ENSURING ELECTRICITY FOR ALL:

OVERCOMING STRUCTURAL DISINCENTIVE FOR DISCOMS THROUGH RESTRUCTURING OF RGGVY

Background Paper for the Round Table on February 18, 2012 at Pune, India

Note: This background paper has been prepared by Prayas Energy Group to place issues and some solutions on the table for discussion during the round table on electricity for all. We thank all those who have helped us to prepare this. We plan to finalise this paper after consolidating feedback and inputs from the round table. Please send any comments to sreekumar@prayaspune.org.

Prayas Energy Group, Pune

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आरोग्य, ऊर्जा, शिक्षण आणि पालकत्व
या विषयांतील विशेष प्रयत्न

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Summary

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The National Electricity Policy 2005 recognises electricity as a major driver of rural development and hence poverty alleviation. The Indian challenge of "electricity for all" is much more complex compared to that of other countries because of the high numbers, vast geographical spread and variety in geography, climate and social factors. India has the dubious distinction of being the country with the highest population without electricity access. The benefits that electricity access brings are justified on the grounds of social, equity and economic objectives. Thus, efforts on electricity access should be looked as an investment, which would catalyse development, rather than a social expenditure. Experience from successful international rural electrification efforts indicates the need for a comprehensive approach with a onetime push by all concerned actors. This should cover all the dimensions of rural electrification, namely: setting up infrastructure, providing universal access, providing affordable, adequate power supply and promotion of productive load.

RGGVY, using GoI resources, is extending grid and electrifying BPL households, but the responsibility of making power available to them rests with distribution companies. However, for each unit supplied to such consumer, DISCOM makes a loss as tariff is typically very low and cost of power purchase in current scenario is high. Current and past financial losses of DISCOMs and quantum of revenue increase needed to meet 100% electrification goal, makes it impossible to recover this loss through tariff increase. But we need to ensure that infrastructure created under RGGVY does not remain un-utilized and achieve societal objective of providing adequate supply to rural households. Hence, it is essential to address the structural disincentive for DISCOM to supply to rural areas. This should be the focus of RGGVY in 12th plan. Structural disincentive to DISCOMs could be overcome by allocating low cost power for removing LT load shedding and thereby removing disincentive for DISCOMs in supplying power to poor households.

Power required for this scheme can be procured by a central Government SPV from market through PPA based on competitive bidding and supplied to DISCOM based on separate PPA at fixed rate of say Rs. 2.5 per unit. The central Government will have to fund the gap between the discovered price and the fixed rate at which SPV supplies power to DISCOM. Alternatively, bidding can be done based on coal allocation for the power requirement, in the form of captive coal mine, so that tariff discovered can be low and possibly no need for funding from the government. Share of each state would be in proportion to load requirement for selected areas. To facilitate monitoring and accountability, scheme should be made available only to those states which agree to make identified poor districts/regions load shedding free. Supply hours on these LT feeders can then be remotely monitored through automatic meters (all India cost < Rs. 500 Cr). Respective SERCs / RLDC can easily monitor DISCOM load shedding based on such feeder load data. To ensure accountability, CERC should have authority under the PPA to revoke allocated share in case any DISCOM does not comply with the zero load shedding requirement.

The scheme could be launched immediately based on unallocated share of central sector power or by providing viability gap funding to projects nearing completion. Indicative calculations show that provisioning 14 GW of low cost thermal power capacity and an annual support of Rs.10,000 cr, which would reduce over the years, would be sufficient to make nearly 170 districts, spread across the country, load shedding free. This would enable 24 x 7 power supply to around 70 million households (25 % of the population) and would be powerful catalyst to rural development.

1. Introduction

The National Electricity Policy 2005 recognises electricity as a major driver of rural development and hence poverty alleviation. Its target is to provide electricity access to all households and ensure minimum lifeline consumption of 1 unit/household/day as a merit good by 2012. Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) was planned to achieve this target. But today there are doubts on meeting the target, quality of construction and most important, the feasibility of supplying adequate power to the rural consumers. Experience from successful international rural electrification efforts indicates the need for a comprehensive approach with a one-time push by all concerned actors. This should cover all the dimensions of rural electrification, namely: setting up infrastructure, providing universal access, providing affordable, adequate power supply and promotion of productive load. This background paper presents an approach to restructure RGGVY towards meeting the target of "electricity for all".

1.1 Electricity and Development

India has a massive development imperative. Nearly half of its children are malnourished (World Bank Indicators, 2010), 404 million people are without access to electricity, 75% of the population still relies on biomass as a cooking fuel (IEA, 2010). 52% and 19% of rural houses are built partly (semi-pucca) or completely (kaccha) from mud, thatch and other low quality materials respectively (NHFS, 2005-06). The average GDP per capita in India, at $3270 per year in 2009 $ PPP, is about a third of the world average, and a tenth of the OECD average (World Bank Indicators, 2010). This is also reflected in low fossil fuel use which stands at a quarter of the world average, and low energy emissions of only 1.1 T CO2 per capita per year, against the world average of 4.4 in 2005 (WRI-CAIT, 2010).

