



Energy Storage Issues and Opportunities

# **TRANSFORMATION: FROM STORAGE TO SAVINGS**

**Transport and Electricity:  
Results of break-out session discussion**

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<b>Issues</b>	<b>Barriers</b>	<b>Opportunities</b>
Electricity networks	Intermittent power Ramping velocity Monthly/annual variation	
Grids-to-vehicles	<u>Near term</u> Controlling charging times EV to help manage peak demand is possible Need a price signal and/or charging control systems	Strong in the near-term
Vehicles-to-grids	<u>General</u> Many concerns, we don't know much yet Issues include battery performance impacts, consumer requirements for EV state-of-charge/range availability <u>Stabilisation</u> Large battery capacity needed to implement Other options exist, don't need vehicle batteries Could be done with vehicles if systems in place More research and standardisation needed	Potential long-term benefits for short-period storage, cutting peak demand Could provide such capacity, along with other storage options
Markets	Market implementation will take 5-10 years With few vehicles, how to address issues?	Allows time for learning, testing, and research
Costs, business models	<u>Electric Vehicles</u> Who will own batteries, and who profits? <u>Electricity Networks</u> Evolution of electricity and fuel costs Costs to upgrade networks could be substantial (estimates range from 20% to doubling of current electricity distribution infrastructure)	Battery swapping and car sharing possible approaches

<b>Issues</b>	<b>Barriers</b>	<b>Opportunities</b>
Consumers	<u>Guarantees</u> Uncertainties of battery performance, lifetime <u>Valuation</u> If I do something good for the grid, what does the grid do for me?	
Learning curves	Need for more demonstration projects, learning curves, case studies of successes/failures	
Vehicle batteries	<u>Charge/recharging</u> Vehicle batteries are not designed as large stationary storage devices Second-life issues	Potential for batteries after 5-10 years of use Not particularly any major advantages compared to other storage options
Hydrogen or fuel cells	Need for infrastructure Lack of power density / velocity	More appropriate for large-scale storage