

STATE SPECIFIC ACTION PLAN

Jharkhand Renewable Energy Development Agency

Name of the Project: Capacity Building of SNAs and Other Key Stakeholders for Promoting
RET based Off-Grid Solutions for Electrification in Rural Areas

Contract No: 11/15/2013/PMU/WB-2

Funding Agency: Ministry of New and Renewable Energy, GoI / World Bank

Consultant: World Institute of Sustainable Energy, Pune

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EXECUTIVE SUMMARY

The State Nodal Agencies (SNAs) originally were responsible for implementing the Ministry of New and Renewable Energy (MNRE) sponsored subsidy-driven renewable energy programs /schemes, mostly centered on stand-alone renewable energy devices such as solar home lighting systems, bio-gas plants, etc. Therefore, the SNAs were structured and equipped to handle RE-based off-grid programs mostly using stand-alone RE devices / systems by distribution of subsidies/grants received from MNRE. With the change in policy scenario, MNRE wants SNAs to enhance their capabilities for taking on bigger responsibilities and perform their role in up-scaling of off-grid RE programs with the help of private entrepreneurs with sustainable market approaches. The key barriers for up-scaling and large-scale commercialization of RE-based-off-grid programs for energy access as identified by MNRE are the weak institutional and individual capacities of the SNAs.

To overcome this, MNRE and the World Bank has commissioned SNA capacity building study, wherein the consultant is required to undertake a study on capacity building of SNAs and other key stakeholders to enhance their understanding and vision in implementing RET based off-grid programs with the help of private entrepreneurs. WISE has been awarded the work of capacity building of SNAs in the states of 1) Uttar Pradesh 2) Bihar 3) Jharkhand and 4) West Bengal. The study has been broadly divided into two parts – Stage 1 and Stage 2. During Stage 1 of the study, the consultant is required to prepare state specific action plans (SSAP) for each of the states awarded for study. While preparing the SSAP, the consultant has to look into the key functional areas of the SNA, namely (i) program planning and program implementation (ii) organization structure and human resource (iii) financial management and governance structure (iv) policy and regulatory framework. The scope of work under Stage 2 involves actual implementation of the short-term interventions proposed in the SSAPs. Stage 2 of study involves holding minimum of two combined skill up-gradation and training programs for the personnel of 4 states and other stakeholders to meet the requirement of skilled manpower for the development of rural energy access projects followed by a concluding workshop at the end of the study.

As part of the study, the consultant had made visits to the SNA and interacted with the key officials. Necessary information and supporting documents were collected from the SNA to know the present state of working in the key functional areas and program implementation practices followed. Subsequent to the visit, the consultant had reviewed the functioning of the SNA in the key functional areas by examining the data collected from the SNA. Wherever necessary, more information / clarifications were sought from the designated officers of the SNA. A diagnostic review report has been prepared for the SNA identifying the gaps/ short comings in the key functional areas of the SNA. Based on the diagnostic review report, a state specific action plan (SSAP) has been prepared. Following interventions / measures have been suggested in the key functional areas of the SNA so as to enhance capacities of the SNA, and adequately prepare it for scaling up RET based off-grid programs in the state.

PROJECT PLANNING AND PROJECT IMPLEMENTATION

- ▶ JREDA needs to impart necessary training to its staff to undertake renewable energy potential assessment / mapping the potential areas for implementation of various RET

based off-grid systems / solutions across the districts / regions in the state. The necessary application software like PV-syst, GIS tools, METEONORM database should be made available to the staff by the SNA.

- ▶ JREDA should take the initiative in developing web-based online Grievance Redressal System for recording complaints from the beneficiaries about the RET based off-grid systems / application installed by the SNAs through a toll free telephone number which is further integrated with web-based complaint management system. This mechanism shall ensure both recording of the complaints and timely action for rectification of the fault / problem noticed in the RET based systems/ applications. The data stored in the online system can be further analyzed to know how efficiently a particular RE based off-grid system / application is working on the field. Such a user-friendly online interface created for end users /beneficiaries to communicate with the implementing agency will bridge the communication gap, and build confidence in the end users about the RET based off-grid applications.
- ▶ The consultant has designed the web-based Online Complaint Registration and Grievance Redressal System for JREDA. The detailed design and process flow diagram for the application is provided in **Annexure 1** of this report. The consultant proposed to support JREDA in implementing this intervention in Phase II of the project.
- ▶ The SNA shall set up an accreditation program for all off-grid renewable energy manufacturers, system integrators, developers, and O&M services providers, consultants, etc., from the state so as to create a database and ensure the adherence to the requisite regulations.
- ▶ The SNA shall involve engineering colleges / polytechnic institutes from the state in conducting the testing of the RET based system/equipments on regular basis to ensure adherence to standards specified in the tenders floated for various works.
- ▶ The consultant has developed a training module / program structure for conducting training on O&M of solar PV based off-grid systems / applications in the field for the technicians and field staff of SNA. This will facilitate the non-technical staff of SNA to equip themselves with the technology and the O&M of small off-grid PV systems. The detailed program contents of the training module are enclosed as **Annexure 2** of this report.
- ▶ JREDA should formulate strategies for effective operation and maintenance of RET based off-grid systems / projects by involving local NGOs, self help groups (SHGs), etc. The local people need to be trained to look after the operation and maintenance of RET based off-grid systems / solutions installed in their area, open supply outlets for spare parts in the rural areas. This will facilitate the O&M of RET systems, as well help to propagate the information at the grassroots level.
- ▶ SNA website should include information related to past projects which can be made available to the public. The mechanism for monitoring of such a system is also required to be developed.
- ▶ A reference document giving details of standard guidelines for preparation of feasibility report / DPR study for mini-grid projects, etc., should be prepared. This document should outline the standard methodology for site survey, RE potential assessment, demand survey, socio-economic survey, selection of RE technology and sizing of mini-grid power plant, design of power distribution network and techno-economic viability check for such projects.

ORGANIZATION STRUCTURE AND HUMAN RESOURCE

- ▶ The consultant has suggested restructuring of the organization by keeping in mind the various RET based programs being implemented by the SNA at present. Attempt has been made to bring technology specific / programs of similar nature under one head which will be looked after by the in-charge project officer. The proposed restructuring of the organization, when adopted shall bring simplicity in program implementation and ultimately result in scaling up of RET based programs in the state. The consultant has studied the existing structure of JREDA along with its proposal submitted to the state government, and finally proposed a revised structure for JREDA.
- ▶ At present there is no clear written job responsibility defined for each staff. The consultant has proposed a brief job responsibility against the proposed manpower in the revised organogram.
- ▶ The SNA do not have technical staff on its pay roll; the present technical staff working in the SNA is on deputation. Therefore the SNA needs to recruit fresh manpower on priority.

FINANCIAL MANAGEMENT AND GOVERNANCE STRUCTURE

- ▶ The state government may levy and collect a 'Green Cess' of 3 to 10 paise per unit on electricity consumed by industrial and commercial users to create a state-level clean energy fund for promoting RE. This fund can partly be utilized by the SNA for meeting its plan and non-plan expenditures, and partly for creating the common infrastructure. The consultant shall assess the potential of creation of Green Cess in the state. The detailed note in this regard is prepared as **Annexure 3**.
- ▶ A Citizens' Charter represents the commitment of the organization towards standardized, high-quality and timely service delivery. At present, JREDA does not have any such document in place. It is proposed that the SNA should have its own Citizens' Charter and the same should be published on its website. The detailed note in this regard is prepared as **Annexure 4**.
- ▶ At present, the SNA is dependent on the state and the central funds for plan and non-plan expenses. The delay in such cash flows hampers the operations of the SNA. Further, the present functioning of the SNA does not include any revenue generation activities for funding its operations. Hence, in order to ensure long-term financial sustainability of the organization, the SNA should start revenue generation activities by investing in grid-connected power projects. JREDA can set up MW-scale solar power projects to ensure continuous revenue to meet its non-plan expenses. The detailed note for preparation of DPR for setting up of captive solar power projects is prepared as **Annexure 5**.
- ▶ JREDA should have its own MIS for effective implementation and monitoring progress of its activities by the senior staff.

POLICY AND REGULATORY FRAMEWORK

- ▶ The SNA can take initiative and file a petition before SERC for issue of draft regulations on operation of RE based mini-grid projects in DISCOM franchisee mode as per model guidelines issued by the Forum of Regulators. The SNA can also petition for tariff determination of RET based mini-grid projects in the state. This will bring clarity on operation of the project in case of extension of centralized grid to such project areas.

- ▶ After studying the status of unelectrified households, and after assessing the quantum of financial incentive that could be made available from the state government, an annual capacity addition plan and financial incentive policy can be drafted. The proposed five year plan (2012-17) and the financial provisions requested from the state government can be included in the off-grid RET policy. This will help the stakeholders to understand the target and the availability of financial incentives for implementation of off-grid RETS based system in the state. The stakeholders can then synchronize their plans and efforts toward achieving the same.

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1 INTRODUCTION

1.1 ABOUT THE STATE

Jharkhand is a state in eastern India having rich natural resources. The state was formed on 15 November 2000 after bifurcating Bihar and became the 28th State in India. The state has 24 districts and 29,492 revenue villages. The state has a population of 32.96 million. 75% of its population lives in rural areas, and the rest in urban areas. Agriculture is the main source of employment in the state. 28% of the state's population comprises of tribal people, 12% scheduled castes, and others make up the rest 60%. The state has been at the centre of the Naxalite insurgencies.

Resources

About 30% of the total geographic area of the state falls under forests, comprising forest tracks of Chota Nagpur Plateau and Santhal Pargana. This region is hilly and thickly wooded, and not suitable for agriculture. Of the total forest area, 18% is reserved forest, 79% is protected and remaining 3% is unclassified.

Jharkhand is rich in natural resources which include iron ore and coal. The iron ores are located in Chiria in Singhbhum District, and coal resources are spread over Jharia, Bokaro, Rajmahal, Hazaribagh and Chatra districts. Apart from the above resources, the state has good resource availability of limestone in Palamau, Hazaribagh, Singhbhum and Ranchi districts.

State Energy Scenario

The total installed power generation capacity of the state as on 31.12.2014 is of 2589.86 MW including the central allocation. Most of these projects are based on coal except 20.05 MW which comes from renewable energy mainly from solar and small hydro power (SHP). The detailed capacity and allocation is as follows:

Table 1 Installed and allocated power generation capacity (in MW)
for the state of Jharkhand

Sector	Thermal				Nuclear	Hydro	RES	Total
	Coal	Gas	Diesel	Total				
State	1190.00	0.00	0.00	1190.00	0.00	130.00	4.05	1324.05
Private	900.00	0.00	0.00	900.00	0.00	0.00	16.00	916.00
Central	268.88	0.00	0.00	268.88	0.00	70.93	0.00	339.81
Total	2358.88	0.00	0.00	2358.88	0.00	200.93	20.05	2579.86

(Ref: CEA website) (As on 31.12.2014)

Electrification Status

The village electrification data as per CEA and the household electrification as per the 2011 Census data are as follows:

- ▶ Number of Villages Electrified : 27,167 (as on July 2014)
- ▶ Number of Un-electrified Villages : 1298 (0.004%) (as on July 2014)
- ▶ Number of Households : 61.81 lakhs (as per census 2011)

- ▶ Number of Households Electrified : 28.30 lakhs (45.8%) (as per census 2011)
- ▶ Number of un-electrified Households : 33.49 lakhs (54.2%) (as per census 2011)

It can be seen from the above data that around 54% of households do not have access to electricity. However, some of these may be covered under the Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) scheme. However, there the number of un-electrified household is still huge, and these can be electrified through locally available renewable energy sources.

State RE potential

Jharkhand has around 8,560 MW of power generation potential from renewable energy sources. As against this potential, only 20.05 MW capacity RE projects have been installed so far. The renewable energy resource-specific potential and installed capacity for the state of Jharkhand is given in the following table:

Table 2 Jharkhand State Renewable Energy Potential and Installed Capacity (in MW)

Sr. No	Renewable Energy Resource	Potential	Installed Capacity
1	Wind	91	Nil
2	Solar	18,180	16
3	Biomass	67	Nil
4	Bagasse co-generation	NA	Nil
5	Municipal Solid Waste	14	Nil
6	Small Hydro Power	208	4.05
7	Geothermal	NA	Nil
	Total	18,560	20.05

Of the available RE sources, solar is the prominent one, while small potential exists for biomass and hydro resources. Apart from these resources, there is a good potential for geothermal energy in the state. In Jharkhand, thermal springs are found in Tatta-Jarom of Palamau district and Surajkund, Duari, Bagodar of Hazaribag district. The thermal springs found in Hazaribag district are grouped in the Damodar valley graben geothermal province. The geothermal resource potential has not been assessed so far.

As far as the electrification of un-electrified households is concerned, solar has a good potential for use in small community-based distributed micro-grid based power projects or individual household-based power plants.

