

TECHNOLOGY

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Panu Kurronen plays with his grandson on his motorbike. He says hydrogen is the long-term answer to protecting his grandchildren from dangerous climate change. Photo: Contributed

Only green hydrogen will do, says Switch technology boss

Blanket electrification is not the answer for transport, argues Panu Kurronen, but green hydrogen made from seawater and offshore wind can be

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By [Paul Berrill](#) in London

A few years ago, [Panu Kurronen](#) was shown a dramatic graph of the rise in atmospheric carbon over recent decades.

"For me it was decisive. We need to wean ourselves off fossil fuels, and fast," the vice president for technology at Finland's Yaskawa Environmental Energy/The Switch told TradeWinds.

The situation, he said, has become all too real with extreme weather events this year.

"Right now, the outlook isn't great, even for sticking to the Paris Agreement target. I don't want that for my grandchildren."

But he concedes it is hard to give up the privileges that fossil fuels have made possible. The first need is to supercharge efficiency across all uses, he said, and then complete a total energy transition.

But "the idea that electrification will solve everything worries me". The European Union's charge towards electrification to replace combustion engines for land transport is mistaken, he added.

"How can we realistically build the charging infrastructure to power a billion electric vehicles on demand? And where is all the extra electricity going to come from?"

Renewable energies cannot deliver on the sheer scale needed, according to Kurronen, and there is a problem with reliability when there's no wind or sunshine. Energy storage is also an issue.

To meet EU targets for renewable electricity, wind turbine production would need to be ramped up massively, with a huge demand for critical raw materials, he added.

"One big wind turbine can weigh up to 700 tonnes. Just the direct drive is 200 tonnes, the generator 20 tonnes and it has 40 tonnes of copper. Building all this entails a huge increase in mining, which I don't think politicians fully appreciate," he said.

Specifically, electrification is not an option for marine because battery power is only a solution for short distances, he added.

It all convinces him that hydrogen is the best source of energy for transport: "From hydrogen we can make synthetic fuels that can be more easily stored to serve load requirements on land and sea.

"Fuel cells using hydrogen or hydrogen-derived synthetic fuels are also the best answer for cars, despite the fact that major European manufacturers seem to have dropped hydrogen as an alternative."



Kurronen said engine maker Wartsila, for example, has had promising results looking at ammonia and fuel cells.

"I believe marine will actually lead the way. Ammonia's big advantage is that carbon emissions are zero. Burning methanol releases a small amount of CO₂, so some form of low-threshold carbon capture may be necessary where that is the preferred solution."

Methanol's advantages are that it is easier to store and deploy and can be easily switched to for ships that currently use LNG.

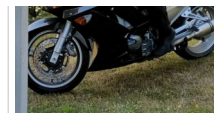
But relying on "blue" hydrogen made from fossil fuels, as is mostly the case now, defeats the purpose — although it could be used for transition while building up a green infrastructure.

"I support the idea to create a new green hydrogen production industry using seawater, which is in plentiful supply, and renewable power from offshore wind to make the hydrogen," Kurronen said.

"There could also be new opportunities for shipping to service the platforms and shuttle carriers to take the hydrogen for onward refining."

Green hydrogen's main downside versus blue hydrogen, though, is its price, currently around \$5 per kg. Kurronen said \$2 per kg will probably make it competitive, but the aim is for \$1 per kg.

"This we certainly might achieve by around 2030, when the biggest land-based green hydrogen projects come onstream, but we're going to need a lot more of it, and offshore production should be part of that chain." ([Copyright](#))



Panu Kurronen admits it would be 'more PC' to have an electric motorbike but believes it is unrealistic to build a charging infrastructure to power millions of electric vehicles. Photo: Contributed

THE SWITCH'S 'FOSSIL' WHO HAS NO TRUCK WITH FOSSIL FUELS

Panu Kurronen will have been at The Switch for 20 years in January.

"I've been involved in pretty much everything we produce," he said.

"Moving into marine in 2013 with our permanent magnet technology was a big leap, but it's very satisfying to offer products that can make a difference in vessel performance."

Kurronen studied at the Lappeenranta University of Technology (LUT) in Finland, and its mechanical, chemical and environmental engineering courses provide a local supply of smart young talent, he said.

He was awarded an MSc in 1990, working first for KONE lifts from 1995 to 2000, then returning to LUT to work on high-speed machines and for his PhD in 2003.

With other academics and partners, he bought shares in LUT solid-rotor technology spin-off Rotatek Finland, which became The Switch when industrial investment fund Vacon bought it in 2001. The company was acquired by Yaskawa in 2014.

"I joined officially as employee No 3. The first two are no longer with us, which makes me the official 'fossil!'"

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