

Hydrogen Transport in European Cities

HyTEC

Contract number: 278727

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HyTEC PROJECT OVERVIEW

- Call topic : SP1-JTI-FCH.2010.1.1
- Application Area: LARGE-SCALE DEMONSTRATION OF ROAD VEHICLES AND REFUELLING INFRASTRUCTURE III
- Dates: 1st Sept 2011 - 31st August 2015 (48 months), project has completed
- Project budget: €29.1m, FCH JU funding €11.95m, EC contribution of 41.1%
- Aim: Delivery of H₂ transport centres into London, Copenhagen & Oslo
- Project Achievements:
 - Fleets of hydrogen fuel cell passenger cars in operation in three European Cities
 - London's first fleet of hydrogen fuel cell taxis deployed
 - UK first public fuelling station at Heathrow airport
 - A network of hydrogen fuelling stations in Copenhagen



CITY OF COPENHAGEN



HYUNDAI (NEW THINKING. NEW POSSIBILITIES.)

GREATER LONDON AUTHORITY



Intelligent Energy



HyER

elementenergy



Fraunhofer



Hydrogen Link



London Buses



hy SOLUTIONS
Driving innovation for tomorrow

MAT GAS



ludwig bolkow
systemtechnik



cenex

AIR PRODUCTS

Heathrow
Making every journey better

PROJECT TARGETS & ACHIEVEMENTS:MAIP

Programme objective/ target	Project objective/ target	Final Achievement	Details
Light Duty Vehicle deployment	20	30	<ul style="list-style-type: none"> • 5 fc hybrid taxis in London • 2 fc passenger cars in London • 15 fc passenger cars in Copenhagen • 8 fc passenger cars in Oslo
Additional sites & stations	2 additional sites 3 new HRS	2 additional sites 4 new HRS	<ul style="list-style-type: none"> • UK's 1st public HRS • UK vehicles used a 2nd HRS in London • 3 new HRS in the Copenhagen area • In Oslo, vehicles used existing HRS, increasing their utilisation
Establish a commercial EU H ₂ refuelling infrastructure	Roadmap to establish a commercial EU H ₂ refuelling infrastructure	Rollout strategies / partnerships in UK & Denmark	<ul style="list-style-type: none"> • Rollout strategy reports for Copenhagen and London • 'Statement of collaboration' signed by HyTEC regional/city partners at final project event

PROJECT TARGETS AND ACHIEVEMENTS:AIP

Programme objective/ target	Project objective/ target	Final Achievement	Details
Vehicle Reliability	Mean Time Between Failure (MTBF) >1,000 km	Vehicle reliability MTBF >1,000 km	<ul style="list-style-type: none"> Achieved
Vehicle availability	>95%	>95%	<ul style="list-style-type: none"> Achieved 95% - 99% (average - depending on vehicle type and location)
Refuelling Capacity	Stations refuelling at 35 & 70 MPa, with capacity of 50kg & potential for extension to 200kg	35 and 70 MPa, with potential for extension to 200kg	<ul style="list-style-type: none"> London HRS 35 & 70 MPa - capacity of 50kg with potential to extend up to 200 kg Copenhagen 3 x HRS - 70 Mpa each able to dispense up to 200kg
Station availability	>98%	>98%	<ul style="list-style-type: none"> 95% - 99% (average - depending on vehicle type and location)

PROJECT TARGETS AND ACHIEVEMENTS

- London: Project achievements
 - Deployment of 5 fuel cell hybrid taxis into London in July 2012
 - Operation of the taxis, to support activity in the Olympic Games and to achieve performance targets.
 - Deployment of the UK's first publically accessible HRS in July 2012
 - Delivery of 2 Hyundai ix35 FCEVs in 2014, used by staff of TfL
- Copenhagen: Project achievements
 - Deployment of 15 FCEVs in September 2012
 - Deployment of 3 HRS in the Copenhagen area
 - An H₂ infrastructure expansion analysis, used in the national hydrogen transport plan for Denmark
- Oslo: Project achievements
 - Delivery of a fleet of 8 fuel cell cars in Oslo in September 2014
- Legacy:
 - Hyundai ix35 FCEVs continue to operate in the partner cities
 - The HRS in London and Copenhagen operate as part of the HyFIVE project
 - The partner cities / regions signed a statement to encourage future collaboration in the area of hydrogen transport



RISKS AND MITIGATION

- HyTEC achieved the majority of its targets
- The project encountered some difficulties when one partner (LTI) went into administration and had to leave the project
- The targets for the fuel cell taxi operation were reconfigured and these targets were achieved
- Budget was reallocated to allow for fuel cell passenger car deployment in London and Oslo
- The London HRS achieved 95% availability (against a target of 98%). It is expected that the 98% will be achieved as the HRS continues operation as part of HyFIVE

SYNERGIES WITH OTHER PROJECTS AND INITIATIVES

- The HyTEC deliverables in London and Copenhagen were complemented with additional project funding:
 - Innovate UK (LHNE): second HRS in London and 4 FCEVs
 - NextMove (INTERREG): funding for 6 of the 15 passenger cars deployed in Copenhagen
 - In the UK, the two HRS received funding from the UK government (OLEV). Funding supporting upgrades to the HRS to enhance the end user experience
- HyTEC created the basis for HyFIVE
 - HyFIVE is increasing the level of infrastructure and vehicle deployment and includes London and Copenhagen as two of the project clusters
- The infrastructure expansion analysis for Denmark and London that have been carried out in HyTEC supports national and city level deployment plans for hydrogen transport
- At the final HyTEC dissemination event, a statement of collaboration was signed by senior representatives of the region of Arkershus, Copenhagen, Hamburg and London. This stated their desire to work together to further the deployment of hydrogen transport

HORIZONTAL ACTIVITIES

- As part of the vehicle and infrastructure deployment, a programme of work related to safety and certification activities was completed
- Environmental assessment reports were completed on the vehicles and fuelling stations operating in the project
- Training was carried out so that end users could use the vehicles and fuelling stations unaided
- Expert symposia took place in Hamburg in April 2013 and Copenhagen in June 2014
 - These events brought together international experts from the public and private sectors to discuss the role of cities and regions in supporting the rollout of hydrogen transport
 - They provided a forum for sharing lessons learnt and international best practice
 - A resulting ‘Best Practice Guide’ was created, with the aim of sharing with cities and regions across Europe that have an interest in becoming early adopter areas for hydrogen transport

DISSEMINATION ACTIVITIES

- A project website was created (hy-tec.eu) with regular updates provided. The website will continue to be live until August 31st 2016, giving access to all final public reports
- A series of 5 project newsletters provided regular updates on the project to over 7,000 contacts across Europe
- Over 30 separate dissemination events took place each in London and in Copenhagen - these include events at the HRS and presentations at technical conferences
- The taxis brought a high level of public profile to through activity at the London Olympic Games

EXPLOITATION PLAN/EXPECTED IMPACT

- HyTEC has been a flagship project for European H₂ transport in Europe
- The project has supported deployment of the first commercially leased fuel cell passenger cars into Europe and the first publically accessible fuelling station networks into two European capital cities
- The operation of the fuel cell taxis has provided high public profile to fuel cell technology (thorough operation at the London Olympic Games)
- Through the extended testing of the taxis, important data on 'real life' fuel cell performance has been realised
- Valuable 'real life' user experience and data has been collected through the operation of the public network of HRS
- The results will be exploited and built upon through the HyFIVE project
- The HyTEC project has proved that hydrogen vehicles can be put into the hand of 'real' end users and their feedback will provide an important platform for further deployment