The correlation between consumption of electricity, a high quality energy source, and improvement in the Human Development Index (HDI), especially at low levels of HDI, is well known (Gaye 2008). This cause and effect relationship is two-way. Electricity consumption could lead to a higher HDI, or a rise in the HDI could lead to higher electricity consumption. However, even a small quantity of electricity supply can make a marked difference in the quality of life of the poor. Figure 1 plots Human Development Index (HDI), a frequently used indicator of development, as well as electricity use, which is a major part of energy use. This data for 114 countries displays a strong correlation between the two. A similar relationship is also seen between other development indicators, like child mortality, female life expectancy, or proportion of undernourished people, and energy use (Smil, 2010). Therefore, India must plan for its energy requirements to improve standard of living of its vast population living in abject poverty.

At the same time, Figure 1 offers another lesson. It shows that some countries have a higher HDI for the same level of electricity use as that of India. This lends support to critiques of the current developmental path, and underscores an urgent need for a more inclusive development process. It is of relevance here that providing basic services such as energy for lighting and cooking, though essential, are insufficient for wholesome development and poverty reduction. One should expect a significant role for electricity, so as to achieve an HDI of 0.8. In short, addressing poverty no doubt requires change in policies, but it also needs a sizable increase in energy use (Sant 2011).

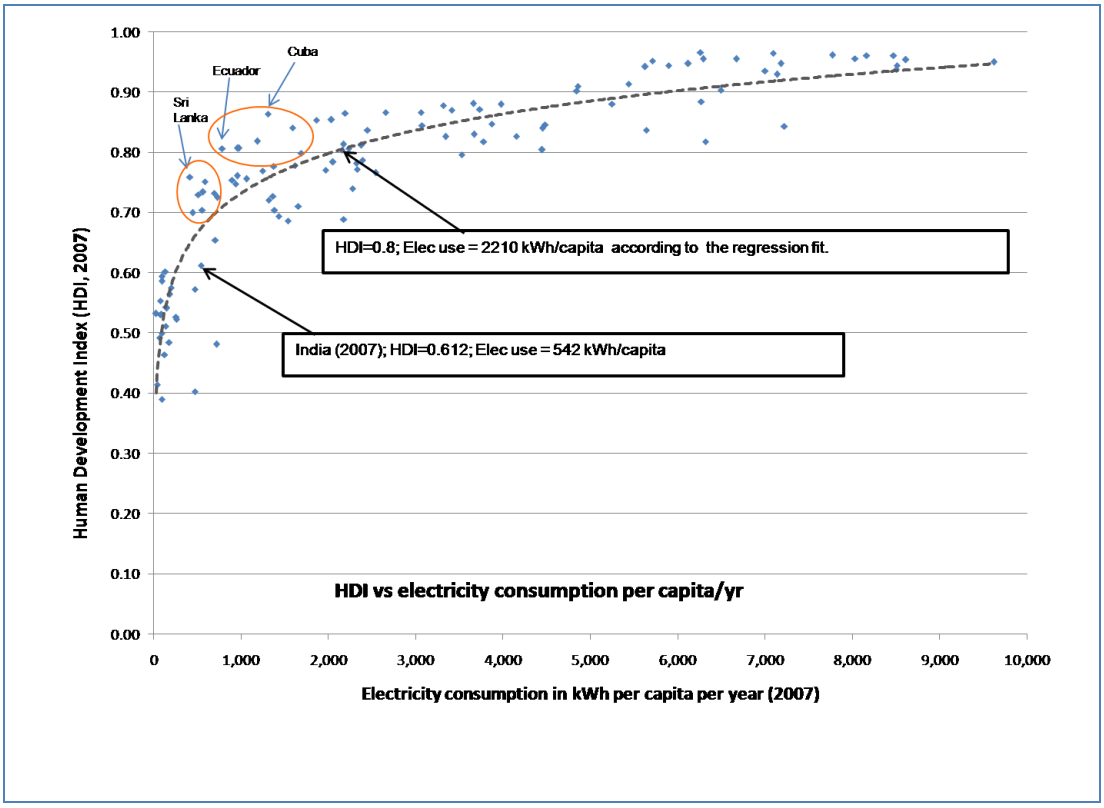

Figure -1: Correlation between Electricity and Development

The priority should be to cost effectively address the energy needs of the households, community and productive loads. Electricity has a major role to play. Electricity helps to meet the social needs (lighting, fans, TV, communication, food processing & storage, drinking water supply, health care, schools), avoids excessive cash expenditure for kerosene, increases productive working hours of the day, and promotes small economic activities (shops, cottage industries, cold storage, grinding) (Dubash 2005, Prayas 2010).Electricity use has a multiplier effect on the economy. There are anecdotal evidences of linkages of 10th class pass levels or health indicators to power cuts.

The benefits that electricity access brings are justified on the grounds of social, equity and economic objectives. Thus, efforts on electricity access should be looked as an investment, which would catalyse development, rather than a social expenditure.

1.2 Lessons from International Experience

The Indian challenge of "electricity for all" is much more complex compared to that of other countries because of the high numbers, vast geographical spread and variety in geography, climate and social factors. India has the dubious distinction of being the country with the highest population without electricity access. If all the un-electrified people formed a country, its population would equal that of the USA. One out of five people in the world without electricity access is an Indian. (IEA 2011). World over, electricity access levels are low in rural areas. Rural electrification is a tough challenge with issues of dispersed low load concentrated during evening peak, low paying capacity and slow load growth.

