



Johnson Matthey Fuel Cells

the power within

Fuel Cell Market Development

**The Path to a Fuel Cell Economy in Pennsylvania
and the Mid-Atlantic Region**

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Johnson Matthey PLC

Corporate Dimensions:

- ▶ **4 divisions:**
 - ▶ **Catalyst & Chemicals, Ceramic Materials, Pharmaceuticals, Precious Metals**
- ▶ **\$8 billion annual sales**
- ▶ **8,000 employees**
- ▶ **34 countries**

Johnson Matthey Fuel Cells Ltd:

17.5% Anglo Platinum, 82.5% Johnson Matthey PLC

Johnson Matthey Fuel Cells Business

A leading developer and provider of fuel cell system components including:

- ▶ **Anode and Cathode Electrocatalysts**
- ▶ **Membrane Electrode Assemblies (MEAs)**
- ▶ **Fuel Processors**
- ▶ **Catalysts and Catalyzed Components**
- ▶ **Hydrogen Purification Membranes**

Johnson Matthey Fuel Cells Operations

- ▶ United States (50 employees):

West Chester, PA - Fuel processor development
and testing; Hydrogen purifier manufacturing;
Catalyst development

West Deptford, NJ - Electrocatalyst manufacturing
and testing

- ▶ United Kingdom (110 employees):

Sonning Common, England - MEA and Catalyst
development

Swindon, England - MEA and Catalyst
manufacturing

Fuel Cell Markets - Johnson Matthey Participation

▶ Mobile:

- ▶ Electrocatalysts
- ▶ MEAs for PEMFC stacks
- ▶ Gasoline reforming catalysts
- ▶ Exhaust clean up catalysts

▶ Stationary:

- ▶ MEAs for PEMFC stacks
- ▶ Natural gas and LPG reformers (10 and 75 kW)
- ▶ Reforming, WGS, and PrOx catalysts
- ▶ Hydrogen separation membranes

Fuel Cell Markets - Concerns

▶ Mobile:

- ▶ PEMFC stack performance, cost and durability
- ▶ Reforming on-board start up time
- ▶ Hydrogen infrastructure feasibility, cost, timing
- ▶ Long time horizon

▶ Stationary:

- ▶ FC system cost, performance and durability
- ▶ Lack of market drivers