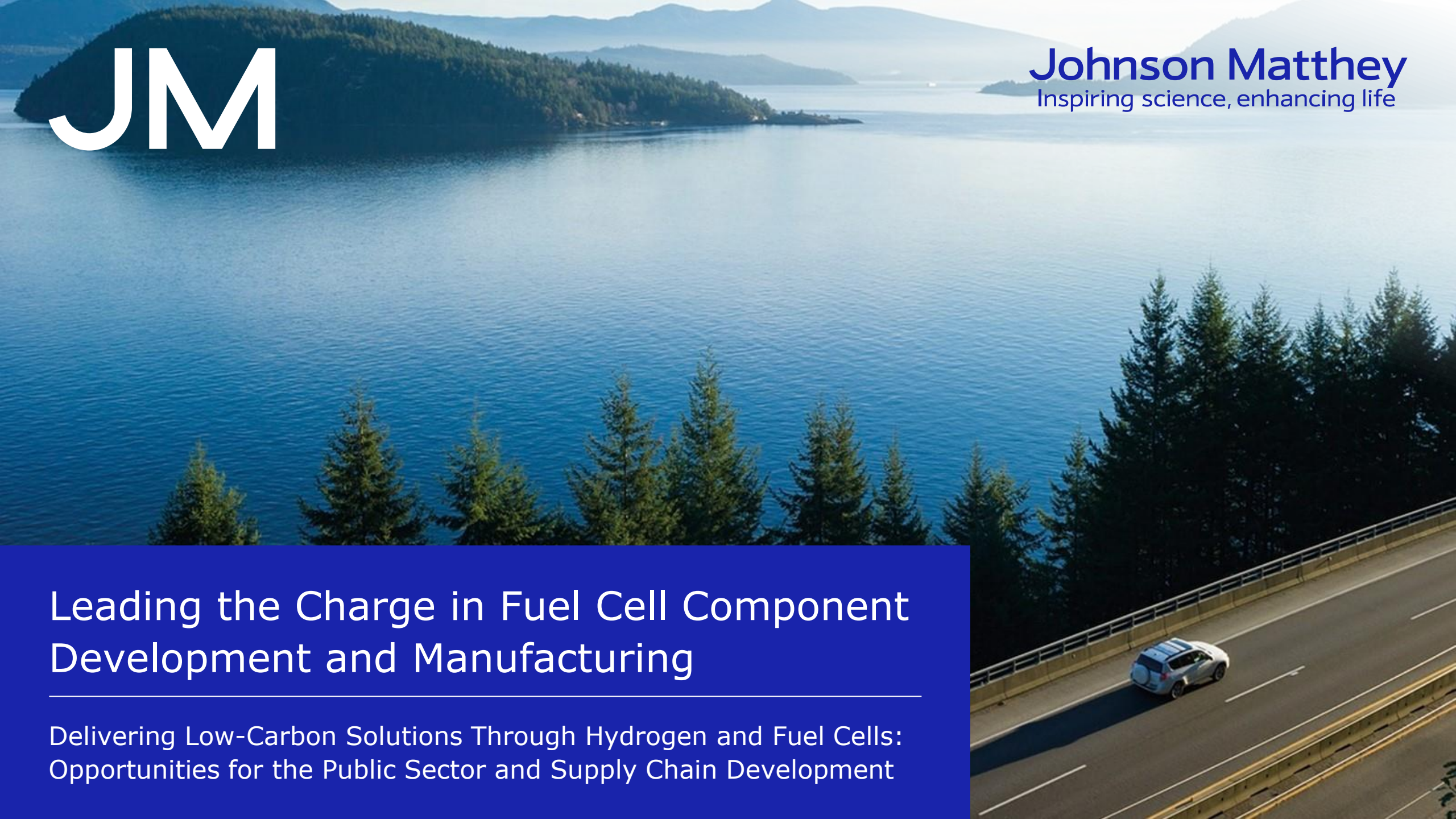
Example 3

Luke Tan, Johnson Matthey



Johnson Matthey
Inspiring science, enhancing life

Leading the Charge in Fuel Cell Component Development and Manufacturing

Delivering Low-Carbon Solutions Through Hydrogen and Fuel Cells: Opportunities for the Public Sector and Supply Chain Development

Johnson Matthey

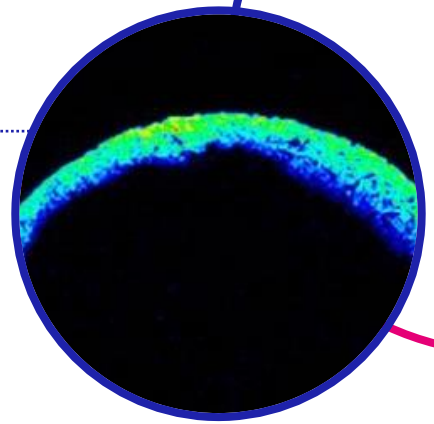
Strong brand	Technology leadership	Annual sales*	Operating profit	R&D investment
200-year history	**#1 or 2** in chosen markets	**£4.2 billion**	**£566 million**	**~£200 million** per annum

