

Smart grid is a type of electricity grid that helps to integrate renewable energy sources and includes advanced communication and control technologies and is designed to enhance reliability, flexibility and efficiency in electricity generation, distribution and consumption, making it possible to use more renewable energy sources and is the future of electrical energy. By integrating these diverse sources of energy into smart grids, we can help improve grid stability and enhance overall system performance. One of the advantages of smart grids is that there is two-way communication in them, which allows the exchange of information between utility companies and consumers, and smart grids are designed to accommodate the integration of distributed energy resources, including solar panels, wind turbines and energy storage systems at the local level. Integration of renewables Renewables (RESs) and energy storage systems (ESSs) are key technologies for smart grid applications and offer great opportunities to improve energy security, reduce greenhouse gas emissions and save money. Among the benefits of smart grids:

- o Increased integration of large-scale renewable energy systems facilitating the integration
- .of large decentralized renewable energy systems into the grid