

**A REVIEW OF POLICY RECOMMENDATIONS FOR IMPLEMENTATION OF
DECENTRALIZED AND DISTRIBUTED GENERATION (DDG) SCHEMES FOR RURAL
AREAS IN INDIA**

Surbhi Bakshi

*Associate Professor, Deptt. of Electrical Engineering
Chandigarh University, Gharuan, India
surbhi_pec@yahoo.com*

Abstract

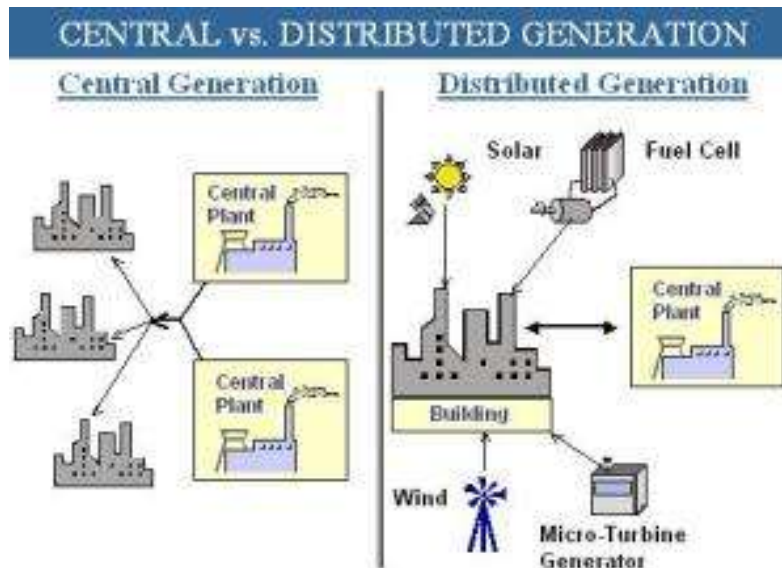
Rural electrification in India has long been regarded as a essential condition for social development. It is essential to accelerate economic growth, creation of employment, elimination of poverty and human development. Grid connectivity is the traditional way to electrify the rural areas. In large area and diverse country like India, with its unique geography, Current state of economy and habitations, grid connectivity is neither feasible nor cost effective. Therefore off grid solutions like Decentralized Distribution Generation (DDG) facilities stand as an ideal mode for supply of electricity. This paper presents an overview about the availability of resources, importance and benefits of the Decentralized Distributed Generation System for rural electrification

Index Terms – Renewable resources in Rural India, Distributed Energy Resources (DER), Decentralized Distributed Generation (DDG)

I. INTRODUCTION

Power is essential for the socio-economic development of a country and is being recognized as a basic infrastructural requirement. Although the installed capacity has increased to 210 GW but India faced an energy deficit of around 10% in last few years. Even today, 40 per cent of households are denied electricity; the other 60 per cent do not have reliable access to electricity and is lagging service, measured by hours of supply as well as penetration. Power cuts, erratic voltage and low or high supply frequency have added to the 'power woes' of the consumer [1].

Today, the need of the hour is sustainable power supply which will help address the need for increased demand. For a large and dispersed country like India, with its unique geography and current state of economy, innovative means of producing energy needs to be looked at to reduce its dependence on oil and coal as a primary source of energy.



Ministry of Power, Government of India launched Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) in 2005 for providing access to electricity to rural households. Electrification of about 1.15 lakh un-electrified villages and electricity connections to 2.34 crore BPL households by 2009 was on the agenda [2]. Under the scheme of Rural Electricity Infrastructure and Household Electrification, DDG was introduced in the XIth Plan to address the issue with the recommendations of Gokak Committee.

Technologies which can be used for Distributed Generation are:

- The Internal Combustion Engine.
- Biomass
- Turbines
- Micro-turbines
- Wind Turbines
- Concentrating Solar Power (CSP)
- Photovoltaic
- Fuel Cells
- Small-Hydel

Penetration of DDG: Till end of 2012[], around 6% of the villages were still to be electrified and these villages planned to be electrified with a mix of GE and DDG.

