

Future Clean Energy Systems

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Energy, or precisely, “Clean Energy”, is at the centre of a highly active and dynamic field, which changes and affects not only our current life, but also our near future. Due to the importance Clean Energy currently possess and its transitive characteristics: research, development, implementation, innovation, market penetration of clean energy technologies and systems have expanded in recent course of time.

Energy systems have been in transition, extending their boundaries beyond the energy systems themselves. I call this the 3-D interactive extensions that relate to the dimensions of physical **S**pace, **T**ime scale and **H**uman behaviors--STH extension. STH-3D also defines the scope and trends of R&D in clean energy systems. For example, as it was necessary for us to explore how we could efficiently and effectively use our *space* to supply, convert and use energy resources; we have introduced new smart grids and intelligent energy systems. These tools aim to solve the challenges of intermittent power generation and mismatching of energy supply and demand over a *time* scale. *Human* behavior is also integrated into the energy systems to interactively improve the sustainability. Under the new circumstance of the STH-demission, we need a new approach to solve the challenging issues associated with new transitions of future clean energy systems. Its interdisciplinary and synthetic approach not only reveals the systematic overview, but also detailed components of clean energy systems.