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16. Abstract

This survey of the feasibility of introducing carbon capture and storage (CCS) into light vehicles started by reviewing the level of international support for CCS in general. While there have been encouraging signs that CCS is gaining acceptance as a means to reduce carbon emissions, the overall outlook looks somewhat mixed. Recent developments in the US, the UK, Germany, India, and China are discussed to obtain an indication of how likely it is that CCS technologies will gain acceptance in each respective country.

Fossil fuels continue to be a versatile means of energy storage, especially compared with many low-emissions alternatives. This is noted because, apart from reduced fuel consumption, CCS technology is key to reducing CO_2 emissions produced by the use of fossil fuels in transportation.

Primary focus in this review was placed on post-combustion-capture technologies because these mechanisms are most easily adapted for use with the existing fleet of internal combustion engines. Three post-combustion-capture mechanisms were described: absorption, membrane separation, and adsorption.

Considerations about the consumer's operational costs were discussed, including storage management of captured CO_2, additional energy costs to support separation and storage, discharge procedures, and vehicle maintenance costs. Models of consumer inclination to adopt new technologies were also reviewed. An important component of a consumer's motivation to adopt eco-friendly transport is perceived financial benefit. This suggests that incentives beyond reduced emissions may be required to motivate consumer adoption of vehicle-based CCS because the link between emissions and fuel consumption may change.

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