Blue hydrogen? Nein danke

by Martin Bush

Canada and Germany look set to ink a major energy project in Newfoundland that will see that province manufacture large amounts of green hydrogen over the next decade and ship the gas over to Germany.

It's an ambitious proposal but Germany is in a bind. It needs hydrogen to decarbonise its heavy industry and doesn't have enough electricity to manufacture the quantities of clean hydrogen for its needs, given the other demands for electricity in the transport and residential sectors. Canada, with its huge renewable energy resources available in the Atlantic region, looks like just the ticket.

Atlantic Canada has world-class wind resources and the Newfoundland project plans an onshore windfarm of 164 large turbines. This electricity

will power the manufacture of electrolytic hydrogen: the clean green version that Germany wants.

But there's another way to make hydrogen. It can also be manufactured from so-called 'natural' gas—which is essentially methane. This process unavoidably produces greenhouse gas emissions, which can be reduced using carbon capture and storage technologies, but never entirely eliminated. Known as blue hydrogen, it is being heavily promoted by Alberta's oil and gas industry which claims that because it is less expensive to produce than green hydrogen, this should be Canada's hydrogen of choice.

The liberal government also likes this idea, asserting enthusiastically last year, "Canada's oil and gas sector is well-positioned to develop domestic hydrogen supply chains." This view is set out at length in the government's 2020 hydrogen strategy for Canada.

But blue hydrogen was never quite all it's cracked up to be. Apart from those inevitable greenhouse gas emissions, the cost difference between blue and green is evaporating fast.

So, the federal government has decided to go colour blind and Ontario has followed suit: any mix of blue and green is now presented as 'clean hydrogen'. No difference.

Say again?

Except, of course, there is, and Germany's not going to fall for it.

But there's another message here for the government of Canada: Germany doesn't want blue hydrogen.

The European Commission is hedging its bets, but Germany, the largest economy, and the most heavily industrialised country in Europe, has made it clear that the future of hydrogen is green. The argument that green hydrogen is too expensive looks increasingly bankrupt. In Europe, green hydrogen is reportedly now cheaper than liquified natural gas, and

as the cost of electricity from wind and solar energy continually declines, the volatile price of natural gas spikes, falls, and spikes again, green hydrogen looks like a much safer bet. “For an investor, blue hydrogen will look very risky”, cautions Hydrogen Science Coalition co-founder Tom Baxter.

Even British Petroleum can read the tea leaves, eyeing up a major offshore wind-powered green hydrogen plant to supply a Rotterdam refinery, while an even larger green hydrogen installation powered by 345 MW of wind is planned for Texas by Apex Clean Energy windfarms and Plug Power, a supplier of hydrogen-based technologies.

Quebec is also dipping a toe in the water, planning to build and operate an 88 MW green hydrogen electrolysis plant in Varennes, Quebec.

The LNG fiasco

The war in Ukraine has disrupted European gas supplies from Russia, and Europe desperately needs to find other suppliers. Sure enough, Captain Canada plans to come to the rescue: Alberta’s abundant supplies of natural gas can be shipped to Europe to save our cousins from freezing in the dark. There’s only one small problem: Canada has no operating LNG export infrastructure.

LNG Canada’s export facility under construction in Kitimat, British Columbia, will be Canada’s first completed LNG export installation when it comes on stream in 2025. Intended to serve the Asian market, the terminal will be supplied through the 650 km Coastal GasLink pipeline that continues to be justifiably contested by the Wet’suwet’en Hereditary Chiefs.

To supply Europe in its hour of need, a flurry of new LNG projects in Atlantic Canada are now being discussed. LNG Newfoundland and Labrador is proposing a $7 billion terminal in that province to export 2.6 Million tonnes (Mt) of hydrogen a year. LNG exports have reportedly been fast-tracked so that shipments may commence in 2028. In Nova Scotia,

the Goldboro project has plans for a floating LNG terminal that will start LNG deliveries of 2.5 Mt a year in 2025. And then in New Brunswick, Repsol has revived a plan to construct an LNG export terminal at its import facility at Saint John. This could be up and running in maybe 3 to 5 years; but the catch here is that to supply gas to the facility for export, additional pipeline capacity to New Brunswick and Nova Scotia will be required, all of which will flow through Quebec. Widespread public opposition to increased pipeline capacity across *La Belle Province* is almost certain. So, 2025 looks like a bit of a stretch.

Still, it does sound like a plan. But it also raises an awkward question. We know that the European response to the disrupted gas supplies from Russia is to fast-track the substitution of renewable sources of energy, and to substantially cut back the demand for natural gas as rapidly as possible. By the time Canada's first shipment of LNG sets sail from Atlantic Canada in perhaps five year's time, will Europe still be desperately searching for supplies of natural gas?

Europe has moved quickly to counter the reduction in supplies of gas from Russia. Since May this year, the EU has secured "record levels of LNG imports and higher pipeline gas deliveries". The recently formulated REPowerEU programme calls for an ambitious rollout of renewable energy rising to 45% of primary energy supply by 2030 and setting a target of reducing the bloc's natural gas consumption by at least a third by 2030.

The EU economic commissioner Paolo Gentiloni has suggested that Europe could wean itself off Russian gas by 2027; that's about the same time the first LNG tanker casts off from Atlantic Canada.

Plan B

LNG export terminals are multi-billion-dollar investments and there is a very real risk that this infrastructure could quickly become a stranded asset if the European demand for imported LNG starts to decline after the present crisis is resolved.

But wait! Couldn't these LNG export terminals be used for another hot commodity? Like hydrogen?

Natural Resources Minister Jonathan Wilkinson has a vision. Canada's energy masterplan starts with the construction of LNG export terminals; then, as the hydrogen economy gains global momentum, Canada deftly switches its exports from LNG to hydrogen. It's a nice idea, and one that the prime minister has fully embraced, assuring his colleagues at the end of the G7 summit in June this year that Canada's LNG installations could "later be used to export hydrogen."

Except that they can't; at least not without substantial reconstruction work that will cost a great deal of money. Not only are the physical properties of methane and hydrogen dissimilar in important ways, but the chemical engineering processes required to liquify each gas are totally (and I mean totally) different. This means that an LNG export facility will need to be largely rebuilt in order to process hydrogen. In all likelihood, it would be less expensive to build the hydrogen liquefaction plant alongside the LNG operation and share the supporting infrastructure including the port facilities. Whatever the engineering decision, asserting that an LNG export plant can be used to export hydrogen is nonsense, and just one more example of how the oil and gas industry is successfully distorting the narrative in order to manipulate government policy in its favour.

So, lets just recap what we know.

Building LNG export terminals is a colossal waste of money; LNG terminals cannot be flipped over to hydrogen; blue hydrogen will soon be uncompetitive with green; and the federal government is once again formulating national energy policy by listening to all the wrong people.