

LONDON HYDROGEN PARTNERSHIP

Building the London Hydrogen Economy

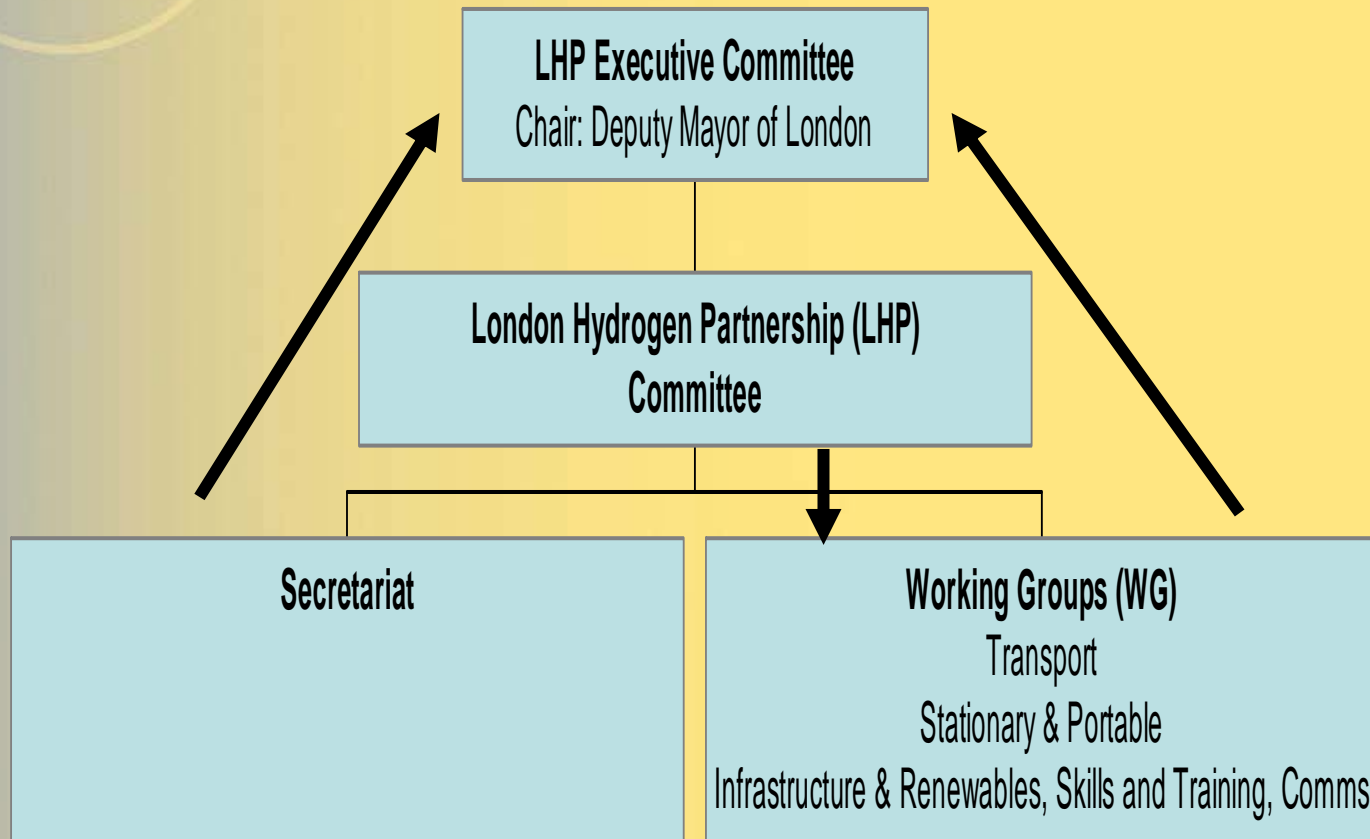
London Hydrogen Partnership

www.lhp.org.uk

Background

- To deliver a 'hydrogen economy'
- Benefits for air quality, CO₂, energy security, green economy, London brand
- Linked to and forms part of the process of implementing the Mayor's Energy Strategy, London Plan, Air Quality, Transport, Economic Development, Municipal Waste and Ambient Noise Strategies in particular.

