

Sustainable Energy across Scales

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Abstract

Over the last two decades, sustainable energy technologies have become a critical part and a major contributor to the global energy supply mix especially in the electricity sector. This is driven by our desire to use sustainable resources to reduce pollution emanating from the current use of fossil fuels, increasing resource security through local generation, and the creation of new industries and jobs. Although some of the sustainable energy technologies are in some cases, still driven by what is termed as support mechanisms or subsidies, the sustainable or renewable energy industry has matured, with huge investments being ploughed into it globally. Global investment in renewable power and fuels (excluding large hydro-electric projects) was around US\$286 billion in 2015, nearly 19% higher than the previous year. A large proportion of the investments have targeted solar and wind electrical power generation, and overall investment in these exceeded that for traditional fossil fuels. Renewable energy is now a major industry sector that is likely to grow further, displacing and augmenting traditional electricity generation facilities as we progress in this century. This talk will address these technologies and will give a discourse of status, applicability and policy implications, covering solar, wind, and marine energy. It will also consider installations at building, village, city and large deployments in farms or arrays.

Biographical note

Professor AbuBakr Bahaj (FICE, FIET, FRSA, MInstP, CPhys) leads the 55-strong [Energy and Climate Change Division and the Sustainable Energy Research Group](#) at the University of Southampton, where he completed his PhD, progressing from a researcher to a Personal Chair in Sustainable Energy. For more than 25 years, Professor Bahaj has pioneered sustainable energy research and established the energy theme within the University. His major research programmes can be found at www.energy.soton.ac.uk. These include [Cities](#), [Energy and Infrastructure](#), [Data and Modelling](#), [Energy and Behaviour](#), [Energy and Buildings](#), [Energy for Development](#), [Environmental Impacts](#), [Microgeneration Technologies](#) and [Renewable Energy](#) ([Solar Photovoltaics](#), [Offshore Wind](#) and [Marine Energy](#)).



Professor Bahaj's work has resulted in over 300 articles, published in academic refereed journals and conference series of international standing. In 2018 founded the [International Marine Energy Journal](#) to support the wave and tidal energy communities. Prof Bahaj also holds visiting professorships at the Xi'an University of Architecture and Technology (XUAT), Xi'an, China, (2017 -), the Ångström Laboratory and Engineering University of Uppsala, Sweden (2011-15) and the King Salman bin Abdulaziz Visiting Chair for Energy Research, at King Abdulaziz University (KAU), Jeddah, Saudi Arabia (2014 -). He is a Fellow of the Institution of Civil Engineers (FICE), Institution of Engineering Technologies (FIET) and the Royal Academy of Arts (FRSA).

In 2012, Prof Bahaj was appointed Chief Scientific Advisor to Southampton City Council—believed to be the first such appointment in the UK and in 2014; he was named by the UK's Science Council as one of the [UK's 100 leading practising scientists](#).