



Johnson Matthey
Inspiring science, enhancing life

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A global footprint



14,580
employees worldwide

North America

11 major manufacturing facilities
27% of Group sales*
19% of employees

Europe

15 major manufacturing facilities
41% of Group sales*
59% of employees

Rest of World

4 major manufacturing facilities
7% of Group sales*
5% of employees

China

6 major manufacturing facilities
13% of Group sales*
8% of employees

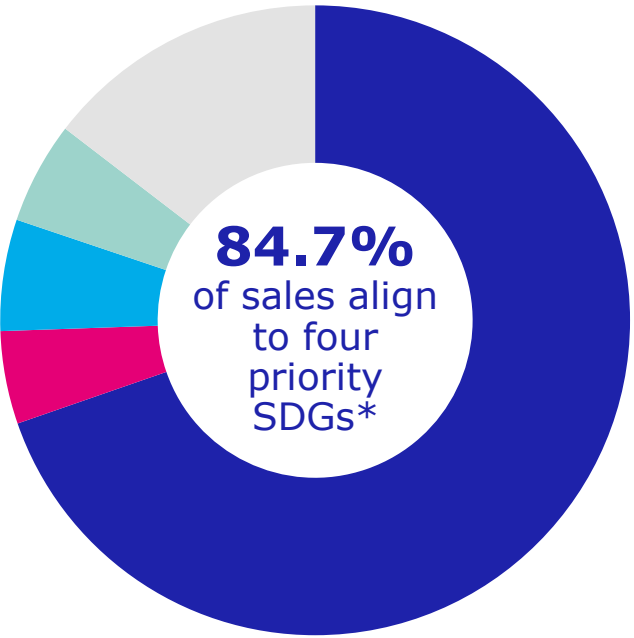
Rest of Asia

4 major manufacturing facilities
9% of employees

Our path to net zero by 2040

Sustainability framework and targets including net zero by 2040

We aim to have 95% of sales contributing to four priority UN SDGs by 2030



*Sales excluding precious metals, FY 2020/21

- SDG 3** Good Health and Wellbeing
- SDG 7** Affordable and Clean Energy
- SDG 12** Responsible Consumption and Production
- SDG 13** Climate Action
- Not related to the four UN SDGs

Hydrogen: established businesses and fast growing

Fuel Cells



Green hydrogen



Blue hydrogen



Grey hydrogen

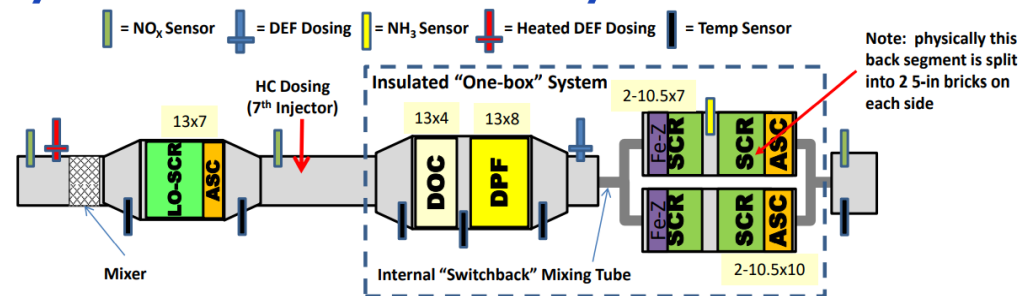


Hydrogen sales of c.£100m¹

Executive Summary

- Johnson Matthey is a global leader in sustainable technologies
 - We employ >2500 staff in R&D, Testing, Sales and Manufacturing across North America
 - Globally we invest ~5% of Sales (ex PGM) in R&D - £194million (~\$260million) in 2021
 - Our emissions control catalysts are preventing the emission of 40 tonnes of pollutants every minute of every day
- We support the EPA's Pending HD Low NO_x / GHG rule as a pragmatic way to improve air quality – particularly urban air quality¹ – for the lifetime of the vehicles impacted by the rulemaking

EPA System A Aftertreatment System



Schematic for illustration only

Accelerating the transition to a cleaner, healthier world

Our vision is for a world that's cleaner and healthier. And so we are making it our business to help address the four essential transitions the world needs for a sustainable future.