II. Benefits of DDG

- Utilizing waste fuel to Energy source.
- Saving deferment in Transmission Sector
- Quality of power and auxiliary Service
- Inaccessible Areas Electrification
- Quality of power

III. Barriers to implementation of DDG

- Lack of Adequate Information for market development.
- Poor Access to Credit.
- Lack of awareness of RET (Rural Energy Technologies) in rural India.
- Limited Site specific issues may erupt.
- Financial Viability-A major factor.
- To successfully implement DDG, Overall strategy that can be thought of is.
- Support Incentive in the near term.
- Transition to New Market.
- Reducing remaining institutional barriers.

IV. Model/Proposed Framework for Implementation of DDG

- Rural Electrification Policy (REP):

The present REP naturally discusses the approach of achieving 100% rural electrification but it surely falls wanting recommending a single nodal company for all rural electrification efforts. The Agency will have to act as an overseer for channelizing of funds through various agencies like MNRE, REC etc. and encouraging private participation in the sector [3-5].

Under Sec 14 of Electricity Act 2003, no licence is required for electricity generation & distribution in notified rural areas (26 states have notified). RE Policy states that for villages/habitations, where grid connectivity would not be feasible or not cost effective, off-grid solutions based on stand-alone systems may be taken up for supply of electricity so that every household gets access to electricity.

- Management of DDG systems: Nearby authority/panchayat/societies must keep the method as they are the true customers and a sense of belongingness may comprise in them.
- Selection of Technology: Relevant technology ought to be adopted through the authorities with adequate feasibility evaluation(in phrases of raw substances, feedstock degree, transportation amenities, usage sample of purchasers etc.) of particular vicinity.
- Capital Subsidy from Government: Customarily Rural cooperative societies control the excessive expenditure of the DDG but proudly owning to gigantic capital expenditure worried in the preliminary stage, government should provide ample subsidy to the developers or the EPC firms whosoever is concerned in the project. The incentives/subsidy should be established on the more than a few explanations like geographic region of discipline, deliberate potential addition and output efficiency.
- Enabling guidelines for Tariff revision: Under the purview of CERC, Tariff surroundings and revision should be taken care by way of the involved nodal company which has been assigned the positive implementation of DDG in a precise area and additionally there should be crystal clear transparency on this process.

- CDM Benefits: All RE projects are eligible for CDM benefits, DDG projects can be made financially more viable and competitive after encompassing the monetary benefits associated with them.
- Considerations to be taken w.r.t various institutional Models recommended by Gokak Committee: Models like Sunderbans Model, TERI Model, Bangladesh Model may be adopted after suitable changes in order to increase people participation at large [6-9].

V. Other recommendations

- Extend RGGVY to fund evacuation infrastructure.
- Develop transparent and simple interconnection rules and procedures.
- Streamlining Project Approval.
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Roles and responsibilities of Implementation Support Group shall be as follows:

Support to funding agency and single window to project developers for all data / information support.

- (i) Identification of villages/ target project areas
- (ii) Evolve guidelines and checklist for formulation of Feasibility Reports & Detailed Project Reports.
 - Contents of the Reports
 - Compliance to appraisal parameters.
 - Listing of clearances and requirements at each stage.
- (iii) Evolve Guidelines and parameters for Project developers for
 - Project implementation support.
 - Project monitoring
 - Quality assurance
 - Capacity building
 - Project closure
 - Operation stage support
- (iv) Support to REC
 - Techno Commercial appraisal.
 - Project monitoring
 - MIS support on scheme implementation.
 - Evolve guidelines and procedures for all steps in project implementation and operation.
 - Set quality benchmark parameters.
 - Provide monitoring benchmarks and check milestones.
- (v) Formulate detailed guidelines and check list for

- Detailed Project Report acceptance (for Project approval)
The steps and interfaces between ISG/ REC and Implementing Agency will be detailed through procedural guidelines.

(vi) Conduct Grant utilization audit

(vii) Maintain data repository on all aspects and deliverables of Scheme implementation.

(viii) Single Window to all Stakeholders

- Data/ Information support.
- Capacity building and awareness about new techniques and technologies.
- Target Project areas identification.

