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Public Perceptions of Hydrogen – how important is risk?

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Objectives of presentation

- To examine:
 - How hydrogen risks are currently perceived (Hindenburg/H bomb, etc.)
 - Do people seem troubled about hydrogen?
- To discuss results from 3 studies in urban areas, about:
 - Public attitudes towards H₂ vehicles (esp. buses)
 - Public attitudes towards H₂ refuelling facilities
 - Attitude change over time

Three public acceptability studies

1. EC-funded ACCEPTH2 cross-continental study of public attitudes & preferences for H2 buses (<http://www.accepth2.com/>)
2. “Public Acceptability of H2 Infrastructure in London” (EPSRC-funded: *The Development of a H2 Energy Infrastructure in London*)
3. BP/Imperial College London study: “*Public Acceptance of and Demand for Information about H2 Refuelling Stations in 3 London Boroughs*”

Data collection

ACCEPTH2:

- mostly 'phone interviews with bus users in Berlin, Luxembourg, Perth (WA), London & Oakland (CA.);
- before & after H2 bus experiments (sample sizes approx. 300-415 per city).

EPSRC H2 Infrastructure study:

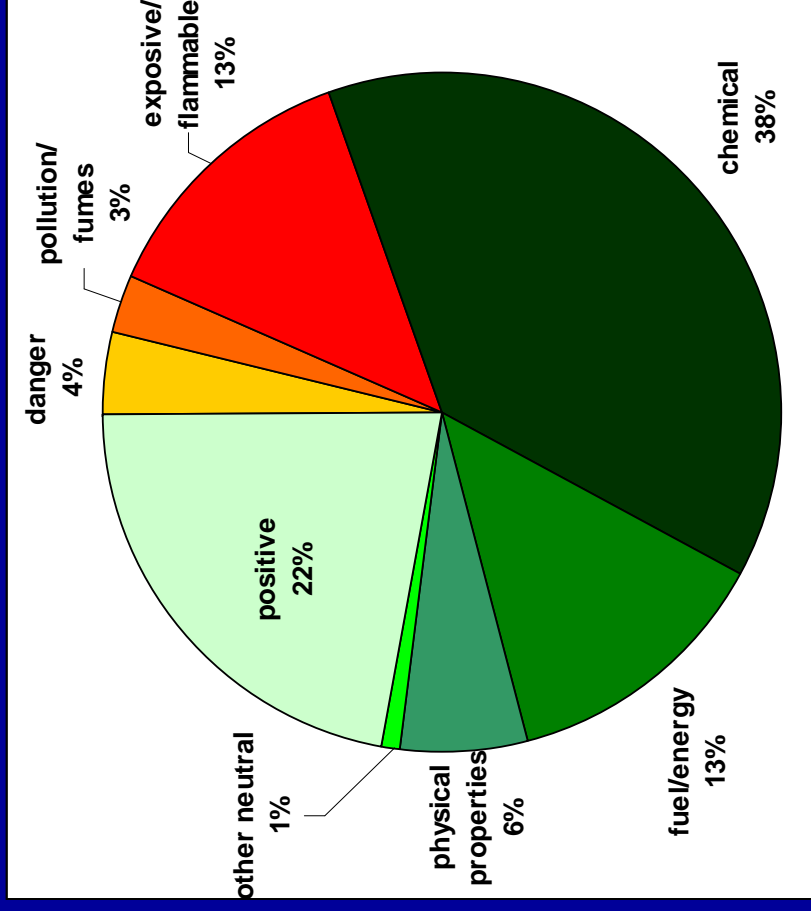
- questionnaires distributed in 2003 to households near existing refuelling stations in Greater London (sample=346)

BP/IC longitudinal infrastructure study:

- in 3 London boroughs (Bromley, Havering and Redbridge)
- 'phone surveys (n=600) every 6 months over 3 years, from 2004 (sample: 3600)

Perceptions of hydrogen in London*

“What are the first words that come to mind when you hear the word ‘hydrogen’?” (Asked in all studies)