*Sales excluding precious metals

Turning science into customer solutions

We know how to design processes

Scale up complex manufacturing



We know chemistry and materials

Provision of customised solutions

We know how to apply our science

New and next generation products, formulation and industrial process optimisation

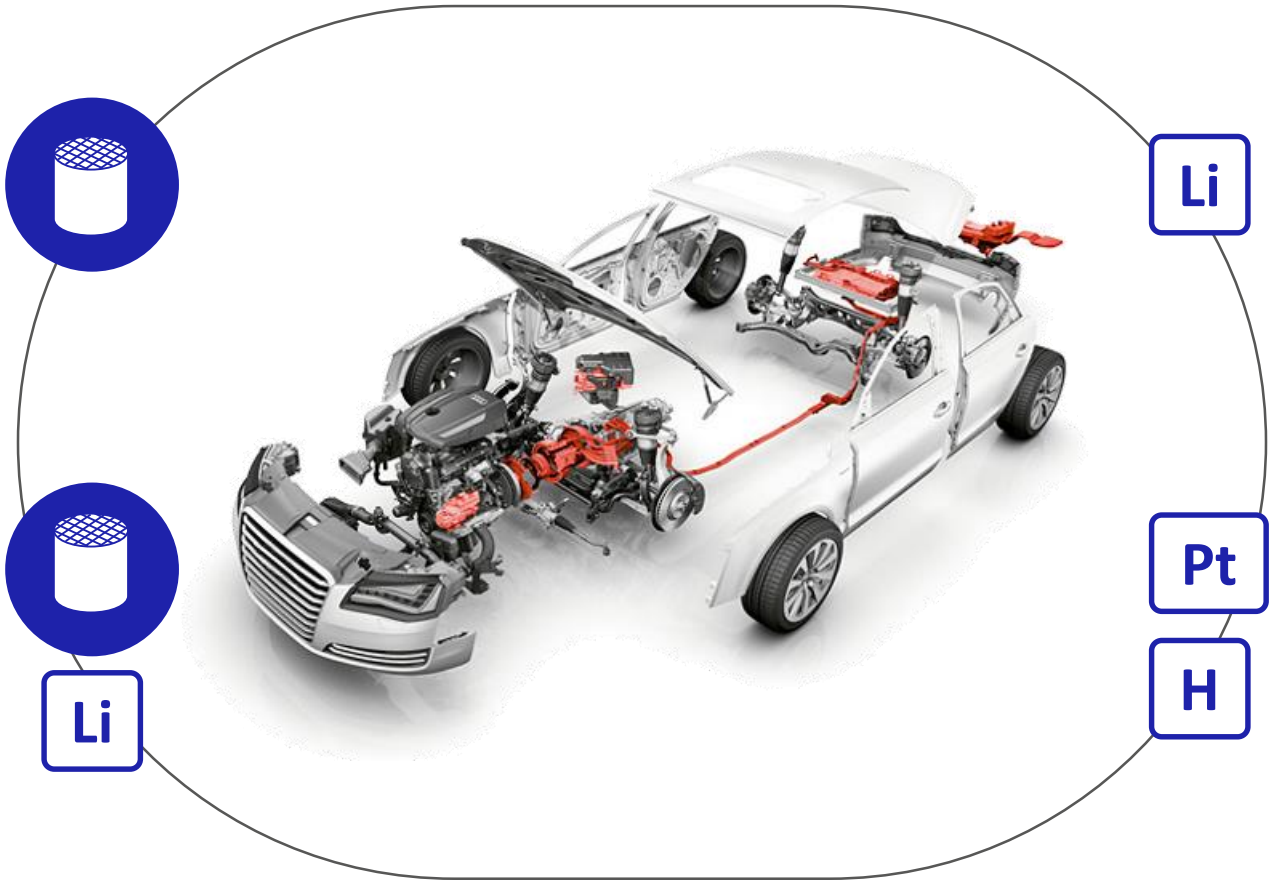
Using world class science and technology to solve complex problems for our customers

JM

JM covers options to enable clean ICE, PHEV, BEV and FCEV

ICE
Emission control catalysts
Gasoline and diesel

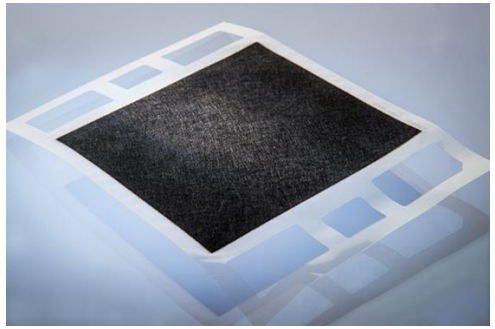
PHEV
Emission control catalysts
Li-ion battery materials



