

# Integrated renewable energy resource assessment for Gujarat

## Executive summary

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### Introduction

The sources of energy from the conventional sources like coal, oil, natural gas, etc. are limited in quantity and if they were depleted at the present rate of consumption, they will be going to exhaust in the coming few decades. With the development of the mankind, in the present life style, it is very difficult to imagine the life without energy or more precisely without electrical energy. What can be the solution to this? The only answer came to anyone's mind is to think of sources which are non-exhaustible, i.e. renewable sources of energy. Solar, wind, biomass, tidal, geothermal, ocean thermal etc. are the main names in the list of Renewable Energy (RE) sources. Energy security has become more important in the case of developing countries like India because most of such countries heavily depend on the oil imports for their energy demand, and this contributes a lot in terms of the money outflow from the country. India is a big country having different climatic zones in different part of the country, and it is very difficult to point out that this renewable energy source is best for India as the potential of renewable energy sources are heavily dependent on the geography of the location. Government of India (GoI) is putting a lot of efforts in increasing RE share and targets set as 20 GW under national solar mission for 2022 clearly shows government willingness to this. Gujarat is one of the biggest states of the country having a large amount of waste land along with good solar radiation and wind flow for most of the year. Biomass, tidal, geothermal resources are also available in the state. Proper estimation of potential of any renewable energy technology is essential for planning and promotion of the technology. There has been some state level potential assessment of these resources under the Government of India programs for renewable energies. In the present study a focus has been made to go beyond the previous approaches, and an integrated approach has been made for RE potential assessment at the district level, considering the availability of the waste land, water, existing electrical transmission network, gas grid network etc. Geographical Information System (GIS) has been used for land use land cover analysis and identification of wasteland for RE projects mainly the solar and wind power projects and mapping the RE potential over the state.

### Objective

The broad objective of the study is to carry out the Integrated Renewable Energy potential assessment for the state of Gujarat, to develop a renewable energy atlas which can give user a bird's eye view of relative potential of the RE sources at the district level along with existing electrical transmission network, gas grid network, Narmada canal network, and other infrastructures.

### Methodology

For the assessment of renewable energy resource in Gujarat, a logical approach has been adopted. The methodology includes data collection on the previous estimates of Renewable energy potential in the state, analysing those data, finding the shortcoming and need for improvements that can be made on potential assessment methods, and additionally the impact of technology development in to the actual potential. Various government agencies namely GEDA, GIDC, GETCO, CGWB, IMD,

and other relevant institutions have been contacted for collecting the data required for the study. The land use and land cover (LULC) data of Gujarat were collected for the present year and analysed through the Geographic Information System (GIS).

The lands that are appropriate for the installation of solar and wind power projects and the lands having potential for producing biomass had been identified based on the LULC map of the state. The available data for all the RE resources, collected from the secondary sources has been mapped and used for the assessment of district wise RE potential. Since water availability is a concern for the concentrated solar thermal power projects, the study also covered the water availability assessment apart from the grid infrastructure availability. Latest technological development and efficiency improvements have also been considered as an important factor for revised potential assessment.