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Role of Renewable Energy in Indian Power Sector

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Abstract

Renewable energy in the form of small hydro, biomass, solar, urban waste, industrial waste and wind together accounts for 14.8% of the total installed power generation capacity in India (as on Dec 2016). Deregulation, liberalization and opening up of Indian electricity market post enactment of Indian Electricity Act 2003 has ensured complete participation by private producers. Today 99% of total installed generation capacity using Renewable energy (other than Hydro) is by private producers. In this study we review the role played by Renewable Energy in Indian Power sector, REC trading and the role played by power/energy exchanges in Indian electricity market with the objective of aiding policymakers to bring forth further measures to stimulate future growth of Renewable energy in India for decades to come.

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Keywords: Renewable Energy; India; Policymakers; REC trading; Power Exchange

1. Introduction

India is one of the largest electricity producers (7th) in the world using Renewable energy sources according to International Energy Agency [1] and Central Electricity Authority of India [2] with electricity generated from Renewable energy sources accounting for 28.7% of the total installed electricity generation capacity which is majorly contributed by Hydro (48.4%). Renewable energy in the form of small hydro, biomass, solar, urban waste, industrial waste and wind together accounts for 14.8% of the total installed power generation capacity in India (as on Dec 2016). Table 1 reveals details about total electricity generation capacity in India region-wise as on 31st

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December 2016 by diverse thespians such as Central Government, State Government and Private sectors on the basis of manner in which electricity is generated.

Today 99% of total installed generation capacity using Renewable energy (other than Hydro) is by private producers in India. Till 2003, contribution by private producers was meager owing to policy constraints. Enactment and effective execution of Indian Electricity Act 2003 has played a substantial role in impelling India's electricity generation capacity predominantly from renewable energy sources [3-6]. Figure 1 reveals electricity generation in India from different sources as on 31st December 2016. The progression of installed generation capacity in India in the preceding decade has been prodigious with Private players contributing 41% of the total installed capacity in 2015-16 viz. a viz measly 13% contribution in 2006-07 [2].

Table 1. All India Total installed Generation capacity (in MW) as on 31st December 2016

Region	Thermal (Coal, Gas and Diesel)	Nuclear	Hydro	Renewable Energy Source	Total
Northern	52305.76	1620	18382.78	8976.44	81284.98
Western	84036.42	1840	7447.5	15818.49	109142.4
Southern	46419	2320	11689.03	20277.82	80705.85
Eastern	30297.87	0	4378.12	564.39	35240.38
North Eastern	2069.8	0	1242	268.72	3580.52
Islands	40.05	0	0	11.1	51.15
ALL INDIA	215168.9	5780	43139.43	45916.95	310005.3

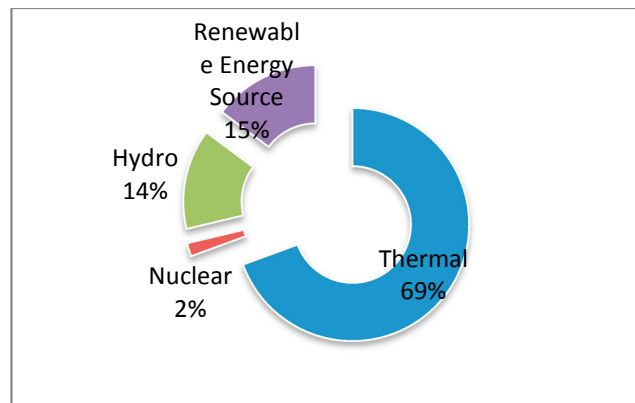


Fig. 1 Electricity generation in India from different sources

In this study we assess the role played by Renewable Energy in Indian Power sector, REC trading and the role played by power/energy exchanges in Indian electricity market with the objective of aiding policymakers to bring forth further measures to stimulate further growth of Renewable energy in India for decades to come. The rest of the paper is organized as follows: In section 2, we give an ephemeral gestalt of Indian electricity market. In section 3 we take a closer look at Renewable Energy in Indian Power sector, REC trading and the role played by power/energy exchanges. In Section 4 we discuss the possible policy deliberations for further accentuating the Role of Renewable Energy in Indian Power Sector.

2. Indian Power Sector

The Indian electricity market is mostly divided into north-eastern region, western region, southern region, eastern region and northern region as seen in Figure 2 [3] [7]. Figure 3 gives the edifice of Indian electricity market post

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