

Micro Combined Heat & Power (Micro-CHP) Systems, a Key Strategy to Meet the Paris Agreement Targets in Smart Cities

In order to limit global warming and meet international and regional environmental and fuel consumption targets, more environmentally benign technologies must be used in the residential market. Combined heat and power (CHP) is the simultaneous production of heat and electricity from a single fuel source, close to where they are to be used. This means that the heat and electricity generated can be used in the building extremely efficiently because there is no energy wastage or loss during transportation to another site. Although large scale CHP boilers have been available for many years for commercial use, micro combined heat and power systems (also known as mCHP, Micro-CHP or domestic CHP), with an electrical power of <50 kW, are relatively new systems, generating low cost, low carbon electricity and heat for homes and domestic applications. The UK Government Microgeneration Strategy has identified Micro-CHP as one of the key technologies to offer a realistic alternative to centrally generated electricity in the future smart cities. This keynote speak is aiming to provide a detailed techno-economic analyses of the four major prime mover technologies in the Micro-CHP systems (i.e., Gas engines, Stirling engines, Fuel cells and Micro turbines technologies). Integration of this systems with the renewable energy sources (e.g., biofuel, solar and wind) will present even more environmental benefits and can represent substantial savings by extending the lifetime of the current grid. The Political, Economic, Social, Technological, Legal and Environmental (PESTLE) risk analysis of deploying these systems in smart cities will be discussed and the best cogeneration energy option for the UK and worldwide domestic market will be identified by means of Multi-Criteria Decision Analysis (MCDA).