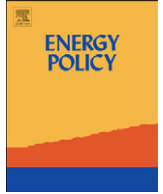


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# Energy Policy

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## Introduction to Section 2—Energy distribution and storage

Energy and energy sources are stored widely in the UK, in oil tanks, gas pipelines, water reservoirs, and, on a less grand scale, in the hot water tanks of private homes and in small batteries. But the electricity transmission and distribution system famously operates with only tiny amounts of storage capacity. It lives in a continuous present in which supply must balance demand almost precisely.

Energy storage is an innovative science, as the papers here show. A few years ago, lithium-ion batteries were a novelty. Now, they are made by the billion, especially for mobile telephones. Here, Hall and Bain discuss the scope for developments in battery technology.

Over the next decades, as Edwards and colleagues show here, fuel cells powered by hydrogen may allow energy to be stored on many different scales, from powering laptops to acting as the power store for entire regional electricity systems based on renewable energy. So might future capacitor, battery and flywheel systems discussed by Baker. New materials may be created which can be used to store energy as they change from solid to liquid and back, perhaps over very precise temperature ranges, as Baker and Hall discuss. In an era of global warming, these materials may be used more to cool buildings than to heat them. The possibility exists, and is explored here in a specially extended 'think piece' by Hall, that this new storage technology will lead to a single integrated energy system for the United Kingdom, involving transport as well as fixed energy use, and making use mainly of renewable energy sources.

One strong possibility is that future power systems will be more complex than those we know today. The growth of renewable and local energy systems may mean that by 2050, local and national power grids may coexist and feed electricity to each other as prices and availability change with time. These systems will need more inbuilt flexibility and intelligence than today's. McDonald discusses the innovations in information and communications technology that may make this possible.