

# *Integrated Executive Summary of RGGVY Evaluation of Rajasthan, Assam, Gujarat, Himachal Pradesh and Uttar Pradesh*



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Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) Programme is a landmark initiative of the Government of India. The visible positive impact of the programme are (a) electricity supply for more than 6-8 hours in rural areas, (b) provides better opportunities in education, health, communication and economic development in the villages, (c) facilitated implementation of “National Electricity Policy” and “Rural Electrification Policy”, (d) strengthening rural electrification system through franchisees (e) opened up opportunity for power generation from renewable energy resources and link it to the national grid. IRADe has conducted the evaluation of RGGVY in Rajasthan, Himachal Pradesh, Assam, Gujarat, and Uttar Pradesh. The details of the district surveyed are shown in the map (annexure-1). The integrated executive summary is the combined summary of the findings of each state and is based on surveyed data; information available, focus group discussion and various interactions with the stakeholders is as follows:

### 1) The Supply Hours of Electricity:

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The availability of electricity on a daily basis vary from State to State, and also within the districts. It varies from 6 hours to 24 hours. Himachal Pradesh (HP) and Gujarat (GJ) are providing nearly continuous power supply in rural areas. Electricity supply in Rajasthan and Assam is satisfactory. Jodhpur, Ajmer and Hanumangarh district of Rajasthan receive on an average 16-18 hours of supply per day. In Rajasthan, even though 16-18 hours of supply per day is made available, but only 0.5 to 2 hours of supply is provided during the evening (peak) hours. Similarly, evening hour supplies, (in the range of 0-2 hours) were observed in the surveyed villages of Uttar Pradesh and Assam. The electricity supply in Uttar Pradesh is in the range of 6 to 12 hours daily but is of poor quality. Supply constraint is the main barrier for less hours of supply in the power deficit states like UP and Assam. In Himachal Pradesh, HPSEB provides power supply for 16-22 hours per day, however the consumers report frequent network tripping and low voltages in remote households and in hamlets. On the other hand, Gujarat state supplies around 22-24 hours of electricity and is of good quality.

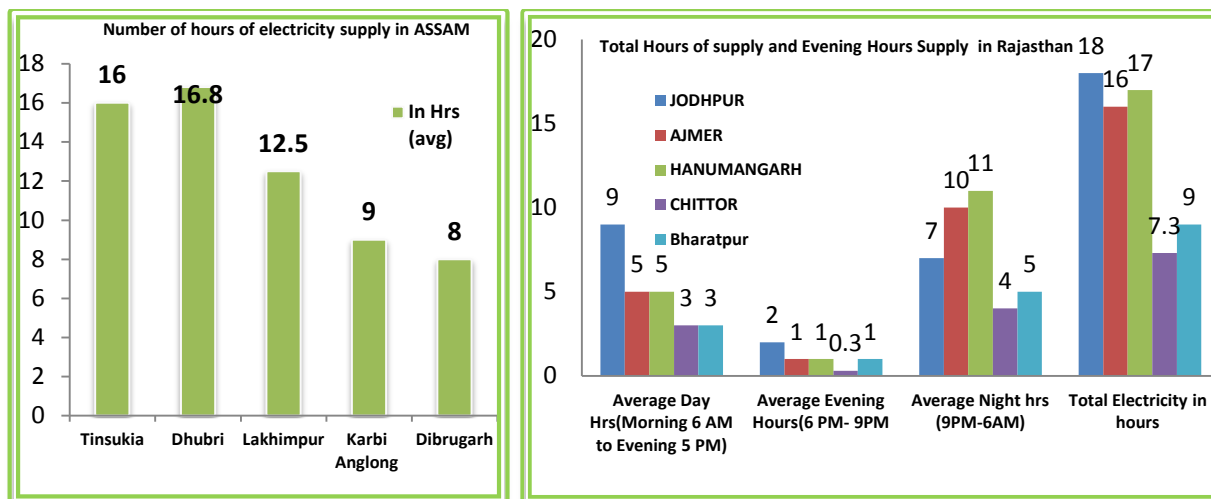


Figure 1 Hours of Supply in Assam and Rajasthan<sup>1</sup>

The good quality of supply in Gujarat is mainly due to segregation of agricultural feeder from other loads and the feeders receive 8 hours supply on a rotation basis. In lieu of problems being faced by consumers, particularly in the state of UP, Rajasthan, Assam, and Himachal Pradesh, consumers demanded: (a) Mandatory power supply of 2-3 hours during evening hours, (b) advance information regarding load shedding and supply schedule. *State governments must upgrade and strengthen the rural feeder with the twin objectives of achieving better quality and reliability of power supply; and to reduce technical losses in distribution system.* Since electricity supply to rural consumers is considered a loss making proposition for DISCOMs, there is a structural disincentive for the DISCOM to serve rural consumer particularly in a power deficit scenario. The adequate availability of electricity and of good quality is essential for long term sustainability of rural electrification. *To remove these structural disincentives, the central government may devise an appropriate mechanism by which they may supply unallocated power of NTPC and other cheap hydro power ( power from cheap hydro power resources ) at cheaper rates to the state government by emphasizing that this will be provided to the rural areas.* The Detailed mechanism can be devised in proper consultation with the stakeholders.

<sup>1</sup> Graphs for rest of the states are show in the Annexure 3

## 2) Village Electrification, BPL Households (HHs) and Public Places:

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BPL connections have been released in phases; and access to electricity has been provided in public places located within the revenue village or within populated areas. Our **survey** results indicates that 45%, 57%, 51%, BPL Households (HHs) have been electrified in Assam, Rajasthan and UP, respectively. In Gujarat and Himachal Pradesh (HP) almost all the BPL households have been electrified in fact; in HP more number of BPL has been connected than the RGGVY target. Villages surveyed in Gujarat and of three districts of the HP, were partially/previously electrified and the focus was more on intensification and infrastructure augmentation. State governments have their own rural electrification schemes which complement and supplement the effort of RGGVY. Gujarat state had Jyoti Gram Yojana (JGY) and has Zupadpatti scheme which also provide BPL connections. Similar schemes exist in UP (Ambedkar village program where electrification is one of the component) and in Rajasthan (CM electricity for all Yojana). Delay in electrifying BPL HHs is mainly due to finalization of the eligible BPL list (which takes time as there are differences in the lists provided by Ministry of Rural Development and the State Government), migration of HHs, relocation and shifting of HHs in the villages and its physical identification of HHs in the villages, HHs living beyond 500 meters from the distribution transformer location, HHs living in the Non Abadi (outside main village clusters) areas.

Though small hamlets (less than 100 populations) are not covered under RGGVY, but they are being electrified in some cases in Rajasthan, as in Rajasthan almost all of the BPL families live in small hamlets in certain villages. The RGGVY Programme allocates Rs 2200 for giving free connection to BPL households, however this cost's norm needs revision as in some states costs are much higher. HP provides an additional amount of over Rs 2200/- for BPL connections, due to geographical reasons. *It is observed that large no of BPL HHs and rural population lives in small hamlets of less than 100 population, particularly in states like Rajasthan and Assam. Efforts must be made to electrify these households in 12th plan projects.* Since exact no. of HHs living in hamlets are not known, for 12<sup>th</sup> plan proper survey must be carried out in the context of current census, to know the exact number of hamlets and the HHs so as to have a proper design and implementation of the programme.

Access to electricity was/is available in public places but the electricity connection and energization was not availed of by all. In certain cases adequate access is not provided as it was observed schools are far away from the main village habitation. It was felt that laying line lines for schools (those are outside of the main village) may be prone to thefts and therefore lines were not laid till the school premises. The status of public place electrification in surveyed villages is indicated in Figure 2. In Rajasthan, Assam, UP, Himachal and Gujarat, there were 32, 20, 13, 18 and 40 public places in the surveyed villages respectively; of which 10, 4, 8, 15 and 40 places were energized respectively. *Initiatives by the state governments (through the Program and schemes) are the key to 100% energization of public places, as it is observed in Gujarat and Himachal.*

It was observed that authorities in control of Public Places in Assam and UP and to some extent in Rajasthan are not aware of the procedure of applying for electricity connection.

