

News Release

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Johnson Matthey ramps up on Green Hydrogen – Eugene McKenna appointed as business head

- Clean hydrogen, produced with low or zero emissions, is vital for decarbonising long distance transport energy intensive industrial processes.
- JM technologies already at the heart of enabling clean hydrogen production and fuel cell applications.
- JM is increasing efforts on green hydrogen, leveraging core science capabilities and market expertise to drive large scale adoption.
- Countries and regions setting ambitious targets which are driving the hydrogen economy.
- JM well positioned – significant growth opportunities in the hydrogen space.

Johnson Matthey, a leader in sustainable technologies, including those at the heart of the hydrogen economy, announces it has appointed **Eugene McKenna** as Managing Director of its **green hydrogen** activities.

Eugene, who has been with JM for four years, moves from his role leading business development, strategy and innovation within JM's Efficient Natural Resources Sector, where he focused on a pipeline of innovative low carbon technologies including those for clean hydrogen. Prior to joining JM he spent more than 20 years in Shell in a variety of roles including technology commercialisation and strategy.

Hydrogen produced with low or zero emissions is at the heart of the global energy transition and JM is a key technology partner for clean hydrogen with business activities spanning hydrogen production and fuel cells.

As the world unites to tackle climate change and commitment to achieve 'net zero' greenhouse gas emissions increases, a significant shift is required towards low and zero carbon sources of electricity. While renewable energy sources (like wind and solar) will work for some applications – domestic heating, cars and vans and lighter industrial processes – they won't get us to net zero on their own.

Hydrogen provides a clean source of power for energy hungry applications like long distance trucks and buses, as well as for energy intense industrial processes, such as steelmaking and cement, and in submarine and rail applications. There are two types: **blue hydrogen** – which is manufactured from methane but with less than 5% CO₂ emissions, and **green hydrogen** – where renewable energy is used to split water into oxygen and hydrogen with no carbon dioxide emissions, by a process called electrolysis. Both are vital in decarbonising heavy transport and industry and, within the next decade, blue and green hydrogen technologies will start to replace current production methods for hydrogen (called grey hydrogen).

While the market for clean hydrogen is in its early stages, ambitious targets are already being set. For example, within the recently announced EU hydrogen strategy, Germany alone has committed to invest €7 billion in hydrogen-related businesses. JM is well positioned to enable the global hydrogen economy. Our market leading Low Carbon Hydrogen (**LCH™**) technology (for **blue hydrogen**) is at

the core of several ground breaking new projects and our **fuel cells** technology is already out on the roads, powering more than 700 zero carbon buses.

For **green hydrogen**, JM has unique expertise in the critical technologies for electrolysis and can see a substantial and valuable market for these technologies.

In his new role, Eugene will continue the development of JM's **green hydrogen** business, which will centre on the design and manufacture of the catalyst coated membranes which operate at the heart of the electrolysis process. This business will leverage JM's deep expertise in platinum group metal science and fuel cell manufacture to drive the performance and dramatic cost reduction needed for large scale adoption of green hydrogen.

Commenting, Eugene McKenna said:

"I'm delighted to be heading up JM's activities in green hydrogen as we leverage the strong overlap of our fuel cells and our core science capabilities to improve the performance and the economics for our customers. We are well positioned to bring new solutions to the hydrogen space to drive the energy transition that is so vital in creating a cleaner and healthier world."

Ends

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About Johnson Matthey

Johnson Matthey is a global leader in science that enables a cleaner and healthier world. With over 200 years of sustained commitment to innovation and technological breakthroughs, we improve the performance, function and safety of our customers' products and in 2020 we received the London Stock Exchange's Green Economy Mark, given to companies that derive more than 50% of revenues from environmental solutions. Our science has a global impact in areas such as low emission transport, pharmaceuticals, chemical processing and making the most efficient use of the planet's natural resources. Today more than 15,000 Johnson Matthey professionals collaborate with our network of customers and partners to make a real difference to the world around us.

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For further information, please contact:

Rebecca Williams [jmp@matthey.com](mailto:jmpr@matthey.com)

0208 2698428

Notes to editors

A growing market for clean hydrogen

Today, around 70 million tonnes (equivalent to ~2,600 terawatt hours) of hydrogen per annum is produced from natural gas using a process called steam methane reforming. CO₂ is emitted during the process and hydrogen produced using this method is given the term 'grey hydrogen'. Almost all of the world's hydrogen is produced in this way today and JM's catalysts are used in around 40% of grey hydrogen production.

To give a sense of scale, one terawatt hour is equivalent to the typical gas consumption of just over 80,000 UK homes for one year*.

By 2050, JM estimates global hydrogen production will increase from today's 70 million tonnes to around 550 million tonnes (21,800 terawatt hours) per annum – half will be blue hydrogen, half will be green hydrogen and grey hydrogen will no longer be produced.

As well as activities in green hydrogen, JM has market leading technology for the production of blue hydrogen. Our Low Carbon Hydrogen (LCH™) technology is being commercialised as part of several major blue hydrogen projects in the UK.

** assuming 12,000 kWh per customer per year, based on mid-point of the range of Typical Domestic Consumption Values, published by Ofgem*

JM and green hydrogen

Green hydrogen is made by using renewable energy to split water into oxygen and hydrogen using electrolysis.

Several types of electrolysis technology can be used to make green hydrogen. The main routes are alkaline water electrolysis (AWE) and proton exchange membranes, or PEM electrolyzers which use precious metal catalysts.

Alkaline electrolyzers are a more mature technology typically used in larger continuous applications.

Widespread and economic adoption of green hydrogen will require alternative technology to suit new applications, to which PEM electrolyzers are expected to be more suited.

The particular advantages for PEM electrolyzers are that they can be scaled to the required size, they are very robust, and are suited to non-continuous use applications, for example, when coupled to renewables such as wind turbines. PEM will also be more cost competitive at scale.

PEM electrolyzers are a particularly good match for JM, as they use precious metal catalysts in a similar way to fuel cell technology - where the catalyst is coated onto a membrane (a catalyst coated membrane).

PEM electrolyzers are a relatively new technology for producing green hydrogen, so there's plenty of scope to reduce costs through, for example, thriftier precious metal content and scaling up manufacturing, something which JM has historically proven it can do very well.

JM is well placed to succeed – a strong overlap with fuel cell technology and unrivalled expertise in precious metal chemistry, catalysts and recycling, plus deep understanding of the market for hydrogen.

- For more information, visit www.matthey.com/hydrogen