1.2 SCOPE OF WORK

WISE has been awarded the work of capacity building of SNAs in 'Block A' states comprising 1) Uttar Pradesh 2) Bihar 3) Jharkhand and 4) West Bengal. The scope of the work as agreed between MNRE and WISE, as given under the Request for Proposal (RFP) and the contract signed between MNRE and WISE is elaborated below:

Stage-I: Preparation of State Specific Action Plan (SSAP)

- ▶ Undertake diagnostic review of 4 states i.e. Uttar Pradesh, Bihar, Jharkhand and West Bengal.
- ▶ Sensitize the SNA management and state government on the critical issues that may exist in various functional areas, specifically governance structure, autonomy, available skills, etc.
- ▶ Identify priority areas for capacity building and institutional strengthening.
- ▶ Develop a State Specific Action Plan (SSAP) for the four states.

Stage –II: Implementation of the State Specific Action Plan (SSAP)

- ▶ Implementing a maximum of three short term interventions on organizational strengthening for the states which would be identified as quick wins from the previous stage.
- ▶ Holding minimum of two combined skill up-gradation and training programs for the personnel of 4 states and other stakeholders to meet the requirement of skilled manpower for the development of rural energy access projects.
- ▶ Holding final workshop in each state.

1.3 APPROACH AND METHODOLOGY

The precise objective of MNRE behind commissioning this study is to **undertake capacity building of SNAs and prepare them for promoting RET based Off-grid solutions for electrification in rural areas in more innovative ways**. Traditionally, in India, the rural electrification program has been based predominantly on extension of centralized grid through RGGVY scheme. However, progress in household electrification under RGGVY has remained slow due to high cost of grid extension to remote areas, low paying capacity of the consumers, and limited electricity demand in such areas. It is therefore advisable to extend the central grid only where it makes economic sense; alternatively following two off-grid RE options are advisable:

- ▶ Promote off-grid RE based energy access solutions for electrification of rural areas like solar home lighting in sparsely populated areas with weak demand potential.
- ▶ Promote RE based decentralized distributed generation and supply projects (mini-grids) in villages outside the reach of central grid where agriculture/commercial demand can come up in the future.

The consultant had therefore focused attention on the areas mentioned in (i) and (ii) above, while collecting the data as well as developing the diagnostic review report of the SNA. The State Specific Action Plan (SSAP) being developed by the consultant shall be directed towards capacity building of individual officials together with **strengthening of the institution for effective scaling up of the off-grid energy / electricity access projects**.

Methodology

As part of the study, the consultant visited the SNA for data collection and interacted with the key officials of SNA. The consultant had earlier designed the questionnaire / data collection format for collecting the data on the key functional areas of the SNA viz organization structure and HR, project planning and project implementation, financial management and governance

structure, and policy and regulatory framework prevailing in the state. Prior to visiting the JREDA office (15-17 December 2014), the consultant circulated the questionnaire. The Project Director of JREDA designated as the nodal officer for this study helped the WISE team in collecting the requisite data / information. During the visit, discussions were held with the Director and other key technical staff of JREDA to look after the implementation of different RE programs. Information was collected along with supporting documents on key functional areas with respect to the RE programs being managed by JREDA, with special focus on RET based off-grid programs for electricity / energy access.

Preparation of Diagnostic review Report

Subsequent to the visit to the SNA, the consultant reviewed the functioning of the SNA in the key functional areas by examining the data collected. Wherever necessary, more information / clarifications were sought from the designated officers of the SNA over telephone. The consultant had critically examined the present organization structure, human resources, project planning and project implementation procedures followed, financial management and governance structure, and policy and regulatory framework that prevails in the state from the point of view of promotion of RET based off-grid solutions / systems in rural areas. A diagnostic review report was developed highlighting the gaps/ shortcomings noticed in the key functional areas of SNA which the consultant felt are directly or indirectly hampering the scaling up of RET based off-grid RE programs in the state.

Preparation of State Specific Action Plan

The State Specific Action Plan (SSAP) has been prepared to overcome the gaps / issues identified in the diagnostic review analysis. The SSAP clearly specifies the suggestions / interventions required to overcome the issues / gaps identified in the key functional areas of the SNA. The draft SSAP will be presented before the SNA for incorporating their suggestions before finalizing it. Three short-term interventions from the SSAP will be selected for implementation after taking the consent of MNRE and the SNA. The consultant shall help the SNA in implementing the three short-term interventions.

Training Program and concluding workshop

The consultant will organize two training programs for capacity building of the SNAs and other key stakeholders. The concluding workshop will be organized at the end of the project to share the findings and experience.

2. PROJECT PLANNING AND PROJECT IMPLEMENTATION

JREDA is implementing renewable energy based projects and programmes sponsored/supported by MNRE, state government through the state budget, MP/MLA funds and funds from different state government departments. At present, there are few grid-connected solar PV projects in the state, and the SNA is exploring the possibilities of setting up more such projects. JREDA has identified some of the potential small hydro sites, and these are being considered for development through private participation.

JREDA is more active in implementing RE based off-grid projects in the state, especially solar PV based off-grid systems / applications. The off-grid programmes implemented by JREDA include solar street lights, solar lanterns, solar home lighting systems, solar stand-alone power plants, solar based charging stations, etc.

JREDA is following the MNRE-approved standard technical specifications at the time of bidding. The SNA does not prepare program-specific tender document for calling bids for implementation of different RET based off-grid programs. They have a standard tender format and the same is modified appropriately as per the requirement. The SNA implements RET based programs on behalf of other state government departments by utilizing funds available with respective departments. While implementing such programs, JREDA invites tenders, evaluates the same, issues Letter of Intent and monitors the implementation work. At present, JREDA receives funds from the Education Department, Health Department, Forest Department, District Collectors, MLA/MP funds, District Dairy Development Officers, GAD Budget (Police), District Jails, Government Schools, etc., for implementation of various RET based off-grid programs/schemes in the state. The tenders are structured so as to ensure five years of operation and maintenance by equipment suppliers. The technical staff and field technicians of JREDA visit and undertake periodic verification of the RE installations on sample basis. JREDA also conducts third party verification and monitoring of the system's performance through separate contracts.

JREDA has identified around 68 potential sites for installation of small hydro projects in the state, out of which only eight sites were found techno-economically feasible. JREDA has invited tenders for development of these small hydro power projects through private sector participation.

The Bureau of Energy Efficiency (BEE) has appointed JREDA as the designated agency to implement energy efficiency projects and programmes in the state. An Executive Engineer who is in-charge of the administrative department is also made responsible for implementation of energy conservation programmes in the state. Apart from the in-charge Executive Engineer, JREDA does not have any other technical staff to look after the state's energy conservation activities. BEE is extending financial support to the SNA for recruitment of additional manpower for effective implementation of the programs run by the BEE. For deputing technical staff with financial assistance from BEE, JREDA had invited tenders for supply of manpower for executing the work of energy conservation in the state. However, the selected bidder failed to supply the requisite manpower services to JREDA, and hence the technical staff is not available for implementation of the EC/EE activities.

JREDA is also the designated agency for implementation of decentralized distributed generation projects (DDG) under the RGGVY scheme of the Ministry of Power. Under the DDG scheme, JREDA had prepared several DPRs through consultants for electrification of un-electrified villages/hamlets through RE sources. These DPRs have been forwarded for approval to the Rural Electrification Corporation. Apart from these, no other RE based micro-grid projects have been proposed in the state.

2.1 DIAGNOSTIC REVIEW AND IDENTIFICATION OF CRITICAL GAPS

- ▶ There is ample potential for implementation of RET based off-grid projects based on solar and SHP resources in the state. The Government of Jharkhand therefore needs to strengthen JREDA for effective implementation of such programs. The current permanent manpower, especially the technical persons are inadequate to look after, monitor, and up-scale the programs.
- ▶ JREDA do not have prepared model document / guidelines for preparation of DPR / feasibility study for RET based off-grid projects in the state
- ▶ The database with regard to RET based off grid projects/systems installed in the past is not centrally maintained by JREDA. Further, performance monitoring of RET based systems / projects is carried out on sampling basis. The implementing agencies have the O&M obligation up to five years from the date of commissioning of such projects. During this period, the beneficiaries do not have any forum to present their grievance and complaints regarding non-functioning of such systems due to faults. The only means available with the beneficiaries is to contact the local technician deputed by the supplier, since there is no monitoring and surveillance by JREDA.
- ▶ JREDA is implementing only grant-based projects.
- ▶ None of the DDG projects whose DPRs were prepared by the SNA have been commissioned or implemented by the SNA.
- ▶ JREDA's activities in implementing the Energy Efficiency / Energy Conservation projects are limited due to non-availability of manpower, and the available funds from BEE are unutilized. .

2.2 SUGGESTED INTERVENTIONS AND ACTION PLAN

- ▶ JREDA needs to impart necessary training to its staff to undertake renewable energy potential assessment / mapping the potential areas for implementation of various RET based off-grid systems / solutions across the districts / regions in the state. The necessary application software like PV-syst, GIS tools, METEONORM database should be made available to the staff by the SNA.
- ▶ JREDA should take the initiative in developing web based online Grievance Redressal System for recording complaints from the beneficiaries about the RET based off-grid systems / application installed by the SNAs through a toll free telephone number which is further integrated with web based complaint management system. This mechanism shall ensure both recording of the complaints and timely action for rectification of the fault / problem noticed in the RET based systems/ applications. The data stored in the online system can be further analyzed to know how efficiently a particular RE based off-grid system / application is working on the field. Such a user-friendly online interface created for

end users /beneficiaries to communicate with the implementing agency will bridge the communication gap, and build confidence in the end users about the RET based off-grid applications.

*The consultant has designed the web based online complaint registration and grievance redressal system for JREDA. The detailed design and process flow diagram for the application is provided in **Annexure 1** of this report. The consultant proposed to support JREDA in implementing this intervention in Phase II of the project.*

- ▶ The SNA shall set up an accreditation program for all off-grid renewable energy manufacturers, system integrators, developers, and O&M services providers, consultants etc., from the state so as to create a database and ensure the adherence to the requisite regulations.
- ▶ The consultant has developed a training module / program structure for conducting training on O&M of solar PV based off-grid systems / applications in the field for the technicians and field staff of SNA. This will facilitate the non-technical staff of the SNA to equip themselves with the latest solar PV technology and the O&M of small off-grid PV systems. The detailed program contents of the training module are enclosed as **Annexure 2** of this report.
- ▶ The SNA shall involve engineering colleges / polytechnic institutes from the state in conducting testing of the RET based system/equipments on a regular basis to ensure adherence to standards specified in the tenders floated for various works.
- ▶ JREDA should formulate strategies for effective operation and maintenance of RET based off-grid systems / projects by involving local NGOs, and self help groups (SHGs). The local people need to be trained to look after the operation and maintenance of RET based off-grid systems / solutions installed in their area, and open supply outlets for spare parts in the rural areas. This will facilitate the O&M of RET systems, as well as help to propagate the information at the grassroots level.
- ▶ SNA website should include information related to past projects which can be made available to the public. The mechanism of monitoring of such a system is also required to be developed.
- ▶ A reference document giving details of standard guidelines for preparation of feasibility report / DPR study for mini-grid projects, etc., should be prepared. This document should outline the standard methodology for site survey, RE potential assessment, demand survey, socio-economic survey, selection of RE technology and sizing of mini-grid power plant, design of power distribution network and techno-economic viability check for such projects.

3 ORGANIZATION STRUCTURE AND HUMAN RESOURCE

The Jharkhand Renewable Energy Development Agency (JREDA) is incorporated as a society under the Societies Registration Act, 1860, in the year 2001 under the administrative control of the Department of Energy, Government of Jharkhand. JREDA was established as per the objective of the erstwhile BREDA (nodal agency for undivided state of Bihar). JREDA is also the designated agency for implementation of the energy efficiency programmes in the state under the aegis of the Bureau of Energy Efficiency (BEE), Govt. of India.

Governing Council and Human Resource

The Principal Secretary, Department of Energy, Government of Jharkhand, acts as the Chairman of the Governing Council of JREDA. The organization is headed by the Director nominated by the Government of Jharkhand. At present, besides the Director, the SNA has total 6 nos of technical staff on its roll. All the technical staff operates from the head office in Ranchi. Apart from the technical staff, JREDA has 18 technicians on its roll. Out of the 18 technicians, 14 have been deputed at district offices, while the remaining 4 are working in the head office. Other than these technicians, 7 support staff are working on contract basis, and 1 support staff has been outsourced at the head office.