BEV
Li-ion battery materials

FCEV
Coated catalyst membranes
Membrane electrode assemblies
Li-ion battery materials

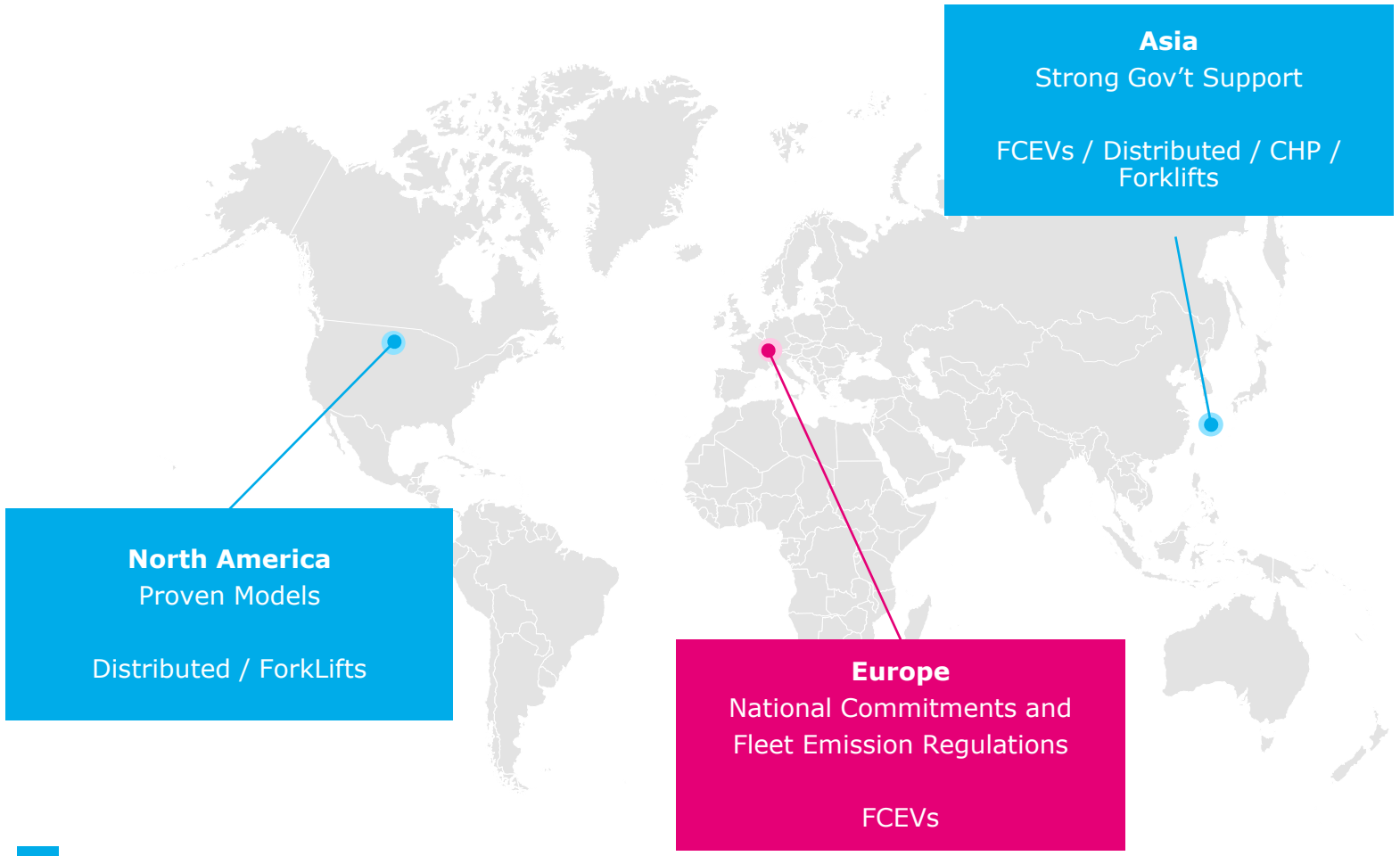
History with Fuel Cells components



- 1960s – Fuel cell catalysts for the Apollo space programme
- 1995 – Large PEM fuel cell R&D activity
- 2000 – JM Fuel Cells business established 2000
- 2002 – First ever dedicated MEA (Membrane Electrode Assembly) facility established in Swindon
- 2003 – First automotive PPAP successfully completed
- 2005 – Volume manufacturing processes introduced for Direct Methanol Fuel Cells (~1 million parts supplied)
- 2007 – Introduction of volume manufacturing for High Temperature electrode manufacture
- 2012 – Development and introduction of volume capable automated manufacturing processes for Hydrogen PEM technology