Partnership Structure





“Hydrogen is the fuel of the future. I am proud to Chair the London Hydrogen Partnership which has an impressive membership. We are all working together to make sure hydrogen has a big part of London’s future in helping London reduce its impact on Climate Change.”

**Nicky Gavron – Deputy Mayor of London,
Chair of the London Hydrogen Partnership**

Executive Committee - Members



Johnson Matthey



Department for Business
Enterprise & Regulatory Reform



Rolls-Royce



MAYOR OF LONDON

Institution of Mechanical Engineers

A multi-sector facilitator

- Operates by:
 - Establishing joint aims and working together to establish a 'route map' to a hydrogen economy for London
 - Delivering advocacy and communications projects to remove barriers e.g. in regulation and public acceptance
 - Delivering research and feasibility to underpin commercialisation
 - Facilitating delivery of hardware projects, especially for demonstration

Planning Applications

The Policy Framework

Planning applications in London are assessed by local planning authorities, and strategic applications are referred to the Mayor of London. They are considered against Local Development Framework policies and London Plan policies.

London Plan Policy 4A.7 requires 'the inclusion of energy efficient and renewable energy technology and design, natural ventilation, borehole cooling, combined heat and power, community heating, photovoltaics, solar water heating, wind, **fuel cells**, biomass fuelled electricity and heat generating plant in new developments wherever feasible'.

Supplementary Planning Guidance to the London Plan on sustainable design and construction (in consultation) includes the preferred standard: 'Major developments should make a contribution to London's hydrogen economy through the adoption of hydrogen and/or fuel cell technologies.'

Green light to clean power, the Mayor's Energy Strategy, provides context and further detail for these policies.

Benefits

Performance Smaller units achieve 30 to 40 per cent electrical efficiency (compared with 8 to 9 per cent for a stirling engine), and over 80 per cent total efficiency. Some of the larger systems can be configured for over 70 per cent electrical efficiency.

Environment High efficiencies lead to significant reductions in carbon dioxide emissions compared to conventional systems. Because no combustion takes place, fuel cells fed with natural gas are also very quiet and deliver negligible amounts of NO_x and SO_x. A pure hydrogen feedstock delivers no harmful emissions locally.

Security Fuel cell CHP can deliver uninterrupted power, of particular value for banking, data processing and medical installations.

Current and Planned Fuel Cells



Woking's Pool in the Park fuel cell CHP

A 200kW_e United Technologies fuel cell was installed in 2001 by Thameswey Energy Ltd for Woking Borough Council next to the leisure centre in Woking Park. Cost was not prohibitive as both equipment and financing were delivered as part of an integrated energy system with energy efficiency, photovoltaics and conventional CHP.



5kW Fuel cell backup power system operating at **Investec HQ London – case study found at**

<http://www.idatech.com/Media-Center-Investec.asp>

American Embassy in London - 5kW Plug Power fuel cell demonstration project for 12months as a trial.

City Hall



Recent LHP Project



- London's first theatre production powered entirely by a hydrogen fuel cell opened on the 13 Feb 08.
- LHP provided the fuel cell
- Mayor of London Ken Livingstone said: *'The Arcola Theatre is a good example of why London's cultural sector is so dynamic and successful. Arcola is leading the theatre industry in developing the world's first sustainable production and I know that many other theatres are now keen to follow.'*



News

HEADLINES: 'Affairs link' to police boss death..... Strong winds bring chaos to roads..... MoD reveals loss o

Hydrogen cell helps theatre clean up its act

Mark Prigg, Science Correspondent
13.02.08

London's first theatre production powered entirely by a hydrogen fuel cell opens tonight.

The Arcola Theatre in Dalston will get all the electricity for *The Living Unknown Soldier* from a fuel cell installed in its foyer.

It converts hydrogen to energy and is cleaner than conventional electricity sources such as coal or nuclear



Transport Projects



- CUTE Project – 3 buses, project end Jan 2007
- Demonstrated that hydrogen buses can achieve the required level of performance for urban public transit, reliably and safely
- TfL concluded that hydrogen buses could offer a long term route to zero carbon public transport.
- Next step - demonstrate the **operational viability** of hydrogen buses.