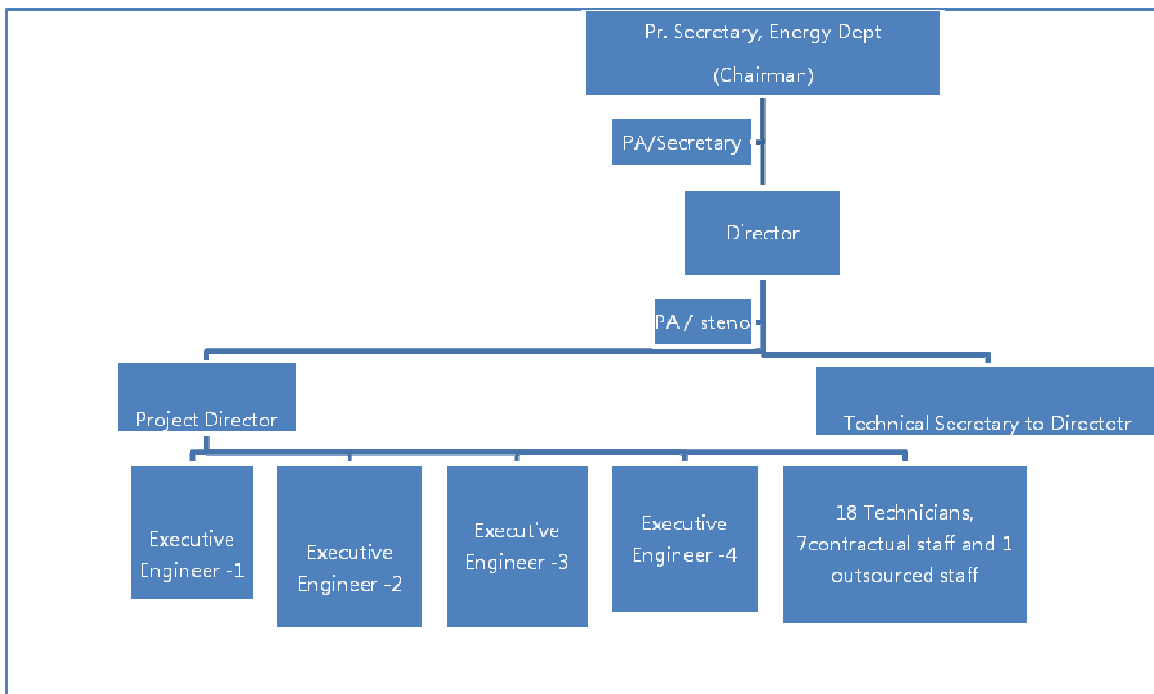


Figure 1: Present Organization structure of JREDA

Key technical staff supporting the Director includes one Technical Secretary who is of the rank equivalent to an Executive Engineer (EE)/Superintendent Engineer (SE) of Jharkhand State Electricity Board (JSEB). The Project Director who is of the rank equivalent to that of a Superintendent Engineer (SE) of JSEB oversees all technical, administrative and financial matters in the JREDA. At present, the key staff of the SNA includes Director, Project Director, Technical Secretary to Director and four Executive Engineers deputed from JSEB / Energy

Department, Government of Jharkhand holding the additional charge in the SNA. The four Executive Engineers deputed at the SNA are looking after the work of administration, solar off-grid projects, bio-gas plants, biomass based power projects, grid-connected solar power projects, DDG projects under RGGVY, and energy efficiency related work.

In addition to the technical staff mentioned above, following non-technical / supporting staffs have been deployed at JREDA.

- ▶ Computer operators/assistants – 2 Nos. (On contract)
- ▶ Computer operators/assistants – 1 Nos. (Outsourced)
- ▶ Drivers – 3 Nos. (Permanent)
- ▶ Drivers – 2 Nos. (On Contract)
- ▶ Technicians – 18 Nos. (Permanent)

The 18 technicians are the permanent employees of JREDA and were transferred from the Bihar Renewable Energy Development Agency (BREDA) at the time of separation of the two states. Most of the technicians working in JREDA are 10th/12th standard pass outs, and do not possess any technical qualification. Out of 18 technicians, 4 are deputed at the head office to assist the head office staff, while the remaining 14 technicians are deputed to different districts and report to the District Development Commissioners (DDCs). The field technicians are trained to undertake the field surveys, and operation and maintenance of biogas plants. These technicians now conduct field verification of solar systems implemented in their districts. Besides, 3 computer operators/assistants employed on contractual basis/through outsourcing are supporting the technical staff at the head office.

Office Building and Infrastructure

JREDA office is presently accommodated in rented premises and occupies one floor of the building owned by the Jharkhand State Load Dispatch Centre. The Head Office has sufficient space for the existing manpower. The office has a conference hall, reception and a mini-canteen. There is no supervisory officer at field level to monitor the work of technicians. The technicians deputed at different district headquarters are sitting in the office of District Divisional Commissioner (DDCs). JREDA follows the recruitment and service rules of the state government. However, since its formation, JREDA has not done recruitment for any cadre. The existing technical staff of the SNA has been deputed from JSEB or the state energy department. The supporting staff are employed either on contract basis or are outsourced. The present Director/Project Director and other senior technical staff have completed 3 years of service with JREDA.

3.1 DIAGNOSTIC REVIEW AND IDENTIFICATION OF CRITICAL GAPS

- ▶ The SNA has limited manpower at present. The four Executive Engineers in the head office are overseeing implementation of various RET based grid-connected and off-grid programs / schemes in the state. As per the present organization structure of JREDA, there are no separate departments to look after the project, administration, finance, planning related activities.

- ▶ The present technical staff is not on the permanent pay roll of JREDA. All technical officials working in JREDA are temporarily deputed from JSEB or the Energy Department, Government of Jharkhand. In such a situation, there is the risk of the trained manpower returning to their parent departments leaving no permanent assets to JREDA.
- ▶ The SNA has prepared the Business Plan for the 12th Five Year Plan period specifying the targets for implementation of different types of RET based programs / schemes in the state. The present manpower available with JREDA seems to be inadequate to implement the scale of RET based programs envisaged in the business plan.
- ▶ JREDA does not have field-level officers to supervise / monitor the implementation work at the field level. At present, the 14 technicians deputed at offices of various District Divisional Commissioner (DDC) / District Magistrate are responsible for carrying out work at the field-level. The technicians are not technically qualified. No periodic skills up-gradation programs have been conducted for them, and therefore they have limited exposure to new developments in the technology and RE sector. The technicians deputed at field offices / head offices need to be trained to undertake the work related to installation, monitoring, performance analysis of off-grid solar PV projects / systems installed in the state.
- ▶ The SNA does not have a library facility at its head quarters.
- ▶ At present, the main focus of JREDA is on implementation of off-grid solar programmes. However, if adequate manpower and infrastructure is provided, other RET based off-grid programs can also be implemented in the state.
- ▶ The present technical staff requires training in the area of regulatory affairs, tariff determination and project financials, etc.

3.2 SUGGESTED INTERVENTIONS AND ACTION PLAN

- ▶ The consultant has suggested restructuring of the organization by keeping in mind the various RET based programs being implemented by the SNA at present. Attempts have been made to bring technology-specific / programs of similar nature under one head which will be looked after by the in-charge project officer. The proposed restructuring of the organization, when adopted shall bring simplicity in program implementation and ultimately result in scaling up of RET based programs in the state. The consultant has studied the existing structure of JREDA along with its proposal submitted to the state government and finally proposed a revised structure for JREDA.
- ▶ At present the administration section has not prepared a document clearly specifying the role and responsibility of the staff working in the SNA. The consultant has spelt out the roles and responsibilities of the individual staff in the revised organogram suggested in the SSAP.
- ▶ The SNA does not have technical staff on its pay roll; all the present technical staff is on deputation. The SNA will have to recruit fresh manpower on priority. Further, the newly recruited personnel will have to undergo focused training so as to equip themselves adequately to perform their duties. In view of this, the consultant has proposed different sets of training programs to suit the needs of the staff of the SNA.

Proposed Organization Structure and Manpower

During interactions with the Director, JREDA, it was learnt that the SNA has submitted a proposal to the Government of Jharkhand for sanction of permanent staff for the SNA. However,

the proposal has not been approved by the government yet. The Director, JREDA, during discussions asked the consultant to study the proposal submitted by JREDA and provide suggestions on the organization structure and manpower requirements by considering the responsibilities and the work the SNA has to undertake in future, including scaling up of RET based off-grid programs / schemes in the state. The manpower proposed by JREDA in the proposal forwarded to government is given below:

Technical Staff: (Total: 53 Nos)

- a. Chief Engineer : 1 No
- b. Superintending Engineer: 2 Nos
- c. Executive Engineer : 9 Nos
- d. Assistant Engineer:17 Nos
- e. Junior Engineer: 24 Nos

B) Financial Staff: (Total: 4 Nos)

- a. Finance Controller:1 No
- b. Accounts Officer:1 No
- c. Account Assistant: 2 Nos

C) Administrative Staff: (Total: 35 Nos)

- a. Administrative Officer: 4 Nos
- b. Assistant: 8 Nos
- c. Personal Assistant / Steno: 1 No
- d. Technicians: 18 Nos
- e. Adeshpal : 4 Nos

Overall, the proposal submitted to government has proposed a total 92 Nos of permanent staff, with 53, 4 and 35 numbers of staff required for the technical, finance, and administrative sections respectively.

Restructuring the Organogram:

Director, JREDA has asked to re-work the manpower requirement plan for JREDA in order to prepare the SNA to undertake new responsibilities in the future. The consultant has carefully studied the proposal submitted by the SNA to the state government. After studying the functional areas of JREDA and the new areas in which the SNA has to work in the future, the consultant feels that

- ▶ With increasing inputs to the renewable energy and energy efficiency sector, the work load of JREDA would increase considerably in future.
- ▶ It is advisable to have specific wings /departments in the SNA for activities like grid-connected projects, off-grid projects, administration and finance, and energy conservation.
- ▶ Skilled manpower is also required to undertake activities like grid-connected solar project development, infrastructure development, own demonstration projects, publicity and communication, IT, data analysis, exhibitions, policy and regulatory matters, budget and planning, energy conservation, library, accounts and finance, administration, etc.

- ▶ The present manpower in the SNA is deputed from other government departments. In such cases it is quite possible that after the passage of time these employees may be called back by the parent departments. This would put the SNA at risk of losing the trained manpower.
- ▶ The consultant has studied the RE potential, and the potential RET based off-grid systems /programs that can be implemented in the state. Based on this, the consultant proposes the following:
 - Ideally the organogram should have separate sections for grid-connected RE, off-grid RE, energy conservation, regulatory and infrastructure development, outreach and communication, planning and co-ordination, account and finance, and administration. There should be specific staff for renewable energy resource assessment, civil/electrical infrastructure development, regulatory issues, market development, coordination with financial institutions, and data analysis/management and budget/planning coordination, which are currently lacking in the present structure of JREDA. A typical representative organogram is shown in figure below:

