

Hidden Hydrogen

By Neville Barlow

This article grabbed my attention and I hope many people will take notice.

In the shade of a mango tree, Mamadou Ngulo Konare recounted an event in his childhood. In 1987, when well diggers had come to his village of Bourakebouguou, in Mali, to drill for water, but had given up on one dry borehole at a depth of 108 metres.” Meanwhile, wind was coming out of the hole.” Konare told Denis Briere, a petrophysics who was vice president at Chapman Petroleum Engineering in 2012. When a driller peered into the hole while smoking a cigarette, the wind exploded in his face.

“He didn’t die, but was badly burned”, Konare continued “and now we had a huge fire. The colour of the fire in the daytime was like blue sparkling water and did not have black smoke pollution.

We were very afraid that our village would be destroyed. (I would like to describe an experience I had. On one of our Jaguar trips away, several years ago, we visited a manufacturing Jeweller in Hamilton. He was using a gas torch and I noticed it had a blue flame.



Aliou Diollo, Chairman of Petroma

I was familiar with Oxy acetylene cutting torches that had an orange flame. He told me he used only Hydrogen for his work.)

The fire was snuffed out and the well was capped. However soon after a wealthy businessman, Aliou Diollo who was chairman of an oil and gas company named Petroma, acquired the rights to prospect the region. With his mobile lab, Briere and his technicians discovered the gas was 98% Hydrogen.

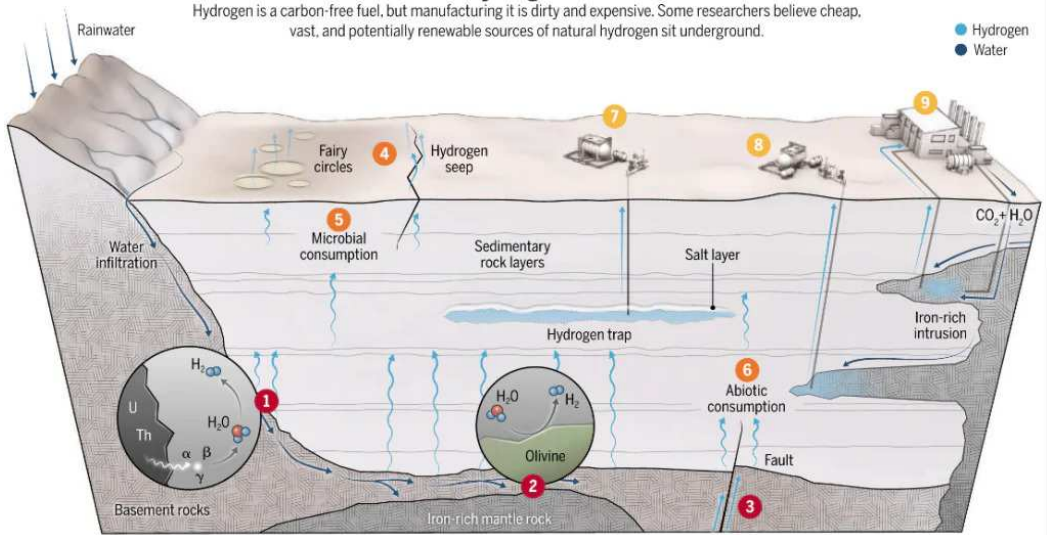
Within a few months, Briere's team had installed a Ford engine tuned to burn Hydrogen. Its exhaust was water. The engine powered a 30-Kilowatt generator that gave Bourakebouyou its first electric benefits, lights for evening prayers at the mosque and a flat screen TV so the village could watch soccer games. Children's schoolwork improved as they had lighting to do their homework. Diallo changed the name of the company to Hydroma and began drilling more new wells in the district.

This what is now known as Natural Hydrogen. It is not only clean but renewable. It takes millions of years for organic deposits to turn into oil and gas. By contrast Natural Hydrogen is always being made afresh, when underground water reacts with minerals at elevated temperatures and pressures.



Earth's hydrogen factories

Hydrogen is a carbon-free fuel, but manufacturing it is dirty and expensive. Some researchers believe cheap, vast, and potentially renewable sources of natural hydrogen sit underground.



Generation

1 Radiolysis

Trace radioactive elements in rocks emit radiation that can split water. The process is slow, so ancient rocks are most likely to generate hydrogen.

2 Serpentinization

At high temperatures, water reacts with iron-rich rocks to make hydrogen. The fast and renewable reactions, called serpentinization, may drive most production.

