

RE-Energising Karnataka:

An Assessment of Renewable Energy Policies, Challenges and Opportunities



1. Karnataka: A Leader in Renewable Resources, Laggard in Installed Capacity

Karnataka has about 30,000 MW of officially estimated Renewable Energy (RE) potential, making it one of the country's top five RE-rich states¹. The main RE resources as per these estimates are as shown in Figure 1.



■ Wind ■ Small-hydro ■ Biomass ■ Cogeneration ■ Grid Solar



Despite having a comprehensive state RE policy, Karnataka has lagged behind in RE capacity addition over the past few years, compared to other RE-rich states such as Tamil Nadu, Maharashtra and Gujarat (as shown in Figure 2).



Figure 2:Inter-state comparison of installed RE capacity

2. Objective and Method

Why did we undertake this study?

To identify the key barriers and challenges in the growth of RE in the state and galvanise government action towards increased deployment of RE

What is the basis of our findings?

In addition to secondary research, a detailed stakeholder consultation was conducted with RE developers in the state, industry experts, the state nodal agency, the state electricity regulator and government agencies related to rural electrification through questionnaires and interviews. The stakeholder consultation process helped identify the barriers which curtail growth of RE in the state. Recommendations to overcome these barriers were presented at a national-level stakeholder workshop for feedback.

Who is our primary audience?

Policymakers and stakeholders in the power sector at the state and national level.

3. Karnataka RE Landscape

Karnataka has an installed electricity generating capacity of about 14.3 GW out of which 4.7 GW or 25% (Figure 2) is from RE sources. 10% of the state's utility generation comes from RE sources. The state nodal agency, responsible for RE development in the state-under the purview of the Energy Department — is the Karnataka Renewable Energy Developing Agency (KREDL). KREDL works as a facilitator between industry, finance, government, and technical experts to increase the deployment of RE in the state.

The main state policies governing Karnataka are:

Karnataka RE Policy 2009-2014

It seeks to enhance the contribution of renewables to the overall energy mix in the state, create a favourable investment environment for RE projects, implement energy efficiency measures and achieve commercial viability for RE projects. The main policy features include capacity addition targets from various RE sources, creation of a green energy fund and establishment of a single window clearance procedure.

technologies that are most suitable for Karnataka's development goals.

¹ http://kredlinfo.in/reprogressreport.aspx



Karnataka Solar Policy 2014-2021

In order to increase the growth of solar energy in the state, the Karnataka government introduced a special solar policy aimed at promoting utilityscale, rooftop and off-grid projects. The solar policy has made attractive policy provisions such as encouraging land-owning farmers to install solar plants and establishing a comprehensive rooftop solar with net metering scheme. Karnataka offers an attractive solar rooftop tariff of 9.56 Rs/kWh for unsubsidised systems and 7.20 Rs/kWh for systems availing a 30% central subsidy.

Surya Raitha Scheme (2014)

A scheme launched to encourage famers to install solar panels for their irrigation pumps. Farmers can sell excess electricity produced back to the grid. Tariffs offered for electricity are the same as that of solar rooftop plants; however central subsidies of up to 90% are available for irrigation pump sets.

4. Drivers for RE: Numbers at a Glance^{2,3,4}

20% (11,042 MU) of utility electricity supply was from short-term purchases in FY 13
13.9% (9,092 MU) annual electricity demand deficit (including short term-purchases) in FY 13

4,750 crores annual short term power purchase costs by utilities in FY 13
11 lakh households without electric lighting in FY 11

38-40% of electricity consumed by agricultural sector in FY 147,200 crores agricultural power subsidised by

the state in FY 14

³The Hindu (2014, September2). *Surya Raitha to light up farmers' lives*

⁴Census of India (2011).Source of Lighting:2001-2011

5. Utility-scale Projects: The Way Ahead

The biggest challenge for utility-scale projects in the state has been project implementation i.e. progressing from allocation to actual commissioning. Although 60% (18,014 MW) of the state's RE potential has been 'allocated' by Karnataka Renewable Energy Development Ltd. (KREDL), only about 15% (4,612 MW) has been commissioned. The following recommendations are made in order to ensure timely commissioning of projects based on findings of this study.