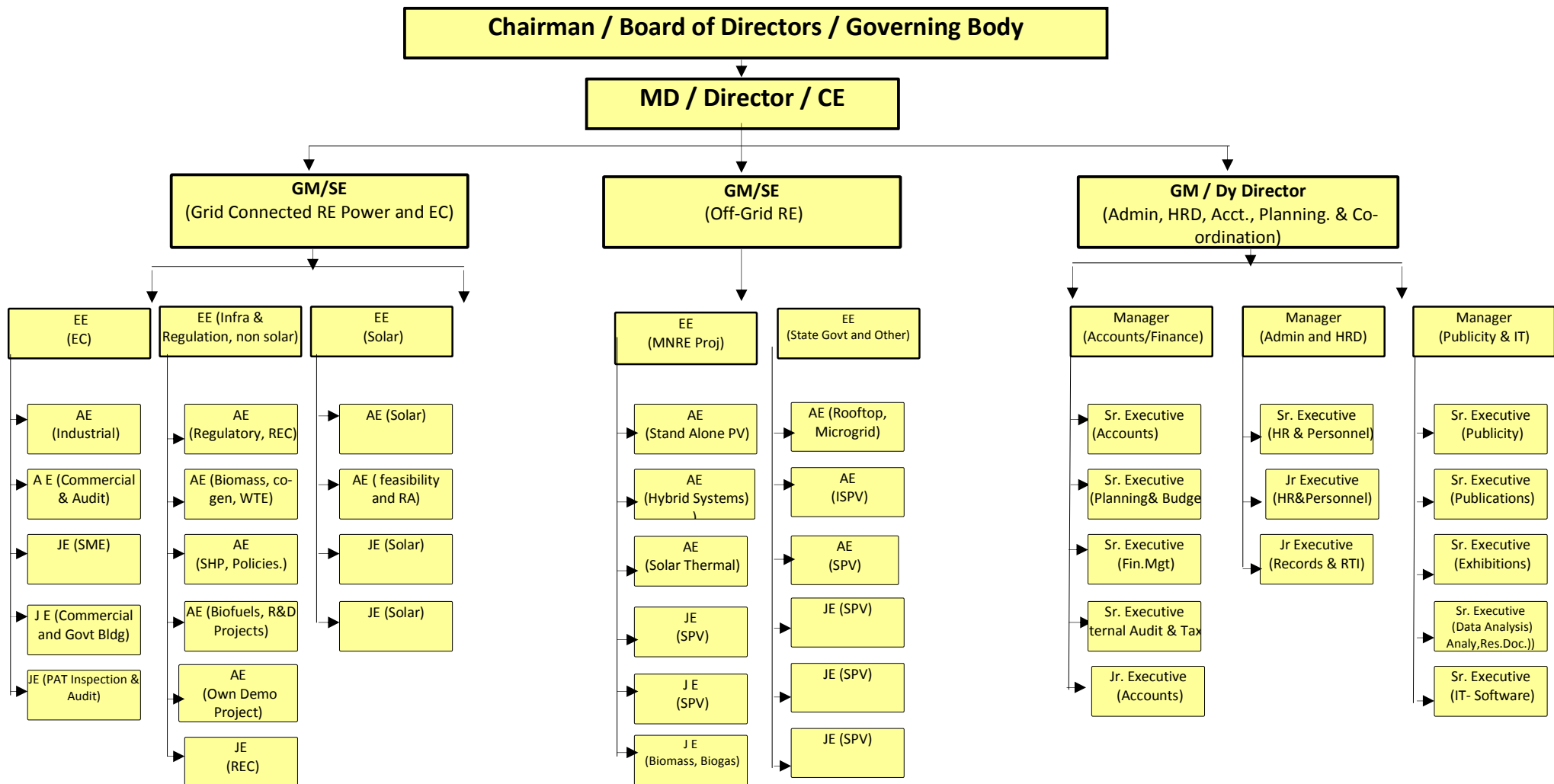


Figure 2: Proposed Organization Structure of JREDA Head Office

Proposed Field Office Setup

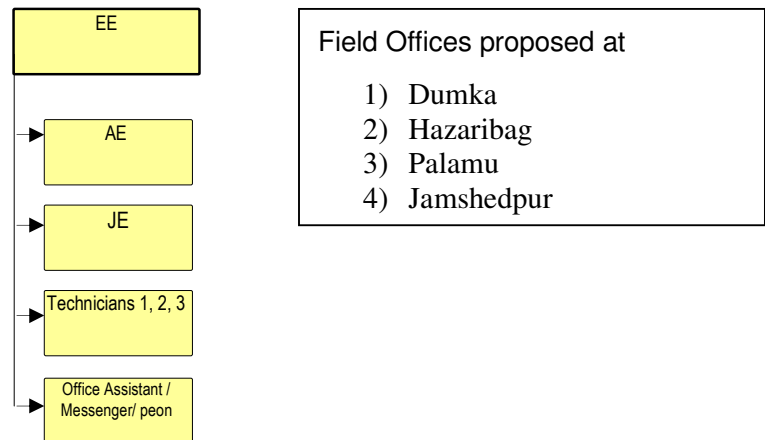


Figure 3: Proposed Organization Structure of JREDA Field Office

- ▶ In the proposed organization structure, the Chairman is to lead the Board of Directors. Major decisions would be approved by the Board, which comprises senior government officers from relevant departments. It is suggested that the Board would have at least three independent technical directors with diversified technical expertise.
- ▶ It may be noted that for the SNA to become a professional organization, certain new kinds of jobs have been suggested, fitting into existing cadres relevant in the present context. New manpower is proposed to work in the areas of regulatory matters, data analysis, market development, planning and coordination, coordination with financial institutions, publicity, R&D and new initiatives, etc.
- ▶ At present JREDA has 14 technicians. Some of them are placed in the head office and some at the district headquarters. These technicians do not possess minimum technical qualification and are 10th / 12th class pass outs. These technicians need to be trained to undertake activities related to site selection, sizing of solar PV plant, O&M of solar PV systems, etc. JREDA being a facilitating and promoting organization needs technical manpower and less of support staff. While recruiting new technicians in the future, care should be taken to see that candidates possess a minimum technical qualification / diploma from an Industrial Training Institute (ITI).
- ▶ Additional sanction may be obtained from the government/ Board of Directors and requisite vacant posts may be filled as early as possible to smoothen the functioning of the SNA.
- ▶ As regards support and service staff, the present strength of staff is adequate, and the staff may be suitably placed within the organization by the administration as required.

Job Responsibilities Chart

- ▶ After development of the revised organogram, the brief job chart of the proposed technical staff is proposed as follows. The job chart of the individual technical staff can further be elaborated by including minute job responsibilities, reporting officers, standard execution time, financial sanction limits, approval procedures, etc.

Table 3 Job responsibilities of staff proposed after organisation restructuring of JREDA. Energy Conservation

Position	Reporting To	Preferred Qualification / Experience	Job Chart
EE (Energy Conservation)	SE (Grid Connected RE and EC)	Energy Auditor, BE (Ele / Mech/Chemical)	Managing and co-ordinating SDA's energy conservation activities, Planning, program implementation and liaison with BEE, etc.
AE(Industrial sector)	EE (Energy Conservation)	Energy Auditor, BE (Ele / Mech/Chemical)	Implement programs of BEE and state government in the large and medium sector industries.
AE(Commercial & Audit)	EE (Energy Conservation)	Energy Auditor, BE (Ele / Mech/Chemical)	Implement programs of BEE and state government in the commercial category electricity consumers, plan and facilitate energy audit activities.
JE(Commercial and Government Bldg)	EE (Energy Conservation)	Energy Auditor, BE (Ele / Mech/Chemical)	Implement programs of BEE and state government in the commercial and government buildings, ULBs, etc.
JE (PAT, Inspection and Audit)	EE (Energy Conservation)	Energy Auditor, BE (Ele / Mech/Chemical)	Implement programs of BEE and state government, processing the activities related to PAT, keeping track of designated consumers, their mandatory targets and compliance, facilitating the energy audit, etc.

Grid-connected Non-solar Projects, Policy and Regulatory, Infrastructure Development

Position	Reporting To	Preferred Qualification / Experience	Job Chart
EE(Grid-connected non-solar projects, policy and regulatory, infrastructure development)	SE (Grid connected RE and EC)	BE (Ele / Mech) or MBA (Power) or M. Tech (Energy)	Managing and coordinating department activities, planning, liaison with promoters, government departments, utility for grid connectivity, PWD for approach road development, Infrastructure planning, liaison with promoter and utility, undertaking site pre-feasibility studies, co-ordinating with utility for grid evacuation, planning, etc.
AE (Regulatory and REC)	EE(Grid-connected non-solar projects, policy and regulatory, infrastructure development)	BE (Ele / Mech) or MBA (Power) or M. Tech (Energy)	Recording power generation data, validating power generation data of RE projects, liaison with ERC, power exchange, utilities, CERC, SERC and activities assigned to state agencies under REC by CERC, accounting of emission reductions, etc.
AE(Biomass, Co-gen and WTE)	EE(Grid connected non solar projects, policy and regulatory, infrastructure)	BE (Ele / Mech) or MBA (Power) or M. Tech (Energy)	Undertaking resource assessment studies, developing proposals through PPP model, facilitating sanctions, project clearance monitoring, implementation and performance monitoring, etc.

	development)		
AE (SHP and Policies)	EE(Grid-connected non-solar projects, policy and regulatory, infrastructure development)	BE (Ele / Mech) or MBA (Power) or M. Tech (Energy)	Undertaking resource assessment studies, developing proposals through PPP model, facilitating sanctions, project clearance monitoring, implementation and performance monitoring, etc.
AE(Biofuels, R&D Projects)	EE(Grid-connected non-solar projects, policy and regulatory, infrastructure development)	BE (Ele / Mech) or MBA (Power) or M. Tech (Energy)	Undertaking resource assessment studies, developing proposals through PPP model, facilitating sanctions, project, and clearance monitoring, implementation and performance monitoring, etc.
AE (Own demonstration project)	EE(Grid-connected non-solar projects, policy and regulatory, infrastructure development)	BE (Ele / Mech) or MBA (Power) or M. Tech (Energy)	Proposal preparation for setting up of own demonstration projects, getting financial sanctions, preparation of DPR and tender, project monitoring and O&M, etc.
JE (REC)	EE(Grid-connected non-solar projects, policy and regulatory, infrastructure development)	BE (Ele / Mech) or MBA (Power) or M. Tech (Energy)	Recording power generation data, validating power generation data of RE projects required for REC compliance, etc.

Solar

Position	Reporting To	Preferred Qualification / Experience	Job Chart
EE (Solar)	SE (Grid-connected RE and EC)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Managing and co-ordinating department activities, planning, liaison with promoter and other government departments, etc.
AE (PV)	EE (Solar)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Generating proposals related to solar PV program as per approved scheme and budget, assessment, scrutiny and processing of power project proposal, liaison with promoter, utility, MNRE, etc.
AE(Feasibility and resource assessment)	EE (Solar)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Assessment of solar resources, identification of project sites, undertaking pre-feasibility studies, assessment of local infrastructure, liaison with promoter, assisting utility in bid preparation/evaluation, etc
JE (PV)	EE (Solar)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Assessment, scrutiny and processing of power project proposal, liaison with promoter, utility, MNRE, site inspection, project inspection, etc.
JE (CSP)	EE (Solar)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Assessment, scrutiny and processing of power project proposal, liaison with promoter, utility, MNRE, site inspection, project inspection, post-commissioning monitoring and data collection, etc.

Off-Grid RE (Central Grants Projects)

Position	Reporting Authority	Preferred Qualification / Experience	Job Chart
EE(Off-Grid RE)	SE (Off-grid RE)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Managing and co-ordinating department activities, planning, liaison with MNRE, promoter, district level agencies, dealers, bankers, etc.
AE (SPV)	EE(Off-Grid RE)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Processing of off-grid SPV proposals, preparation of tenders, liaison with beneficiary, contractor, promoter, MNRE, etc. Processing subsidies, site inspection, etc.
AE (Hybrid Systems)	EE(Off-Grid RE)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Processing of off-grid hybrid proposals, preparation of tenders, liaison with beneficiary, contractor, promoter, MNRE, etc. Processing subsidies, site inspection, etc.
AE(Solar Thermal)	EE(Off-Grid RE)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Processing of solar thermal systems proposals, preparation of tenders, liaison with beneficiary, contractor, promoter, bankers, MNRE, etc. Processing subsidies, site inspection, etc.
JE (SPV)	EE(Off-Grid RE)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Processing of off-grid PV proposals, preparation of tenders, liaison with beneficiary, contractor, promoter, MNRE, etc.

			Processing subsidies, site inspection, etc.
JE (SPV)	EE(Off-Grid RE)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Processing of off-grid PV proposals, preparation of tenders, liaison with beneficiary, contractor, promoter, MNRE, etc. Processing subsidies, site inspection, etc.
Development Officer (Bio-gas, biomass)	Manager (Off-Grid RE)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Receive, scrutinise and process proposals related to off-grid bio-gas projects, biomass gasifiers, biomass briquetting, chulha, etc. Preparation of tenders, liaison with promoter, contractor and other government departments, etc.

Off-Grid RE (State Grants Projects)

Position	Reporting Authority	Preferred Qualification / Experience	Job Chart
EE(Off-Grid RE)	SE (Off-grid RE)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Managing and co-ordinating department activities, planning, liaison with various state govt departments, promoter, district level agencies, dealers, bankers, etc.
AE (SPV)	EE(Off-Grid RE)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Processing of off-grid SPV proposals, preparation of tenders, liaison with beneficiary, contractor, promoter, MNRE, etc. Processing subsidies, site inspection, etc.
AE (SPV)	EE(Off-Grid RE)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Processing of off-grid SPV proposals, preparation of tenders, liaison with beneficiary, contractor, promoter, MNRE, etc. Processing subsidies, site inspection, etc.
JE (SPV)	EE(Off-Grid RE)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Processing of off-grid PV proposals, preparation of tenders, liaison with beneficiary, contractor, promoter, MNRE, etc. Processing subsidies, site inspection, etc.
JE (SPV)	EE(Off-Grid RE)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Processing of off-grid PV proposals, preparation of tenders, liaison with beneficiary, contractor, promoter, MNRE, etc. Processing subsidies, site inspection, etc.
JE (SPV)	EE(Off-Grid RE)	BE (Elec / Mech) or MBA (Power) or M. Tech (Energy)	Processing of off-grid PV proposals, preparation of tenders, liaison with beneficiary, contractor, promoter, MNRE, etc. Processing subsidies, site inspection, etc.

Accounts and Finance

Position	Reporting To	Preferred Qualification / Experience	Job Chart
Manager (Accounts / Finance)	GM/Dy Director (Accounts /	MBA (Finance), M.Com, B.Com	Total management of accounts and finance dept., Efficient financial management of total inflow and outflow of funds in a self sustainable manner,

	Finance)		undertaking regular audits, liaison with state govt, MNRE, IT dept, etc.
Sr. Executive (Accounts)	Manager (Accounts / Finance)	M.Com, B.Com	Handle all the matters related to accounting of payments, receipts, salaries, wages, advances, recoveries, etc.
Sr Executive (Planning and Budget)	Manager (Accounts / Finance)	M.Com, B.Com	Managing and co-ordinating department activities, Co-ordinating budget and planning, prepare department-wise annual plans and budget, follow-up with state govt and MNRE for timely disbursement of funds, keeping track of proposed budget, sanctions and utilisations, preparing UCs for submission to MNRE/ state Govt. / other departments, etc.
Sr. Executive (Finance Mgt, Internal Audit & Manager (Accounts / Finance) Taxation)		M.Com, B.Com	Handle all matters related to financial management, investment, funds mobilization, etc.
Jr. Executive (Accounts)	Manager (Accounts / Finance)	M.Com, B.Com	Undertaking internal audits, compliance of CAG audits, liaison with Income Tax Dept., etc.
Jr. Executive	Manager (Accounts / Finance)	M.Com, B.Com	Day-to-day accounts, cash handling, book keeping etc.