It is interesting to examine how different countries addressed the tough challenge of rural electrification. Rural electrification in the USA went up from 10% in 1930 to 95% in 1955 under the

central government supported program called the “New Deal”. The rural electrification level in 1930’s in USA was lower than that of many European countries. The central Rural Electrification Administration supported many rural electricity cooperatives to achieve the targets. Cheap power, at nearly half the rate, to the extent of one-third the total requirement, was made available to cater to cooperatives through Tennessee Valley Authority and other project s (Barnes 2007). Countries like Brazil, China and South Africa have made significant progress in rural household electrification through focussed programs. In Brazil, from 1988, the central government has taken the responsibility of distribution of electricity as an essential public service. It undertook a major rural electrification program “Light for all” from 2003, when the rural access was about 50%. By 2009, Brazil had achieved 88% rural access. With an urban access of near 100%, the country wide electricity access was 98% in 2009. China has addressed rural access with grid, off grid and grid interactive systems. In 1978, rural access was 61% whereas by 1998, it had reached 97%. In 2009, 100% of the urban population had access, while it was 99% for rural, making the country wise access close to 99.5%. South Africa undertook a major rural electrification program after 1994. Rural access, which was 30% in 1993 rose to 73% by 2008 (Bhattacharya 2011, IEA 2010, Winkler 2011).

The IEA 2010 comparative study on rural electrification covering India, China, Brazil and South Africa suggests that social fairness in terms of ensuring universal household access can be one of the initial driving motivators in the first stages of electrification. It notes that economic development will follow sooner or later even when productive end-uses are not the prime objective to electrification (IEA 2010). Experience from successful international rural electrification efforts indicates the need for a comprehensive approach with a onetime push by all concerned actors. This should cover all the dimensions of rural electrification, namely: setting up infrastructure, providing universal access, providing affordable, adequate power supply and promotion of productive load.

1.3 Rajiv Gandhi Yojana – Opportunities and Challenges

In India, State Electricity Boards set up immediately after independence had the mandate to take electricity beyond the major cities. Till 1970s, rural electrification was a by-product of connecting the towns with the grid and villages near the grid benefited. In mid - 1970’s, based on farmer’s demands, there was a trend to reduce agriculture tariff across many States. This led to large demand for agriculture connections and thus to rural electrification. (Sankar 2009). Rural Electrification Corporation (REC) was set up in 1969 to finance and promote rural electrification all over the country. Household electrification towards ‘electricity for all’ was not a priority of these rural electrification efforts. Household electrification was considered as a by-product of the conventional electricity development plans based on commercial considerations and the universal electrification of all villages and all households was expected to be achieved in some distant future as a result of the trickle-down effect. No wonder that many States with high village electrification levels have low household access (Sankar 2009).

Considering the importance of giving focussed attention to rural household electrification, starting from late 1980s, there were some initiatives supported by the Government of India to explicitly address the issue of low household electrification, especially the rural poor. These initiatives included grid options led by the Ministry of Power (MoP) and the off-grid options led by the Ministry of New & Renewable Energy (MNRE). RGGVY, launched in 2005, merged all the grid initiatives and is bigger than all the previous initiatives.

Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY), launched during the 10th plan and continued in the 11th plan, is a major step towards providing electricity access to all households. RGGVY, under the 10th

and 11th plans addressed first two components of ensuring electricity for all, namely developing distribution infrastructure in rural areas to meet electricity demand of all households and giving connections to all BPL families. Under this scheme, around 1.8 crore rural households (mostly BPL), have been given connections, and 1 lakh villages electrified. The cost estimate is about Rs. 52,000 crores and as of January 2012, nearly half of that is reported to have been spent. This implies spending of around Rs.15,000/connection. Village electrification has increased from 74% (2005) to 92% (MoP 2012). Discussions in the 12th plan preparations indicate that another 30,000 Cr may be set aside in the 12th plan for RGGVY, making the total investment close to 80,000 Cr. As for household electrification, recent data from NSSO (NSSO 2010) indicate that 66% of the rural population has access, a significant increase from 43% (2001 census). This paper has used NSSSO (2010) data for electrification levels and Census 2011 data for household numbers. Census 2011 is expected to give a more accurate picture of household electrification[1].

RGGVY has made significant progress in rapidly increasing rural household connections, but there are questions on quality of construction and adequacy of the network to cater to full rural demand. It is also observed that large number of APL households have not been electrified and availability of power for rural households is often much less than 6 - 8 hrs / day (which is envisaged under RGGVY). If this situation persists then large number of APL households will not benefit from RGGVY. Continued lack of power in rural areas can put substantial RGGVY investment under risk of either sub-optimal utilization or rapid degradation of infrastructure due to non-utilization and inadequate maintenance. Distribution Companies shoulder the dual burden of satisfying the rising demands of existing high end consumers and meeting the social obligation of reaching out to the poor consumers. High end consumers demand constant improvement in quality of supply and service at low cost. Connecting and providing supply to the poor, who are mostly rural, requires high investment, high recurring cost and generates low returns. This background paper analyses causes for this scenario and suggests approaches to address the same.

