Our increasing dependence on intermittent renewable energy production places a greater focus on the development of novel, affordable energy storage. The recent emphasis on electrochemical storage, and on lithium batteries in particular, addresses a significant component of our future energy storage requirements but future low-carbon energy scenarios must utilise a broad range of storage options. After a general introduction to energy storage, the talk will focus on both electrochemical and chemical energy storage options with a particular emphasis on zero carbon chemical energy carriers.

The hydrogen economy has the potential to be a significant and sustainable, green and clean alternative to fossils fuels. However, despite almost two decades of intensive research, technical challenges still remain - particularly in the area of hydrogen storage. There are three potential areas of hydrogen storage that may, in time, replace 700 bar pressurised hydrogen tanks. These are: cryogenic physisorbed systems, lightweight solid hydrides and liquid hydrogen carriers. My talk will focus on the latter two options where I will show that high wt%, highly reversible solid hydride systems do exist - but have technical complications - and highlight the opportunities afforded by ammonia.