

(a) **RPO compliance.** Uncertainties surrounding the regulatory environment and enforcement mechanisms tend to reduce investor confidence. Hence the REC mechanism can be fully functional only if the RPO compliance is duly enforced. If the power purchase agreement (PPA) becomes stable and bankable, it will not only make investments viable but will also give confidence to the ecosystem.

(b) **Stakeholder Support.** The market for solar energy has become more sophisticated and players have come forward to unleash its potential, thereby necessitating improved coordination in garnering stakeholder action and support.

(c) A long term plan for the execution of the Mission is critical to ensure the progress of the solar sector. All stakeholders should be made aware of such a roadmap and it must be inclusive of the entire supply chain. Capacity building of the labour force and mechanisms to obtain sufficient and customized resources (financial and otherwise) must be clearly outlined as well

Conclusion

5. India's energy sector is increasingly unable to deliver a secure supply of energy amid growing demand and fuel imports. Increasing import dependency exposes India to greater geopolitical risks, fluctuating world market prices and intensifying international competition. At present around 60 per cent of India's

power generation capacity is based on coal. Net coal import dependency has risen from a negligible percentage in 1990 to nearly 23 per cent in 2014. This, in addition to India's increasing dependence on imported oil, is leading to imports of around 28 per cent of India's total energy needs⁷⁰. During the year 2013-14, India was the fourth largest consumer of crude oil in the world, however, during the same period, India accounted for only 1.02% of the world crude oil production.

6. India has an estimated renewable energy potential of about 900 GW from commercially exploitable sources viz. Wind – 100 GW (at 80 metre mast height); Small Hydro – 20 GW; Bio-energy – 25 GW; and 750 GW solar power, assuming 3% wasteland is made available. The solar energy available in India in a year itself exceeds that of all fossil fuel energy reserves in India. The renewable energy can therefore not only contribute immensely to country's energy security, in addition it will reduce greenhouse gas (GHG) emissions when displacing fossil fuels.

7. RE has been emerging as an integral part of the solution to meet the nation's energy needs and an essential player for energy access. It has been realized that renewable energy has to play a much deeper role in achieving energy security in the years ahead and be an integral part of the energy planning process. Accordingly the Government has articulated the future of renewable as "moving from megawatt to gigawatt".

⁷⁰ GoI, MNRE Annual Report 2014-15 accessed at http://mnre.gov.in/file-manager/annual-report/2014-2015/EN/Chapter%201/chapter_1.htm

8. Considering the large potential of renewable energy the country processes, the impetus on increasing renewable energy generation has become one of the key policy decisions of the present government. To demonstrate its commitment to renewable energy, the government has set aggressive targets of five time increase in India's renewable energy, i.e. achieving 175 GW of renewable energy by year 2022 which includes 100 GW of solar power. As on 31 Jan 2016, India's cumulative power (grid interactive/ off grid/captive), through renewable energy, stood at approximately 41 GW. The power generated by renewable energy sources account for almost 14 % of total power generated in the country.

9. A large number of policy decisions for capacity enhancement of renewable energy generation have been implemented by the government over the past five years. However, while the most renewables have zero fuel costs, they are more capital-intensive than conventional fossil power plants. India's renewable resources are abundant, but the output of wind and solar photovoltaic is variable, and in the case of wind in particular, subject to uncertainty. To capture the benefits, India would need to raise the necessary capital, and get comfortable with managing the variability and uncertainty of renewable energy generation.

10. While the need for enhancing RE generation is well appreciated and the same is being pursued with renewed vigour by the government, there remain a number of critical gaps in RE governance. The amendment to Electricity Act 2003 which is the key legislation guiding development of renewable energy is yet to be enacted. In addition to MNRE, involvement of multiple agencies both at central

(Ministry of Power, Ministry of Environment and Forests) and well as State level remains a key concern for the growth of RE sector. In addition, due to the present policy, the final say on how renewable energy projects should be developed rests with state-level agencies and the progress on the ground depends mainly on state-level policies on feed-in tariffs and RPOs, evacuation, clearances, open access, and facilitation from state nodal agencies. Further, the growth of adequate infrastructure has not been kept in pace with the envisaged growth in RE sector. To formulate sound policies and roadmaps for renewable development, availability of reliable good-quality resource data is crucial. However, because of non standardisation of data formulation and collection methodology in the country, this remains a grey area.

National Solar Mission

11. With about 5,000 trillion kWh per year solar energy incident over India's land area with most parts receiving 4-7 kWh per sq. m per day, India's installed solar capacity would be at 8,000GW with only 10% of the total land used for harnessing solar energy. However, not even one percent of India's total solar energy potential has been harvested till date. It is therefore imperative that the country's solar energy potential is optimally exploited to meet our energy need.

12. The National Solar Mission was launched in 2010 with initial target of achieving 20 GW of solar power generation by year 2022. The National Solar Mission target, in May 2015, was revised to achieving 100 GW (40 GW through Off-grid decentralized Rooftop Solar Projects and the remaining 60 GW through

grid connection) of solar energy by the year 2022. This is certainly a mammoth task, considering the fact that since its launch in 2010, only 5.3 GW of grid connected solar power has been commissioned till date.

13. A large number of policy initiatives have been implemented by the government for the development of the solar energy sector which include exemption from excise duties and concession on import duties on components and equipment required to set up a solar plant, 10-year tax holiday for solar power projects guaranteed market through solar power purchase obligation for states subsidy of 30% of the project cost for off-grid PV and solar thermal projects etc. A range of initiatives have also been proposed to bolster the training and skill development infrastructure across India so the country can successfully achieve its twin objectives of clean energy development and employment generation.

14. While all efforts are in hand by MNRE to ensure achieving of revised target of 100 GW of Solar Power by 2022, a number of critical bottlenecks like Debt finance issue, achieving solar tariff and grid parity as the power produced by coal based thermal plant continues to be way cheaper as compared to solar power, ease of land acquisition for solar power project developers, more stringent enforcement mechanism for RPO etc need to be addressed by the Government.

15. To conclude, while the government initiatives have resulted in a boost in RE sector, especially in the solar energy sector, taking full advantage of India's RE potential over the next few years will require new

initiatives from central and state governments, beyond policy and programs currently in place, to support the engagement and participation of power sector stakeholders including RE industry and developers, grid operators, public and private finance, consumers, and others.