2. Barriers for Rural Electrification

Undertaking electrification involves three major costs for the DISCOM, namely: a) setting up network infrastructure, b) maintenance & repair, and c) cost of supplying power. RGGVY addresses the first cost component. Under RGGVY, BPL households are given free connections. However, there could be exclusion errors in BPL identification and many poor households who just manage to qualify as APL may still find the connection charges in the range of Rs. 1,500 - 3,300[2] for getting a connection unaffordable. Therefore, in spite of power network reaching the village, many APL households may remain un-electrified. Further, most state DISCOMs are facing supply shortage and will not be able to provide good quality supply and service to these newly electrified household. The cost at which DISCOM procures power and its recovery from consumers effectively decides the quality and quantity of supply the consumers will get. For distribution companies, increasing supply to rural households is often a loss making proposition as tariff to these consumers is typically set below cost of supply.

[1] As per NSSO, with an urban access of 94%, and rural access of 66%, 74% of the Indian population has electricity access in 2010.

[2] Current RGGVY household connection norm is Rs. 2200/HH. There have been reports that this is low and that this figure would be revised to Rs.3300/HH in the 12th plan. SERC specified charges for new connections are in the range of Rs. 1,500 / connection. But there are significant unofficial additional charges that consumers have to pay and they also face several procedural difficulties in getting connections, such as inadequate identification and house ownership documents. All these factors result in many APL families also not getting connections.

2.1 Structural disincentive for DISCOMs to supply power to poor households

The DISCOM's reluctance to supply power to poor households is mainly on account of structural disincentive which makes this endeavor economically unviable. This can be understood from the Table 1 below.

Marginal Power purchase cost in Rs/u	3.5*
PP cost after accounting for Distribution loss of ~20%	4.4
Distribution margin in Rs/u	1.0
Total cost of supply in Rs/u	5.4
Revenue from sale to electrified HH in Rs/u	1.5
Loss per unit	3.9

Table 1: **Structural disincentive for DISCOMs in supplying to poor households**

** Without accounting for the fact that this power will be required at peak hours and hence will be costlier*

Even considering modest distribution loss level of 20% and discounting the fact that household demand is mostly of peak nature and considering a power purchase cost of Rs. 3.5[3] /unit, the DISCOM makes loss of Rs. 3.9 /unit of sale to poor household. Considering poor financial health of many DISCOMs, such loss becomes a strong structural disincentive for increasing rural supply hours. Until this structural barrier is removed, DISCOMs will not be able to supply adequate power to these households. Also, the problem of low electrification is concentrated in few regions. Just five states viz. Bihar, UP, West Bengal, Rajasthan and Odisha account for more than 70% of the total un-electrified rural households in the country[4]. Increasing consumer tariff or budgetary support to DISCOMs by state governments is often suggested as desirable options to overcome this structural barrier. However, that may not be a feasible proposition as discussed below:

I. Tariff impact on account of supplying power to newly electrified consumers is very high for states with very low levels of electrification. Figure 2 shows indicative tariff increase required to ensure electrification for some select states based on their latest available tariff orders. States like Bihar which has very low electrification level, will need tariff increase of more than 50%.. These states also tend to have low industrial consumption which reduces the possibility of protecting small consumers from tariff shocks.

II. Many state DISCOMs are reeling under past and present financial losses, mitigating which will need significant increase in tariff. Figure 3 shows the tariff increased required for the same states to meet the past and present financial losses. Indicative calculations show that for states with major proportion of un-electrified households, tariff increase in the range of 40% to 70% would be required to mitigate past (spread over 5 years) and current year losses. Thus most states with large un-electrified houses will have to increase tariff in the range of 60 % to 120% address losses and to recover additional loss on account of increased sales to rural households.

[3] Price discovered in latest rounds of competitive bidding for base load capacity through long term contracts by various state DISCOMs

[4] Based on NSSO 2009-10 data

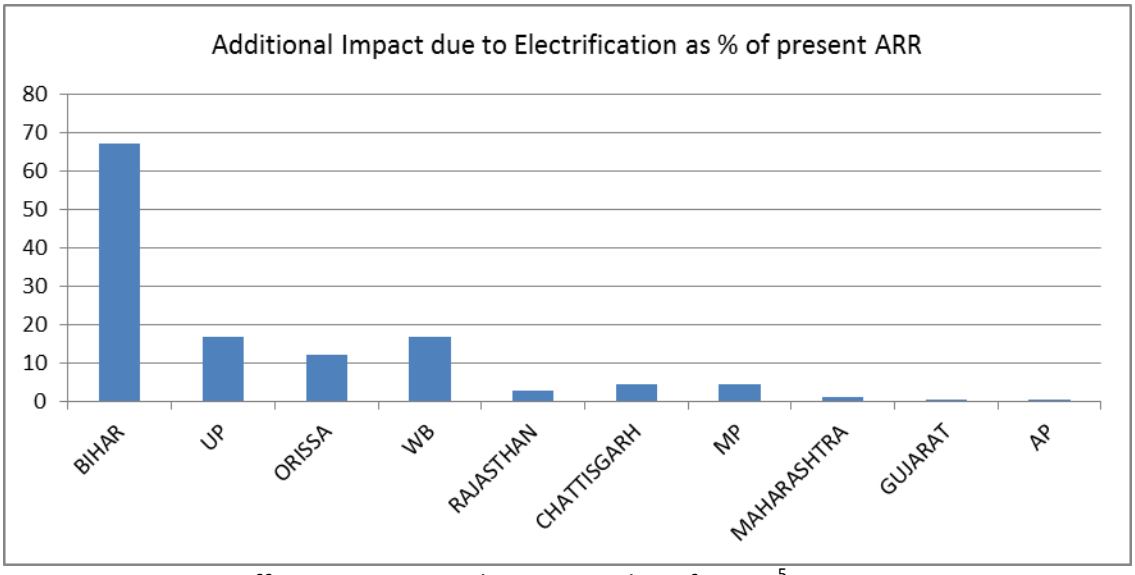

Figure 2: Percent tariff increase required to ensure electrification[5]

