

Smart Power via Fuel Cells: prospects in the UK

Tom Sperrey
Fuel Cell Systems Limited

Introduction & background



Context

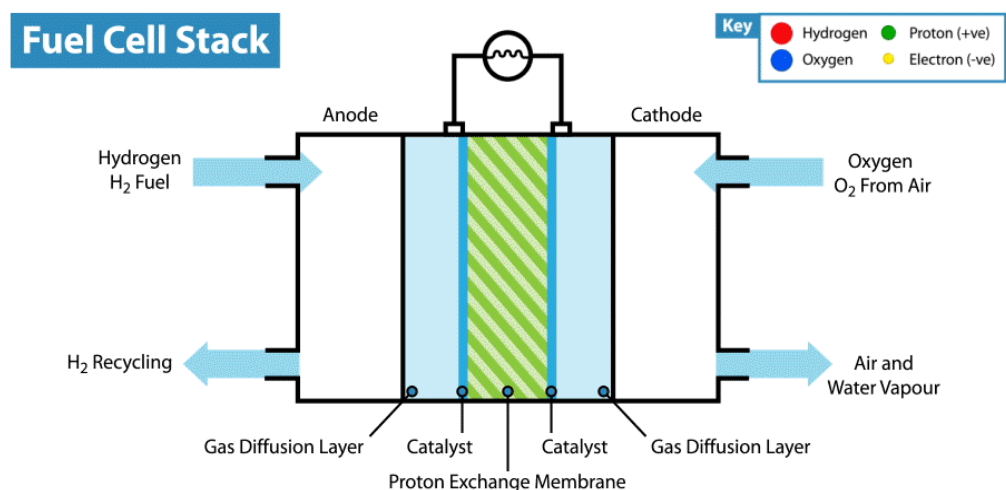
- Stationary fuel cells
- Potential for public sector involvement
- Supply chain opportunities

Why fuel cells?

- Clean (cleaner)
- More efficient
- Potential for CHP
- Low maintenance
- Low noise
- Potential for low TCO

Fuels

- $H_2 + O = \text{energy, heat and } H_2O$
- Oxygen from the atmosphere
- But Hydrogen?



