals and high shipping costs threatening its commercial viability.

Opportunity remains for Canada to plug the holes. Current plans to supply hydrogen to the EU are non-binding. Wind-energy resources that would otherwise be inefficiently used to produce green hydrogen for export can instead decarbonize local electricity grids. Directing its energy this way, Canada will contribute far more to the global energy transition than steering leaky vessels across the Atlantic.

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