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Review of Advanced Optimization Approaches in Smart Grid Technology

Datey Sachin Devidas[1] and Dr. Sanyam Agarwal[2]
Research Scholar, Department of Electrical Engineering[1]
Professor, Department of Electrical Engineering[2]
Sunrise University, Alwar, Rajasthan, India

Abstract: *In order to create a power grid that is durable, efficient, resilient, and sustainable, smart grid technology advances the conventional grid via the use of computational intelligence and networking capabilities of different communication networks. It is thought to be the grid of the future because it uses a bidirectional electrical stream via a communication module, which creates an environment that allows consumers to become prosumers individuals who may autonomously produce and control the import and export of electrical energy in their local community. A smart grid offers a safe, self-healing, adaptable, and efficient power infrastructure that enables power exchange amongst several stakeholders. An efficient and safe communication network between the smart grid's electronic devices and those in users' homes is essential for the system to function properly. To improve the power system, data interchange across communication modules need effective communication and optimization systems. Our contribution consists of a comparative study of several optimization strategies that might be used to energy management in smart grids. We have identified the main obstacles that might prevent the smart grid from operating and controlling effectively in order to solve the issues facing its successful adoption. We think that early-career academics involved in smart grid energy optimization will find this research paper beneficial.*

Keywords: Smart grid, Optimization Algorithms, Energy Management.