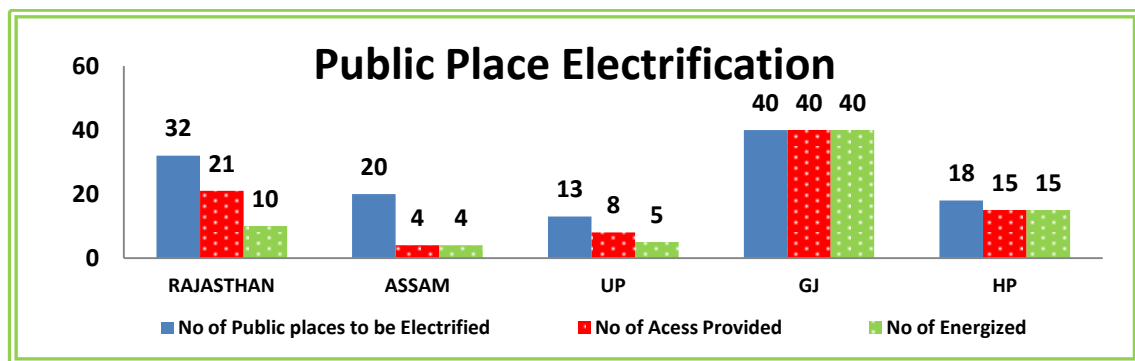


Figure 2: Status of Public Place electrification in numbers.

### 3) Extent of APL connections and VEI:

*Proper consumer mix (BPL, APL, commercial, and agricultural) is essential to ensure revenue sustainability of rural electrification.* Release of APL connection is a systematic process in Himachal Pradesh, Rajasthan, and Gujarat. In UP and Assam more focused effort is required by DISCOMs as a large number of APLs are still not connected. Sample Survey in Assam (Oct 2011) shows only 3.4% of APL Households were electrified, and large number of applications were pending. In Uttar Pradesh only two APL households were electrified out of total 1536 HHS surveyed in sample villages. During discussion with villagers, poor APL connections were attributed to poor quality of supply (intermittent and low voltage of supply), timely repair, restoration and maintenance of services, thereby APL's are not interested in applying for the new connection. APL consumers also expressed that free connection for BPL households is

provided whereas APL households has to pay for getting connected. Many APL households said that the disparity of income between APL and BPL is very less and therefore *they should also be issued connections in line with the BPL connections or at subsidized rates (similar to the Schemes in West Bengal)*. In HP large proportions of APL HHs are electrified. Extent of APL electrification in Rajasthan is satisfactory; efforts are being made to release the APL connection within 2-3 months of receipt of applications and the lists of pending connections are put up on the website by Rajasthan DISCOMs.

In Gujarat all APL HHs are released connections within 30 days of application and cost of connection is based on load demand. In Uttar Pradesh and ASSAM the release of APL connection is slow. In Assam, Rajasthan and UP, in most of the villages, *it was seen and reported that a good number of APL HHs have unauthorized connections through hooking. DISCOMs are reluctant to release more connections as they have to augment the transformer capacity in many cases, which is constrained by financial resources.*

- Most of the transformer capacity augmentation is also not proactive, it generally happens after transformers fail due to overloading.
- Camps are being organized in some states (Rajasthan, Gujarat) during process of handing over and taking over of the RGGVY-VEI. This practice should also be followed in other states as well.

It was observed that the appliances used by BPL and APL had cumulative load of 200-400watt and 500-1500 watt respectively. The range is indicated as it varies from state to state. Proactive and proper load assessment of the villages and HHs is needed for transformer capacity augmentation. The DISCOMs have fund constraints for transformer upgradation. *The REC may consider providing loans for transformer augmentations. The state governments should also provide funds for transformer augmentation as this help in reducing AT&C losses.* Further to improve efficiency of investments, Electricity Distribution Circles (EDC) should be empowered to decide on investment utilization, procurement and execution. *It is very essential that proactive efforts must be made to develop a proper consumer mix in villages particularly bringing productive loads in the rural areas (small scale commercial activities, agricultural load etc.) for the long term sustainability of rural electrification. The central government may give financial support for bringing productive loads in the RGGVY villages.*



#### 4) Electricity Billing & revenue collection:

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Billing and revenue collection processes have been streamlined in the states of Rajasthan, UP, Gujarat and HP, but efficiency varies. In Gujarat and HP almost 100% billing is being done and the villagers are regularly paying the bills, except in few tribal areas and for some habitual defaulters. In Rajasthan 80% villagers in the sampled survey receive bills bimonthly. Only 65% of Households had been making payments regularly. In Assam the surveyed villages were mostly electrified within last one year and about 47% households were receiving bills. It was encouraging to see 100% recovery of the bills issued to HHs holds in Assam. In UP most of the bills raised were based on average billing. It was seen that 30-40% of meters were not working, and were installed in inaccessible locations. Further, billing on an average basis creates unnecessary controversy. In all the states except Gujarat, it was found; DISCOMS take long time (2-6 Months) for issuing the first bill after the new connection due to consumer indexing. *Because of the delay, first aggregate bill is large, in the range of 1000-1500 rupees, which is difficult for Rural Household to pay in one go. This leads to a continued high level of outstanding bills including fine, thereby increasing risk of disconnections.*

*Consumer indexing and automatic meter reading could be introduced to rural consumers.* Meter reading based billing is a must to attract APL connection. There are certain villages where BPL do not pay bills as they think electricity is free for them. Message to BPL HHs need to be sensitized that connections are free but electricity usage has to be paid for. Meter defects should be attended without delay. Problems of theft and payment defaults need to be tackled effectively by having a effective vigilance group. *To improve quality of billing and theft control, low cost prepaid meters may be installed in villages through pilot projects in 12th plan, and should be taken in mass scale if results are satisfactory.*

#### 5) Instances of Disconnections:

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In surveyed villages 16, 13 and 10 cases of disconnections were observed in the states of Rajasthan, UP and Gujarat respectively. In Assam and HP no disconnections were reported. In Assam, villages were newly electrified and case of default in payment did not arise. In HP, HPSEB executives mentioned that 0.5% disconnections occurs. Reasons for disconnection are power theft (Meter bypassing), default in payment, houses getting damaged and migration of



population. *The risk of disconnection will be higher in future due to high outstanding bills and theft. The issue of releasing first bill must be systematized as in some cases issuing first bill took 2-6 months.* It is desirable to involve the Gram Panchayats and Law & Order machinery to do away with power theft in the villages. Gujarat state has effective vigilance wing to help DISCOM in maintaining consumer discipline and theft control.

## 6) Socioeconomic impact of RGGVY:

Contribution of rural economy to national GDP is gradually shrinking, but the socioeconomic impact of the rural revenue and income cannot be discounted. During the survey in all the states the consumers claimed that (a) their standard of living has improved, (b) the place is more secure, (c) women can work inside the house during evening hours on household chores, thus freeing them for more productive work on the field during the day. But in surveyed villages (in Rajasthan) only 2 % felt an **increase in employment opportunities** and 15 % villagers felt **increases in income** due to electricity (as they were using electricity in activities like weaving, tailoring, running kirana shops). More positive impacts were noticed in un-electrified villages than in partially electrified villages.