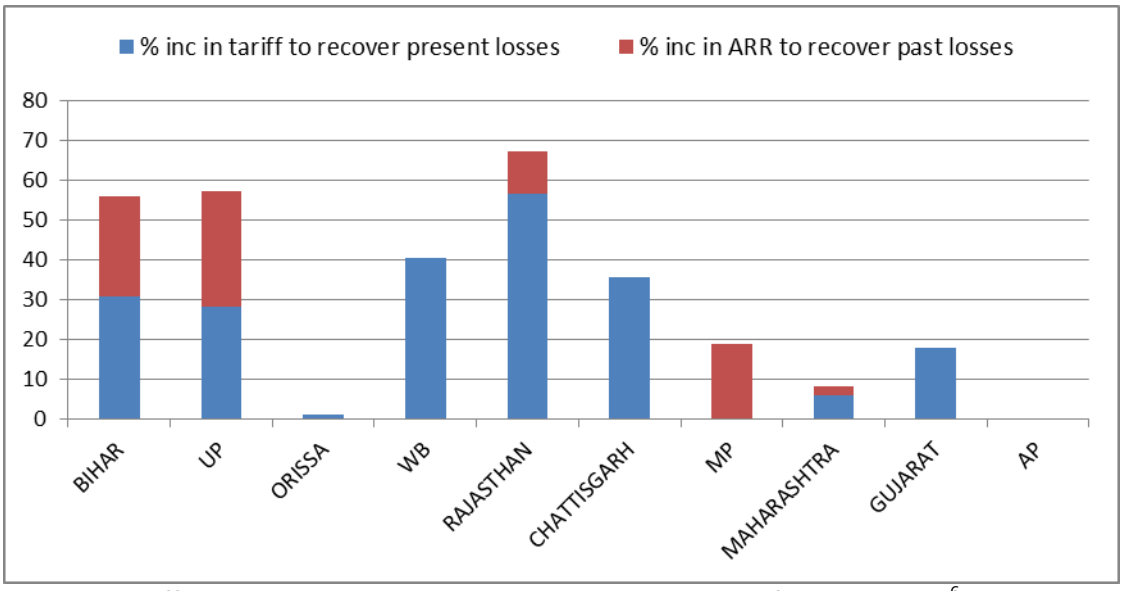

Figure 3: Percent Tariff increased required to meet the past and present financial losses[6]

Additionally, if proposed mandatory distribution open access is implemented, cross subsidy would reduce and there would be very limited scope for overall increase in tariff to overcome this structural barrier, without significant tariff shock to small consumers. Tariff increase required for meeting increase in O&M costs and fuel costs would be in addition to this increase. Most of these states' budgets are also under severe financial stress and hence they would not be in a position to offer budgetary support at

[5] This is calculated based on latest tariff orders by SERCs of respective states. Tariff impact is calculated assuming that the DISOM will have to recover loss of Rs. 3.9 / unit sold to newly electrified household (ref. Table 1), 30 units / month / HH consumption and considering number of un-electrified households in the state. Chart represents increase in tariff i.e. average billing rate (ABR) based on current consumer mix. This is a conservative estimate as actual tariff increase will vary for different consumer categories and would be much higher for several consumer categories as it would not be feasible to have such tariff shock for agricultural and other small consumers.

[6] This is calculated as increase in average billing rate (ABR) required if past (accumulated) losses have to be recovered over 5 years (with carrying cost) and current year losses recovery.

the required scale to overcome DISCOM's structural disincentive for supply to rural households. Hence, structural disincentive may persist for long time thereby severely restricting rural hours of supply. This can adversely affect not only the households, but also supply to other productive and socially essential loads such as public health centers, schools, drinking water supply schemes, small commercial and industrial establishments. With increasing rural grid, demand for agricultural purpose would also increase, and similar low realization from these consumers, would aggravate the disincentive.

3. Restructuring RGGVY under the 12th plan

It follows from the discussion that there is an urgent need to address the structural barriers as well as to incentivize legal connections to all households, including APL. One of the potential approaches for achieving this objective could be to restructure RGGVY. Along with the current focus on balanced work of rural grid strengthening and connections to BPL households, restructured RGGVY should address three key issues:

3.1 Increasing rural APL connections

Based on recent West Bengal's experience it has been seen that when connection charges are significantly lowered, say to the range of Rs. 200 – 500 / HH, very large number of families opt for legal connections. To encourage APL connections under RGGVY, partial support can be given to DISCOMs to implement schemes such as, say, 100 x 100 connection drives. Under this scheme, DISCOMs should give connections to all un-electrified households within 100 meters of the line, without insisting on strict procedural and documentation compliance, and by charging very nominal charges. This will certainly help the DISCOM to reduce losses,increase revenue, (as this will make hitherto illegal connections legal) and ensure optimal utilization of the infrastructure. As both DISCOM and consumer stand to gain from such an arrangement, both should partly share the cost burden and RGGVY could provide funds to incentivize such 100 x 100 schemes by DISCOMs.