© Intelligent Energy Limited

10kWh(e) output



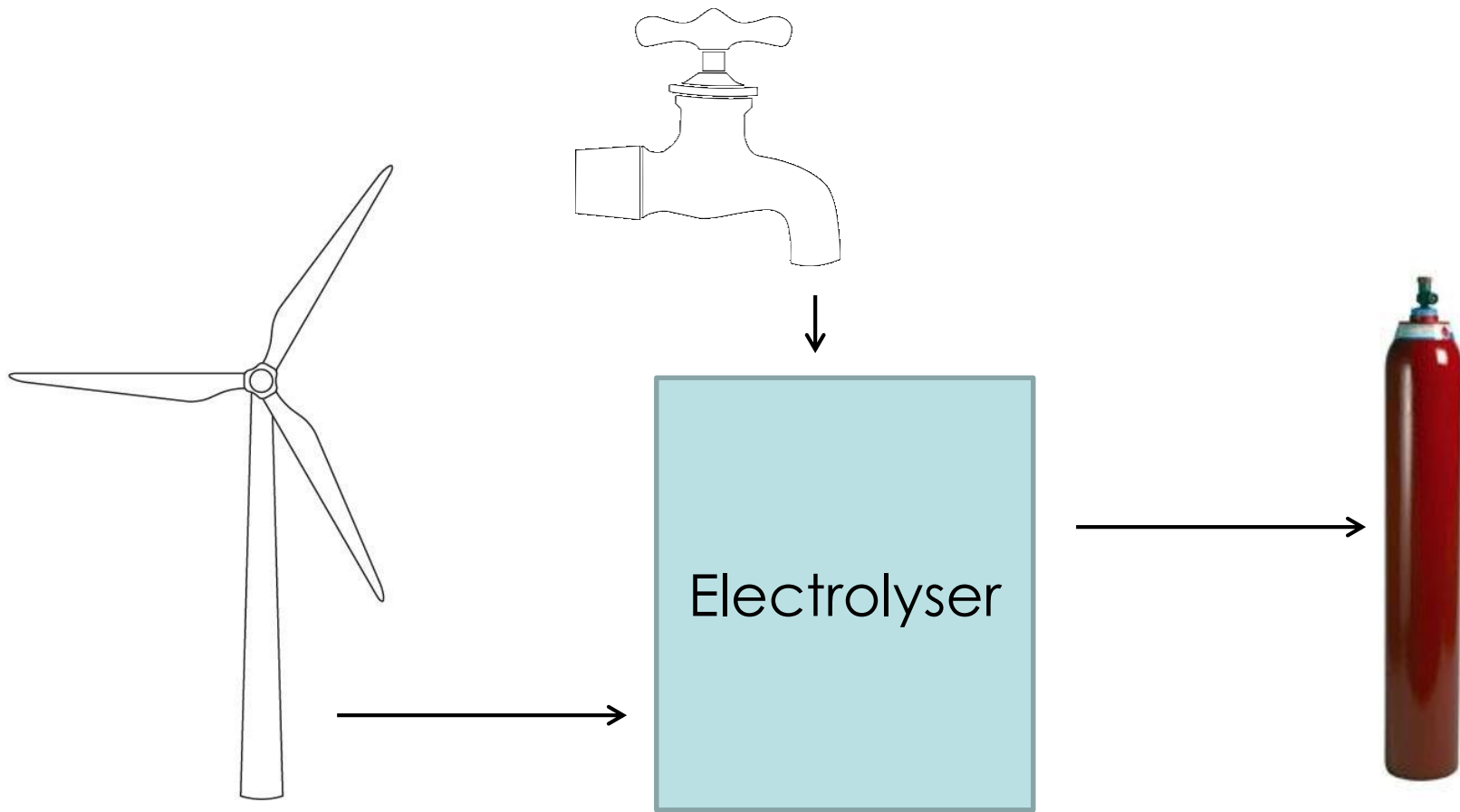
	H2	Propane	Methanol
Total Mass	75kg	8.8kg	8.6kg