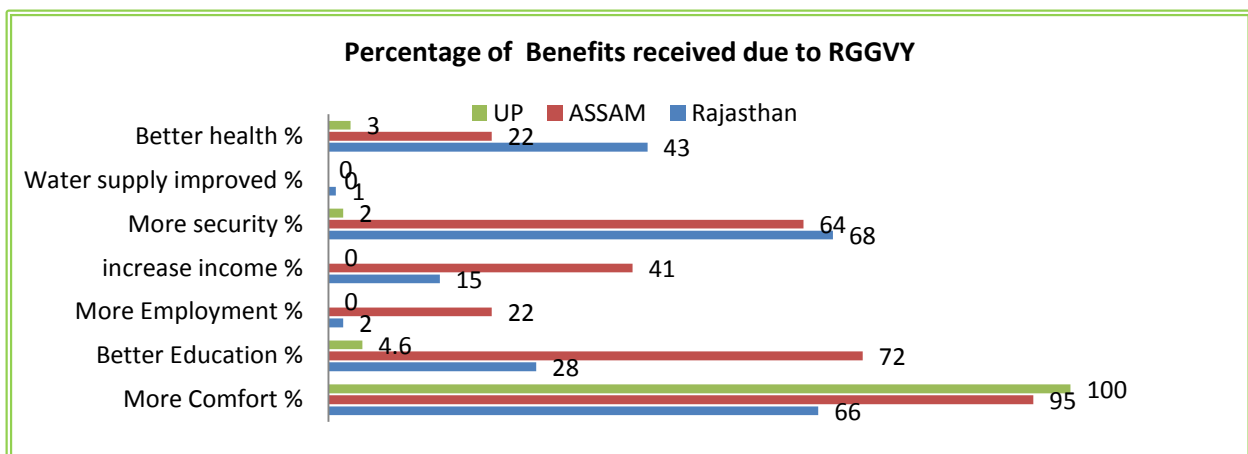


Figure 3 Socio-economic impact of RGGVY

In UP, poor and inadequate supply of electricity has resulted in very little positive socioeconomic impact. In fact during the surveys villagers reported that no benefits can be received with such poor supply. In Assam 100% increase in comfort, education and securities were felt by the villagers across the districts surveyed, although the supply was in the range of 8-16 hours. Sense of security has improved substantially in rural areas because of better illumination, thus respite from insects/snake bites and animals in most of the villages. *On*

*being asked about need of street lights, women in all the states said there should/must be few street lights deployed in the villages as a part of the programme which will immensely improve the security during night hours.* Rural electrifications had made good progress in Gujarat and HP, has huge positive impacts across various socio-economic indicators, But it is yet to generate visible employment opportunities and additional economic developments in rural areas. The quality of health service in the state has improved in Rajasthan, Gujarat, and HP. *Despite positive impacts it is observed that the current level of electrification is not enough to induce overall economic development in the villages, as envisaged in the National electrification policy.* State Governments should create appropriate linkage and coordination between Agriculture/food and utilities so that DISCOMs/EDCs could help in the growth and development of Agro and food processing and other village level enterprises. This will help in economic development and moving away from subsidies and cross-subsidization of electricity. More sustained efforts are required to draw the benefit of rural electrification *and factors such as quality and reliability of supply and the overall distribution governance must be improved substantially.*

## 7) Availability of Grid network & backward linkages:

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Rajasthan, Himachal and Gujarat State governments have taken their own initiatives along with RGGVY to strengthen the distribution infrastructure, augment the rural REDBs and VEI, and provide BPL connections. Assam and Uttar Pradesh need a more concerted effort to augment rural network, though UP has a special scheme for Dalit Basti. In HP the projects in three districts are of retrofitting; VEI needs to be upgraded with higher capacity of DT or planned with HVDS design for rural area. In Assam 15 blocks out of 25 blocks have substation. In UP, RGGVY infrastructure in two villages was found to be damaged and one was partially damaged. Augmentation of network in Rajasthan is regularly being done due to the complementary schemes run by the State government. Under GPVY (Gram Panchayat Vidyut Vitarana Yojana), 800 new 33Kv GSS are being built for a cluster of Panchayats and separate 11Kv feeder line is being laid for each Panchayat in Rajasthan.

*R-APDRP may be extended to rural/semi rural areas in a phased manner. This will facilitate the creation of an efficient Distribution Management System with the balancing of Urban and Rural Load. R-APDRP will facilitate RGGVY program implementation by (a) online*

*monitoring of technical parameter in rural areas, (b) project management will be in line with organization setup of the utility, (c) Energy pooling can be done at the micro level.* Since a large number of 33/11 KV Substations and DT's are being installed under RGGVY program, they should be provided with smart meters to link with R-APDRP systems.

Looking at the future load growths in rural India, there is a massive need for proactive augmentation and strengthening of overloaded system. State governments must develop a separate business plan for each distribution circle (may be drawn from the existing Rural electrification plans) for strengthening of 132KV and below distribution systems by taking in to account, the load growth for next 10 years. Financial assistance for this may be provided to by the Central government from case to case basis.

### 8) Effective Use of HVDS and Size of DTs:

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HVDS network design is being practiced in Rajasthan, UP and Gujarat. HP and Assam have a conventional design due to the scattered location and right of way issues. The use of distribution transformers (DT) having capacity of 10, 16, and 25 KVA is prevalent. Currently DT capacity used is sufficient, but scenario may change as more APL consumers are connected to the infrastructure. Considering the enhancement BPL and APL load demand 16 KVA or 25 KVA transformers may not be sufficient for villages having 100 or more households. *However in some cases one 10/16 KVA transformer has been deployed for 2-3 household in hamlets. Under this context the capacity of DTs needs a practical assessment on techno-economic considerations, as there is scope for optimization.* This may be done by latest GIS based digitized distribution system design. The far off hamlets with 2-6 households may be electrified through LT cables. HVDS is a very effective system and it should be continued in the next plan as well. It is felt that since large number of small capacity transformers are deployed and more will be deployed in near future, distribution companies need to build sufficient number of workshops for the repair of these transformers, as it was observed in the states like UP, RJ, HP , small capacity of transformers are not generally repaired due lack of workshops.

## 9) Adequacy of Distribution Network and Cause of DTs failure:

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The failure rate of the transformer is found to be much higher in rural areas compared to urban areas. The failure rate of DT in Rajasthan's rural area is 8-10%, while in urban area it is 2 to 3% only. The failure rate in Gujarat and UP was 12.96% (2009-10) and 10-13% respectively. The transformer life should be 25 Years; which is considerably less in rural areas. The failure rate is comparatively low in Himachal Pradesh. The failure is generally attributed to (a) illegal hooking and theft, (b) aging, (c) over loading, (d) failure of the protection system, (e) poor earthing, (f) tampering with the installation for theft, (g) load balancing in 3 phases of DT etc.

Electrification of Partially electrified villages in HP were retrofit projects, for which they desired that use of 63 KVA DT may be permitted due to the scattered population in the hilly villages. It is suggested that (a) infrastructure must be augmented with proper assessment of load through regular monitoring; (b) Repair workshops for transformer repairs should be established at the DISCOM level (c) Completely sealed type transformers could be deployed in rural areas to enhance transformer life. *A detailed system adequacy assessment should be carried out by DISCOM after 2-3 years of RGGVY project implementation* and it must be a regular exercise. Consumer load growth in rural area will happen rapidly, hence the overall T&D system needs to be strengthened and improved to cater to the demand. The state government should strengthen the network system through their own funds or by the use of RGGVY funds or by taking loan from financial institutions.

## 10) Decentralized Distributed Generation (DDG)

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Introspection on **DDG** scheme is called for in order to ascertain reasons for complete absence of any working DDG projects in the states surveyed. DDG scheme needs to be revamped and promoted more aggressively particularly in light of the sharp drop witnessed in the cost of solar energy. These systems on standalone basis or in hybrid mode with other renewable technologies could be more cost effective alternative in many remote locations. Prima facie, the constraints seem to arise from information asymmetry, complex procedures, structural barriers and lack of ownership that prevents private initiatives including PPP in implementation of DDG. Villagers preferred to have solar based DDG projects. In Rajasthan DISCOM officials liked the idea to have DDG projects in the villages but majority of them

suggested to be implemented in a Public-Private-participation (PPP) mode. State Nodal agencies for renewable in Rajasthan and Gujarat are pursuing large renewable energy projects and implementing these in PPP mode, but are lukewarm to DDG scheme under RGGVY. Two main reasons for delay in DDG 1) lack of clarity on ownership of the project and security of installation 2) lack of incentives for entrepreneurs 3) poor operational revenue form the projects as highlighted by the entrepreneurs. To overcome this *Generation Based franchisee model and off-grid distributed generation franchisee model may be adopted under the existing DDG scheme through a competitive bidding process.* DISCOM should identify such models in consultation with the State Nodal agency to attract private sector participation.

DDG projects should be eligible for renewable energy certificates, which facilitate states to meet renewable purchase obligations. *Ministry of Power can take up the initiative along with CERC to decide upon an attractive feed in Tariff for DDG projects as it will help in a big way in bringing private players in DDG area.* It is also recommended that a simple attractive feed in tariff with fixed capital subsidies will be a good way of deploying DDG projects in large scale in rural areas as it will bring private sector investment and expertise.

Franchisee based DDG system can be integrated with RGGVY franchisee model. DDG projects should be connected to Grid to make it commercially viable. DDG project must be continued with the proper restructuring of the scheme as it will ensure adequate supply of electricity in remote villages.

