



Fuel Cells

Automotive fuel cell system and hydrogen tank value chains

Helping build a strong fuel cell electric vehicle supply chain in the UK



An introduction to the automotive fuel cell system and hydrogen tank value chains

The value chains provide a guide to helping grow the industrialisation of fuel cell and hydrogen tank technologies in the UK. These have been developed by the Advanced Propulsion Centre UK, with expert support from industry.

The fuel cell value map covers all critical steps required to manufacture membrane electrode assemblies (MEA) and complete assembly of fuel cell systems. A separate on-board hydrogen tank value map provides the relevant carbon fibre production processes for tank manufacturing.

The value stream maps can be used in a variety of ways by industry, academia and government. A few suggestions are provided below:



Industry

- Identify strategic strengths within the UK for market growth opportunities
- Understand how each company's technology fits in and its contribution to the value chain
- Identify gaps within the local supply chain and opportunities for foreign direct investment



Academia

- Guide R&D into next-generation fuel cell technologies to build a strong UK supply chain
- Promote undergraduate and postgraduate uptake in chemical engineering to feed the growing demand in fuel cell and hydrogen technologies
- Develop up-skilling and re-skilling programmes to support UK industrial growth

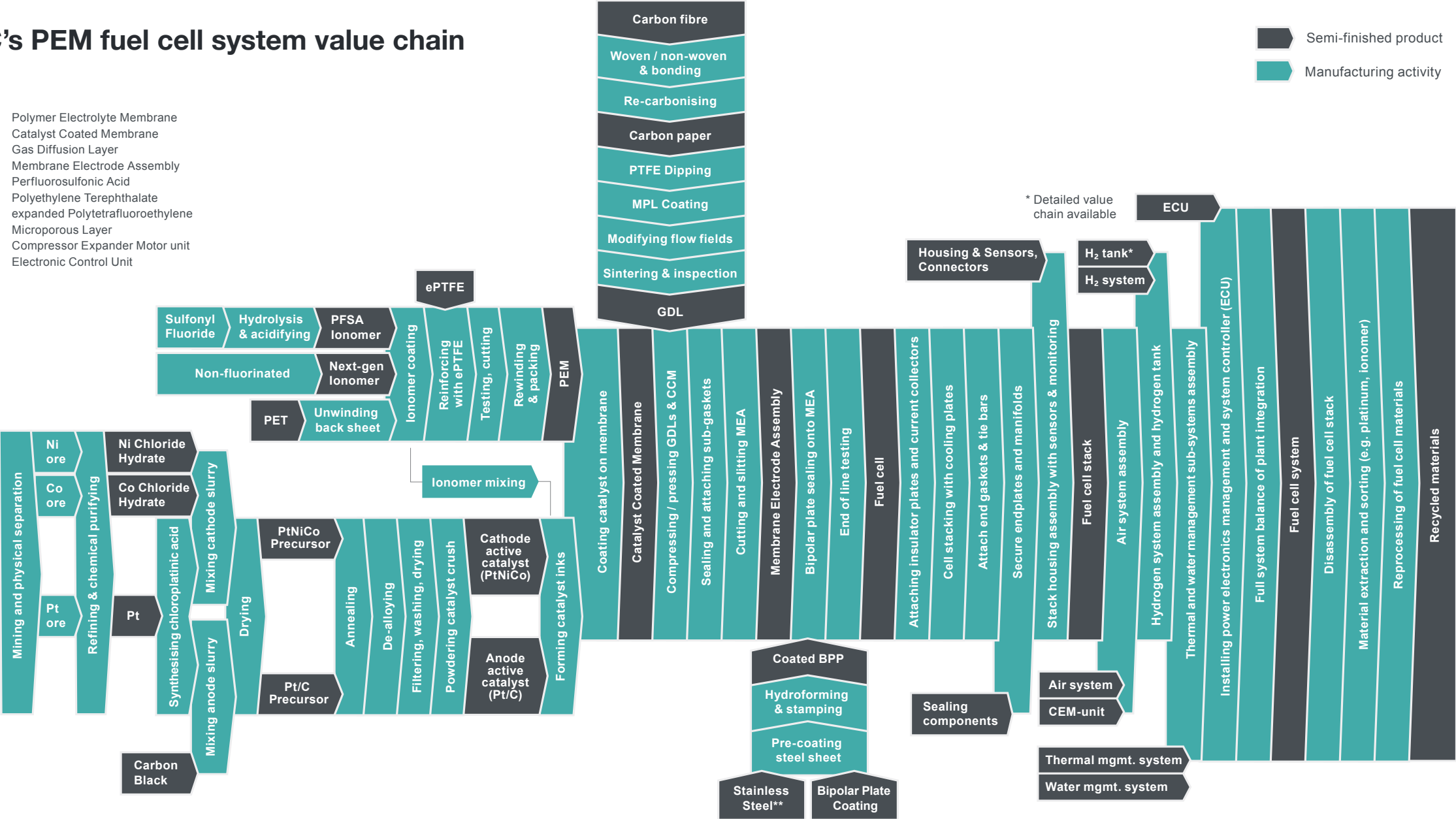


Government

- Understand where the UK's strengths and gaps exist for fuel cells and hydrogen tanks
- Guide policy, strategy and funding to accelerate scale-up in key parts of the UK supply chain
- Support foreign direct investment decisions that complement UK strengths

APC's PEM fuel cell system value chain

- PEM Polymer Electrolyte Membrane
- CCM Catalyst Coated Membrane
- GDL Gas Diffusion Layer
- MEA Membrane Electrode Assembly
- PFSA Perfluorosulfonic Acid
- PET Polyethylene Terephthalate
- ePTFE expanded Polytetrafluoroethylene
- MPL Microporous Layer
- CEM-unit Compressor Expander Motor unit
- ECU Electronic Control Unit



Source: Value chain developed by the APC Technology Trends Team (2021)

** Alternative substrate materials available

On-board high pressure hydrogen tank value chain

PAN Polyacrylonitrile
Al Aluminium
HDPE High-Density Polyethylene
H₂ Hydrogen

Semi-finished product
Manufacturing activity

