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Executive Summary

Addressing Land Issues for Utility Scale Renewable Energy Deployment in India

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CONTACT DETAILS

Office Address

TERI School of Advanced Studies
Plot No. 10 Institutional Area
Vasant Kunj
New Delhi - 110 070, INDIA

Phone	+91 11 71800222
Fax	+91 11 26122874
Email	registrar@teriuniversity.ac.in
Website	www.teriuniversity.ac.in

The following are the key authors of this report and may be contacted for any questions and additional information.

	Name	Designation	Contact Details
1	Mr Amit Kumar	Senior Director, TERI	akumar@teri.res.in
2	Mr Sapan Thapar	Fellow, Teri School of Advanced Studies	sapan.thapar@teriuniversity.ac.in

EXECUTIVE SUMMARY

The government of India is promoting renewable energy (RE) as an effective tool to mitigate climate change besides enhancing energy security and enabling energy access. It has set an ambitious target of 175 GW RE capacity to be achieved by the year 2022. Procuring land for the upcoming 50 GW ground mounted solar plants and 35 GW of wind power, estimated at about 1,50,000 hectares of land (considering 1.5 hectares per MW for wind projects and 2 hectares per MW for solar projects) would pose a significant challenge to both the policy makers as well as the project developers.

Having only 2.4% of the total geographical area, India supports 17% of the global population. However, there has been no comprehensive land utilization policy either at the federal level or at the state level. More than two-thirds of our population depends upon farmland either directly or, indirectly, though the contribution of agriculture to the national economy is abysmally low at 15%. With a large number of small and marginal farmers having a land holding of 2 hectares and below, most of the agriculture farms are of very small size, leading to low yields and limited avenues for technological interventions. The land area in India has been classified into eight categories which include forests, arable land, barren and unculturable land, wasteland, fallow land and land used for non-agricultural purposes.

Since independence, land utilisation in India underwent significant changes. While the lands under net sown area, forests and non-agricultural uses have increased, the lands under “other areas” have halved. As such, for future land demands, the forest lands and agricultural lands may have to be used. Effective land use planning and management can facilitate optimal utilisation of land resources, based on regional development plans and looking into the aspect of competing demands of different sectors of the economy.

Land being a state subject, approvals are required from the concerned departments of the state government (revenue, panchayat, SNA, industrial, etc.) to procure/ lease the land, making it time consuming. It is estimated that it takes over 6-9 months to procure land for setting up solar/ wind project, even though many of the SNAs provide a deemed Non-

Agricultural (NA) status with regard to change in land use status. The lack of digitization of land records makes the procurement procedure even more tedious. Types of land procurement include revenue land allotted on lease and private land which is to be purchased on mutually agreeable terms. In areas having high cost of land, leasing of private land has been witnessed in recent years. Revenue land is typically associated with low rentals, while the private land creates a long-term asset for the investor.

Land requirement for a wind project varies, depending upon several factors like wind speed, turbine technology (hub-height) and topography. Similarly, for a solar project, it depends upon the latitude of the location, solar insolation, topography and technology. There has been a marked improvement in wind and solar product profiles-higher efficiency a well as module wattage and higher capacity of turbine, due to increased hub height and longer blades.

However, the minimum land requirements under most of the government programmes have not been revised to reflect upon the changing ground realities; the Solar Energy Corporation of India (SECI) has kept the minimum size of land required for setting up a solar PV project at 1.5 hectares per MW. In comparison, the power capacity of a module (Wp per square meter) has increased substantially since last 5 years, from 280 Wp to 335 Wp using the same module area, depicting a 25% increase. Another important factor is the latitude of the location of a solar project, which determines the spacing between modules. The latitude varies vastly in India from 10-degree N in Northern states to 35-degree N at the Southern tip of Peninsular India, which may influence the land requirements for solar PV projects.

As per a study conducted by the National Institute of Solar Energy (NISE), the total solar potential in the country has been estimated as 750 GW, considering use of 3% of wasteland area. The National Institute of Wind Energy (NIWE) has also estimated 150 GW of wind power potential in India on wasteland areas. However, it may be noted that there has been a marked decline in the area categorized as barren and culturable wasteland since independence. Moreover, the wasteland is concentrated in only a few

states of the country.