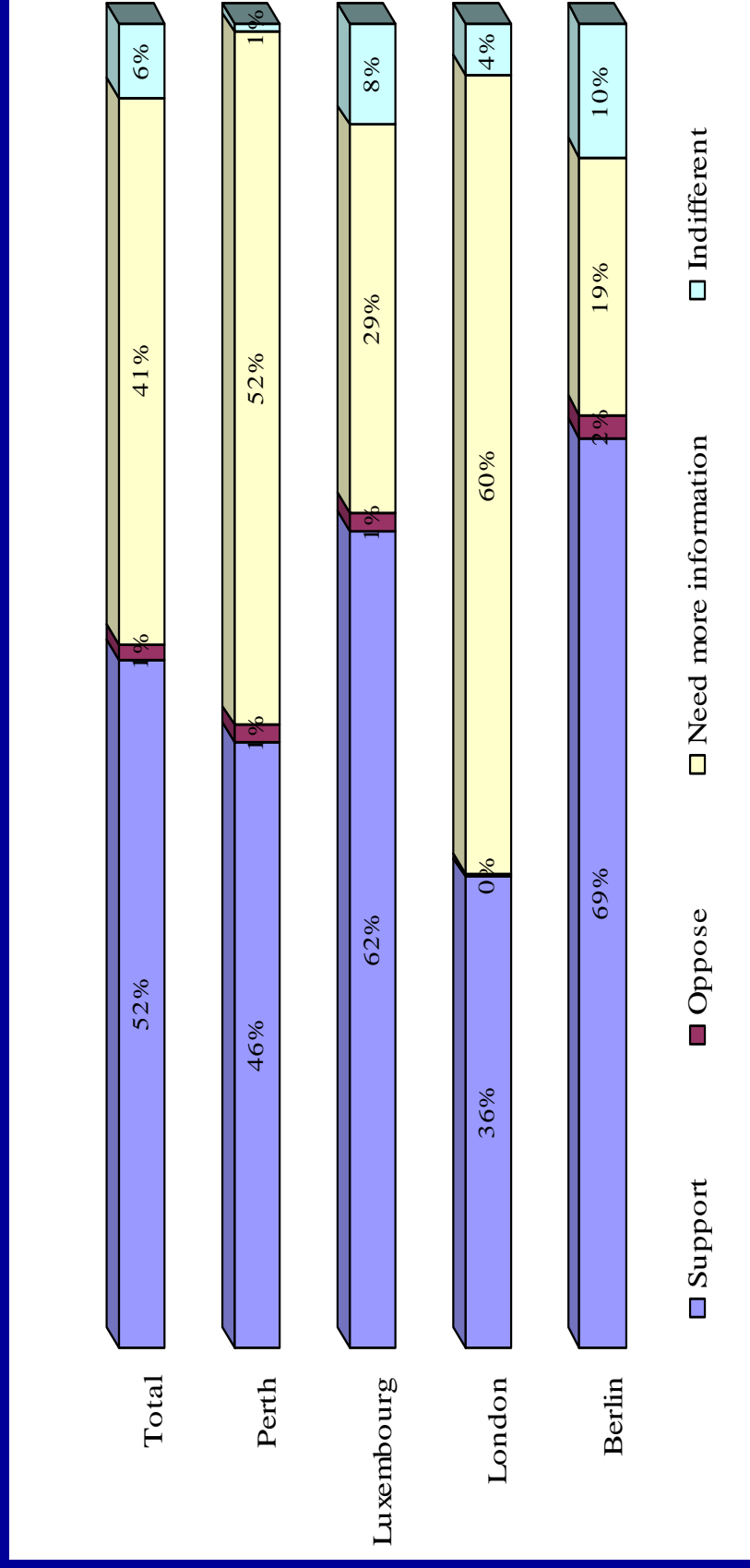
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Public attitudes to Hydrogen Transport