Automotive

Drivers

Global imperative for clean air, driving shift towards lower and zero emission vehicles

Our solutions

- **Emission control catalysts and systems for petrol, diesel and hybrid vehicles – cars, trucks and buses, non-road mobile machinery**
- Battery material research and systems for vehicles
- Fuel cell catalysts and components
- Components for sensors, spark plugs and automotive glass

Helping customers with

- Meeting legislated emission standards
- Improving the performance and cost competitiveness across the full spectrum of electric vehicles (battery and fuel cell)
- Reliable performance



Technical Feasibility

- Components for 2027 regulations are evolutions of current technologies
 - Well proven catalyst families
 - Significant level of in-field data on aging impact of performance
 - Current technologies performing as expected after high mileage (>500k - 1million miles)
- MECA SWRI study¹ demonstrated 0.02g/bhp-hr
 - Lab based environment
 - Current engine design modified with hardware and software to simulate anticipated 2027+ technology
- JM does not yet have a 2027+ engine available; and as such a conservative approach could be 0.02g/bhp-hr plus engineering margin
 - Historically, engineering margin has been 25-50% of the limit

Cost Impact of potential 2027 systems – Catalyst Components

- Heavy Duty Diesel trucks have a very long in-field lifetime, and it is anticipated that 2027+ trucks may continue in service beyond even today's normal lifecycle
 - Mobile source emissions standards have a huge benefit to air quality – and particularly to disadvantaged communities in densely populated urban areas
- JM Catalysts for ICE are designed to be robust for the lifetime of the vehicle¹
 - Filter components are designed to be robust to ash cleaning cycles currently performed today
- JM provided input to, and support the findings of the MECA cost analysis
 - Modest total catalyst volume increases
 - No completely new catalyst technologies; innovation and evolution of well understood technologies and catalyst system architecture



Appendix

JM

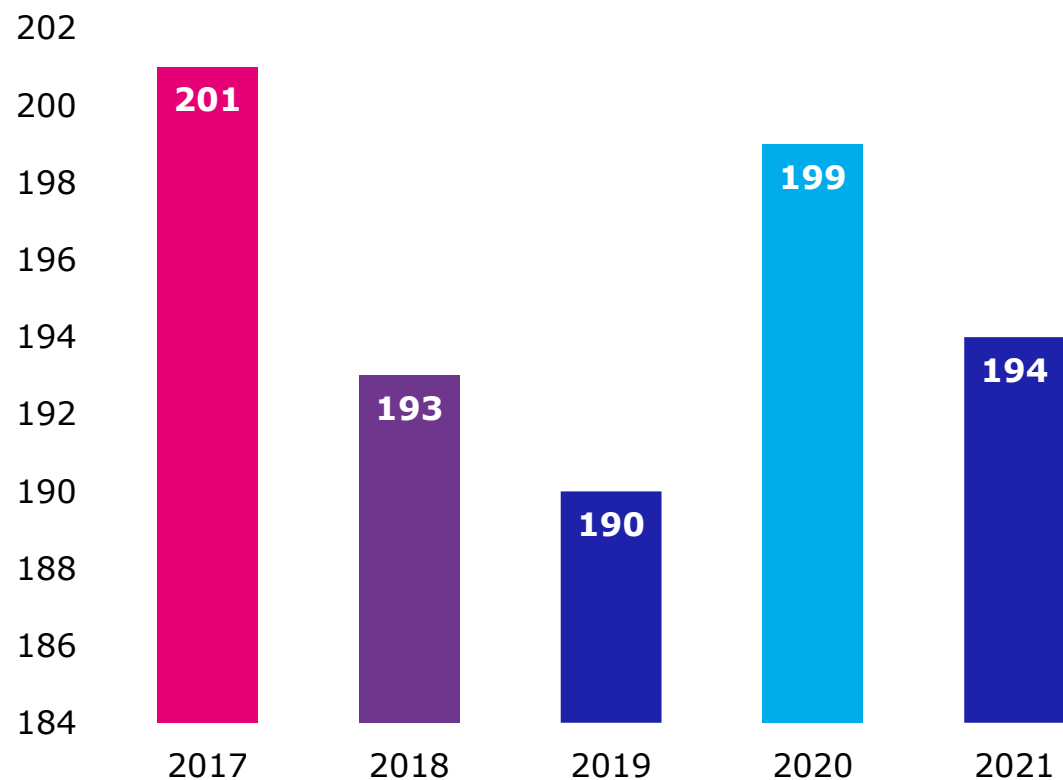
**Our vision is for a
world that's cleaner
and healthier;
today and for
future generations.**



As a global leader in sustainable technologies, we apply our cutting edge science to create solutions with our customers that make a real difference to the world around us.

