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METAL FOR A GREENER FUTURE

Developments at COP26 have strengthened the case for platinum-based hydrogen technologies

The 2021 Glasgow Climate Pact, agreed by nearly 200 participating countries in the closing stages of COP26, is a global agreement to accelerate action on climate change this decade. It consolidates aspects of the 2015 Paris Agreement, keeping the possibility of limiting temperature rise to 1.5°C alive, a goal that is increasingly viewed as necessary to mitigate the effects of climate change.

Significantly, the Glasgow Climate Pact is the first ever climate deal to explicitly plan to reduce the use of fossil fuels, although it stopped short of making a commitment to phase them out altogether at this stage.

Scientific consensus, including the United Nations' Intergovernmental Panel on Climate Change, is that human activities have been the main driver of climate change, primarily due to burning fossil fuels like coal, oil and gas, which releases carbon dioxide (CO2) and other greenhouse gases. Under current thinking, greenhouse gas emissions need to reduce to zero by around 2050 to limit warming to 1.5°C.

A recent report published by the Hydrogen Council* addresses the necessity of transitioning to a low-carbon society if goals to prevent climate change are to be achieved, identifying the abatement ability of 'clean' hydrogen, use of which could avoid 80 gigatons of cumulative CO2 emissions between now and 2050. Clean hydrogen refers to both low-carbon hydrogen** and emissions-free green hydrogen, which is produced from renewable energy.

Clean hydrogen is critical for decarbonising industry, replacing the use of fossil fuels. The steel industry, one of the world's highest CO2 emitting industries, is already exploring ways of using green hydrogen as a feedstock instead of coal. For example, platinum-based proton exchange membrane (PEM) electrolysis is being used to produce green hydrogen from wind power as part of a low-CO2 steel-making project developed by Salzgitter AG in Germany.

Hydrogen is also being used to help mobility and transport sectors achieve net zero goals. What is more, its use as a low- or zero-emissions fuel is enabling the deployment of hydrogen fuel cell electric vehicles (FCEVs), which also use platinum-based PEM technology and emit only water from their tailpipes.

COP 26 GLASGOW

PEM technologies in demand

Annual demand for hydrogen is expected to rise from about 90 million metric tons (MT) today to 140 MT in 2030, with green hydrogen having a 20 per cent share. Supplying the more than 30 MT of green hydrogen that this growth would require necessitates the build-out of over 250 gigawatts (GW) of electrolyser capacity before the end of the decade – well above the 90 GW of cumulative capacity expansions earmarked to date.

Longer-term, it is estimated that the supply of clean hydrogen would need to reach 690 MT by 2050 to meet demand from end-users. Between 60 to 80 per cent of this would be green hydrogen, necessitating three to four terawatts of electrolysis capacity.

The significant expansion of electrolyser capacity needed to support future demand for green hydrogen is positive for platinum, as PEM electrolysers are especially suited to coping with the intermittent nature of renewable electricity. Growth in hydrogen availability also supports wider deployment of hydrogen infrastructure, such as refuelling networks, which could provide a further boost to platinum by allowing the wider adoption of FCEVs.

*Hydrogen for Net-Zero, November 2021

** Low-carbon hydrogen refers to hydrogen produced from fossil fuel reforming with carbon sequestration

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