3 Deep-seated

Streams of hydrogen from Earth's core or mantle may rise along tectonic plate boundaries and faults. But the theory of these vast, deep stores is controversial.

Loss mechanisms

4 Seeps

Hydrogen travels quickly through faults and fractures. It can also diffuse through rocks. Weak seeps might explain shallow depressions sometimes called fairy circles.

5 Microbes

In shallower layers of soil and rock, microbes consume hydrogen for energy, often producing methane.

6 Abiotic reactions

At deeper levels, hydrogen reacts with rocks and gases to form water, methane, and mineral compounds.

Extraction

7 Traps

Hydrogen might be tapped like oil and gas—by drilling into reservoirs trapped in porous rocks below salt deposits or other impermeable rock layers.

8 Direct

It might also be possible to tap the iron-rich source rocks directly, if they're shallow and fractured enough to allow hydrogen to be collected.

9 Enhanced

Hydrogen production might be stimulated by pumping water into iron-rich rocks. Adding carbon dioxide would sequester it from the atmosphere, slowing climate change.

In the decade since boreholes began to tap Hydrogen in Mali, flows have not diminished.

It is believed that while collecting Hydrogen, the well could also tap the geothermal energy in the heated water that returns to the surface. Best of all, if carbon dioxide were dissolved in the injected water, it could react with magnesium and calcium in the iron containing rocks and be locked up permanently as limestone. You would be getting rid of carbon dioxide and producing Hydrogen at the same time!

With 30 wells across the Bourakebougou fields Briere says it contains at least 60 billion cubic metres of Hydrogen. We don't see that it's a confined volume, but that it is always being filled and flowing continuously.

An Australian named Luke Titus found an obscure 1944 report made by the Department of Mines of the Geological Survey of South Australia. It included data from one borehole, drilled in 1921 on Kangaroo Island that had produced as much as 80% Hydrogen.

Another well, on the nearby Yorke Peninsula was close to 70%. In February 2021 when South Australia allowed drilling for Hydrogen, Titus submitted an application to explore nearly 8000 square kilometers on the Yorke Peninsula and Kangaroo Island. In January, in an initial public offering by the company Gold Hydrogen on the Stock Exchange, the company raised \$20 million to start drilling wells. It would appear that South Australia is in the middle of a Hydrogen boom because a likely replacement for coal could have been found.

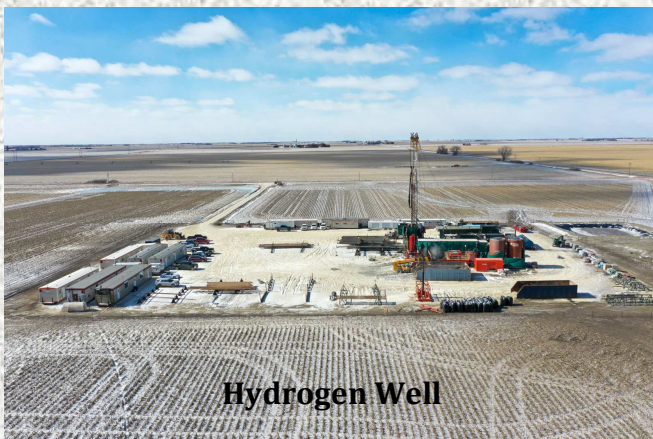
The enthusiasm for Natural Hydrogen comes as interest in Hydrogen as a clean, carbon free fuel is surging. Governments are pushing it as a way to fight global warming, efforts that were galvanized when Russia invaded Ukraine last year and triggered a hasty search, especially in Europe, for alternatives to Russian natural gas. Natural Hydrogen, if it forms sizeable reserves, might be there for the taking, giving the experienced drillers in the

oil and gas industry a new, environmentally friendly mission. "I believe that it has the potential to replace all fossil fuels" said Viacheslav Zgonnik who wrote an article entitled The occurrence and geoscience of Natural Hydrogen, and "That's a very large statement, I know."

It would appear that many countries of the World are now seriously looking for Natural Hydrogen. These include Bosnia, Herzegovina, New Caledonia, Turkey, the Balkans, China Papua New Guinea, Australia, etc. Maybe some of the dry wells bored in Taranaki might have Natural Hydrogen wanting to pour out.

But I forgot, 'someone' canned all that on a whim.

Neville



Hydrogen Well