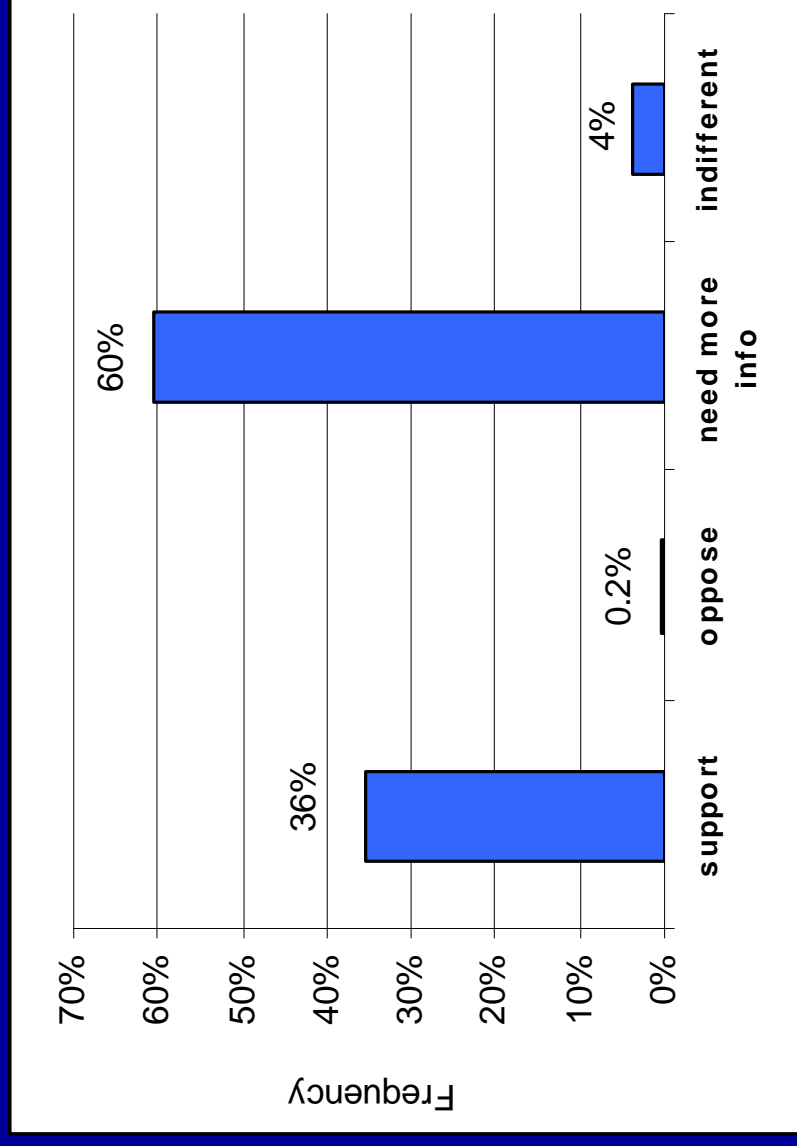
Attitudes to H2 vehicles*

“How would you feel about the introduction of H2-powered vehicles in your city?” (before buses introduced)



