

# Building a sustainable hydrogen economy

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The concept of the hydrogen economy (HE), in which hydrogen would replace the carbon-based fossil fuels of the twentieth century was first mooted in the 1970s. Today, HE is seen as a potential solution to the dual global crises of climate change and dwindling oil reserves. A research paper to be published in the *International Journal of Sustainable Design* suggests that HE is wrong and SHE has the answer in the sustainable hydrogen economy.

John Andrews of the School of Aerospace, Mechanical and Manufacturing Engineering, at RMIT University, in Bundoora, Victoria, Australia, explains how rather than there being a straight choice between [hydrogen fuel cells](#) and battery electric vehicles, it is time to accept that horsepower is a matter of "horses for courses". He adds that [hydrogen](#) can be produced using renewables - water as the material source and wind power or solar as the energy supply for conversion. It thus offers a zero-emissions approach to fuel production for power generation using fuel cells to convert the hydrogen into electricity for all modes of transport as an alternative to [petroleum fuels](#). Hydrogen generated by via wind power can also act as an energy-storage medium for times when wind and sun are unable to fulfill power requirements.

Andrews suggests that complementary deployment of both technologies depending on the transport service to be supplied is much more appropriate. Off-road, the concept of SHE can be applied just as well to allow the distribution of bulk hydrogen storages for season-to-season storage on electricity grids, and as a strategic energy reserve. Andrews adds that it is time to carry out detailed energy-economic-environmental

modeling in order to evaluate the SHE vision for national and regional contexts with a global view to addressing the dual issues of climate change and oil depletion.

"It is generally accepted that energy efficiency and [renewable energy sources](#) have a key role to play in this imminent historic technological revolution," says Andrews, "Yet increasing reliance on inherently intermittent and variable renewables will intensify the need for some kind of [energy storage](#) to ensure continuity of supply."

Andrews, in suggesting that HE pass the energy baton to SHE is opening up the debate by keeping the parameters of his analysis of current technologies and infrastructure as broad and as general as possible at this point. As the threats of catastrophic [climate change](#) and oil supply deficits and disruptions intensify, governments and the private sector around the world must support the research and development needed to compare SHE with whatever alternatives exist. "We just cannot let such a potentially attractive solution remain relatively unexplored," concludes Andrews.

**More information:** "Designing a sustainable hydrogen energy economy" in *Int. J. Sustainable Design*, 2011, 1, 361-380

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