## 11) Extra power Availability for RGGVY:

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The commissioning of RGGVY infrastructure has generated demand for additional electrical power. In the eleventh plan approximately 54900 MW power (capacity) has been added, but there are demands from various sectors. Each state is facing a power deficit scenario and higher demand deficit during peak hours as indicated in figure 4. The states manage the shortfall through open access, while maintaining cost component within reasonable limits.

An approximate and hypothetical power demand of the rural domestic sector is indicated in Figure 5. The extra power demand due to RGGVY can be met by (a) electricity generation from renewable, (b) energy efficiency including reduction of T&D losses, (c) open

access to the grid. Rajasthan SEB has taken up Transmission and Distribution network strengthening which includes are Feeder Renovation program (FRP), Gram Panchayat Viduyt Vitaran Yojana etc. Many thermal power stations are being constructed in UP. In 12th Plan UP shall have adequate power to supply to meet the demand of rural areas if plants gets commissioned on time. Gujarat Regulatory Commission plans power demand in advance and any shortfall on this account is met by open access. Assam is a power deficit state; they can plan for large scale renewable generation or negotiate for more power in an open access area. Proactive Demand side management in rural areas can help to manage the electricity demand from rural areas.

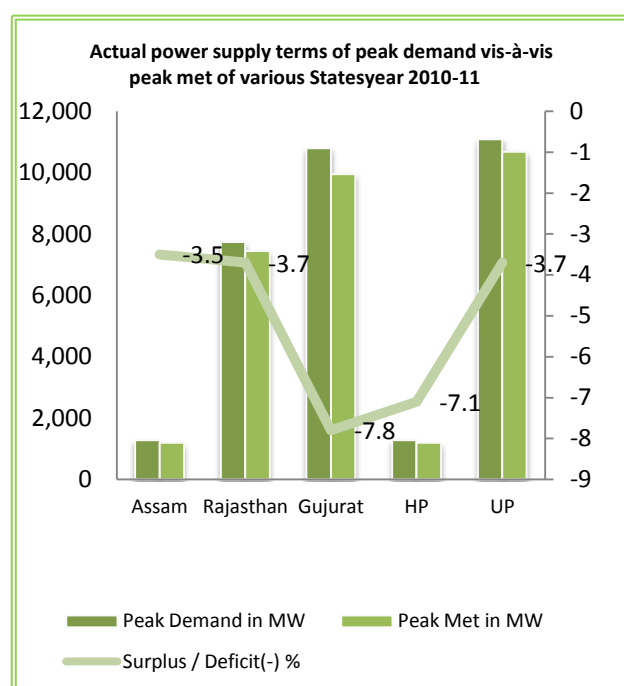
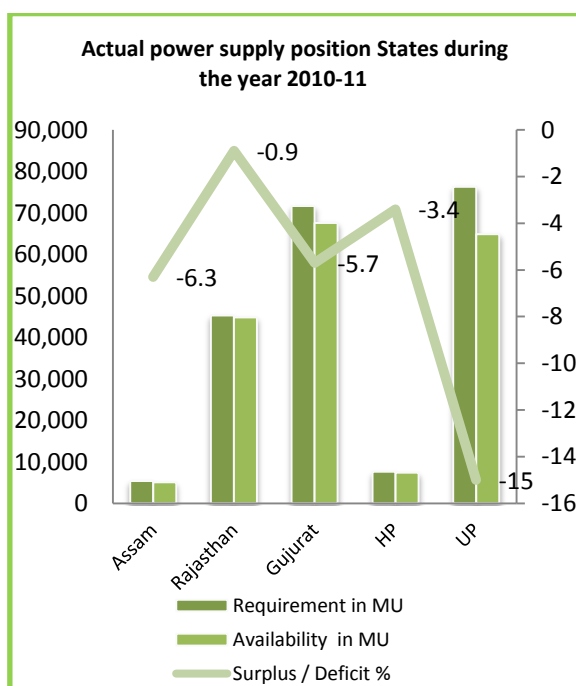


Figure 4 Actual supply position and power demand during peak hours in the states surveyed

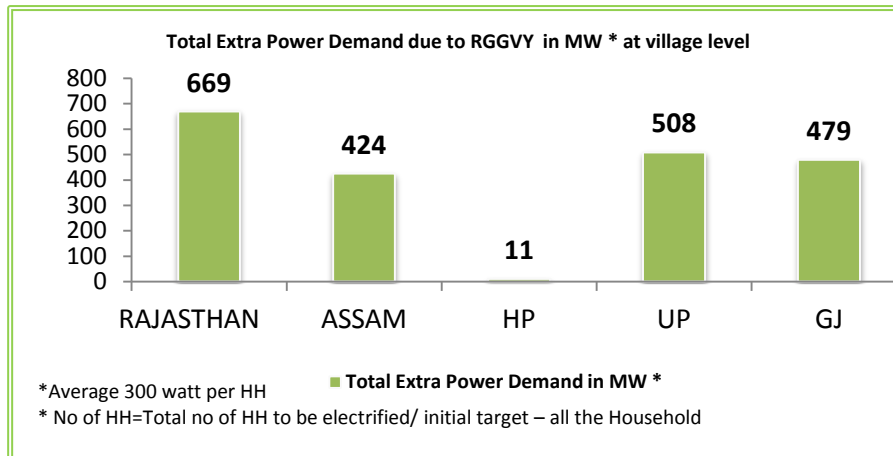


Figure 5 IRADe estimate of extra load demand from Rural Domestic sector

As per the IRADe analysis total extra power demand due to RGGVY connections at the village level are 669 Mw, 424 Mw, 11 Mw, 508 Mw, 479 Mw in Rajasthan, Assam, HP, Uttar Pradesh, Gujarat respectively. This demand will vary depending on various factors including the level of electrical appliance penetration in rural areas. Rural areas are good platform for development of Renewable energy based power generation facilities. The Government has announced incentives such as Feed-in Tariff (FIT), RPO, and renewable energy certificates (RECs). An entrepreneur can exploit these opportunities provided by the incentives in rural areas and generate power from renewable source. The state government can provide incentives in the form of (a) announce a stable FIT for entrepreneur and tax incentives, for solar plants in rural areas (b) energy pooling at block or circle level.

## 12) Deployment of franchisee and their efficiency:

No operating franchisee was found in the surveyed RGGVY villages except in some areas of Assam, Gujarat and UP. DISCOMs have outsourced some of its functions in the revenue cycle and have named it as a franchisee. In most of the cases billing is outsourced. The revenue is collected at local DISCOM office in the block. Some states like Gujarat have links with banks and post-offices to collect revenue. “Franchisee Systems” could not mature the way it was conceived because rural population is not having the adequate paying capacity and the cost of serving the rural consumer is very high. Entrepreneurs are also not interested in rural franchises as it does not make a strong business case for them. In Himachal Pradesh average cost of billing and collections (DISCOMs) is around 5-8 rupees per households. HPSEB initiated the process of deployment of franchisee for which it received bids in the range of 10-15 rupees



per HH and for certain hilly places it was in the range of 20 Rs per household. There is an urgent need for DISCOMs to freshly calculate their Benchmark cost for each distribution circle and it should be put in the public domain, and this cost estimation should be done by an independent agency under the guidance of the State electricity regulatory commission. These benchmark costs will enable the private sector to devise more innovative and economically feasible business models.

DISCOMs/EDCs are interested in developing franchises on the basis of single point supply with bulk supply tariffs, but economic viability in rural areas has not made it feasible. Assam, in some pockets has input based franchisee, but their performance is not good and no new franchisee's are coming up . *The Franchises are not coming up due to the Poor Hours of Supply, Poor Consumer Mix, Scattered Villages (low density), lack of accurate benchmark and baseline data, commercial dispute due to contractual obligations, lack of the financial feasibility of franchisees in rural areas. Most of the franchises business model , the profits are linked to T&D losses and overall trend in decline in Transmission and Distribution losses in the states. As Transmission and Distribution losses keeps on declining the financial profitability of franchisees becomes difficulties, thereby making it less attractive for the entrepreneurs for a long term perspective.* Revenue collection from rural Gujarat is healthier than other states and DISCOMs.Gujarat is pursuing various form of franchisee as the suitability like (i) Feeder Franchisee (for Maintenance), (ii) E-Gram (for revenue Collection), (iii) Post Office (for revenue Collection), (iv)MEGA - Management of Electricity by Gram Associate (Collection based revenue franchisee). The identified challenges in franchisee implementation are (a) franchisee too have inadequate capacity to meet financial, administrative and regulatory requirements, (b) Shortage of skilled manpower at local level, (c) Resistance from employee unions who may perceive it as back door privatization, (d) Inability to meet eventualities like accidents, natural calamities, disputes related to issues of service deficiencies.

