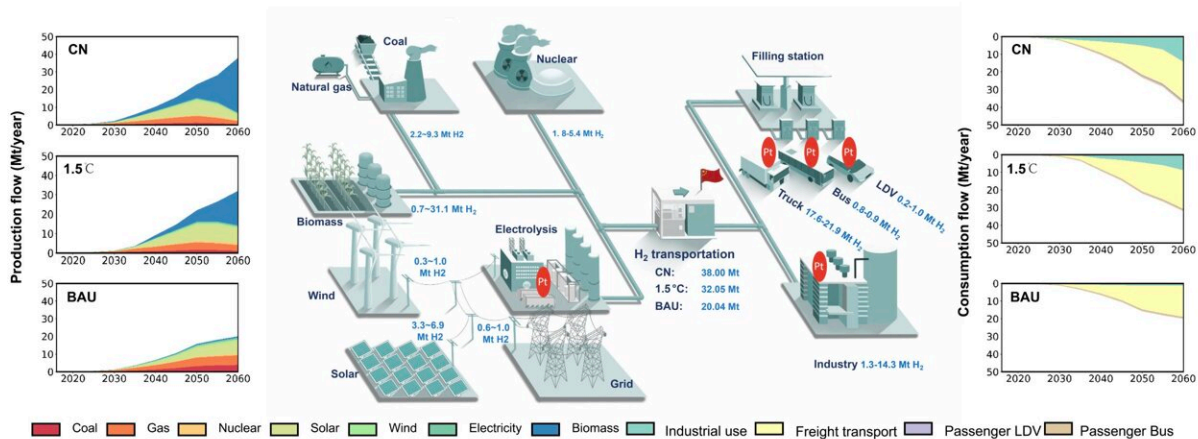


# Platinum circularity underpins China's green hydrogen future

May 15 2024

(A) Mapping China's H2 flow along its value chain



China's hydrogen-fuel future in 2060, with the left-hand side panel showing the evolution of hydrogen production mix from 2020–2060 and the right-hand side panel showing the hydrogen consumption structure. Credit: Wang et al

A study explores the role of platinum in shaping the future of green hydrogen development in China. Hydrogen fuel is one of China's key strategies to achieve national energy security and carbon neutrality. Hydrogen is expected to provide more than 10% of China's total energy supply by 2050, and the country has announced more than 50 large-scale hydrogen projects.

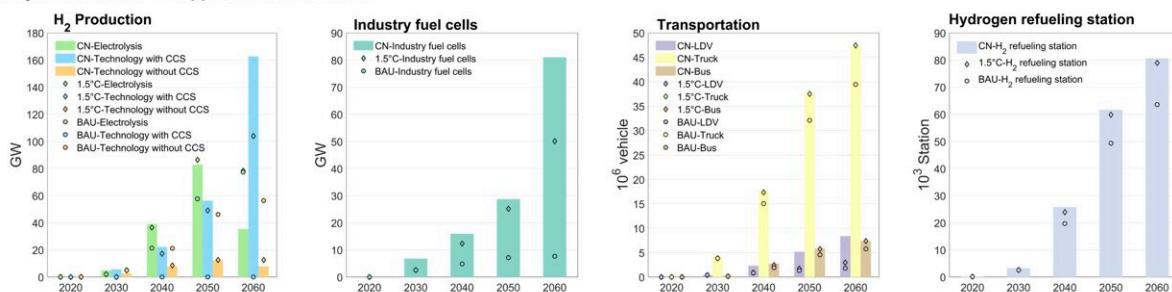
Platinum plays a crucial role throughout the hydrogen value chain from

production to final consumption, and this scarce metal could be a limiting factor in China's expansion of hydrogen fuel use.

Wei-Qiang Chen and colleagues model the potential pathways of China's [hydrogen-fuel](#) industry and the corresponding platinum constraints under three emissions scenarios. The study is [published](#) in the journal *PNAS Nexus*.

In the study's models, solar- and wind-powered electrolytic hydrogen production would rapidly expand before 2050 in all three scenarios, as would hydrogen use as freight transport fuel—assuming the cost of fuel cell electric vehicles declines to reach parity with battery [electric vehicles](#) within a decade.

(B) Key infrastructure to support China's H2 future



The key infrastructure along the hydrogen supply chain over 2020–2060, including hydrogen production equipment, fuel cells for industry use, fuel cell vehicles, and hydrogen filling stations. Credit: Wang et al

Under the scenario in which China achieves carbon neutrality by 2060, the country's demand for platinum associated with hydrogen would increase from 0.6 tons per year in 2020 to 242 tons per year in 2060, which would require a substantial expansion of the country's platinum

supply. This could pose risks, as 95% of platinum is currently sourced from three countries: South Africa, Russia, and Zimbabwe.

Factors such as geopolitical conflicts, labor disputes, and environmental, social, and governance risks could choke the supply of this scarce metal and price fluctuations are to be expected. Along with enhancing international cooperation in stabilizing platinum mineral supply, the authors recommend China pursue a platinum [circular economy](#) as a key strategy in its hydrogen planning.

**More information:** Peng Wang et al, Incorporating platinum circular economy into China's hydrogen pathways toward carbon neutrality, *PNAS Nexus* (2024). [DOI: 10.1093/pnasnexus/pgae172](https://doi.org/10.1093/pnasnexus/pgae172)

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