Administration and HRD

Position	Reporting To	Preferred Qualification / Experience	Job Chart
Manager (Admin & HRD)	Dy. GM (Admin, Publicity & IT)	MBA (HR / Personnel)	Managing and co-ordinating department activities, planning, liaison with employees, etc.
Sr. Executive (HR & Personnel)	Manager (Admin & HRD)	MBA (Personnel),	Responsible for all personnel related matters and HRD activities such as training, career development and skills upgradation
Jr Executive (HR & Personnel)	Manager (Admin & HRD)	MBA (HR), LLB	O & M of all office equipments, AMC, purchase and sale. Allotting duties to service staff on day-to-day basis, managing all legal matters, representing organisation to any legal authority, etc
Jr. Executive (Record & RTI)	Manager (Admin)	Any Graduate	Maintenance of office records, regular back-up of data, maintenance and record of record room, process the replies of RTI, co-ordinate with different departments, etc.

Publicity and Information Technology

Position	Reporting To	Preferred Qualification / Experience	Job Chart
Manager (Publicity & IT)	Dy. GM (Admin, Publicity & IT)	Masters in Journalism / Mass Communication	Managing and co-ordinating department activities, planning and implementing the programs of publicity, publication, exhibition and Information Technology applications (Soft and Hard), working as Editor of the in-house publications, etc.
Sr. Executive (Publicity)	Manager (Publicity & IT)	PGDM (Marketing) / Public relations and advertising,	Largely responsible for outdoor, indoor and electronic / print media publicity activities.
Sr. Executive (Publication)	Manager (Publicity & IT)	Master in Journalism or Mass Communication	Publication of in-house magazine, brochures, pamphlets, booklets, etc., including typesetting, designing, proof-reading, editing, documentation research, etc. Working as Assistant Editor of the in-house publications.
Sr. Executive (Exhibitions)	Manager (Publicity & IT)	PG Diploma in Event Management	Arranging, participating exhibitions, seminars, conferences, special events, workshops, etc.
Sr. Executive (Data Analysis)	Manager (Publicity & IT)	B.E. (Computer), MSc Statistics	Regular data collection- RE project installation and power generation, management, updating of vast data available with the head and field offices, maintain and make available data about international, national and state-level energy / electricity scenario along with emission reduction data management.
Sr. Executive (IT)	Manager (Publicity and IT)	BE (Comp) or MCA or MCM	Web designing, Website maintenance, computer network administration, hardware software management, centralised data management, and storage and backup, etc.

Summary of the Details of Technical Staff after Proposed Restructuring

From the proposed restructuring plan, the summary of the technical, finance and administrative staff required is as follows:

Table 4: Summary of Staff Appointment after Proposed Restructuring

Technical / Finance / Administrative staff	No of posts at head office	No of posts at field office
MD/Director/SE	01	
GM/SE	02	
GM/Dy. Director	01	
EE	05	4
Manager	02	
AE	15	4
JE	12	4

Sr. Executive	10	
Jr. Executive	3	
Technicians	4	12
Steno/Typist/Secretary	4	
Office Assistant / Messenger / Peon	6	4
Total	65	28

Key Areas of Staff Training

After recruitment of the new technical staff, they will have to be trained appropriately depending on the technical qualification and the nature of work of the department. Further, the supervisory and support staff may also be given such induction training to keep them updated to execute their works in the most efficient manner. Some of the training modules suggested to different employees are as follows:

Table 5: Proposed Training Modules for Staff Training

Module 1.0 Technical Stream

Training Module	Topic	Duration (Days)	Target Group (From respective departments)	Coverage	Training Institute #
Module 1.1	Wind Power Technologies	5	SE, EE, AE, JE	Wind Resource assessment, infrastructure development, technology options, energy yield calculations, grid connectivity project development, O&M regulatory issues, present status, etc.	C-WET, WISE, IIT Mumbai
Module 1.2	Solar Power Technologies	3	SE, EE, AE, JE	Solar insolation and potential sites, site suitability conditions, grid-connected technologies (thermal and PV), world scenario, technology trends, etc.	Solar Energy Centre, WISE, IIT. Mumbai,
Module 1.3	Biomass & Waste-to-Energy Technologies	5	SE, EE, AE, JE	Assessment of biomass waste available through agricultural surplus, urban, industrial sources, site suitability conditions, potential in India, conversion technology options, technology trends, etc.	IIT Mumbai, IISc Bangalore, ASCI
Module 1.4	Small Hydro Power	3	SE, EE, AE, JE	Potential assessment, preliminary site selection,	AHEC, IIT Roorkee

	Technologies			discharge measurement techniques, technology options and trends, pre-feasibility studies, etc.	
Module 1.5	New Technologies. (Wave, Geothermal, Fuel Cell, etc)	4	SE, EE, AE, JE	global scenario, technology options and status, site suitability, present trends, future prospects, etc.	WISE, IIT Mumbai
Module 1.6	Off-grid RE Systems	4	SE, EE, AE, JE	Technical information / specification of off-grid RE systems based on solar, wind, biomass, biogas and hydro; site suitability conditions.	WISE, IIT Mumbai
Module 1.7	Bio-diesel and Bio-ethanol Technologies	2	SE, EE, AE, JE	Bio-diesel and Bio-ethanol producing biomass species, plantation techniques and requirements on wasteland, biofuel production technologies, biofuel utilisation and applications, etc.	Bio-energy Development Board, CREDA
Module Project Appraisal and 2 1.8	Approval Procedure		SE, EE, AE, JE	Grid and off-grid RE projects, WISE pre-feasibility report preparation, techno-economic proposal evaluation criteria, vendor/promoter selection procedure	
Module 1.9	Energy Conservation and Efficiency	5	SE, EE, AE, JE	EC Act, 2001, sector-wise EC & EE potential; auditing process and techniques; role of energy auditors and energy managers, etc.	BEE, SEEM, IIT Mumbai, NPC
Module 1.10	RE Policies and Regulatory Matters	5	SE, EE, AE, JE	RE policies (grid and off grid), tariff calculation parameters, renewable purchase obligation, renewable energy certificates, open access and energy trading mechanisms, energy exchange, etc.	WISE, IIT Roorkee
Module 1.11	Large Database Management System, Enterprise Resource Planning, Management	5	SE, EE, AE, JE	Available software for database management and their comparative study. Suitability to given organization, ERP and MIS methodologies and customization, etc.	C-DAC

	Information System				
Module 1.12	Computer Networking and Web Designing	5	Manager (Publicity &IT), Sr. Executive(IT-software)	Inter and intra-office networking, network management and trouble shooting, remote file access, internet based office networking, web designing, updating and uploading, etc.	C-DAC

Module 2.0 Techno-Administrative Stream

Training Module	Topic	Duration (Days)	Target Group (From respective departments)	Coverage	Training Institute #
Module 2.1	Managerial Effectiveness & Skills	3	SE, EE,GM/Dy Director, Manager (A/F), Manager (Admin & HRD), Manager (Publicity & IT)	Interpersonal communication and interpersonal effectiveness, group dynamics and team work, visioning.values, beliefs and goals, self transformation, conflict management, leadership and team building, subordinate development, meditation and yoga.	NITIE, NPC, IIM Bangalore, ASCI
Module 2.2	Service Rules and Labour Law	2	GM/Dy Director, Manager (Admin & HRD), Sr. Executive (HR & Personnel), Jr. Executive (HR & Personnel)	Central and State Government service rules, Company service rules, Applicability of Labour Law ASCI, and important relevant cases, etc.	
Module 2.3	Systematic Problem Solving	5	SE, EE,GM/Dy Director	SPS overview, decision making process, creativity and lateral thinking, idea generation, problem and opportunities, SPS tools, team work, small group activities.	NITIE, ASCI
Module 2.4	RTI and Customer Care	2	All Staff	Central and state RTI acts, effective utilisation and impact on system improvement, customer care practices, citizen charter and its wide publicity, etc.	State Govt trg Institute

Module 2.5	Organisational Effectiveness.	3	SE, EE,GM/Dy Director, EE	Self-awareness. interactive communication skills, group dynamics, leadership styles, negotiation skills, motivating and developing subordinates, managing stress.	NPC, NITIE
Module 2.6	Team Building		SE, EE,GM/Dy Director, EE	Group dynamics, prerequisites for effective team work. Intra- and inter-team cooperation, inter-personal relations. Role of a leader–motivating the members, conflict resolution, etc.	NITIE, NPC
Module 2.7	Communication & Presentation Skills	3	SE, EE,GM/Dy Director, EE	Components of managerial communication, presentation skills (non-verbal, oral, etc), preparing text for presentation. Integrating audio-visual media, delivery and stage presence.	NITIE
Module 2.8	Human Resource Management	5	GM/Dy Director, Manager (Admin & HRD), Sr. Executive (HR & Personnel), Jr. Executive (HR & Personnel)	Manpower planning, recruitment, performance, career and succession management, training, development and redeployment, retention and motivation, empowerment and team working.	NPC, NITIE
Module 2.9	Time & Stress Management	3	All Staff	Conducting self audit, goal setting, preparing text for presentation, Integrating audio-visual media, stress management.	NITIE
Module 2.10	Office Management & Secretarial Skills.	5	All Support Staff	Managing information, key issues and challenges, communication effectiveness, presentation skills, records management,	NPC, ASCI

secretarial skills,
overview of computer
application.

Module 3.0 Accounts and Finance Stream

Training Module	Topic	Duration (Days)	Target Group (From respective departments)	Coverage	Training Institute #
Module 3.1	Accounting and Book Keeping	2	Sr. Executive (Accounts), Jr. Executive (Accounts)	Accounting rules, accounting concepts, financial statements, methods of accounting, etc.	NIFM, IIM Ahmedabad, ASCI
Module 3.2	Financial Management	2	SE, EE, GM/Dy Director	Ratio analysis, cash flow and fund flow, managerial accounting, budget/ budgetary control, investment decision, working capital management, etc.	NIFM, IIM Ahmedabad, ASCI
Module 3.3	Audit	2		Statutory obligation, procedure, types of Audit	NIFM, IIM Ahmedabad, ASCI
Module 3.4	Taxation & Compliance	2	Manager (A/F), Sr. Executive (Internal Audit and Taxation)	Overview of IT Act 1961, various provisions of Income Tax, methods of calculation of Income Tax liability, preparation / submission of various Income Tax forms, etc	NIFM, IIM Ahmedabad, ASCI

Disclaimer: Names of training institutes proposed above related to specific subjects are only representative, and not exclusive. The concerned SNA may opt for other suitable institutes at state/ national level providing quality training on the suggested subjects.

4. POLICY AND REGULATORY FRAMEWORK

The Energy Department, Government of Jharkhand published the Jharkhand Energy Policy, 2012 which sets the target of providing electricity to all households by 2014 as its principle objective. This policy has a separate section for promotion of renewable energy in the state.

The policy has emphasized the need for promoting RET based off-grid projects especially based on solar energy along with the grid-connected projects to achieve objectives of the state related to improving the access to electricity for all.

As per the policy, power generated from grid-connected RE projects is allowed to be sold either to state utilities or to the third party consumers. This policy provides certain incentives / benefits such as concession in electricity duty and concessional access to the grid. However, the policy does not have RE project capacity addition targets or plans.

As mentioned under Jharkhand Energy Policy 2012, JREDA has recently prepared a draft solar policy and submitted it to the state government for approval. The draft solar policy has provisions for promotion of grid-connected as well as off-grid solar power projects including the roof top solar PV projects.

JREDA primarily implements MNRE sponsored RET based off-grid programs / schemes in the state. The state government has made necessary provision in the budget to meet the state share under MNRE sponsored programs / schemes. JREDA has a budgetary allocation of planned funds for implementation of RE programs in the state. Also, JREDA avails funds from different state government departments for implementation of RE systems in the state.

The Jharkhand State Electricity Regulatory Commission (JSERC) notified the JSERC (Renewable Purchase Obligation and Compliance) Regulations, 2010 dated 21 July 2010 for mandatory renewable energy purchase by distribution companies and Open Access (OA) consumers in the state. The minimum percentage of renewable purchase obligation including T&D loss set by JSERC under this regulation is as follows:

Table 6: Renewable Purchase Obligation set by JSERC

Year	Solar	Non-Solar	Total
2013-14	1%	3%	4%
2014-15	1%	3%	4%
2015-16	1%	3%	4%

Other than the RPO Regulations, 2010, JSERC has also notified regulations for determination of tariff for the projects based on various RE technologies. Following regulations issued by the ERC are directly related to the RE projects in the state.

