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Public Perceptions of and Demand for Hydrogen Energy in Transport

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An ongoing independent study for DfT Horizons:
preliminary findings



THE PROBLEM



- Global Climate Change may be imminent: the ‘tipping point’ for irreversible change may, as IPCC 2007 argues, be nearer than thought earlier; and the UK sets a target of 60% CO₂ reduction by 2050, which might be too little too late, yet is probably un-achievable ‘politically’.
- Use of fossil fuels in transport accounts for some 25% of CO₂ emissions. It cannot be the only target for reductions, but must be one of them, because it is growing rapidly.
- Can ordinary members of the public be expected to act in the public good? If not, how can they be persuaded?



OBJECTIVES



- The aim of the DfT Horizons Project is to engage members of the general public in deliberation about possible futures involving **hydrogen** as a major source of fuel in UK transport
- This includes opinions and perceptions relating to the entire infrastructure of production, storage and distribution that would support use of hydrogen in vehicles, not just the gas in the engine
- We have adapted scenarios first developed by stakeholders with PSI, to focus on likely change and continuity in practices and settings familiar to consumers and citizens, should hydrogen energy be introduced
- Finally, we have looked for ways of engaging the public in deliberation about the future that are economical in resource and in participants' time, so that – in principle – consultation could be more widespread



METHODS



- *Developing audio-visual materials* for use in focus groups. Represent the science and technology in ways accessible to the general public. The outcome: a 15 minute documentary film; a demonstration?
- *Purposively sampling three areas* of contrasting transport characteristics. Each is a travel to work (TTW) area centred upon a regional city: Norwich, Sheffield and Southampton. These complement each other: Southampton a multi-transport hub, Sheffield a conurbation with a history of public transport policy, and Norwich a semi-rural area very dependent on the private car.
- *Polling (by phone) some 1000 members of the general population.* The sample was drawn from phone books within the three sites. The poll questions were written by the research team, drawing where possible upon previous surveys, for the purposes of standardisation and comparison.



METHODS (contd)



- *Composing focus groups.* There were 12 in all, four per area: Norwich, Sheffield and Southampton. The poll was guide to how to represent a range of characteristics among members and also for permission from individuals to be approached to join a group. The four groups in each area were differentiated as follows: higher and lower income occupational status; younger and older age. Each group was a blend genders, differing types of transport use, and opinion on the issues of transport and environment
- *Conducting the focus groups.* Each focus group met once for around 90 minutes. The research team wrote the script. The script and the film were keyed together. All the groups were moderated by the same experienced facilitator, employed by the market research firm. A different member of the research team took part in the focus groups in each area, primed with FAQs as well his own expertise, *only* to answer queries. The groups were digitally recorded and transcribed.



THE POLL (1)



- Women are significantly more likely to be worried about climate change than men
- Younger people of higher status without children, are more likely to be prepared to change their behaviour
- Using a car is associated with being male, younger, of higher class and having children; whereas using a bus is exactly the opposite.
- Driving is the only factor associated with location: Norwich with its big hinterland significantly more so than the more urban Sheffield.
- Cycles are for those younger and/or male; motorcycles for males.



THE POLL (2)



- ❑ Higher social grade people are more likely to support charging to drive in city centres; younger people more likely to support lanes for cars with 2+ occupants; younger people and higher social grade more likely to support increasing VED/fuel duty; women more likely to support charging for driving on motorways.
- ❑ Males on the other hand favour building motorways
- ❑ Knowledge of hydrogen is more likely among males, the younger, people in full time work and of higher social grade; except in one respect, it was males, older, retired and of higher social grades who were more likely to know hydrogen had once been used in airships.
- ❑ People who do *not use cars regularly* are more likely to support 'green' transport options.



FOCUS GROUPS



There are three broad themes:

2. Personal mobility and the environment
3. Hydrogen as a fuel for transport (including infrastructure for production, storage and distribution)
4. Communication, trust and public participation



TRANSPORT/ ENVIRONMENT



- Climate change seldom mentioned among problems with current transport system.
- Travel behaviours are shaped by people's personal lives - their networks of family and friends, and their jobs; most car use in Norfolk, which is quite environmentally conscious!
- Changes in behaviour need incentives to be sustained. Affect towards children and grandchildren occasionally a driver. They say few would voluntarily sacrifice their convenience.
- Government leadership often demanded, but with pessimism. Science will eventually provide solutions and people will take them up if they are available, yet have a feeling of powerlessness where political and commercial interests revolve around polluting technology.



HYDROGEN



Producing hydrogen.

- Significant opposition to using nuclear power and fossil fuels in the long term.
- Positive towards wind power as a way of producing hydrogen, but concerns with noise and aesthetics.
- Not many knew what biomass was and how it could be used to produce hydrogen. After explanation, reactions differed according to the type of biomass: waste, such as sewage, was favoured over committing land to crops

Distributing hydrogen.

- People interested in understanding the most cost-effective option and what safety issues it would bring: a combination of centralised and decentralised production to optimise distribution.



HYDROGEN



End-use in transport

- Participants welcomed the absence of carbon emissions and polluting fumes, and quiet engines.
- Longer filling-up time, larger tank and shorter range were discussed with reference to conventional fuels. General agreement: not major inconveniences and technologies would be improved.
- Needed to know how hydrogen would be handled and what changes in their behaviour would be required to deal with the different 'risk profile' of hydrogen.



CONSULTATION



- People were reluctant to express conclusive opinions on hydrogen, and felt they needed more information they could trust.
- Showing the film helped people to get a broader picture of the challenges and most people found it useful and “educational”.
- It was acknowledged that focus groups could be useful to elicit the diversity of public views, but people were sceptical about how far public opinions would be fed into decision-making.
- There was also recognition that multiple values can shape decisions: for instance: costs as well as environmental impacts, and that it is crucial who makes decisions.



LESSONS FOR ENGAGING PUBLIC



Members of the public have different roles: we need to consider the relevance of hydrogen to : a) potential consumers, b) residents, c) citizens, d) kin-keepers (for future generations).

- *For consumers*, implies not (so much) as for stakeholders: Is it efficient? Can it be produced competitively? Can it be marketed profitably? Rather: Is it likely to be expensive? Are there going to be enough outlets? is it risky to have on board, in my garage or house? Type of transport used conditions responses.
- *For residents*, is it safe in the neighbourhood, is it secure from crime & terrorism, where is it going to be put?
- *For citizens*, what contribution has it to reducing threat of global warming and/or fuel running out? What impact has new energy/transport policy on taxation?
- *For kin-keepers*: can we carry on much as now or are major changes required, and do these sacrifice what we have and want OR do they get rid of what we do not like and put better things in its place?

There is not *one* public but several, differentiated by ethnicity (culture); social class; age/generation; gender. We have to think about all these in sampling and in composing focus groups/citizens' juries.



CONCLUSION



- Use of transport is embedded in way of life – circumstances make it resistant to change
- More now accept the argument for reducing CO2 emissions; but few think that their own contribution can make a difference; they hold government, business and even other end-consumers primarily responsible
- Hydrogen energy seems to participants to have a part in the energy future, but only as part of a sustainable whole system, not as ‘the’ technical fix
- Citizens look to government and business to take the lead, but do not trust them to do so and are guarded about the costs of change



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