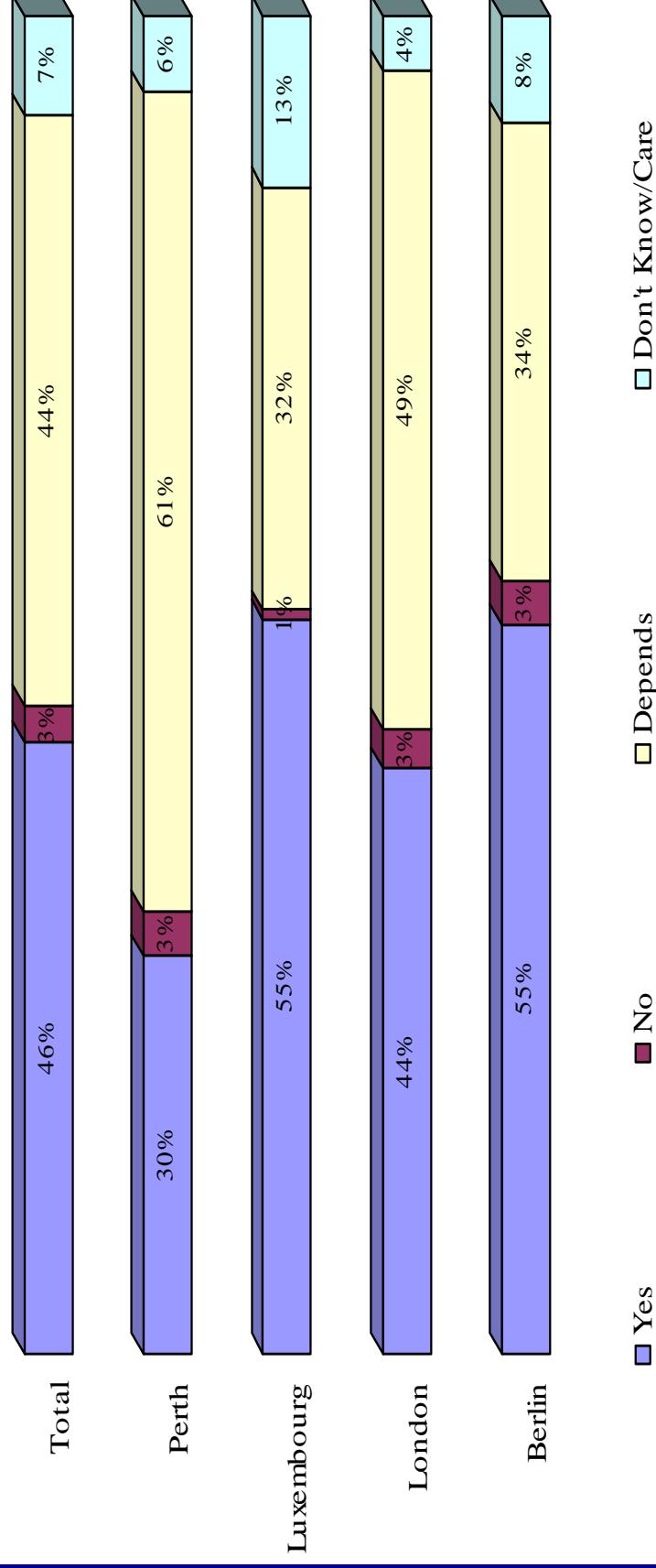
Attitudes to H2 vehicles in London

“How would you feel about hydrogen powered vehicles being introduced in London?”



Attitudes to H2 buses*

“Do you think it would be a good idea to introduce H2 FC buses in your city on a large scale?”
(open-ended qs. suggest opposition largely due to costs, & possibilities of potentially more suitable alternatives)



WTP for H2 buses*

- Overall positive WTP for H2 buses in all cities:
 - About €0.35 per single bus fare
 - About €25 per annual tax
(Values adjusted to cost of living)
- Respondents' intentions to use H2 bus:
 - Most (approx. 75% in each city) would '*take the first bus that comes along*'.
 - < 1% '*would try to take the normal bus*'

6 months into H2 bus trials....

- Support for large-scale intro. of H2 buses increased in every city
- Users of H2 buses +ve about experience (although no more likely to support H2 buses)
- Perceived risks associated with H2 transport don't currently appear to be substantial