During the interactions with stakeholders, some of the suggestions were (a) Banks; financial institution may give financial guarantees on behalf of franchisee, (b) capacity building of DISCOM executives on franchisee through hands on training (c) involving retired employees in the franchisee deployment.

The state government may tender for generations (renewable) based franchises models for cluster of villages, where franchisee will generate electricity and also distribute it to the consumers. The system can be connected to the state grid for accounting purposes. Gradually they may be empowered to issue bills, collect revenue and perform operation and maintenance. *The defined financial mechanism will make Franchisee System more attractive and sustainable. Since franchisees are not coming up, the conditionality in the RGGVY for 12th plan may be relaxed, and state governments should explore the alternatives to franchisee system as per their suitability and decide upon franchisee based business models as per local conditions.* The franchise model with viability gap funding may be considered for remote and hilly villages and franchisee should be awarded through a competitive bidding process.

### 13) Adherence to Implementation Schedule, Delay in Implementation, Monitoring:

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RGGVY projects at village level in Gujarat and Rajasthan were executed in time except in some special cases. Delays in project implementation were observed in the state of Assam, HP, RJ and UP due to a combination of factors like (a) delay in bidding process, award of contract to turnkey contractors, coordination and administrative delays (such as clearance of land, forest clearances, approved BPL list) between PIA and DISCOMs, (b) grey areas in the DPR preparation leading to revised cost estimates, (c) Asset transfer from PIA to DISCOM due to pre-handover inspection, (d) lack of locally available manpower both skilled and unskilled, (e) issues in getting certification from Panchayats and others, (f) insurgency concerns in the states of Assam (g) lower stake of states and absence of dedicated manpower in DISCOMs. Delays occurred where the scope of work defined in DPR was not matching with ground reality; the inappropriateness in DPRs was observed in almost all the DPRs studied. There were issues such as identification and location of eligible BPL Consumers, routing of VEI-LT and HT lines. Law and Order situation needs to be factored in while formulating schemes. While appreciating the challenges in making correct DPR, DPR must provide detailed drawing, planned Distribution system as per DPR, without this DPR should not be approved.

Figure 6; indicates the level of energization in the surveyed villages. The work of electrification in the villages were in progress, however the work was not complete for hot trial

run of network for testing. In Assam (Dibrugarh), there appeared to be lack of logistics and lack of manpower even at subcontractor level. Recent information is that the remaining villages in Dibrugarh are electrified. In Himachal there was heavy snow in the financial year 2011-12 leading to impediment in progress of work. Commissioning of Substation in Pangi Valley was delayed which was to be commissioned by March 31, 2012. Substation commissioning in all surveyed areas were delayed.

The implementation schedule in the villages and block level has been analysed in four components (a) substation [issue was land allocation, and receipt of materials from manufacturers, material transport, tapping from 33 KV line], (b) laying of HT Line [forest clearances, and right of way], (c) Distribution transformer and LT Line [land and right of way, deployment of gangs by sub-contractors], (d) Logistics and other constraints [social conflicts, approach roads and bridges, enabling services, weather conditions affecting execution of project]. Weather is a big project hindrance in Assam and HP due to flooding and heavy snow, respectively. Other observations:

- Handling of Turnkey projects and problems (a) Gaps in DPR and contracts are not resolved amicably (b) During project execution the role of DISCOM is limited, project supervision gets neglected, the problem comes while taking over. The capacity building of contractors carrying out execution is required.
- Engineering wing of the REC and utility -level planning, to suggest the Distribution system engineering and appropriate network design.
- Slackness in professional management due to frequent change of personnel and responsibility at utility level. Dedicated functional rural electrification department is essential and must be created in each DISCOM. It should be a upfront commitment by the state government before the implementation of RGGVY in future.
- Panchayat must reply within 30 days from the date of receipt of the certificate format (it must be in local language). Certificate format may be sent through courier /post from PIA. Involvement of Gram Panchayats/Sarpanch during project execution is desired as it will help in effective implementation of the project at the village level.
- DISCOM should complete inspection of infrastructure and give directions to PIA to make changes, if any within 15-20 days of the request from PIA.

- Selection and deployment of sub-contractor at the state level may be on pre-defined and for which specific guidelines may be prepared.
- DISCOMs may provide Security arrangements for PIA in the disturbed areas.

It is observed that in Gujarat and HP (except in Spiti and Chamba district) state, projects are implemented within schedule although some delay were observed. In these states decision on project implementation through a turnkey Contract or through few separate Design/supply/execution contracts could be left to DISCOM/SE (Distribution Circle) to improve the effectiveness of implementation. Considering the current level of progress it is felt that Turnkey basis for entering into implementation contracts by PIAs may be changed to work contracts designed by DISCOM/EDCs to effect the economy and quality work on a case to case basis.

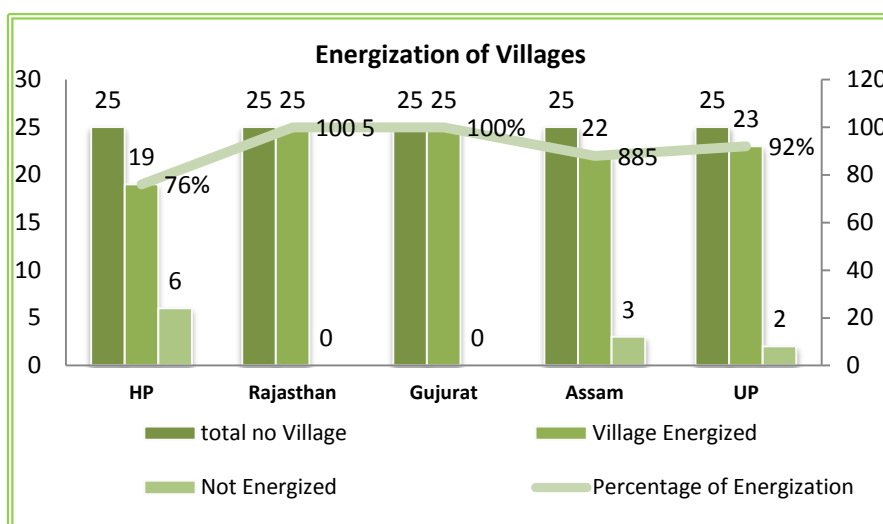


Figure 6 Level of energization in the surveyed villages in each district

The RGGVY is monitored through RGGVY monitoring committee and a detailed MIS system is followed. However it was found that MIS is unable to give accurate and timely desired information, therefore real time MIS be put in place. There is a need to constitute an independent monitoring committee to ensure better monitoring of the program.

#### 14) Quality and Effectiveness of Detailed Project Report (DPR):

DPR defines the project overview which includes estimated bills of materials, scope of work based on demography, landscape, previous status of electrification, implementation schedule, approved technology, and manufacturers and material suppliers etc. During the DPR preparation process certain assumptions are made. It is understood that DPRs were prepared

in a hurry with inadequate inputs from the fields to meet deadlines. However the gaps were addressed during submission for revised DPR to some extent. Preparation of supplementary DPR in some districts became necessary. Demand of APL and BPL load may vary from state to state; however as per the survey a standard load for BPL and APL consumers may be fixed at 0.25 KW for BPL and 1.0 KW for APL HHs with some flexibility. This assumption is important for estimating REDB infrastructure and DT capacity in VEI. It was observed that due to the large number of DPRs and limited staffs' in REC, project offices' proper scrutiny was not possible. During the survey it was observed that villagers are using 2-4 number of 100 watt Incandescent bulbs per households. In 12<sup>th</sup> plan LED bulbs may be distributed to BPL households which will have much lesser power demand. State government should devise schemes in which all the BPL households (both 10<sup>th</sup> and 11<sup>th</sup> plan connections) may be given LED bulbs to reduce load per house hold.

