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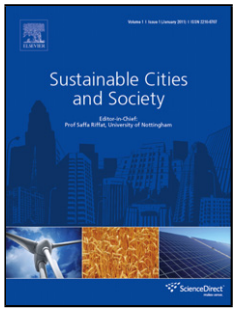

Title: Economic and Ecological Aspects for Microgrids Deployment in India

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Economic and Ecological Aspects for Microgrids Deployment in India

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Highlights of the paper

- The policies, schemes, and investments to promote renewable energy in India
- Feasibility study of solar and wind-based power generation in India
- A comprehensive framework for the deployment of smart microgrids
- Case studies at various locations using Homer® as simulating and optimizing tool

Abstract - Electrical energy and its convenient accessibility act as a benchmark of advancement and a key essential for all-circular prosperity. No core financial pursuit can be sustained without an adequate and consistent source of energy. India has been accounted for nearly 10% of the upsurge in total energy demand since the end of 2000 and among the main five Green-house-gas (GHG) emitters. Renewable energy (RE) is fast emerging as a prominent resource of electrical power in concerns with rapidly increasing demand and GHG emission. This work presents details of governmental initiatives in terms of acts, policies, mission, scheme & incentives since 2000, worldwide investment in the Indian power sector to promote the Renewable Energy Sources (RESs) and the feasibility of solar and wind-based electrical energy throughout Indian terrestrial. Further, this work presents a comprehensive framework for the deployment of microgrids in the Indian scenario. In order to validate the presented framework, at 9 different locations, the microgrid is deployed using Homer® as simulating and optimizing tool by incorporating environmental constraint and grid availability parameter.

Keywords: renewable energy resources, microgrid, energy policy, economic analysis, environmental threat

1. Introduction

India's per capita power consumption has consistently been growing over time. From 734 kWh in 2008-09, consumption has reached 1075 kWh in 2016, a prosperous growth of 46% in eight years, i.e. an average of 6% every year. (Mukherjee, 2008). India's considerable and maintained financial development is setting enormous demand for its energy assets. India has been accounted for nearly 10% of the upsurge in total energy demand since the end of 2000 and among the main five GHG emitters("Energy Statistics," 2016).The electrical power demand and supply irregularity in energy sources are inescapable, requiring genuine endeavors by Government of India (GoI) to increase power generating sources(Joseph, 2010). India imports more than 80% of its petroleum. The potential danger of imports expanding further is creating difficult issues for India's future energy and economic security. Likewise there is a critical danger of the lesser warm limit being introduced by virtue of the absence of indigenous coal in the coming years due to both creation and calculated imperatives, and expanded reliance on imported coal ("GoI: Planning Commission").

In such state of affairs, transforming to RESs based distribution generations (DGs) with interconnected load, i.e. Smart microgrids is seeking wide-scale attention due to the ability to overcome numerous challenges like easy siting, less environmental threat, enhanced system efficiency, security and reliability, power quality enhancement, peak shaving reduction in operating cost and congestion management in Transmission and Distribution (T&D) network (Ahmad et al., 2017a; Ahmad and Alam, 2017; Asaad et al., 2017a). The volatile and intermittent nature of RESs due to dependency on meteorological conditions is making a