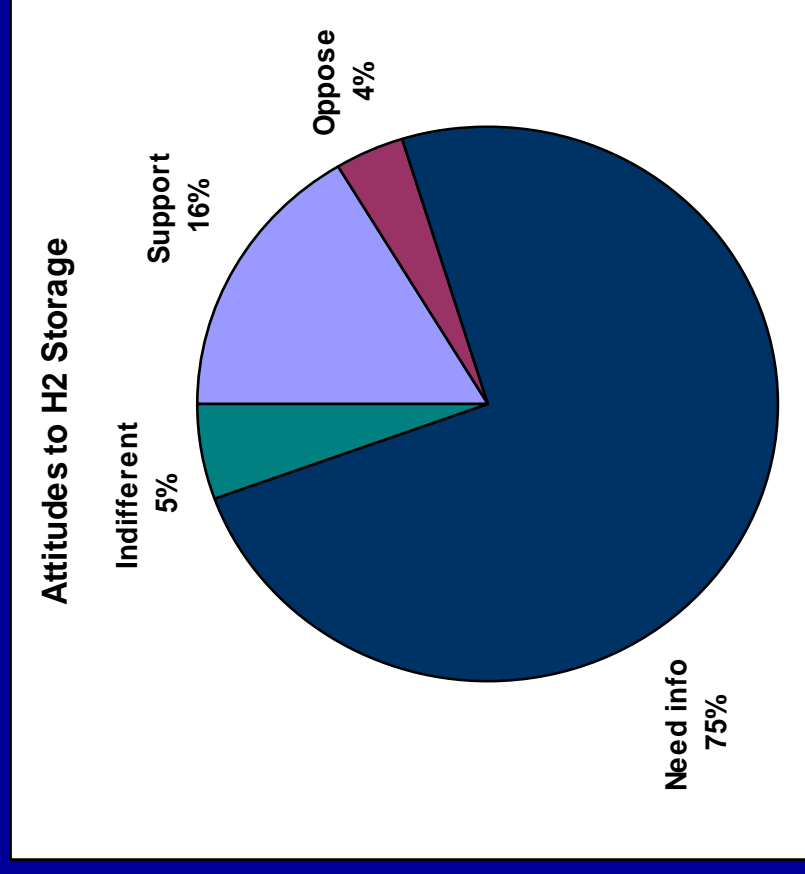
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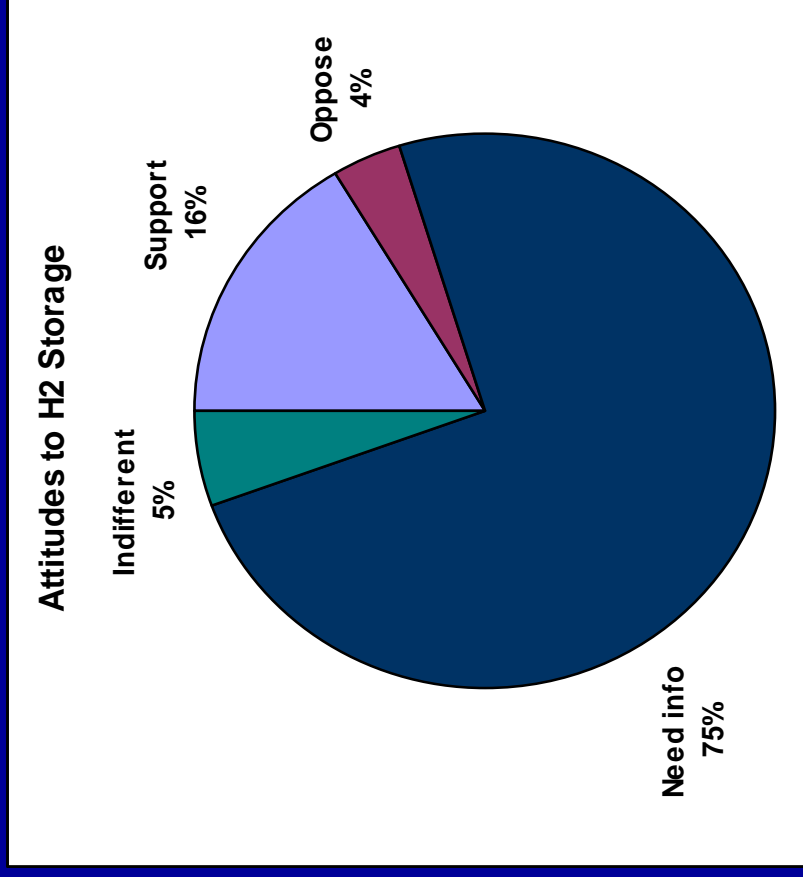
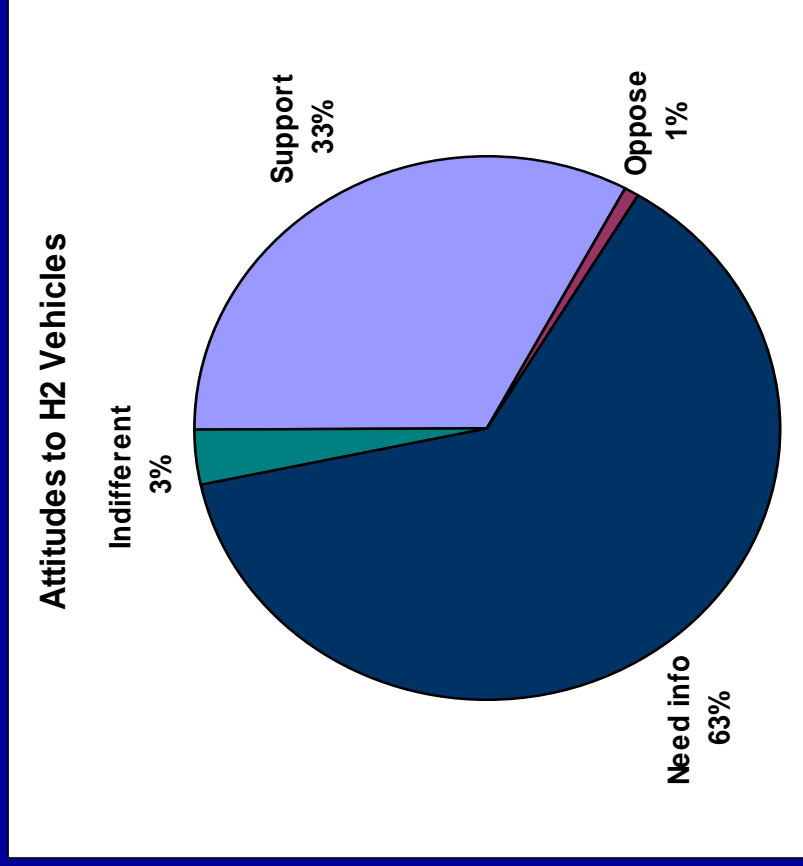
Public attitudes to Hydrogen Infrastructure in London

