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Special Interest Group

Compressed Air Energy Storage (CAES) – busting myths and fixing misunderstandings

IChemE Clean Energy Webinar 10th December 2019 9.00 GMT

Abstract:

Renewable energy now delivers the lowest cost of electricity generation of all for new-build generation plant – measured in terms of the Levelised Cost of Electricity. The stage is fully set for energy systems of the future to be powered largely from renewables. The largest impediment remains the intermittency of the primary energy resource – wind and sun. To exploit renewables effectively, some sources of flexibility must be developed to help to reconcile supply with demand. Energy storage competes with interconnection, generation turn-down and demand-side response in this space. Energy storage is the most complete solution for flexibility.

To many, energy storage is becoming synonymous with electrochemical batteries. Batteries do indeed play a highly important role – especially for discharge durations in the order of ~1hr. For discharge durations in the order of 5hrs to 100hrs, all of the solutions are thermo-mechanical in nature. Compressed Air Energy Storage (CAES) systems are among the most important of these. Far from being a single technology, CAES is a wide family of technologies with different major categories depending on how the pressurised air is stored, how/whether heat is stored and how the air is compressed and expanded. Despite it being conceptually simple, it is also very widely misunderstood and misrepresented. This talk addresses some of the common errors.

Biography:

Seamus Garvey is Professor of Dynamics at the University Of Nottingham. He has been interested in energy storage and the tight integration of energy storage with renewables since 2005 and has undertaken numerous projects in these areas. These have ranged from placing bags of compressed air deep under water, through exploring cavern-based compressed air energy storage with local solar thermal collection and, most recently, the use of heat pumping to integrate energy storage directly with offshore wind. Prof. Garvey is/has-been a principal investigator or co-investigator on research grants in these areas to a collective value of over £4M and has published over 40 papers in the area.

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