In India, solar photovoltaic power and wind energy projects are not covered under the ambit of Environmental Impact Assessment (EIA) Notification, 2006 and no environment clearance is required for such projects under the provisions thereof. The Ministry of Environment, Forests and Climate Change (MoEFCC), Government of India, has placed wind and solar PV projects under 'White Category' industries, which are exempted from obtaining 'Consent to Operate' from the concerned State Pollution Control Board (SPCB).

As in any other infrastructure project, there are socio-economic challenges associated with solar and wind energy projects. These include accessibility of common resources, opportunity cost to villagers due to land diversion, adequacy of compensation offered, livelihood impact on land owners as well as non-title holders and relocation of built up structures. Most wind and solar projects lead to employment creation for local community, however the same is limited to unskilled jobs like security personnel, drivers and module cleaners. Moreover, employment tapers steeply as the project moves from commissioning phase to maintenance phase. Another impact is use of fertile land for setting up solar and wind projects which may impact the food security of the nation. Most of the state governments allow purchase and use of agriculture land by way of deemed change of land use to non-agriculture (NA) category.

Project developers have been working for last many years on the ground aptly guided by the state agencies and it would be pertinent to highlight some of the best practices followed in the sector. With regard to land procurement and allotment, some of the SNAs have created land banks and have been sharing land coordinates through their portals. They also offer deemed land use change for the purpose of setting up of solar and wind projects.

Solar Parks, being developed by SECI in coordination with the state governments, facilitates land to the project developers with all necessary approvals. Some of the state

governments, through their agencies, have started single window approval facility to for the investors. In order to ensure prudential use of land, SNAs are earmarking land limits to be considered while allotting land to the solar and wind project developers. In case of delay in project execution, the state governments have been strict in taking back the land to be re-allotted to other companies. MNRE has recently advised the state governments to ensure that the wind projects are developed within 4 years of allotment of revenue land.

Internationally, the Bureau of Land Management in the United States of America encourages projects developers to bid on government-selected tracts with gusty winds and intense sunlight pre-cleared of major environmental conflicts. In many European countries, landowners lease their land to project developers for installing wind turbines enabling them to receive remunerative rentals in range of $1,250 - 5,000 per turbine, besides royalty payments equivalent to 2-6% of the gross project revenue.

The study has estimated the land requirements for the solar and wind sectors under different scenarios. Under the base case scenario, land requirement is around 3.4 lakh acres after considering existing land usage trends. This gets reduced by about 25% after taking into account the following interventions –

a) Using higher wattage solar modules and taller hub-height wind turbines
b) Promoting repowering and re-allotment of unused wind sites
c) Using land neutral technologies like canal tops and floating solar systems
d) Co-locating solar modules in existing wind farms

Based on a thorough assessment of the policies, regulations and field practices, while taking into account views of the stakeholders, the study recommends the following interventions. These interventions shall facilitate land procurement for setting up solar and wind projects while minimizing the impacts on the community.

Policy

- Developing land utilization policy for each state to balance the land requirements of different sectors in an ecologically friendly manner
- Expeditious computerisation of land records
- Prioritizing use of wasteland for solar and wind energy projects, including inter-state projects exporting power to states with low wasteland area
- Developing 'Model Land Lease Agreement' taking concerns of all entities
- Re-allotting sites in case of delay in project implementation
- Using brown-field sites like vintage wind farms and reclaimed mining sites for setting up projects

Technical

- Identifying suitable project sites considering land type, its use, resource potential, latitude, availability of transmission infrastructure, roads. This can include superimposing maps of resource availability, land use, land records and ownership
- Setting up solar-wind hybrid projects in vintage wind farms
- Promoting land-neutral technologies using rooftops, canal tops and floating systems besides encouraging new technologies like solar trackers

Socio-economic

- Conducting 'Social Impact Assessment' for wind farms and solar projects including solar parks above a certain capacity threshold, which could include livelihood and skill development planning for the local community
- Exploring community participation schemes using innovative business models, wherein, landowners can become shareholders in RE companies based on the notional value of their land