Establish Single Window Clearance

Getting permits and clearances for projects is a big hurdle faced by RE developers in the state. Additionally, there is no clarity in what clearances are required. No investor grievance redressal mechanism exists for stalled clearances. These lead to huge delays in project commissioning and the state is unable to meets its own policy targets.

"The nodal agency KREDL instead of being an intermediary, should actively be involved in speeding up statutory approvals, land acquisition process etc."

Indian Wind Power Association, Karnataka Chapter

The following measures should be taken to help ease permitting processes for investors:

•Strengthen KREDL by providing more manpower

•Establish a single window clearance mechanism for investor grievance redressal

•Promote increased co-ordination between district level authorities and KREDL to facilitate clearances and permits

•KREDL should create an official, standardised list of all the permits required to commission and bid for various types of RE projects



Revive Biomass Industry

Although Karnataka has installed over 100 MW of biomass capacity, 70-80% of biomass projects in

²CSTEP (2013). Karnataka Power Sector Roadmap for 2021-22. Bangalore:

the state are non-operational due to inflexible, uneconomical tariffs and lack of robust feedstock supply systems for large scale projects (above 2 MW).

"There is a high potential for biomass projects in the state...Low tariffs make the plants uneconomical."

> Biomass Expert, Centre for Sustainable Technologies, Indian Institute of Science

The following measures should be taken in order to ensure that biomass power plants are viable in the state:

•Karnataka Electricity Regulatory Commission (KERC) should revise biomass tariffs by implementing two-part structure taking into consideration variable fuel costs

•Undertake a detailed district-wise biomass resource survey as a starting point for the deployment of small-scale biomass plants

•Make a policy provision to lease small holdings of revenue wasteland for the growth of captive plantations required for feedstock in small-scale biomass projects (up to 2 MW)



Strengthen Grid Infrastructure

Investors fear that future addition of RE in Karnataka could lead to local-grid saturation in RE rich districts and to grid congestion between power production sites and load centres.

"Pockets where RE potential exists need to be comprehensively studied and adequate network augmentation needs to be done."

Indian Wind Power Association, Karnataka Chapter

The following measures should be taken to strengthen the grid:

•Karnataka Power Transmission Corporation Ltd. (KPTCL) should prepare a long-term transmission plan with a focus on RE-rich districts

•Strengthen intra-state grid infrastructure between RE zones and urban load centres

•Mandate all solar and wind power plants to install data monitoring technologies which provide real-

time RE data to load despatch centres, to enable better grid integration

•Establish RE land banks with required grid evacuation infrastructure to the extent of meeting RPO targets



Enable Land Acquisition

At present, state revenue lands are unavailable for deployment of RE projects in Karnataka, leaving the uphill task of land acquisition to investors. Wind projects which have earlier been allotted state lands, are held up due to unclear reallocation procedures.

"Land acquisition is a major hurdle in Karnataka's solar development and the core issue behind its slow progress in the state."

Senior Engineer, Solar Company

The following measures should be taken to tackle these land acquisition challenges:

•Establish deemed land conversion process for RE projects on private agricultural lands

•Enforce stricter monitoring for projects allocated land by the state

•Reallocate land from delayed projects to serious players

•Issue guidelines for a transparent and timely clearance mechanism of scrub forest lands with increased co-ordination between Ministry of Forest and Environment (MoEF) and state Forest Department

Rs/kWh

Establish Attractive Open Access Regulations

The lack of clarity regarding open access charges make RE power producers cautious to invest in Karnataka. Although some attractive open access provisions are available for RE projects, there is no clarity in the time-frame for which these charges are applicable (except for solar plants), making it hard for power producers to secure financing for their projects.



"The wheeling and banking arrangement is made complicated and is discouraging in the overall context."

Indian Wind Power Association, Karnataka Chapter

The following measures should be taken by the state regulator, KERC to address this concern:

•Encourage open access sales by reducing cumbersome procedures for all RE projects

•Reduce Cross Subsidy Surcharge (CSS) progressively for all RE projects

•Provide clarity on the applicability of concessional wheeling and banking charges for new projects of all RE sources

6. Need of the Hour: Low Land Footprint Technologies

Land acquisition has been identified as the biggest challenge for RE in the state. Hence, the upcoming Karnataka RE policy should ensure effective implementation of technologies which have a small land footprint such as waste to energy, solar rooftop, solar pumps and small-scale biomass projects.