- ▶ JSERC (Renewable Purchase Obligation and its Compliance – First Amendment) Regulations, 2012, dated 29 November 2012.
- ▶ JSERC (Determination of Tariff for Procurement of Power from Solar PV Power Projects and Solar Thermal Power Projects) Regulations, 2010, dated 23 June 2010.
- ▶ JSERC (Determination of Tariff for Procurement of Power from Wind Electric Generators) Regulations, 2010 dated 23 June 2010.

- ▶ JSERC (Terms and Conditions for Determination for Biomass and Non-Fossil-Fuel-Based Co-Generation Projects) Regulations, 2010 dated 27 January 2010.
- ▶ JSERC (Terms and Conditions of Tariff Determination, Small Hydropower Generation) Regulation, 2007 dated 3 July 2007.
- ▶ JSERC (State Grid Code) Regulations, 2008, dated 30 January 2009.

4.1 DIAGNOSTIC REVIEW AND IDENTIFICATION OF CRITICAL GAPS

- ▶ The Jharkhand Energy Policy, 2012, has a separate section dedicated to renewable energy/green energy. However, there is a need to have a separate comprehensive RE policy for promotion of grid-connected and off-grid renewable energy projects in the state.
- ▶ The Energy Policy spelt the need for promoting RET based off-grid projects for improving electricity access to people living in the rural areas. However, the policy does not propose any specific programs / schemes / targets for RET based off-grid applications, or any incentive schemes from state government.
- ▶ The state has potential for implementation of RET based decentralized distributed generation and supply (mini-grid) projects for providing electricity to villages / hamlets away from the centralized grid. However, the SERC has so far not notified any regulations to facilitate operation of mini-grid projects in the state. The SNA also has not taken any initiative in this regard.
- ▶ The SNA has not taken any step to formulate policies for providing easy and soft financing to RET based systems/projects such as utilizing micro-credit organizations/ rural and co-operative banks to promote RET based off-grid applications.
- ▶ Policy for rooftop solar PV projects along with net metering regulation can expedite such projects in the state.
- ▶ Rural electrification plan has not yet been prepared by the state government.

4.2 SUGGESTED INTERVENTIONS AND ACTION PLAN

- ▶ The SNA can take initiative and file a petition before SERC for issue of draft regulations on operation of RE based mini-grid projects in DISCOM franchisee mode as per model guidelines approved by FoR. The SNA can also petition for tariff determination of RET based mini-grid projects in the state. The tariff guidelines for RE technology-specific off-grid / micro-grid generation and power distribution system can be proposed before the SERC. This will bring clear guidelines for development of such projects in the state.
- ▶ After studying the status of un-electrified households and after assessing the funds that could be made available from the state government, an annual capacity addition plan and financial incentive policy can be drafted. The proposed Five Year Plan (2012-17) and the incentives offered by the state government can be included in the off-grid RE policy. This will help the stakeholders to understand the target and the availability of financial incentives for implementation of off-grid RETS based system in the state.

5 FINANCIAL MANAGEMENT AND GOVERNANCE STRUCTURE

JREDA has prepared a Five Year Plan (2012-17) for implementation of various RET based programs/schemes along with physical and financial targets. The annual program-wise target is as follows.

Table 7: JREDA Five Year Plan (2012-17) related to RE (Electricity Generation) Programs

Sr No	Program	FY 12-13	FY 13-14	FY 14-15	FY 15-16	FY 16-17	Cumulative
1	Solar Lantern	53500	84000	94000	100000	110000	441500
2	Solar Street Light	1200	1440	1600	1800	2000	8040
3	Solar Home Light	2000	2400	2700	3000	3400	13500
4	Solar Pump	30	36	40	48	55	209
5	Solar Power Plant (kWp)	200	300	350	400	425	1675
6	Wind Energy Program	1	1	1	1	1	5
7	Rural Electrification Program in Villages	150	240	270	300	350	1360
8	IREP (village)	5	5	5	5	5	25
9	Solar Park (MW)	500	500	500	500	500	2500
10	Electrification of 50 Villages	50	-	-	-	-	50
11	Solar Power Plants in Block & Panchayat HQ for e-gov. kWp	2000	2943	-	-	-	4943

- ▶ JREDA is receiving plan funds from the state government as well as receiving program-specific grants from MNRE.
- ▶ Non-plan funds are provided by the state government to JREDA for meeting the establishment and administrative expenses.
- ▶ Besides MNRE and state government grants, JREDA is sourcing grants from other state government departments like the Forest Department, Education Department, Dairy Development Department, PWD Department, Central Jails, Tribal Development Departments, MP/MLS funds, etc.
- ▶ JREDA undertakes annual audit of financial statements through Chartered Accountants on an annual basis and also complies with the CAG audit queries.

5.1 DIAGNOSTIC REVIEW AND IDENTIFICATION OF CRITICAL GAPS

- ▶ JREDA has exceeded the target in the case of the program on solar water pumps.
- ▶ JREDA has not availed any grants from the National Clean Energy Fund.
- ▶ SNA is completely dependent on the state government funds for the plan and non-plan expenditures. The SNA needs to be financially sustainable in the long term. At present, there is no revenue generating activity carried out by the SNA.

- ▶ The SNA does not have any capital investment program for ensuring recurring revenue generation activities.
- ▶ The SNA has not formulated Service Rules for the organization.
- ▶ The administrative section so far has not prepared document specifying roles and job responsibilities of the management and staff.
- ▶ No policy for time-bound career growth or mechanism for granting allowances and providing incentives to the staff.
- ▶ Management Information System is not established at present and, thereby, leading to the lack of a mechanism to track day-to-day activities, progress, and to take mid-term review and follow-up action.
- ▶ No monitoring mechanism has been set up so far to ensure compliance of Rules and Regulations.
- ▶ There is no mechanism for centralized monitoring of RE devices, their functioning, trouble shooting, etc.
- ▶ Citizens' Charter has not been prepared.

5.2 SUGGESTED INTERVENTIONS AND ACTION PLAN

- ▶ The state government may levy and collect a 'Green Cess' of 3 to 10 paise per unit on electricity consumed by industrial and commercial users to create a state-level clean energy fund for promoting RE. This fund can partly be utilised by the SNA for meeting its plan and non-plan expenditures, and partly for creating the common infrastructures. The consultant shall assess the potential of creation of Green Cess in the state. The detailed note in this regard is prepared as **Annexure 3**.
- ▶ A Citizens' Charter represents the commitment of the organization towards providing standardized, high quality, and timely service delivery. At present, JREDA does not have such a document in place. It is proposed that the SNA should have its own Citizens' Charter and the same should be published on its website. The detailed note in this regard is prepared as **Annexure 4**.
- ▶ At present, the SNA is dependent on the state and the central funds for plan and non-plan expenses. The delay in such cash flows hampers the operations of the SNA. Further, the present functioning of the SNA does not include any revenue generation activities for funding its operations. Hence, in order to ensure long-term financial sustainability of the organization, the SNA should start revenue generation activities by investing in grid-connected power projects. JREDA can set up MW-scale solar power projects to ensure continuous revenue to meet its non-plan expenses. The detailed note for preparation of DPR for setting up of captive solar power projects is prepared as **Annexure 5**.
- ▶ JREDA should have its own MIS for effective implementation and monitoring the progress of its activities by the senior staff.

ENCLOSURES

PROPOSED SHORT-TERM INTERVENTIONS FOR IMPLEMENTATION DURING STAGE 2 OF THE PROJECT

Annexure 1	Design of web-based online complaint registration and grievance redressal system for the SNA
Annexure 2	Training module, program structure, content of course material and a manual for conducting O&M of solar PV based off-grid systems / applications in the field.
Annexure 3	A case for creation of Green Energy Fund for promotion of RET based projects in Jharkhand
Annexure 4	Drafting of Citizens' Charter
Annexure 5	Development of DPR for setting up of own solar power project

ANNEXURE 1

DESIGN OF WEB BASED ONLINE COMPLAINT REGISTRATION AND GRIEVANCE REDRESSAL SYSTEM FOR THE SNA

Web based online grievance redressal system shall be developed for recording complaints from the beneficiaries about the RET based off-grid systems / applications installed by the SNAs through toll free telephone numbers which is further integrated with web based complaint management system. This mechanism will ensure both recording of the complaints and timely action for rectification of the problem. The data stored in the online system can be further analyzed to know how efficiently a particular RE based off-grid system / application is working in the field.

Customer complaints are part of a business, and it is very important to redress the grievances with a proper system. By using this online grievance redressal system people can register their complaints which will be forwarded to the concerned department for offering solution. In this way, the grievance redressal system satisfies the end users / customers by resolving their complaints and updating them with the compliant status.

Objectives

The objective of Centralized Complaint System is to create a user-friendly online interface for communication with the administrative body, and reduce the distance and time barrier between citizens and the administration.

Key Features of the System

1. Toll free number with IVR system (for compliant registration)
 - Predefined welcome message script (as per your choice with customised voice)
 - Unlimited extensions
 - Web interface
 - Voice mail
 - Call reporting
 - Call forwarding
 - Music on hold
 - Missed call reporting
2. Grievance Redressal System
 - User-friendly interface.
 - Easy intake of user need.
 - Manager, employee related user-id, passwords are sent to their respective mails.
 - Verification of manager, employee, public details
 - Online interaction of administrator, employee and managers
 - End-to-end interaction of employees with public
 - Administrator controls all department queries
 - Generation of reports
 - Compliant status reports on daily / weekly / monthly / yearly basis

- Escalation reports based on responsibility matrix queries and responses answered report
- Complaint report including complaint details, response details, feedback
- Performance reports, section-wise customer-feedback reports.

Optional Features

- Online surveys.
- Facility to upload photographs of the complaint. for eg, photo / evidence of problem.
- Help pages in the form of forums and FAQs.
- Assigning performance ratings to different sections of SNA administration as per direct feedback received from users.

User Interface Priorities

- Compatible with Internet Explorer, Opera, Google Chrome, and Firefox browsers.
- Reports exportable in .XLS, .PDF or any other desirable format.
- Professional look and feel
- Use of AJAX with all registration forms

Operational Procedures and Roles of Different Entities

A. RET based off-grid system registration by vendor / system provider /channel partner

- The concerned department in the SNA shall provide information to administrator (CMS cell) about the placement of order for installation of RET based off-grid systems along with the name of the vendor.
- The administrator shall enter the information in the system and assign UID to each of the RET based off-grid systems.
- The administrator informs the vendor about allotment of UID.
- The system provider/vendor completes the installation work as per the work order and informs the beneficiary details to the administrator.
- The vendor shall ensure that the RET based off-grid system being installed by him is prominently displayed in the UID allotted by the administrator.
- The beneficiary while registering the complaint through the online complaint redressal system shall enter the UID assigned to the system.

B. Procedure for registration of complaint by the users (beneficiaries)

- Users should be able to create a new accounts/log in to their existing accounts which will give them the authority to use the services provided by the system (such as complaint registration, status report, etc).
- Authenticated users should be able to issue complaints, check complaint status, submit feedback, and browse through other complaints and their feedback.
- Authenticated users should be able to create suggestions/petitions; other users can support or make suggestions for petitions; forward petitions to corresponding authority for possible implementation.

- Users can create groups where they can share their experiences; discuss common problems, and possible solutions.

C. Compliance by SNA authorities

- SNA authorities can log in to their accounts created by the administrator.
- Authorities can access all the complaints/suggestions from the users.
- They can invoke proper activity in response to valid complaints, or redirect inappropriate complaints to the administrator.
- The authorities can give response to complaints with activity reports.
- They have access to various reports mentioned in the report section.

D. Role of Administrators /CMS cell

- Create and monitor accounts of authorities.
- Filter the content reported as inappropriate and handle threats.
- Handle complaints about improper response by SNA authorities.