Or Natural Gas

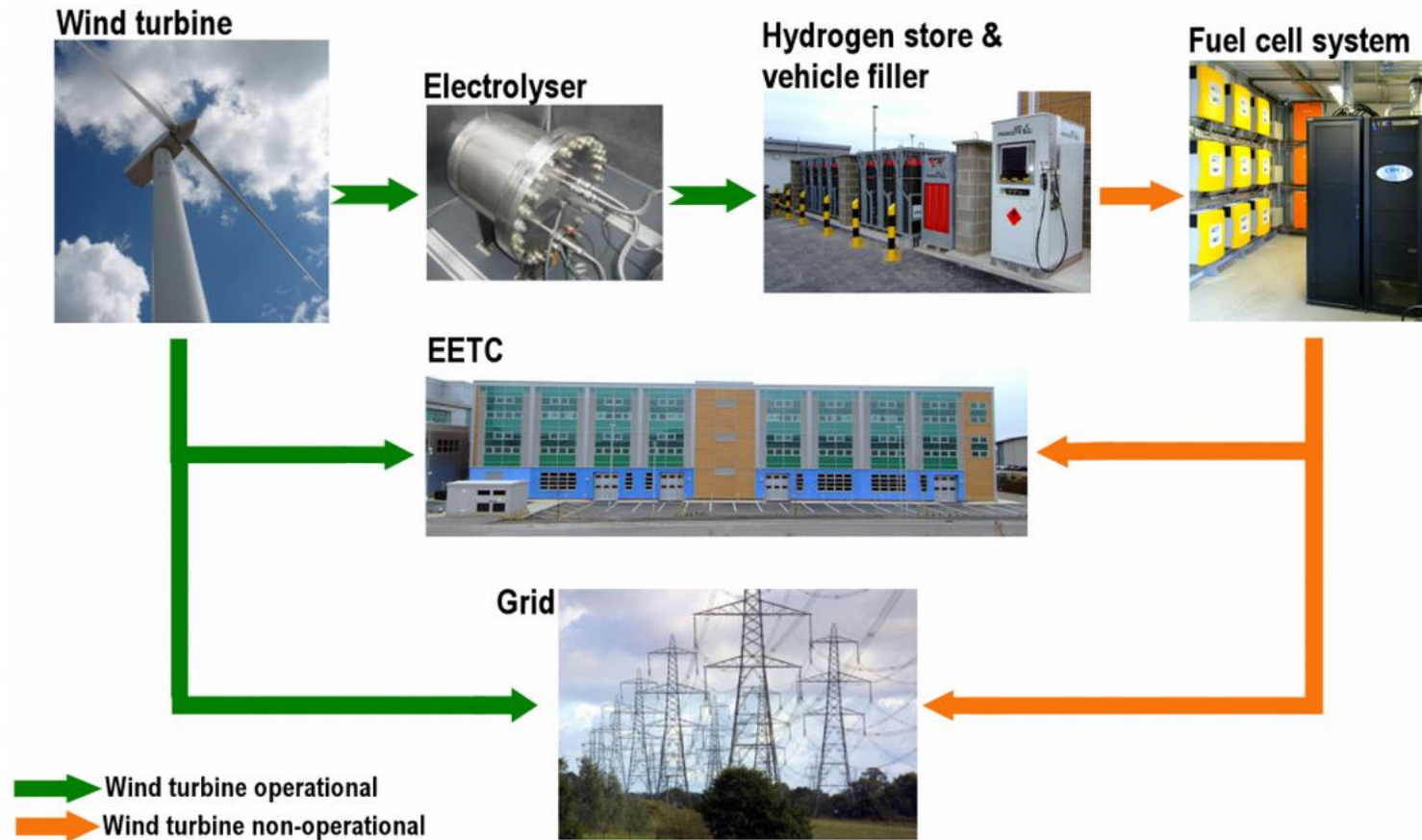


- The cleanest fossil fuel
- Storage and delivery network in place
- Options for 'greening'
- Output modulated easily
- The viable option for FCs over 1MW