The PIA's have moved for Revised Cost Estimate (RCE) for the district due to change in Bill of quantity and uncovered items in the DPR. Some of the reasons given are (a) The estimated number of substations to be built, new or existing substation being augmented, changes during post survey estimates (b) Reconductoring of 33kV Line ahead of Substation as point of tapping was not identified, (c) The requirement of 11/0.433 KV Distribution Transformers increased due to hamlets, (d) For HVDS system, 11 KV lines were to go up to the consumer cluster, but due to clearance problem, lines have been terminated at the village entrance, hence LT line component changed, (e) Requirement of Line sections and other hardware's changed, (f) Increase of price for major raw materials like steel, aluminum, copper, labor, (g) Service tax on PIA's service charges has been included in the RCE. These factors may be taken care of while preparing DPR . GIS technology (has been attempted in some states) may be used in DPR preparation in future projects and auto CAD (specifically for Rural Network Design) be used for preparation of drawings. The baseline data for BPL connection for the 12th plan may be revised based on 2011 census information and for Hamlets (as correct data sources are limited) an assessment should be carried out to know the exact no. of hamlets for population below 100. DPR may include warranty and two year operational spares as a provision. Proper Training for DPR preparation must be given to PIA/DISCOMS. DPR should be prepared based on accurate information to the extent possible and sample survey must be conducted to collect data.

## 15) Formulation and Implementation of RE Policy:

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All the four states Assam, Gujarat, Himachal Pradesh and Rajasthan have notified Rural Electrification Plan (REP). There is ambiguity about Uttar Pradesh as we could access draft plan. All the studied REP does not very clearly spell out the strategy and state plans for Operation & Maintenance of the RGGVY infrastructure and its augmentation. It was observed during the interaction that, extensive consultation has not taken place at the states while preparing the REP. A committee should be formed for developing the REP at the state level and REP plan should be reviewed via-this committee chaired by Energy Secretary. Amendments may be made to REP if required. During the revision, efforts should be made to integrate the State Rural Electrification schemes and other complementary programmes with the REP, and REP should be a part of broader planning process of the District planning. Ministry of Power in consultation with State governments should assess to what extent REP has been adopted in letter and spirit, understand the issues, gaps and challenges in adoption of REP and jointly work out the intervention needed to full implementation of REP.

The rural electrification plan will need revision for 12<sup>th</sup> Plan, based on the current achievement in rural electrification while emphasizing (a) development of rural commercial activity, (b) linkages of renewable energy systems to the grid using appropriate technologies, (c) human resource development and transformer repair facilities development. The responsibility to make best economic use of infrastructure created under RGGVY rests with State Governments and DISCOMS. REP should provide guidelines for application of the ~8% RGGVY fund to augment delivery facilities, or any additional source of fund for strengthening of the administration of DISCOM as envisaged under RGGVY.

The Rural Electrification Plans must specify the role of the Central Electricity Regulatory Commission and State Electricity Regulatory Commissions in the rationalization of tariff structures for generation, transmission and distribution, such that the villages situated in far flung areas from the large energy sources for generation are not penalized with much higher tariffs due to their geographical locations. The REP must be available in the public domain.

## 16) Electricity subsidy by State Governments:

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Each state government has provided subsidized electricity tariffs (Annexure 2) for BPL households, rural HHs, and agriculture. The information of rural subsidy is available in the Himachal Pradesh tariff notification. DISCOMs in Gujarat State are making operational profit, hence they are in a position to manage lower tariff for BPL consumers. Cross-Subsidies in tariffs and allocation of losses are to be built into tariff order by SERCs. Rajasthan REP estimates that the total subsidy burden on the government of Rajasthan due to the BPL connection will be 115 crores of Indian rupees per annum. However it suggests the subsidies to be financed by both cross subsidy and budgetary/cash support from Government of Rajasthan. The tariff for BPL population in Assam (Jeevan Dhara) is Rs 2.50, excluding fixed charges. The surcharge is levied on tea gardens to provide a cross subsidy. The special tariff for BPL households in the state of HP, Rajasthan, Gujarat and UP is Rs 0.70, Rs 0.85/ unit (after deducting the Subsidy), 1.50, and 1.00 per unit, respectively. This excludes fixed charges.

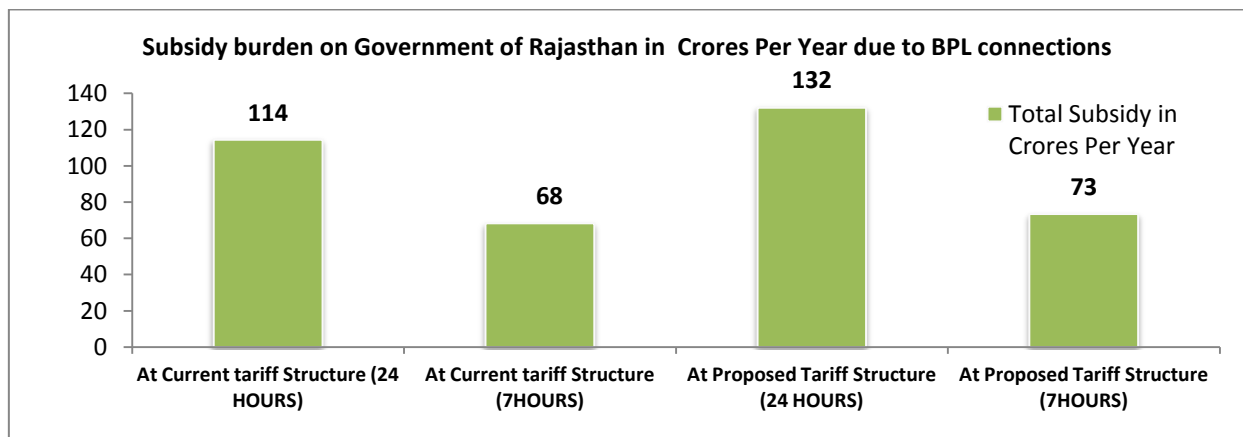


Figure 7 Subsidy burden on Government of Rajasthan in Crores Per Year due to BPL connections

The Government of Gujarat provides subsidy for Agricultural consumption with power supplied through separate feeders. The UPSEB provides subsidized power for private tube wells/pumping sets for irrigation purposes, where the rates are fixed depending on size of pump-set. Gujarat DISCOMs in total booked Rs. 3300 Cr subsidy and received the same amount from State Govt.

## 17) Challenges faced by DISCOMs, long term sustainability of Rural Electrification and the role of stakeholders:

DISCOMs have to operate and maintain RGGVY infrastructure efficiently. Main constraints are poor financial health, lower tariff, high cost of supply, manpower shortage, high AT & C losses in rural areas, logistics and access to the site, with site difficulties. The challenges



for the same are (a) enhanced revenue generation, (b) Need based optimum power supply to villages, (c) improved Billing and revenue collection system. There is a need to develop economic activities in rural areas through state level intervention to make the RGGVY investment sustainable and avoid suboptimal use of RGGVY infrastructure. Dedicated Rural Electrification department should be created in the Energy Ministry of the State, in respective Discoms and in the Holding Company. Promotion of DDG scheme may be a potential solution for additional Power. During the survey it has been found in some villages where the connection that are released under Kutir Jyoti scheme (KJS), are practically disconnected. In certain cases the same BPL who received connection earlier through the KJS, is getting new connection to RGGVY. This explains the need to have a long term view for the sustainability of rural electrification as the connection released so far faces a risk of de-electrification in the future. The existing management of the RGGVY scheme can be augmented with higher participation of the state government by providing manpower, developing franchises, having a parallel scheme for expansion of rural electrification in tune with the State Development Plan.

Ministry of power is responsible for overall Design of the Program and preparation of Rural Electrification Policy (notified in 2006), program review and monitoring was (reviewed and modified in for the 11<sup>th</sup> Plan.) Progress is good, (83% BPL achievement all India.) despite all constraints. To further improve the proper Implement of the RGGVY, following suggestion has emerged out of the study for consideration.