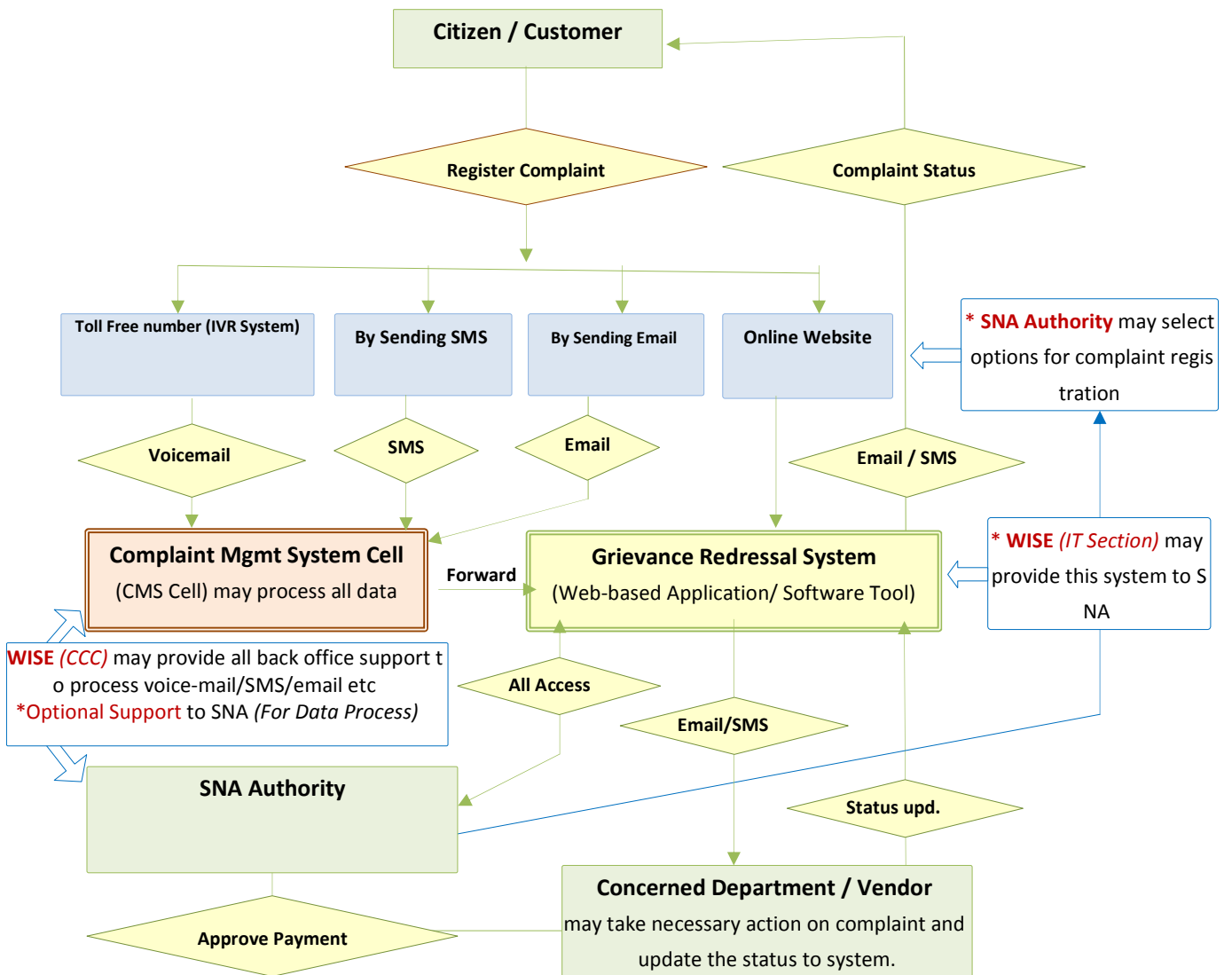


Figure 6: Data Flow Diagram

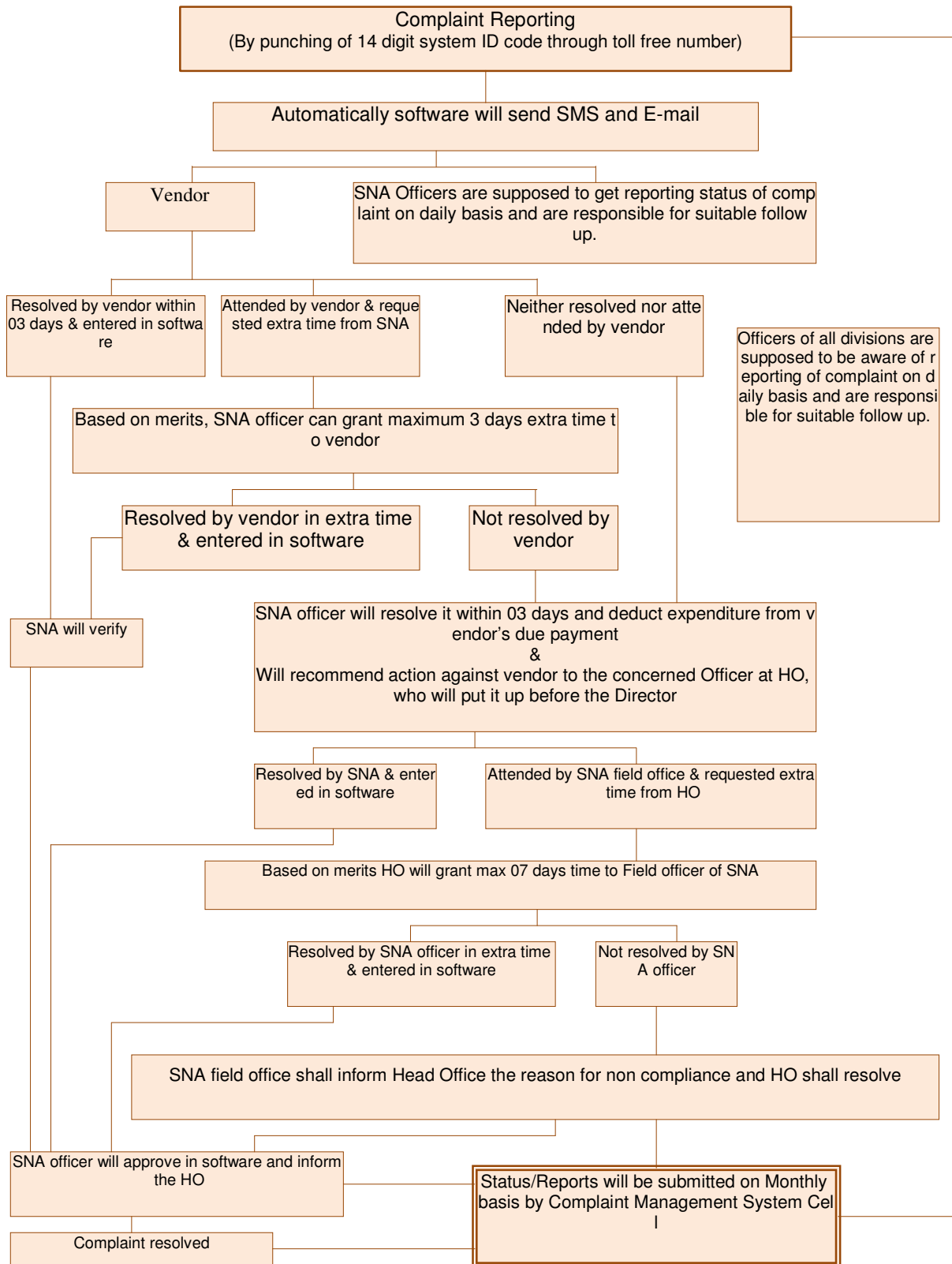


Figure 7: System Flow Chart—Web based Grievance Redressal System/Management Information System)

ANNEXURE 2

TRAINING MODULE, PROGRAM STRUCTURE, FOR CONDUCTING O&M OF SOLAR PV BASED OFF-GRID SYSTEMS / APPLICATIONS IN THE FIELD

- i. Capacity building of field staff (technicians/ operators) in installation and maintenance of off-grid solar PV systems including preparation of O& M manual (duration – 2 days).
- II. Capacity building of managerial staff on policy, regulations, financing and business models **RELATED TO RE BASED OFF-GRID PROJECTS (DURATION – 1 DAY).**

Proposed Venue: For UP and Bihar - UPNEDA Training Centre at Chinhat, Lucknow

Capacity building of field staff (technicians/ operators) in installation and maintenance of off-grid solar PV systems including preparation of O& M manual (duration – 2 days)

The field level staff of SNAs designated as technician / operator / mechanic is actually responsible for supervision and implementation of RET based off-grid programs at the field level. These persons are either posted at the field offices of the SNAs or deputed to the office of District Divisional Commission (DDC) of District Magistrate (DM). These technicians / operators are responsible for overseeing the implementation of RE based off-grid program implementation under the supervision of the Project Officer or sometime higher officers posted at SNA headquarters. The states of Uttar Pradesh, Bihar, Jharkhand and West Bengal have 150, 108, 18 and 6 numbers of field level technicians / operators respectively. It has been noticed that these technicians were recruited at the time of establishment of the SNAs and have only undergone certificate program courses from ITIs, with some of them being only 10th pass.

The technicians are basically trained to oversee the bio-energy programs such as improved chulhas, biomass gassifier systems, etc. Very few periodic skills up-gradation programs have been conducted for them, and therefore they have limited exposure to the new technological advances and applications related to off-grid RE technologies, especially solar based applications. All the four states have huge potential for deployment of decentralized solar based applications / systems for providing electricity / energy access to the rural people. With the Central and state governments evincing more interest in the solar power sector, it has become imperative to train these field level technicians /officer in installation and maintenance of solar based off-grid systems / applications.

The proposed training module has been developed keeping in mind the educational level of the field staff and the type of task /work they are supposed to perform. This particular training module has been developed in consultation with the SNA to train the field level staff in installation and O&M of solar based off-grid systems /applications. The training program is divided into two parts:

- i. Lectures /presentation on installation, and O&M of SPV systems.Explaining the use of O&M manual developed for solar PV based off-grid systems / applications
- ii. Hands-on training on the field. The details of the program are given below.

The following topics shall be covered in the 2-day training program developed for the technicians

SN	Topics
A Lectures	
1	Solar Photovoltaic market and applications
2	Basics of solar photovoltaic and electricity
3	Solar resource assessment, site survey and PV module orientation
4	System components of solar PV (module, battery, controller and inverter)
5	Stand-alone solar PV system sizing
6	Installation of mechanical and electrical components of SPV System
7	O&M, and troubleshooting of SPV system
B Hands-on Training	
1	How to use measuring instruments
2	Measuring of electrical circuit
3	Function check of charge controller
4	Inspection of SHS
5	Monitoring of existing PV system
6	Measuring module output

WISE will develop a comprehensive course material which will cover the above topics in detail. The training module shall be delivered in the 2-day training program with the help of internal /external experts in the field.

Capacity building of managerial staff on policy, regulations, financing and business models related with RE based off-grid projects (duration – 1 day)

This training module is developed for the managerial / senior level staff of the SNA. The course is designed so as to sensitize the managerial staff of the SNA with regard to the recent policy and regulatory development in RE based off-grid projects. Global best practices in implementation of RE based off-grid programs including financing and successful business models shall also be covered in this training module.

Program Content

- ▶ Policy framework for development of RE based off-grid projects in India.
- ▶ Recent developments in formulation of regulations for operation of RE based mini-grid projects.
- ▶ Techno-economic viability analysis of RE based mini-grid projects.
- ▶ Different business models for RE based off-grid projects.
- ▶ Best practices / selected case studies – national level
- ▶ International Best Practices in operating RE based off-grid projects (Bangladesh, Nepal, Philippines, Lao PDR).

**Training Programme on
Installation, Operation and Maintenance of Off-grid Solar PV Systems for Field Staff
(Technicians/ Supervisors) of SNA**

Lucknow / Kolkata / Ranchi | 2015

Venue:

Program Schedule

Day 1, 2015 (Lectures)

<i>Time</i>	<i>Content</i>	<i>Speaker</i>
0930–1000	Registration	
<p style="text-align: center;">Opening Session: 10.00 hrs to 10.30 hrs</p> <hr style="border-top: 1px dashed black;"/> <p>10.00-10.05 Welcome</p> <p>10.05-10.15 Opening remarks</p> <p>10.15-10.25 Objective of the training program</p> <p>10.25-10.30 Self introduction of the participants</p>		
Tea: 10.30 hrs to 10.45 hrs		—
<p style="text-align: center;">Session 2: 1045 hrs to 1315 hrs</p> <hr style="border-top: 1px dashed black;"/> <p>10.45–11.30 Solar photovoltaic market and applications</p> <p>11.30–12.30 Basics of solar photovoltaic and electricity</p> <p>12.30–13.15 Solar resource assessment, site survey and PV module orientation</p>		
Lunch: 1315 hrs to 1415 hrs		—
<p style="text-align: center;">Session 3: 1415 hrs to 1545 hrs</p> <hr style="border-top: 1px dashed black;"/> <p>14.15–15.00 System components of solar PV (module, battery, controller and inverter)</p> <p>15.00–15.45 Stand-alone solar PV system sizing</p>		
Tea: 1545 hrs to 1600 hrs		—
<p style="text-align: center;">Session 4: 1600 hrs –1730 hrs</p> <hr style="border-top: 1px dashed black;"/>		

16.00–16.45 Installation of mechanical and electrical components of SPV system

16.45–17.30 O&M, and troubleshooting of SPV system

Day 2,.... 2015 (Hands-on training)

Session 5: 10.00 hrs to 11.30 hrs

1000–1045 How to use measuring instruments

1045–1130 Measuring of electrical circuit

Tea: 11.30 hrs to 11.45 hrs

Session 6: 1145 hrs to 1330 hrs

1145–1245 Function check of charge controller

1245–1330 Inspection of SHS

Lunch: 13.30 hrs to 14.30 hrs

Session 7: 14.30 hrs to 16.00 hrs

1430–1600 Monitoring of existing PV system

Tea: 1600 hrs to 1615 hrs

Session 8: 1615 hrs to 1745 hrs

1615–1745 Measuring module output

Valedictory Session: 1745 hrs to 1800 hrs

1745–1800 Feedback
Valedictory

Draft Program Schedule for Training Program on
**Policy, Regulations, Financing and Business Models Related to RE based Off-grid
 Projects**

