



Energy Systems for Smart and Intelligent Cities Research

- **Smart Grids – modernization of power systems**
 - Smart grid design and engineering
 - Smart micro-grid modeling and simulation.
 - Electrical grids merging bi-directional power flow with information flow to monitor changes in usage and supply electricity.
 - Utilizing digital communications technology to detect and react to the usage of the electrical supply and integration into the power grid.
 - Smart grids are also 'self-healing' and can repair faults and reduce outages, since they can detect fluctuations and disturbances to the grid and isolate parts of it.
 - Technical and Non-Technical Loss Minimization in Delivery Systems.
 - **Smart Cities Infrastructure and Innovation**
 - Innovative new infrastructure: electric vehicles, battery electric vehicle, plug-in electric vehicle, hybrid electric vehicle, charging stations for electric cars.
 - Smart transportation systems, vehicle-to-grid (V2G) infrastructure, energy-saving & green IoT applications; home- and industry automation.
 - Energy storage and utilization in Cities: UGHPS schemes, district energy systems; electrical/thermal energy, sustainability, energy conservation and recapture, mitigating GHG emissions, carbon neutrality, grid energy storage.
 - **Smart Buildings**
 - Design of integrated & autonomous energy systems for buildings.
 - Hybrid & integrated energy systems: micro-turbines, co-generation.
 - Advance solar PV materials, solar PV energy systems, fuel cells.
 - **Smart Health Care and Smart Water**
 - DC electroporation – non-contact delivery of medicine using DC power.
 - Smart water systems design and analysis.
 - **Smart Education and Smart Technologies**
 - Super-learning and innovative teaching technologies
 - DC renewable energy to consumer homes and businesses
 - Generating RE in DC voltage: Renewable IPP Generators; LV-DC grids.
 - Technical loss minimization to achieve substantial savings in decreasing voltage transformations achieved by direct DC generation.
 - **Smart Business Enterprises and Entrepreneurship**
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