The London Hydrogen Transport Plan (LHTP)



- LHP Transport Action Plan, August 2005
- The London Hydrogen Transport Plan aims to introduce up to 70 hydrogen fuelled vehicles in London by 2012.

Aim to deliver:

- 10 hydrogen fuelled buses
- Up to 60 'light vehicles' – motorbikes, cars and vans
- Appropriate refuelling infrastructure for the vehicles

London Hydrogen Buses



- Announcement by Mayor of London on 13th Nov 07 that 10 new hydrogen powered buses will join London's bus fleet by 2010
- Transport for London has signed a contract with ISE - an American company to supply 5 hydrogen fuel cell buses and 5 HICE buses.
- First Group will operate the buses on 1 central London route
- Tender evaluation for the refuelling infrastructure is now nearing completion.
- A suitable site for the refuelling infrastructure is under negotiation

Cars and Vans for central London

The vehicles will be procured in two phases.

Phase 1 will involve the deployment of **20 vehicles**

Phase 2 will involve deployment of up to **40 more vehicles**

The project will demonstrate a wide range of vehicle types and hydrogen vehicle technologies – Fuel Cell and H2ICE. In the following categories:

- Bikes and scooters
- Small cars
- Passenger cars
- Vans



*2 small refuellers
will be built in
central London*

The vehicles will be procured by TfL and operated within TfL's fleets and in the fleets of London's Functional Bodies – the Metropolitan Police and London Fire Brigade.