Attitudes to H2 Infrastructure in London* (1)

“What are your initial feelings about the storage of hydrogen at existing refuelling stations in London?”
(details & location not specified)

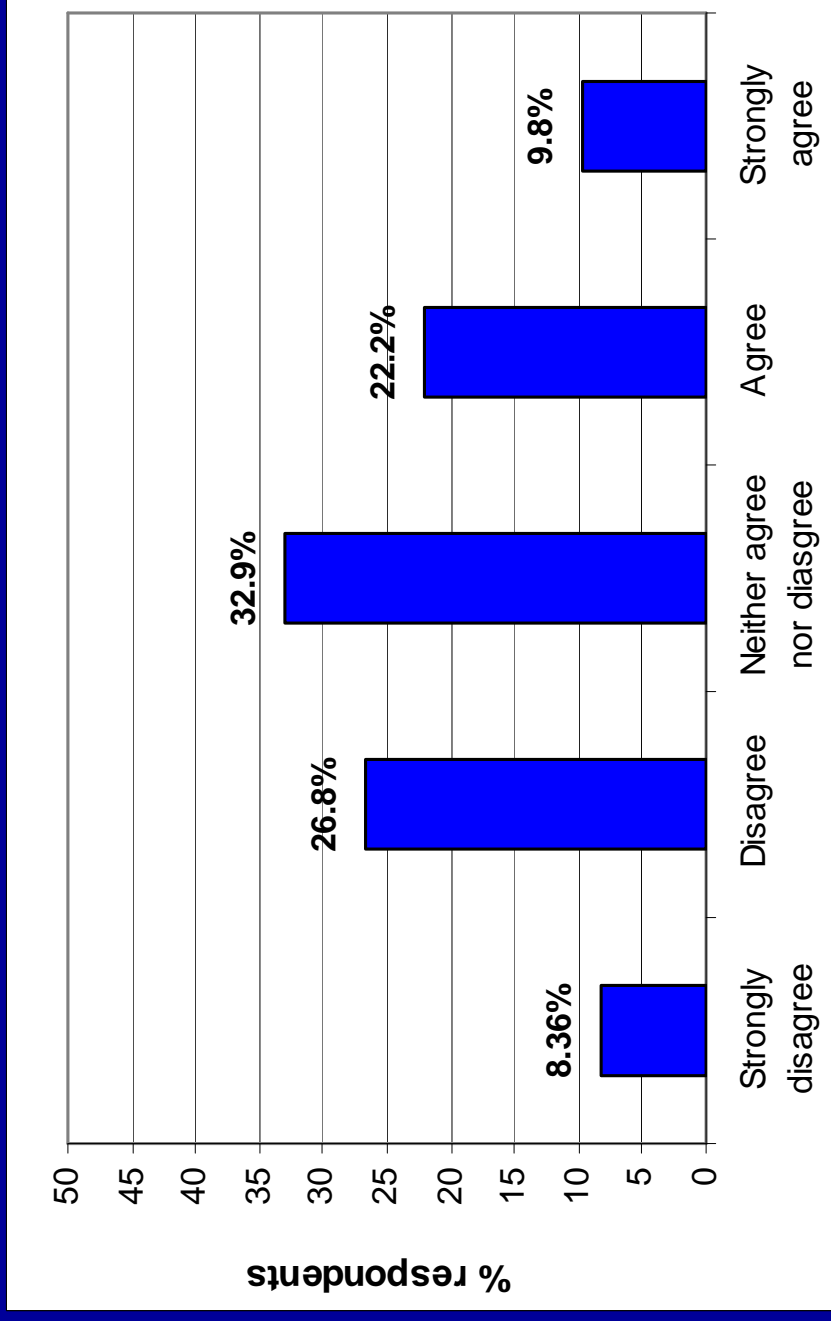