Formulate Supportive Policies

There has been limited support by the state to encourage the deployment of low land footprint RE technologies (notable exception is solar rooftop).

"KREDL is often focused on larger-scale renewable energy programs and has not actively promoted sustainable models for smallscale technologies. The concentration is on wind and solar megawatt scale plants."

Principal Analyst, Off-grid Policy Foundation

The following measures should be taken to provide adequate support to the growth of low land footprint technologies:

•Form a comprehensive waste to energy policy which encourages state-level projects

•Mandate municipal authorities to regularly collect data on the collection and disposal of waste

•Introduce a cess on garbage collection that can be used to invest in segregation machinery

•For rooftop solar plants, encourage innovative schemes within ESCOMs such as rebates on electricity bills instead of consumers having to collect their dues for net injection into the grid



Constitute State-level RE Fund

Although Karnataka has a comprehensive policy and attractive rooftop tariffs, there has been reluctance to install rooftop power plants in the state due to concerns that Electricity Supply Companies (ESCOMs) might not have sufficient payment capacity.

"We are very keen to be involved in the Karnataka rooftop space...However a good net metering system and guarantee of payments by ESCOMS would increase investor trust."

Associate Manager-Business Development, Solar Company

In order to increase investor trust the following should be done by the state:

•Constitute a state RE fund. Utilities should draw a comprehensive set of projects that can utilise this fund for low-cost finance. This can include energy efficiency schemes, grid-connected low land footprint projects and rural RE technologies

•Karnataka should request the next Finance Commission to provide grants to states based on their achievements in meeting RPO targets. These funds can be used in the state RE fund

7. Rural Electricity Supply: Increase Role of RE Technologies

In order to address issues of un-electrified and under-served rural populations as well as the increasing agricultural subsidy, the state government needs to take action towards deploying RE technologies in rural areas. Solutions such as solar pumps and RE technology based community mini-grids/household systems can play an important role in this effort.



Create Roadmap for Rural Electrification

RE solutions can help in addressing issues of underserved and un-electrified remote hamlets. However no state-level plan currently exists to promote RE deployment for domestic rural electrification.

"The state government should focus more on electricity access."

Principal Analyst, Off-grid Policy Foundation

In order to deploy more RE in rural areas, the state government should do the following:

•Implement a state-level action plan which has a target-driven approach for un-electrified rural populations which are not catered by the central Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) scheme



Improved Financial Support

In rural areas of Karnataka, there is a need for good quality electricity services, and although there is willingness to pay, lack of supportive low-cost finance hinders off-grid rural RE projects.

"Good financing mechanisms such as low interest rate loans and generation based incentives should be implemented. Banks should be open to financing off-grid technologies and this should be a priority area."

Off-grid Biomass Expert, Centre for Sustainable Technologies, Indian Institute of Science

The following measures should be taken to improve the financing environment of the state:

•Give financial support from the state RE fund to rural regional banks (RRB) in order to provide low interest loans for rural electricity projects

•ESCOMs should use revenue subsidy models such as Build, Own and Operate (BOO) to promote power

projects in un-electrified hamlets which do not fall under central schemes. Finances can come from the state RE fund

•KERC should provide risk mitigation for off-grid power projects in the eventuality of grid extension by declaring bulk-purchase rates

• State-level VAT should be discontinued for smallscale rural RE technology projects



Develop O&M Skill and Capacity

The dearth of technically trained personnel to operate and maintain rural RE projects poses a great challenge for operational sustainability of these projects. In order to ensure that investments made into small-scale rural electrification are not wasted, the state needs to invest in a strong skilled force.

"As there is a lack of trained personnel to handle O&M of equipment once they are installed, often the systems fall to disuse... communities should be given advanced support in terms of training programmes."

Principal Analyst, Off-grid Policy Foundation

The following measures should be taken to develop technical skill for rural RE technologies:

•KREDL should work with organisations such as Mahatma Gandhi Institute for Rural Energy and Development (MGIRED) to develop a curriculum for small-scale RE technologies and implement these courses in state industrial training/rural institutes

•KREDL should link up with local government authorities and Non-Government Organisations (NGO) to form a viable operational plan for off-grid projects



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