Infrastructure & Renewable



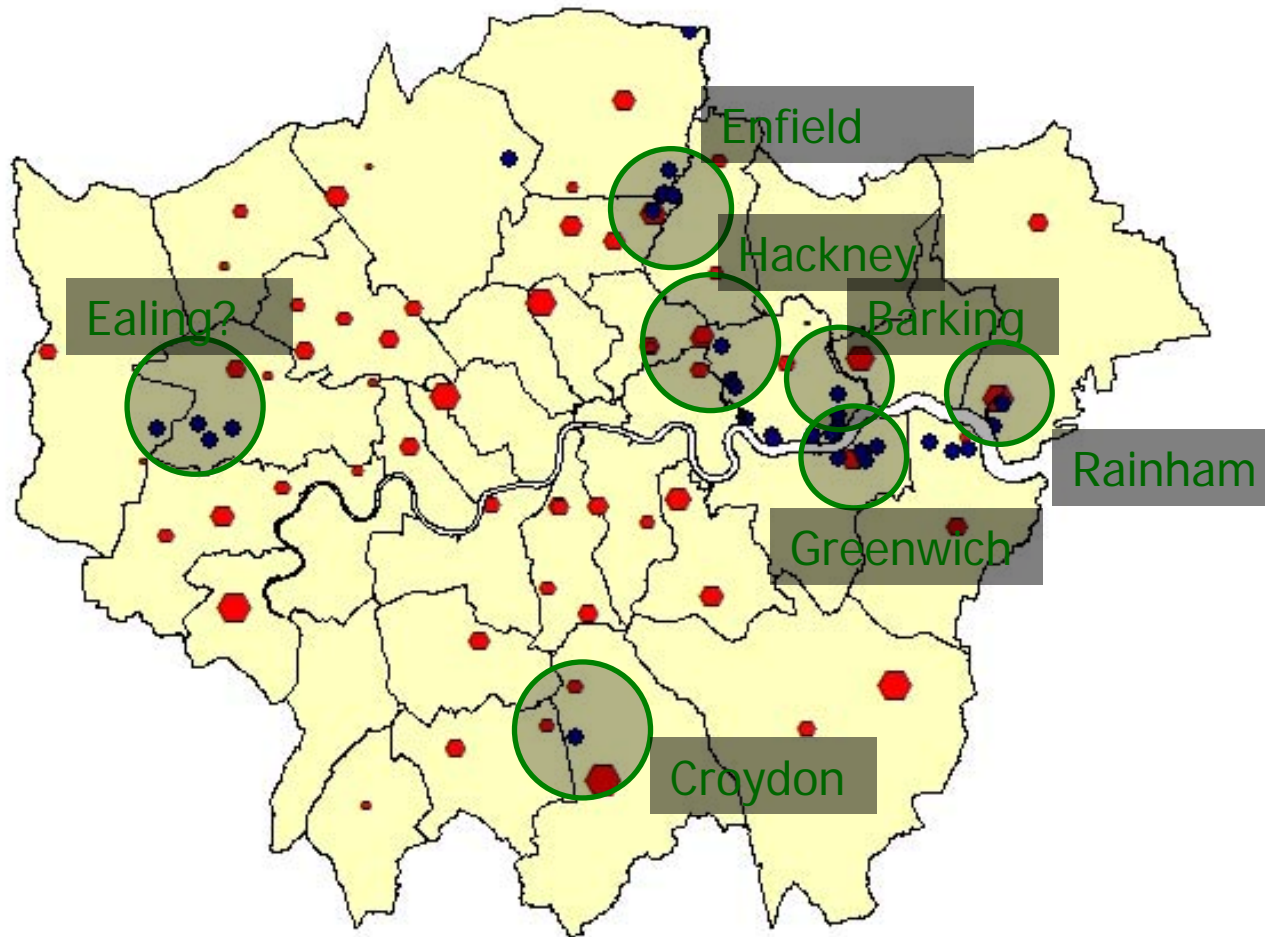
Goals

- The establishment of fuel cells using hydrogen generated from renewable energy
- Guide the strategic development of infrastructure for hydrogen and fuel cells in London
- LHP recognises the role of other technologies in the transition to a hydrogen economy

Outputs include publication of:

- *The Potential for Hydrogen Production from Waste in London*
Conclusions - Gasification and anaerobic digestion offer considerable potential for non-fossil H₂ production up to 141 tonnes of h₂ per day in 2020, **more than sufficient to fuel the entire London bus fleet.**
- *Strategic Hydrogen Infrastructure Options for London to 2015*

Gasification – Potential sites



Communications & Awareness Raising

- The LHP's 5kW Fuel Cell trailer will be providing Clean Energy at the 15 London Events in 2008.
- These include a variety of London Borough Green Fairs and Mayor of London events such as The Russian Winter festival.



London Schools Hydrogen Challenge

www.LSHC.co.uk

Aimed at 11-14 year olds, the Challenge consists of 3 stages;

- **Stage 1:** Curriculum linked online teaching resource available (Launched 19 Sept 07)
- **Stage 2:** Online Challenge available for registered schools (Went live - Jan 2008)
- **Stage 3:** Grand Finals at City Hall (June 2008)
- **109 London Schools are participating**



About the challenge



Teacher information



Begin lessons



Challenge quiz



Grand Final

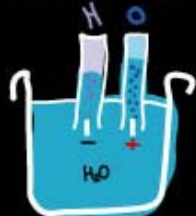


Register now

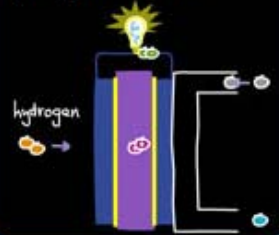
Welcome to the London Schools Hydrogen Challenge!

This section contains everything you need to know about hydrogen: where it comes from, how it can be used to make electricity and power vehicles and how it can help create a zero-emission city for the future.

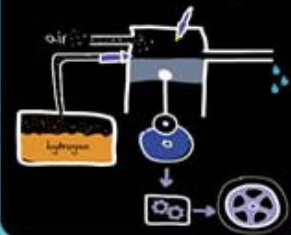
Lesson 1:
How we get hydrogen



Lesson 2:
Hydrogen fuel cells



Lesson 3:
Combustion of hydrogen



Choose a lesson from the menu bar below to start learning about hydrogen.

[Lesson 1](#) | [Lesson 2](#) | [Lesson 3](#) | [Information sheets](#)



January 2008



All Products are available for schools - [Visit Shop](#)

Accessibility

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