Thus, central government, DISCOM and consumer can each share part of the connection charges. Further incentive by GoI / DISCOM could be considered in case consumer accepts either limited wattage (load limiter based) connection or pre-paid meter. To further encourage more number of legal connections, DISCOM can also allow its new consumer to pay their share of connection charges in instalments along with the monthly bills. Even assuming the number of rural un-electrified APL households is 4 Cr.[7], and using the revised RGGVY norm of Rs. 3,300 / connection[8], at 1/3 cost, RGGVY can provide around Rs. 4400 Cr. under the 12th plan as support for 100 x 100 connection drives by DISCOMs. Such support could also be provided under National Electrification Fund and as long tenure, low interest loan, linked to number of new connections in rural areas.

3.2 Managing agricultural load

With the network reaching villages, demand from agricultural segment may increase, which can further aggravate the structural disincentive. To improve management of rural supply, separation of agricultural feeders from rest of the rural load is essential. Many states are undertaking such schemes for better load management reasons. However states with lower electrification may need capital subsidy support for this purpose after a few years when electricity based pumping picks up. The 12th plan RGGVY can provide partial support to such states for undertaking feeder separation. Simultaneously in a couple of

[7] At the beginning of RGGVY, 5.46 Cr rural APL households were considered un-electrified. The NSSO 2009-10 data indicate the number of un-electrified APL households to be around 4 cr. Assuming some electrification of APL HHs in the last 7 years, it is assumed that around 4 cr APL HHs are un-electrified.

[8] Current RGGVY household connection norm is Rs. 2200/HH. There have been reports that this is low and that this figure would be revised to Rs.3300/HH in the 12th plan

districts with shallow water table, solar agricultural pumps can be introduced through solar mission. Based on its social acceptance, not extending agricultural connections through the grid can be explored.

3.3 Ensuring supply to newly electrified households

There could be three options for addressing the revenue loss and hence the structural disincentive for DISCOM to supply electricity, as discussed below.

3.3.1 Direct cash transfer to consumers

The required amount can be directly transferred into consumer's bank account and DISCOM can charge full cost of supply to all consumers. However, presently such schemes are proposed only for economic BPL and hence may not solve problem for large number of poor population that is APL and hence continuation of dis-incentive for DISCOMs. Efficacy and accountability of direct cash transfer is yet to be established as the systems necessary for its implementation will take time to be developed and accepted. Another possible drawback of this option could be the difficulty in withdrawing the subsidy support within a definite timeframe. However, going forward direct subsidy transfer may become the preferred option and hence alternative measures adopted in the meanwhile should be flexible to incorporate the same, whenever it is implemented.

3.3.2 Direct cash transfer to DISCOM

Under this option, financial resources needed to mitigate structural disincentive can be directly transferred to DISCOM. One advantage of this option is the ease of its implementation. It removes the financial deficit but would not address the challenge of efficient power procurement, and resultant burden / demand for increase in such subsidy. If the DISCOM is not able to contract power below Rs. 3.5 per unit, subsidy required can significantly increase. It will also be difficult to withdraw such subsidy in a time bound manner or if the DISCOM fails to supply power to the targeted households.

3.4 Direct transfer of low cost power to DISCOM

Under this option, the Central Government, through RGGVY, will facilitate adequate availability of low cost power to DISCOMs. Allocation of generation capacity, equivalent to expected peak load of rural households, to DISCOMs with significant proportion of un-electrified houses should be considered. Under this approach, since household consumption has low load factor, as it is mostly at the evening peak, there would be surplus power available which DISCOMs can sell to other higher paying consumers during non-evening peak hours. For example, for allocated generation capacity of say 200 W/HH[9], DISCOM would get around 4 units / day, whereas consumption only to the tune of 1 unit / HH (as per national tariff policy) would qualify for subsidy, thereby allowing DISCOM to sell 3 remaining units at higher tariff (within or outside the state) to earn additional revenue to further reduce the structural disincentive. In case of sales outside the state, the respective SERC should ensure that the DISCOM is not diverting power while undertaking load shedding within the state. Thus, this approach can significantly reduce the structural dis-incentive and would also encourage supply to other productive loads on rural feeders. This approach is further elaborated in next section. Since DISCOM would be selling additional units, this can also help in deepening the market and support open access.

[9] This connected load estimate of 200W is based on modest appliance mix of 2 bulbs of 40 W each, 1 fan of 50 W and 1 tube light of 60 W. 200 W used for 5 hours works out to the national lifeline consumption commitment of 1U/day. RGGVY norms were 50 W for BPL and 500 W for APL HHs (Draft RE Plan prepared by MoP and State RE Plan of Maharashtra). Using a norm of 200W as the lifeline connected load for all HHs is in line with the proposed revision of RGGVY norm to 250W BPL and 500W for APL HHs.