State Governments are responsible 1) Deployment of franchisees for the management of rural distribution 2) Determination of Bulk Supply Tariff to ensure commercial viability of franchisees 3) Provision of requisite revenue subsidy to the state utilities 4) Adequate arrangement for supply of electricity without discrimination in the hours of supply between rural and urban households 5) Provision of an authenticated BPL List 6) Notification of RE plans. It was found from the survey that More than 7-8 Hours of supply is available in most of the villages but varies from village to village. Status of franchisee deployment is poor. System Augmentation is good in Rajasthan, HP, GJ; and poor in UP due to the higher load in villages, in Assam the status is improving. All the states have notified REP notified except UP.

The district monitoring committee (DMC) is responsible for coordinating the implementation of RGGVY at the district level. DMC meeting is effective where ever it is held regularly. In many places it is not happening. It mainly works as enabling service by resolving conflicts, and land allocation, local conflicting resolution etc. The functions of the District Monitoring Committee may be regularized; based on the agenda prepared by DISCOM. As listed earlier, there are many stakeholders and each stakeholder is aware of their responsibilities but each stakeholder find various constraints in fulfilling their responsibilities. RGGVY was designed and planned largely at the central level by MoP & REC and there is need to have more decentralized planning in 12th plan; as primarily success of rural electrification lies in the hand of state governments and DISCOMS.

Considering issues faced in 11<sup>th</sup> plan projects following suggestion may be looked in:

- There should be RGGVY center, state RGGVY steering committee for each state that should look into state specific issues. Issues such as grants be converted to interest. Bearing Loan in case of non-fulfillment of the RGGVY conditionality. This steering committee should have a broad based approach not just towards RGGVY implementation but also for overall rural electrification in the state.
- Ministry of Power (MoP) should asses the performance of RGGVY infrastructure created over its life time. Draw a holistic plan/Road Map for best utilization of the investment made, in consultation with State Governments (as it was observed that some recently electrified villages were heading towards the de-electrification). It should be integrated with the overall distribution reform strategy adopted by the Ministry of Power.
- For smoother implementation and effective monitoring, Ministry of Power may strengthen RGGVY monitoring Committee through wider participation of indepent experts to oversee the implementation in 12 th plan.
- 90:10 funding pattern is adequate, but for backward system augmentation MoP may devise scheme for giving soft loans /Grants to the State Governments (60-40 Ratio). It may be linked with National electricity fund.
- MoP and REC can guide preparation of the revised REP for the state for 12<sup>th</sup> Plan. State REP implementation progress should be reviewed by the committee chaired by Energy Secretary.

- MoP should incentivize DDG scheme in power scarce region with a combined strategy of achieving renewable purchase obligation and gain from trading Renewable Energy certificates. More money should be allocated in 12th plan for DDG and project should be awarded through competitive bidding. Security and ownership issue of DDG system must be addressed
- Although 3-tier quality monitoring is satisfactory, but quality of inspection should be improved and qualified persons should visit villages for inspection. Proper training should be given for conducting effective inspection.
- REC and CPSUS should share their expertise with DISCOMs, though CPSUs also are overshooting implementation schedule
- The state should conduct its own independent evaluation of RGGVY and own rural electrification schemes, under the guidance of SERC.
- The state should create Rural electrification fund for proper maintenance of rural infrastructures.
- DISCOM should conduct load and Infrastructure adequacy assessment in every 3 years in RGGVY villages and plan augmentation on DT or request for augmentation of REDB.
- DISCOM must maintain a digital database of every village in terms of load, energy supplied and others. Devise circle wise O & M strategy for Rural Feeders.
- District Monitoring Committee (DMC) should encourage strategies for energy efficiencies in rural areas. DMC should devise district road maps for energy efficiencies with particular focus on rural areas.

### 18) Suggestion for Continuation of RGGVY in 12<sup>th</sup> plan:

RGGVY programme has achieved intended objectives to a large extent. In the twelfth plan the infrastructure that is created has to be sustained with good operation and maintenances, strengthened to cater to the greater load for economic activities. The RGGVY scheme should be continued in 12<sup>th</sup> five year plan. Key Challenges in 12th plan will be supplying adequate electricity, sustainability, efficiency and effectiveness of rural electrification, in addition to the challenges of electrifying remaining household particularly living in hamlets with less than 100 populations.

Following observations may be considered

- (i) Electrifying the remaining BPL household and all the Hamlets below 100 populations (limits may be revised) should also be covered under RGGVY in 12th plan to meet the target of electrifying all BPL HHHs.
- (ii) Strengthening of Rural Electricity Infrastructure (more number of 33/11 KV SS) to provide connection to the remaining households (both APL and BPL). In 12th plan, infrastructure should not be designed only to meet the need of the BPL, but also should meet the needs of APL. Augmentation of the network, backward linkages (may be separate feeder) is needed with inclusion of productive loads that should be taken-up in the next plan for agriculture and commercial activity.
- (iii) New guidelines may be prepared for providing grants/soft loans/support to state governments for strengthening of rural distribution system, system augmentations, feeder segregation and bringing productive loads in villages based on earlier performance. The investment made under RGGVY program should be made through the distribution circle instead of districts, by making a distribution circle as the cost and profit center. RGGVY program may be restructured accordingly.
- (iv) Electricity services in Villages can be sustained only on commercial basis and an appropriate consumer mix is essential for this. Necessary efforts must be made both by the Central and State governments to provide electricity to all consumers and generate commercial activities in rural areas.
- (v) More responsibility should be given to the State governments to raise their sense of ownership for the programme. Rural electrification plans are financially not sustainable and the Centre must provide further financial support to the state government as it will help in improving sustainability of rural electrification.
- (vi) The cost of APL connection is approximately in the range Rs 2000-3000. The initial payment is high for APL consumers in some states. In order to fulfil the vision of providing electricity for all, and sustain rural electrification, the APL connection to remaining APL consumers may be provided at a discounted rate. The central government can give certain financial support for the release of APL connections, and cost of connection may be shared between state and centre.

- (vii) Energy efficient equipment must be marketed in rural areas at a reasonable cost which will prevent inefficient utilization of rural distribution network. DMC should devise district road maps for energy efficiencies with particular focus on rural areas.
- (viii) DPRs investment plans, need not be district based; and Centralized Investments may be made 'Distribution Circle' wise. The distribution circle should be made cost and profit centers to improve the accountability and efficiency of investments.
- (ix) The engineering division under electricity holding company should be strengthened to take care of (a) rural network design (distribution feeder) to reduce the AT&C losses, (b) balance right of way for HT and LT lines. Similarly contract division and revenue section be strengthened. Assessment must be carried out on the impact of RGGVY infrastructure on the overall distribution network in the implemented area. Based on the assessment, necessary distribution system planning must be done.
- (x) In 12<sup>th</sup> plan RGGVY programme should ear-mark some fund for R&D to develop cheap and reliable smart meters, develop interface linking renewable grid to state grid, energy efficient equipment's used in rural India, computer aided rural network design that includes VEI and REDB. GIS based pilot project for DPR preparation can be taken up based on computer aided rural network design.
- (xi) T&D losses in rural network will be high due to village structure. ESCos should be encouraged to take up up-gradation of pump-sets. DISCOM experts mentioned that the losses in single phase transformers are lower. ESCos prefer 3 phase supply for pump-sets. Hence separate feeder for domestic and agriculture may be considered.
- (xii) Greater level of cooperation between the Bureau of Energy Efficiency (BEE) and REC for incorporating gains from energy efficient household commercial, agricultural and industrial appliances.
- (xiii) Both in 10<sup>th</sup> plan and 11<sup>th</sup> plan , the whole approach towards the Rural electrification has been largely on the distribution infrastructure assets creation, which has been implemented very successfully so far. In 12th plan, a more comprehensive approach is required towards rural electrification of commercial facilities with a shared vision between Central and State governments.

