Pollution-free hydrogen: green energy breakthrough?

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Scientists said Tuesday they have developed a way of extracting hydrogen from oil without releasing greenhouse gases—a breakthrough they hailed as a "silver bullet" for cleaner energy and the climate.

Unlike petrol and diesel, hydrogen produces no pollution when burned. It is already used by some car manufacturers to power vehicles and may also be burned to generate electricity.

But until now the wide-scale roll-out of hydrogen technology has been prohibited by the high cost of separating it from hydrocarbons.

Currently the vast majority of hydrogen used for vehicles is derived from natural gas, the extraction process of which produces planet-warming methane.

Now a group of Canadian engineers say they have come up with a method of getting hydrogen directly from oil sands and oil fields, while leaving carbon dioxide and methane in the ground.

The team behind the research, which was unveiled at the Goldschmidt Geochemistry Conference in Barcelona, said the technology had the potential to supply Canada's entire electricity requirement for the next 330 years—all without releasing any greenhouse gases.

"Low-cost hydrogen from oil fields with no emissions can power the whole world using mostly existing infrastructure," Grant Stem, CEO of Proton Technologies, which is commercialising the extraction method, told AFP.

"This is the silver bullet for clean energy and clean climate."

With global energy demand rising in lockstep with emissions, the United Nations Intergovernmental Panel on Climate change says the world needs to work rapidly to curb greenhouse gases or risk dangerous temperature increases.

Strem said the method could produce hydrogen at between $0.10-0.50

per kilo, compared with the current production cost of around $2 per kilo.

Even abandoned oil fields still contain significant amounts of oil. Strem and the team found injecting oxygen into the fields raised their underlying temperature, freeing hydrogen that can be filtered from other gases.

"The only product in this process is hydrogen, meaning that the technology is effectively pollution- and emission-free," said Strem.

Experts greeted the possible breakthrough with guarded optimism.

"Making hydrogen from hydrocarbons using oxygen is nothing new—the trick is not releasing the CO_2 to the atmosphere," said Jeremy Tomkinson, Company Director and CEO at NNFCC The Bioeconomy Consultants.

"It would be really exciting if they had found a way of... ensuring the carbonaceous gases remain locked underground—letting them go to atmosphere would result in no difference to burning the oil above ground at far less energy burden."

Professor Brian Horsfield, from the GFZ German Research Centre for Geosciences, Potsdam, said that extensive field testing would be needed to see how the system works on an industrial scale.

He nevertheless called the project "highly innovative and exciting.

"Declining oilfield infrastructures now stand to get a new lease of life."