Investing in science

R&D investment £ millions



**Over
1,600**
employees
working in
R&D

R&D investment
at
5%
of sales*

Strong credentials

Strong brand
**200+ year
history**

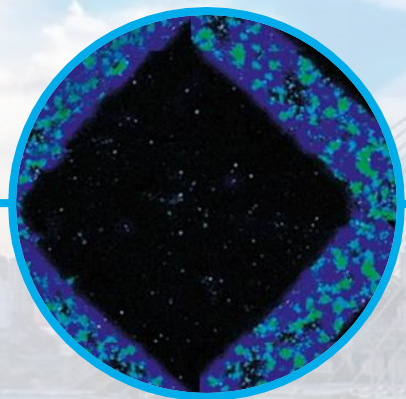
Technology leadership
#1 or 2
in chosen markets

2020/21 sales*
£3.9 billion

2020/21 underlying
operating profit
£504 million



Clean air for all



**Surface
chemistry and
coatings**



**Emission
control
catalysts**

**Preventing the emission
of 40 tonnes of pollutants
every minute of every day**

Expanding our global production capability to meet customer demand

Manufacturing sites

- ① Querétaro, Mexico
- ② Smithfield, USA
- ③ Wayne, USA
- ④ Pilar, Argentina
- ⑤ Royston, UK
- ⑥ Redwitz, Germany
- ⑦ Gliwice, Poland
- ⑧ Skopje, Macedonia
- ⑨ Germiston, S. Africa
- ⑩ Krasnoyarsk, Russia
- ⑪ Manesar, India
- ⑫ Bawal, India
- ⑬ Nilai, Malaysia
- ⑭ Zhangjiagang, China
- ⑮ Shanghai, China
- ⑯ Kitsuregawa, Japan





Chemicals

Drivers

A growing and increasingly wealthy population drives the need for more efficient and sustainable production of chemicals

Our solutions

- Catalyst solutions, optimisation and recycling
- Licensed processes and technologies
- Lifecycle analysis and technical services
- Technologies for bio-based processing

Helping customers with

- High efficiency and optimum yields leading to lower operating costs
- Process optimisation
- Reduced emissions
- Clean hydrogen production
- Routes to sustainable fuels, including Sustainable Aviation Fuels from Municipal Solid Waste and from captured CO₂



Hydrogen Technologies: Fuel Cells and Green Hydrogen

Strong competitive advantage

An established global hydrogen player, well along experience curve

Technology underpinned by platinum group metal (pgm), catalyst and membrane expertise

Potential recycling solutions (closed loop offering); security of supply

Existing manufacturing 2GW capacity; planned further expansion

Fuel Cells

Pipeline of >10 major truck and auto OEM platforms

- Major German auto supplier quadrupled demand expectations for 2024
- New 5 year contract with EKPO Fuel Cell technologies
- 170 FCEVs powered by REFIRE and JM technology on China's roads



Green hydrogen

Working with leading global electrolyser players

- MoU with Plug Power to develop advanced materials for electrolyzers
- MoU with Hystar, newly established Norwegian company, for CCMs into PEM electrolyzers
- MoU with Hoeller Electrolyzer GmbH





Oil and gas

Drivers

Demands for reducing waste and pollution while optimising yields drive the need for the most efficient processing of natural resources

Our solutions

- Catalysts
- Purification
- Refinery additives and addition systems
- Diagnostic services

Helping customers with

- Optimising process efficiency
- Reducing capex and opex
- Lower emissions and reduced environmental impact
- Improved process safety
- Clean hydrogen production



Agrochemicals and fertilisers

Drivers

A growing population is driving the need for more efficient and sustainable food production

Our solutions

- Catalysts for the production of ammonia and nitric acid
- Greenhouse gas abatement systems
- Catalysts, technologies and customer development services for agrochemical intermediates

Helping customers with

- Efficient manufacturing processes – optimised feedstock use and reduced waste
- Lower emissions and carbon footprint
- Difficult chemistry and manufacturing challenges





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