JM has a long history of working with and Fuel Cell components

Fuel Cells Today



Extensive supply network and development portfolio with Global Auto OEMs and Tier 1s

Range of components suitable for multiple applications

Active in support of UK and European development of FC and H_2 industry

Investing in technology and process development to meet growing demand

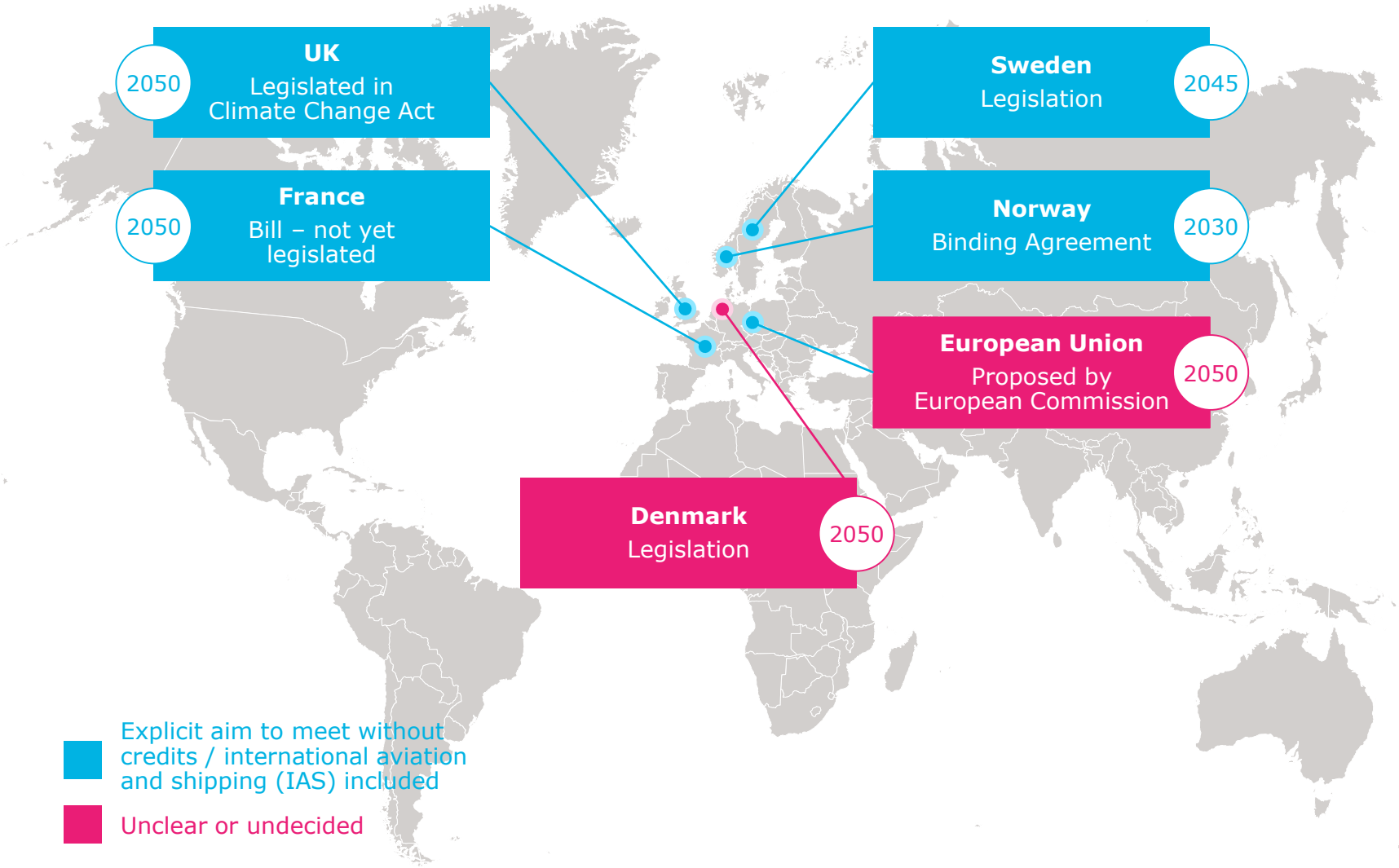
JM

ITM Power Hydrogen Refuelling Station at JM Swindon

- Extending the hydrogen network
- Supporting green technology and CO2 reduction.
- Supporting other local business to run FC vehicles on their fleets.
- A second station in Swindon would give the town real hydrogen vehicle capability.
- Direct access to the M4 (M4 - hydrogen highway).

JM

Fuel cells will play a key role in hitting emission targets



An increasing number of states, countries and regions are committing to **Net Zero CO_2 / GHG** emissions in the **2030** to **2050** timeframe

Source: Committee on Climate Change, Net Zero Report, May 2019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