Comparing attitudes to H2 vehicles and to H2 facilities* (More +ve towards vehicles; more info. needed on infrastructure)



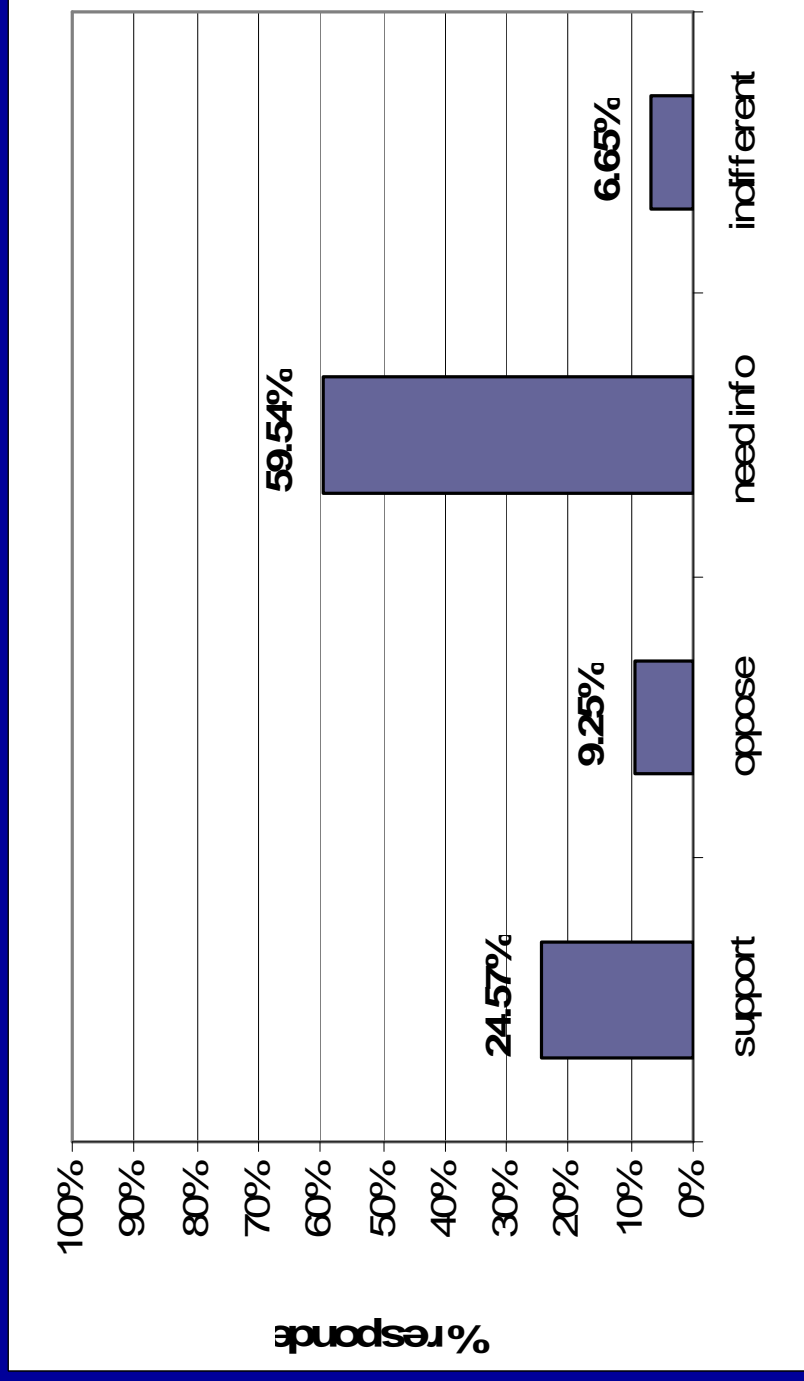
Attitudes to H2 Infrastructure in London* (2)