Lucknow / Kolkata / Ranchi | 2015

Venue:

Program Schedule

Day 1, 2015

<i>Time</i>	<i>Content</i>	<i>Speaker</i>
0930–1000	Registration	
Opening Session: 10.00 hrs to 10.30 hrs		
10.00-10.05	Welcome	
10.05-10.15	Opening remarks	
10.15-10.25	Objective of the training programme	
10.25-10.30	Self introduction of the participants	
Tea: 1030 hrs to 1045 hrs		
Session 2: 10.45 hrs to 12.45 hrs		
10.45–11.45	Policy framework for development of RE based off-grid projects in India	
11.45–12.45	Recent developments in formulation of regulations for operation of RE based mini-grid projects	
Lunch: 12.45 hrs to 13.45 hrs		
Session 3: 1345 hrs to 1530 hrs		
13.45–14.45	Techno-economic viability analysis of RE based mini-grid projects	
14.45–15.30	Different business models for RE based off-grid projects	
Tea: 15.30 hrs to 16.00 hrs		

Session 4: 16.00 hrs –17.30 hrs	
16.00–16.45	Best practices / selected case studies – National level
16.45–17.30	International best practices in operating RE based off-grid projects (Bangladesh, Nepal, Philippines, Lao PDR)
Valedictory Session:17.30 hrs to 18.00 hrs	
17.30–18.00	Feedback Valedictory

Organized by

World Institute of Sustainable Energy, Pune

ANNEXURE 3

A CASE FOR CREATION OF GREEN ENERGY FUND FOR PROMOTION OF RET BASED PROJECTS IN JHARKHAND:

- ▶ In order to ensure sustainable operation of the SNA and for efficient financial management, SNAs need to have sufficient corpus for their operations and for meeting the expenses. This corpus can help the SNA manage its expenses in spite of fluctuations and delays in the plan and non-plan receipts to the SNA.
- ▶ Such corpus can initially be supported by the state government. Alternatively, the state government may levy and collect a 'Green Cess' of 3 to 10 paise per unit on electricity consumed by industrial and commercial users to create a state-level clean energy fund for promoting RE. This fund can be partly utilised by the SNA for meeting its plan and non-plan expenditures and partly for creating the common infrastructures.
- ▶ In the proposed intervention, the consultant shall facilitate the SNA in implementing such a Cess in the state in Phase 2 of the study. A brief working of the same is presented herewith.
- ▶ At the national level, renewable energy or non-conventional energy, has been recognized as high priority sector as evidenced by the provisions of Section 61(h) and Section 86 (1)(e) of the Electricity Act, 2003. In addition, Section 3 & 4 of the Act envisages active role of the state governments. The Government of Jharkhand has a greater role to play in promotion of renewable energy through the enabling instruments of Electricity Act, 2003.
- ▶ Saving conventional (polluting) energy is also considered as indirect green energy. Chapter 6 and Section 57 of the Energy Conservation Act, 2001, require the state government's proactive role to implement its provisions making sufficient funds available. The Jharkhand government needs to take timely action in this sector.
- ▶ The Jharkhand State Electricity Regulatory Commission has notified the JSERC (Renewable Purchase Obligation and Compliance) Regulations, 2010 dated 21 July 2010, and specified the Renewable Purchase Obligation on the obligated entities, namely, the distribution licensees, captive consumers, and open access consumers. At present, the obligated entities are required to procure 4% of generation from renewable based power projects.
- ▶ The National Action Plan on Climate Change (NAPCC) has set a goal of 1% annual increase in renewable energy in the national grid starting from 5% in FY 2009-10 and increasing to 15% by 2020. This 15% RE by 2020 has thus effectively become a 'National RPO' though it is not legally mandated. After the announcement of the NAPCC (June 2008) and the JNNSM (November 2009), various initiatives have been taken by the Government, the Central Electricity Regulatory Commission and SERCs, to set the momentum to achieve this target. Jharkhand being one of the states having large potential in India in terms of land and solar resource availability is expected to play a major role and contribute significantly to achieve the national capacity addition goal.
- ▶ The Jawaharlal Nehru National Solar Mission (JNNSM) aims to establish India as a global leader in solar energy by achieving grid parity by 2022, with 20,000 MW of installed solar power capacity. Besides, for off-grid systems, 20 million sq.m. solar thermal collector area and 20 million home lights will be established by 2022.

- ▶ Section 8.9 of the National Rural Electrification Policy, 2006 requires institutional arrangements for back-up services and technical support to systems based on non-conventional sources of energy to be created by the state governments. The government of Jharkhand will have to take requisite steps in this direction.
- ▶ The Government of India has announced an ambitious plan to enhance the current installed RE capacity (32 GW) manifold. The solar power targets spelt out in the JNNSM has been raised from 20 GW to 100 GW by 2022. The additional 15 GW target set for wind power during 12th Five Year Plan has been revised to an additional 40 GW by 2019. Therefore, the budgetary provision needs to be enhanced by the state government for meeting towards the MNRE target.

Constitutionality, Legality and Propriety of Amendment:

- ▶ **Constitutionality:** The Constitution of India empowers the state government to make amendment in the Act vide Section 162, 166, 189, 196, 199 (a), 206, 207.
- ▶ **Legality:**
 - The Green Energy Cess at the rate of Rs 0.05 / per unit is proposed to be levied only on commercial and industrial consumers. Remaining consumers such as residential, agricultural and other non-commercial entities would be unaffected by this additional cess. Thus, the common man is not affected by this amendment.
 - For commercial and industrial consumers who are already paying tariff of around Rs 3.8 to 6.83 / unit, a further addition of Rs 0.05 through cess will be a minor enhancement.
 - Further, the amendment in existing act is the prerogative of the state government and does not required previous sanction or assent from the President of India as it does not attract the provisions of Articles 31(2), 31-A(1) and 31-C of the Constitution of India.
 - In addition, fundamental rights of the citizens of India remain unaffected by this amendment.
- ▶ **Propriety:**
 - For the targeted RE capacity addition announced under various state government policies, considerable government funding is required for supporting the developers as well as creating the necessary evacuation infrastructure. The grants received from the state government for FY 2010-11, 11-12 and 12-13 was Rs.149.65 Cr, Rs.45.34 Cr and Rs.112.39 Cr respectively. As most of the employees are deputed from the energy department of the state government and from JSEB, their salary is being paid by the host department. However, part of these expenses along with the non-plan expenditure can be paid through the Green Energy Fund created by raising the electricity duty from commercial and industrial consumers.
 - Union Budget for 2010-11, has made the provision for the imposition of Clean Energy Cess as a duty of excise on coal, lignite and peat with an effective rate of Rs.50 per ton, which has been further increased to Rs.100 per ton. Collection of even estimated Rs.3000 Cr as cess per year will be insufficient for such a vast country against the required average Rs.10,000 Cr yearly in this sector. Therefore, the state of Jharkhand needs to make its own provisions to create a Clean Energy Fund.
 - Availability of an estimated Rs.76 Cr as Green Energy Cess annually has been envisaged as per the consumer-wise electricity sale figures of DISCOMs for FY 2014-15

/ 2015-16. The proposed amendments in the act will help avert power crises, generate employment opportunities, keeping the environment clean, and attract large private investment in the state. Thus, the cess will help the state in achieving socio-economic development.

Table 8: Electricity Consumption (MU) by Industrial and Commercial Consumers During FY 2014-15 / 2015-16

	Tata Steel Limited	SAIL/Bokaro Steel Plant	Jamshedpur Utility and Services Company (JUSCO)	Damodar Valley Corporation (DVC)	Subtotal (category wise)
HTS-1 - 33 kV				8338	8338
HTS-2 (incl. traction) - 132 KV				3608	3608
HTS-3 - 220 kV				934	934
NDS		19.09			19.09
HTS		2.23			2.23
Commercial	69				69
HT I	29				29
HT II	115				115
HT III	2097				2097
HT IV	113				113
Sub total (Utility wise)	2423	21.32	250	12880	15325

Source: JSERC

Points for Discussion:

Following are the points for discussion for the consideration of the council:

- ▶ Levy Rs.0.05 per unit as Green Energy Cess to commercial and industrial consumers of electricity in Jharkhand by making appropriate amendments in the Jharkhand Electricity Duty Act -2011 dated 24 June 2011.
- ▶ Creation of special purpose fund namely “Clean Energy Fund” under the major head of “Taxes and Duties on Electricity”, which will be utilised only for promotion of renewable energy, energy conservation and capacity building / institutional development for these sectors.

TENTATIVE WORK FLOW AND TIME-LINE

Table 9: Tentative Work Flow and Time Line

Sr. No.	Actions to be taken	Tentative Time Frame
1	JREDA to get the approval of the Board of Directors	0 date

2	JREDA to submit proposal to the Energy Department	5 days
3	Energy Department to scrutinize the proposal, prepare 'Memorandum' for the decision of the council, and send it to the Advisory Departments such as Public Enterprises Department, Finance Department and Law Department. and get the file back after their comments	20 days
4	Energy Department to submit final case, with comments of Advisory Department, to the Law Department to prepare tentative draft bill and send it to the Energy Department	25 days
5	Energy Department to get the draft bill approved from the Energy Minister	30 days
6	Bill to be introduced in the legislature through proper procedure, and passing the bill by Legislative Assembly.	45 days
7	Getting assent of the Governor	50 days
8	Law Department to cause the bill to be published in the state gazette as an Act of Legislation	55 days
9	Law Department to forward a copy of the bill as passed by the Legislative Assembly to the Ministry of Home Affairs, Govt. of India, and 10 copies of the Act to the Law Department under the Ministry of Law, Govt. of India.	60 days
10	Energy Department to send 5 copies of the Act to the Ministry of Home Affairs, 1 copy to the Ministry of Defence, and 1 copy to the Law Department, Govt. of India	60 days

Note: This proposal to the Council need not be referred to JSERC, since, as per the power and duties of SERCs in the Electricity Act, 2003, taxes and duties do not fall in their ambit, and is exclusively the prerogative of the state government. JSERC is mandated to regulate only tariff and its other ancillary matters.

ANNEXURE 4

DRAFTING OF THE CITIZENS CHARTER:

The main objective of the SNA is to promote renewable energy based technologies/ alternate energy sources to meet the energy requirements of the respective state, which will benefit the people of the state as well as the industries. Further, the state and central governments have introduced various financial and fiscal instruments to make such systems more affordable. In order to ensure transparency, accountability and improve the quality of public services, it is necessary to issue a Citizen's Charter of the organization. This would enable the people to understand the mandate of the concerned Organization, how one can get in touch with its officials, what to expect by way of services, and how to seek remedy if something goes wrong.

The Citizen's Charter does not by itself create new legal rights, but it surely helps in enforcing existing rights. So the SNAs need to put in efforts to provide more responsive and citizen-friendly governance by announcing and displaying the Charter on their website. In the proposed intervention, the consultant shall study the Charter prepared for other organizations, and prepare a ready-to-use draft for the SNA to get final approval for implementation.

ANNEXURE 5

DEVELOPMENT OF DPR FOR SETTING UP OF OWN SOLAR POWER PROJECT

To ensure long term financial sustainability of the organization, the SNA should start the revenue generation activity by investing into grid-connected power projects. As the state has very good potential for solar, the SNA can set up a grid-connected solar power project. This will also help to demonstrate the solar technology in the state and will also ensure continuous flow of revenue from such projects to meet its non-plan expenses. The equity contribution for such projects can initially come from the state government, and the rest can be raised through a loan which can be repaid through the revenue obtained by sale of electricity generated from this project. The consultant shall execute the following steps for preparation of DPR for setting up of solar power project for JREDA.

- ▶ Solar resource assessment study at the identified project location
 - a) The consultant shall study the solar radiation assessment including irradiance values such as Global Horizontal Irradiance (GHI) and diffuse radiation by using best-in-class software and sources at the project location proposed by JREDA.
 - b) The consultant will also analyze climatic parameters like air temperature, wind velocity, sunshine hours, etc.
- ▶ Site feasibility study includes:
 - a) Analysis of the site for inspection of terrain and land topography
 - b) Assessment for critical factors like impact of shading, variability in weather conditions, etc.
 - c) Assessment for availability of water at the site, transport facilities, and connectivity of the site with road infrastructure, etc.
 - d) Nearest grid evacuation point and its distance from the site, quality of power and live grid availability at the grid evacuation point
 - e) Estimated cost of establishing power evacuation infrastructure to grid.
- ▶ Selection of appropriate solar PV technology, configuration and plant layout based upon the site analysis.
- ▶ Estimation of energy generation with the help of software (PV-Syst)
- ▶ Financial modeling of the project on the basis on normative cost
 - a) Project cost estimation including cost of transmission up to the nearest substation.
 - b) Calculation and analysis of levelized cost of electricity for estimating project viability based upon the evaluated project cost.
 - c) Detailed financial assessment and sensitivity analysis of financial parameters like project and equity IRR, DSCR, etc.
- ▶ Project timeline and scheduling
