

## Progress of renewable energy in India

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**Abstract.** Energy holds key to economic growth and prosperity of India. Currently, India has very high-energy import dependence, especially in the case of crude oil (80%) and natural gas (40%). Even coal import has been increasing over the years. Considering India's population growth, emphasis on manufacturing, production, and service industry, energy consumption is bound to increase. More fossil energy consumption means greater dependence on energy import leading to widening trade deficit and current account deficit. Therefore, exploitation of indigenous renewable energy production is necessary. The paper reviews the progress and growth of renewable energy production, distribution, and consumption in India. The paper highlights some of the enablers of renewable energy in India. The authors discuss the opportunities and challenges of increasing share of renewable energy to reduce energy import and address issues of energy security in India. The findings suggest that India is ready for a quantum leap in renewable production by 2022.

**Keywords:** renewable energy; tariff; investment; policy

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### 1. Introduction

Energy holds key to economic growth and prosperity of India. Currently, India has very high-energy import dependence, close to 80% of crude oil and 40 % of natural gas imported in India. Domestic shortage of coal is widening and the estimated shortage is in the range of 185-265 million tonnes by 2016/17 (Das 2014). One of the consequences of shortage in domestic supply is increase in coal import. Overall, increasing energy import dependence recognized as a bigger concern from energy security point of view (Kar and Sinha 2014, MNRE 2011).

More fossil energy consumption means greater dependence on energy import leading to widening trade deficit and current account deficit. There is an emergent need to address the primary energy demand-supply issues. In our view complete exploration and harness of domestic and sustainable sources of energy is not only desirable but also necessary to address energy security challenges in India. Although the importance of renewable energy (RE) sources in the transition to a sustainable energy base was recognized in the early 1970s (MNRE 2011) but actual achievement has been less than expectations. As of September 30, 2014, a cumulative of 33.8 Giga Watt (GW) of renewable installation including off-grid/captive renewable capacity installation

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- Reuters (2015), Land, finance key to India renewables drive - First Solar CEO, NEW DELHI Sun Feb 15, 2015 4:57pm IST.
- Sharma, A., Srivastava, J., Kar, S.K. and Kumar, A. (2012), "Wind energy status in India: a short review", *Renew. Sustain. Energy Rev.*, **16**, 1157-1164.
- Sharma, N.K., Tiwari, P.K. and Sood, Y.R. (2013), "A comprehensive analysis of strategies, policies and development of hydropower in India: Special emphasis on small hydro power", *Renew. Sustain. Energy Rev.*, **18**, 460-470.
- Singh, J. and Gu, S. (2010), "Biomass conversion to energy in India-a critique", *Renew. Sustain. Energy Rev.*, **14**(5), 1367-78.
- Singh, R. and Setiawan, A.D. (2013), "Biomass energy policies and strategies: Harvesting potential in India and Indonesia", *Renew. Sustain. Energy Rev.*, **22**, 332-345.
- The Electricity Act 2003 (2003), Ministry of Law and Justice, Legislative Department, June.
- Tilburg, X., van Laura, W., de Heleen, C. and Stefan, B. (2011), *Paving the Way for Low-carbon Development Strategies*, Energy research Centre of the Netherlands (ECN), September.
- UNEP (2014), The emission gap report, November.
- USAID (2013), Financing Renewable Energy in India: A review of current status and recommendations for innovative mechanisms, October.
- Ram, V. (2015), India likely to exceed target of 100 GW of solar power by 2022: Solairedirect chief. <http://www.thehindubusinessline.com/opinion/columns/vidya-ram/india-likely-to-exceed-target-of-100-gw-of-solar-power-by-2022-solairedirect-chief/article6757490.ece>.
- Xiu, Y., Cheng, L. and Chunyan, L. (2014), "Research on hybrid energy storage system of supercapacitor and battery optimal allocation", *J. Int. Council Electr. Eng.*, **4**, 341-7.