4. Facilitating low cost power to DISCOMs for achieving Electricity for All

As mentioned above, the core principle of this approach is that, in order to reduce the disincentive to supply, availability of low cost power to DISCOM should be ensured. Continuing with the above example, if power is available at Rs. 2.5 / unit, instead of Rs. 3.5 / unit, and if DISOM is able to sell additional units at Rs. 3.3 / unit (at transmission level), (i.e. earning about 0.8 Rs/unit surplus from sale of additional units) then loss of Rs. 3.9 / unit (as discussed in Section 2), could be nearly fully wiped out as can be seen from Table 2 below. However three critical requirements, as discussed below need to be fulfilled for the effective implementation of this approach.

Particulars	**Current Scenario**	**Proposed Scenario**
Marginal power purchase cost (Rs./ unit)	3.5	*2.5*
Power purchase cost after considering distribution loss of 20% (Rs. / unit)	4.4	3.1
Distribution cost / margin (Rs. / unit)	1	1
Total Cost of Supply (Rs./ unit)	5.4	4.1
Revenue from sale to electrified HH (Rs./ unit)	1.5	1.5
Loss to DISCOM (Rs./ unit)	3.9	2.6
Surplus from sale of additional units (3 units x 0.8 Rs./ unit)		*2.4*
Net loss to DISCOM (Rs./ unit)	3.9	0.2

Table 2: Change in structural disincentive after considering availability of low cost power

4.1 Ensuring low cost of power to DISCOM

To ensure low cost of power to DISCOMs different options could be considered.

4.1.1 Competitive Bidding

First option can be an approach similar to competitive bidding guidelines based procurement. Under this approach, a Central Government SPV can procure power from market through bidding and supply it to DISCOMs of target areas, at fixed rate of say Rs. 2.5 per unit. For this purpose the SPV will have to sign independent PPAs with project developers as well as DISCOMs. Figure 4 shows a schematic representation for the arrangement. The 12th Plan, through RGGVY could fund the gap between the discovered price and the fixed rate at which SPV supplies power to DISCOM. PPA with DISCOM could also provide for gradual (year on year) increase in DISCOM purchase price so as to reduce fiscal burden of RGGVY. Decentralised generation sources could also participate in such a scheme wherever appropriate.

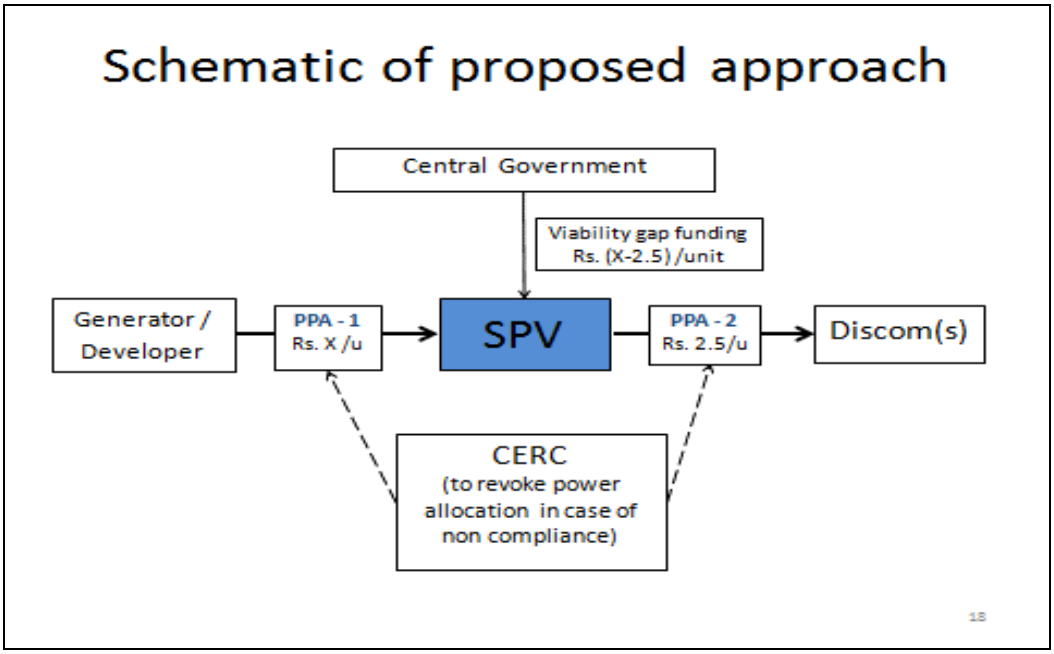

Figure 4: Schematic representation of the power procurement process

4.1.2 Coal allocation

Under this option, power will still need to be procured based on competitive bidding done by central government SPV, but coal allocation for the power requirement will be offered in the form of captive coal mines, so that tariff discovered can be low and there will be little or no need for funding from government. This would be similar to Sasan or Tilaiya UMPP approach, only difference being beneficiary DISCOMs will be decided on the basis of electrification level and willingness to comply with transparency and accountability provisions discussed in subsequent sections. In this case also, the SPV will sign back to back PPAs with developers and DISCOMs.

4.2 Identifying beneficiaries and quantum of power allocation

One possible way of identifying the beneficiaries is to select the most backward districts or the least electrified ones, and then allocate power equivalent to 200 W / HH in those districts to respective DISCOM. Table A-1 in Annexure 1 shows indicative number of households that will benefit based on this approach if backward districts identified by Planning Commission report of Inter ministry Task Group on redressing growing regional imbalances, 2005 are considered. Accordingly table A-2 shows the State and district wise, power and energy requirement based on calculation method mentioned above.