(ix) Formulate guidelines for funding of application projects based upon New technologies.

Decentralized Distribution Generation (DDG) Projects under Rajiv Gandhi Grameen Vidyutikaran Yojana

The preparation of Detailed Project Report (DPR) for the DDG projects to be established under the Rajiv Gandhi Grameen Vidyutikaran Yojana includes following parameters:

i. Executive Summary

A brief about the project, including the Technology chosen, System Configuration and Cost Parameters

ii. Introduction (Village profile)

A brief description of the village area and population details should be provided. The geographical location of the village within the State and District should be shown on map as an attachment. This section should cover the village level information obtained through Focused Group Discussions (FGD) and village survey. The FGD should generate the social and resource map of the village and these maps should be attached with the DPR.

iii. Village Energy Plan

The load for the village and estimate the capacity of the power plant will be provided and one shall also estimate the energy required to be generated for five years from the date of commissioning. While computing the load, provision of 2 light points (2 x 11/18 W) and one socket (80W) may be considered for each household, unless the households demand differently. The details of the energy consumption pattern should also be provided for the domestic/commercial uses within the village. It should also provide the details (type and quantity) of the availability of renewable energy resources in the village including the seasonal variation, as also the possibility of generating such resources in future like plantation activity for biofuel/biomass projects [10]. To assess the load and energy demand household and village survey should be conducted based on Focused Group Discussions (FGD). Data has to be captured for the entire village / hamlet (kerosene, firewood, animal waste, solar devices, batteries etc)

iv. Estimation of Load Demand and Energy Demand

This section addresses the load demand, the energy demand and the daily operational hours. This also focuses on anticipated yearly percentage increase in energy demand and five years energy demand for the village.

Next annual Energy Demand would be current annual energy demand plus the anticipated %age increase in energy demand.

v. Technology Selection Decision

This section captures data for selection of appropriate technology options best suited for the village and shall consider the sustainability of such DDG projects. The decision flow chart as mentioned in the DDG guidelines may be referred for a better understanding on the selection of technology.

Provide methodology and calculation to show how “estimated generation capacity available” has been arrived at only for selected technology (if required, please attach an annexure to the DPR)

vi. Design details of the power plant and estimated costs

This section provides the system design details, including energy plantation requirements, the intended energy services as also any value addition in terms of setting up micro enterprises that may be established on account of availability of electricity. All the costs of the project have to be estimated to cost of completion. All the cost figures mentioned in this section should be “Estimated Cost of Project Completion”. [11]

vii. Project Management and Monitoring Plan

This section should provide the overall management plan and implementation schedule for all the project activities. This section should mention the project monitoring mechanism, and try to estimate probable impacts of the DDG project in the village and also develop the probable parameters and indicators that could be monitored for ex post impact analysis of the project. This section should also describe any possible constrains for successful project implementation.

Implementation Methodology: Based on the DPR document, the Implementing Agency has to prepare the Bid Document for successful implementation. In case the Implementing Agency does not have in-house expertise themselves to prepare the Bid Document and for project implementation and management, they can avail the services of a Consultant to prepare the Bid Document and for project management and implementation. The suggested BAR / PERT Chart to be enclosed as part of the DPR.

viii. Baseline information for calculating emission reductions from carbon trading schemes

This section should provide the baseline information for calculating the baseline emissions for the project activities. This information would be used for calculating the total emission reductions in terms of tones of CO₂ for market based carbon trading mechanisms like the Clean Development Mechanism. Even in the case of the voluntary market, baseline data is available to use directly [12].

VI. CONCLUSION

In the long run, distributed generation will help consumers to get power at lower tariff as power will be available at lower per unit cost. Extra employment possibilities, each at plant

administration stage and within the manufacturing sector for associated machinery, will toughen living requirements of the folks. Availability of vigour at low price will appeal to more investments, which would be extra evenly distributed during the nation instead than being limited to cities by myself. Going forward, concerted efforts through the Union and State Governments, monetary associations, tutorial and study institutes, non-governmental firms, as good as multilateral and bilateral companies is required. A disbursed generation matrix for India is recommended for lighting the lives of those for whom lighting a bulb still remains dream!

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