## Five Point Analysis of RGGVY Program

### Five Positive aspects of RGGVY :

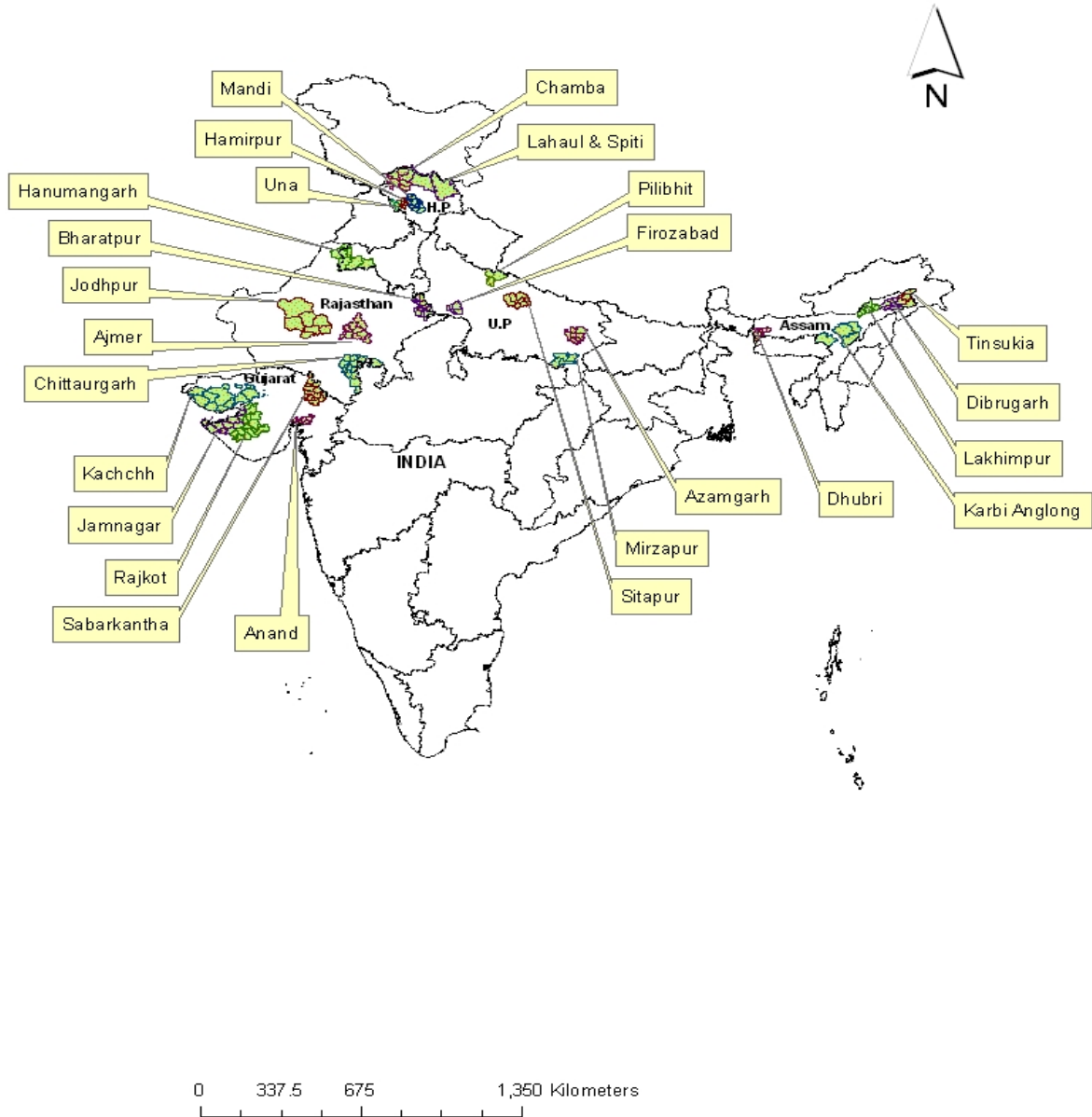
1. The Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) has been able to build a good quality infrastructure to sustain electricity supply for the rural Areas. This has ensured supply of electricity for more than 6-8 hours in large number of Villages although reliability and quality of supply need to be improved substantially for long sustainability of rural electrification.
2. RGGVY program is beginning to implement the objective of “Rural Electrification Policy” although more efforts are needed. The program has enabled the States to prepare The Rural Electrification Plan, thereby bringing a much needed focus towards rural electrification in the states.
3. For the first time in India, the large number of marginalized population of the society has been provided electricity connection a free of cost. It has also opened up opportunities for APL consumers to get electricity connections.
4. Positive Socio-economic impacts were observed in the newly electrified villages. Comfort, education, and health has improved immensely, as responded by the households. However it is found that current level of electrification is not sufficient to create overall economic development in the villages as envisaged by the Rural electrification policy. For sustainable positive impact, quality of supply, reliability must be improved substantially.
5. Process of harnessing renewable energy by Decentralized distributed generation has been launched, though it has not picked up the way it was desired, but could gain ground in grid connected mode. The progress of DDG scheme will enhance energy availability in future and key sustainability of rural electrification, therefore this program should be pursued aggressively in future.
6. The System of Operation and maintenance of the infrastructure and services have been structured and processes of providing efficient services in rural areas are developing and should be augmented. RGGVY programme gave new opportunity of employment to the rural youth by incorporating ‘Franchisee System’ as a necessary condition in Distribution Management, wherever franchisees are operating.

## Five Negative aspects of RGGVY:

1. DPR preparation and DPR approval process is not very effective. DPR template is extensive and elaborate but is being prepared with insufficient inputs. There is general coordination problem in acquiring information and proper survey is generally not being carried out. The load assumption at household level is low that need to be increased both for APL and BPL consumers. As DPR is the main document, which has impact on whole execution and implementation cycle, due to the inaccuracy in DPR preparation a lot of execution and implementation delays are occurring. This has led to revised cost estimates and , delays in approval RCE etc.
2. Inadequate and poor quality Power supply is great constraint in rural electrification. The poor financial health and poor service delivery mechanism and overall governance in rural areas of Discom are becoming a major challenge of long sustainability of Rural Electrification.
3. Due to the Mission mode approach towards the RGGVY, whole planning and to some extent execution process has been very centralized and top down approach has been followed. Although top down approach has helped but it also created a lack of ownership by states in the whole RGGVY programme, which lead to delay in preparation and notification of quality rural electrification plan, co-ordination and administrative delays etc. Program lacked a comprehensive approach as more attention and emphasis was given to achieving targets whereas enough attention was not given to the availability of Manpower in Discom, augmentation of backward linkage systems, land acquisition for the substations, accurate BPL list, operation and maintenance of the systems , franchisees deployment , state specific issues.
4. Deployment of Franchisees has been very poor so far. It was envisaged that franchisees will ensure the revenue sustainability, now it has put a question mark on the revenue sustainability, as Discom are not able to do the service delivery in a proper manner in rural areas.
5. Although a huge amount of Distribution infrastructure has been created, but the backward system augmentation (backward linkages) and strengthening of sub transmission system has not matched with RGGVY infrastructure created. More over whole approach has been to create infrastructure mainly to meet the need of BPL and indirectly facilitate power to the requirement of agriculture and other activities. An adequate consumer mix of BPL, APL and commercial loads in villages is crucial to long term viability of rural electrification.



## RGGVY Surveyed Districts in 5 States



## Annexure-2

Rajasthan Existing BPL Tariff				Rajasthan Proposed Tariff					
Category	Energy Charges (EC)			Fixed Charges (FC)	Category	Energy Charges			Fixed Charges
Domestic Rural & Urban	EC	Subsidy by GoR*	Effective EC after subsidy		Domestic Rural & Urban	EC	Subsidy by GoR*	Effective EC after subsidy	
Upto 50 units per month (BPL)	Rs 1.95/unit	Rs 1.10/unit	Rs 0.85/unit	Rs 80/consumer/month (effective FC Rs 50 consumer/month after subsidy of Rs. 30/connection/month)	0- 50 units per month (BPL)	Rs. 2.25/unit	Rs 1.40/unit	Rs 0.85/unit	Rs 80/consumer/month (effective FC Rs 50 consumer/month after subsidy of Rs. 30/connection/month)

\*Subsidy allowed as per GoR for BPL and Small Domestic Consumers consuming upto 50 units in a month.

Name of State	Tariff for BPL	
	Tariff	Minimum Monthly Charges (MMC)
Himachal Pradesh	0-40 units – Rs 0.70/unit.	Nil
Uttar Pradesh	Rural Unmetered service connection: Rs 125/connection/month	Not Applicable
	Rural Metered Service Connection: Rs 1/unit	Rs 15/KW/month
Assam	For load upto 500W – for maximum consumption of 1 unit/day(28-31 units/month) - Rs 2.5/unit	Rs 15/C/M
Gujarat	0-30 units – Rs 1.50/ unit	Rs 5/- per month

**Annexure 3-**