Electrolysis

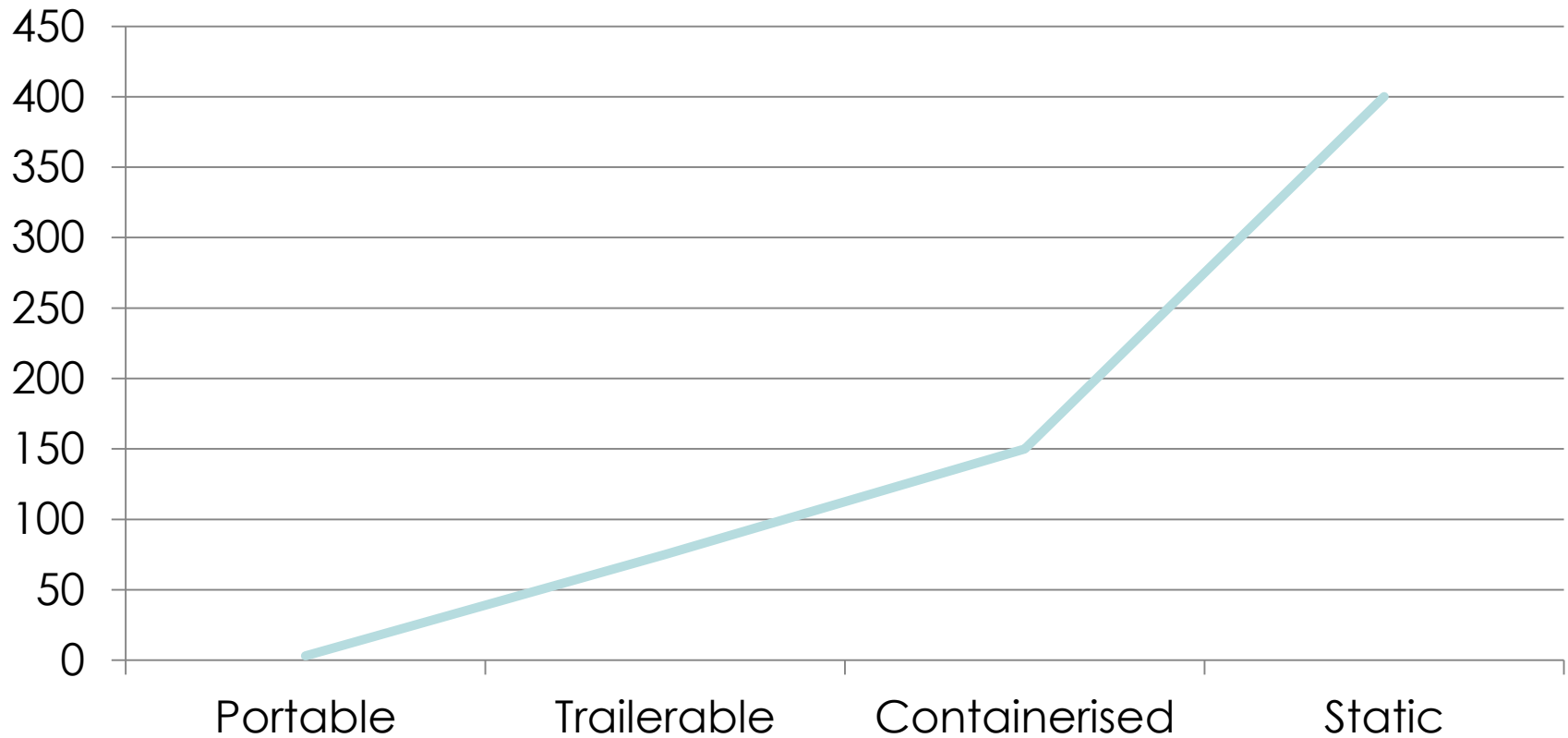


Hydrogen Mini-Grid System Advanced Manufacturing Park, Rotherham



Fuel cell disposition vs. power

kWe output



Portable



100W, 8.3A at 12V, 10kWh

Trailer

Alteryg, Inc.: 'Freedom Trailer'
5kW / 120 hours lighting trailer,
Hydrogen-fuelled



360MW, Pyeongtaek City, Korea



Fuel cell supply chain

Components and subcomponents

- | | |
|-----------------------|--------------------------------|
| • Fuel store | • Control systems |
| • Circulation | • ePower conversion/regulation |
| • Stack | • tPower conversion/transport |
| • Fuel processing | • Cabling |
| • Pipework & plumbing | • Building works |

Fuel cell supply chain

Fuel generation and supply

Renewables to gas:

- Increased wind and PV demand
- Tidal and Lagoon turbines
- Electrolysers
- Civil engineering

London



Public sector opportunities

- Leadership – showcasing FC use
- Potential for Decentralised Energy (DE) via *'Licence Lite'*
- Retaining value of power and environmental benefits that would otherwise be ceded to established suppliers through power purchase agreements
- Hedging exposure to rising /volatile energy supply costs
- Meeting Corporate Social Responsibility obligations.

e.g. London

- Ability to generate revenue:

“The ground-breaking move will permit (the Mayor) to offer the capital’s small electricity producers up to 30 per cent more for their excess energy than existing suppliers do, which he will then sell on to TfL, the Met and others at cost price.”*

*GLA, 25 April 2014

Summary

- Clean air
- Improved efficiency – local generation
- Scalable – domestic to industrial
- Manufacturing opportunities
- Local generation opportunities