“I would be concerned if hydrogen were stored at my local refueling station” (after info. provided)



Attitudes to H2 Infrastructure in London* (3)

Attitudes towards development of H2 refuelling facility at
local refuelling station in 3 months' time



Attitudes to H2 facilities in London

- Support most likely amongst younger males with prior knowledge about H2 (BP/IC study)
- Opposition more likely amongst:
 - Older respondents who distrust regulations & tended to “*prefer it if hydrogen were stored at a refuelling station elsewhere in London*” (BP/IC & H2 Infrast. studies)
 - Those who had undertaken individual actions to influence planning in the past (H2 Infrast. study)
 - Those who did not agree that environmental issues are important (H2 Infrast. study)

Opposition in London: a closer look (1)

1. Awareness of H2-fuelled vehicles low amongst opposed respondents:
 - Less than 1/3rd (31%) of opposers in BP/IC study had heard of H2 vehicles
 - 60% of opposers in H2 Infrastr. study had heard of H2
 - but most (71%) still think themselves ‘*not at all*’ or ‘*not very knowledgeable*’
 - Approx. 80% of opposers in both studies said they would ‘*need more info*’ to give an opinion about the introduction of H2 vehicles

Opposition: a closer look (2)

2. Opposing individuals are no more likely to associate H2 with ‘bomb’, ‘Hindenburg’ or ‘explosion’ than other respondents (BP/IC & H2 Infrast. Studies)
3. Nevertheless, most opposers (80%) are ‘*over 75% certain*’ that they oppose local H2 storage developments (BP/IC study)

Opposition: a closer look (3)

4. Most opposers in H2 Infrastr. study are willing to *spend time* opposing local H2 storage (e.g. write letters to MP, organise meetings).
 - However, only half are willing to *donate money* towards an opposition group's efforts.
5. Opposers are likely to have undertaken individual actions to influence planning issues in the past (unrelated to H2)

How important is risk?

- Risk does not *at present* appear to be a serious issue in relation to H2 transport acceptability
- Risk possibly an issue *at present* in relation to H2 facility developments, but..
 - Opposed individuals poorly informed – let alone misinformed - about H2
 - In all studies most would ‘*need more info*’ to be able to express views about local facilities - so attitudes might be volatile
 - Opposition driven by many different factors
 - In some cases H2 ‘risk’ possibly a (strategic) ‘vehicle’ to validate opposition on other grounds?

Further Research?

Might usefully explore:

- Initial drivers of opposition to/support for H2.
- Whether/how the act of opposing local facility developments provides benefits/costs to people.
- How attitudes to H2 vehicles/infrastructure vary with information, knowledge & experience.
- Wider issues relating to ‘unfamiliar’/‘new’ technologies

References

- O'Garra, T., Mourato, S. and Pearson, P. (2005) 'Analysing awareness and acceptability of hydrogen vehicles: a London case study', *International Journal of Hydrogen Energy*, 30, 649-659
- O'Garra, T. (2005) *Public Acceptability of and Preferences for Hydrogen Fuel Cell Buses and Refuelling Infrastructure*, Thesis submitted for the Degree of Doctor of Philosophy, University of London, Imperial College London, Aug. 2005. [Note: Dr O'Garra's PhD research was supported by the John Stanley Studentship]
- O'Garra, T. (2005) 'Comparative Analysis of the Impact of the Hydrogen Bus Trials on Public Awareness, Attitudes and Preferences: a Comparative Study of Four Cities', Final Analysis Report, AcceptH2 project, (www.accepth2.com), Research funded by the European Commission under Fifth Framework Programme, Contract ENK5-CT-2002 80653

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End – Thank You!