Other possibility could be to adopt a state-wise approach based on current firm allocation of NTPC power and the level of household electrification within the state. Presently, five states (Bihar, UP, West Bengal, Rajasthan and Orissa) which account for over 70% of the rural un-electrified households in the country receive about 25% of total central sector power capacity (firm and unallocated), as shown in Figure A-1 of Annexure 1 (CEA 2011). Similarly Figure A-2 shows that these states do not get allocation sufficient to meet the normative demand of 30 units a month (i.e. central allocation to these states is much lower than 200 W / HH, that is required to use 30 units / hh / month assuming usage for 5 hours a day). Therefore, it can be suggested that to meet the national goal of electricity for all, share of low cost power can be allocated to states on the basis of deficit in central allocation. That is, States with less than 200 W / HH central allocation could be provided this additional allocation of low cost power so to bring central allocation to these states to the level of 200 W / HH. . The State can then decide which regions should be given priority to get benefit of this allocation. Irrespective of the criteria for selecting target

area, all households within the area should be considered for the scheme. Once the target areas (and hence number of households) have been identified, MW requirement can be calculated assuming a normative load of say 200 Watt per household (equivalent to 1 unit / day consumption @ 5 hrs/ day). Indicative calculations show that an additional 14,000 MW will have to be allocated. This quantity of power could be allocated to respective States and States could then be asked to choose specific districts to implement such a scheme.

4.3 Ensuring transparency and accountability

Monitoring of the scheme will be essential to ensure that target households actually receive supply from the DISCOM at evening peak hours. This can be done by mandating all LT feeders in target district to be load shedding free. Supply hours on these LT feeders should be remotely monitored through automatic meters (all India cost < Rs. 500 Cr)[10]. Respective SERCs / RLDC can easily monitor DISCOM load shedding based on such feeder load data. To ensure accountability, CERC should have authority under the PPA (signed between DISCOM and SPV), to revoke allocated share in case any DISCOM does not comply with the zero load shedding requirement. Such an arrangement can ensure that DISCOMs comply with agreed conditions, without having the Ministry involved in monitoring.

5. What the scheme will achieve

Indicative calculations based on district wise approach show that provisioning 14 GW of low cost thermal power capacity would be sufficient to make nearly 170 districts, spread across the country, load shedding free. This would enable 24 x 7 power supply to around 70 million households (25 % of the population) and would prove significant catalyst to economic activity in these 170, most backward and rural districts of the country. This could be achieved at very limited fiscal impact, if approach similar to Sasan or Tilaiya UMPP is adopted to achieve generation cost of less than Rs. 2.5 / unit from pit-head plants. This would imply coal allocation of less than 20% of coal mines already allocated for captive mining. Even in the absence of such coal allocation, fiscal impact can be limited by contractual design of PPA between SPV and DISCOM. This also makes the subsidy withdrawal possible at the end of the contract. Rough calculations indicate the requirement of viability gap funding to the tune of Rs.10,000 Cr/year for a few years. This is a reasonable investment, considering the five year plan outlay of Rs.50,000/year for distribution alone.

6. Immediate implementation possibility and action items

6.1 NTPC Un-allocated power

While it is true that undertaking bidding through SPV and actually getting low cost power will need at least 4-5 years, the scheme can still be immediately launched by utilizing the NTPC unallocated share (which is currently sold at less than Rs. 2.5 / unit[11]) . The present unallocated share is over 5500 MW, out of which 4,000 MW can be immediately allocated to this scheme. Such an approach would immediately enable 24 x 7 supply to over 50 most backward districts and would benefit nearly 20 million households. This scheme can also utilize capacity lying idle in the form of projects nearing completion, but are unable to commence generation due to problems related to fuel or inability to find buyers. The GoI promoted SPV can procure power from these projects through competitive bidding, and supply the same to DISCOMs in targeted states. As mentioned above GoI could pay viability gap funding to SPV to ensure that power is available to DISCOMs at Rs. 2.5 / unit. This would enable direct targeting of viability

[10] This estimate is based on recent MSEDCL capex proposal

[11] This figure varies over plants from 1.9/u to 3/u and we are assuming a weighted average of 2.5/u.

gap funding for rural development and electrification of poor households. Coal mines could also be allotted to such projects on priority basis so as to benefit poor households.

6.2 Action ideas

For the scheme to take off, all concerned stake holders should undertake coordinated efforts. To achieve this goal various agencies will have to undertake certain specific tasks. For example, the Ministry of Power should announce the scheme as part of restructuring of RGGVY under the 12th plan. Details regarding method of power procurement, basis for selection and monitoring the contracts will need to be decided based on consultation with all States and CERC. The Ministry can even make an announcement in the Parliament regarding its resolution on "electrifying all households" and ensuring "power for all" and present this in the meeting of State Chief Ministers/ Energy Ministers. Using the national electricity, rural electrification and tariff policies, clear mandate should be given to State Regulatory Commissions to oversee and ensure implementation of schemes related to rural electrification, including RGGVY. The policy should also prohibit state DISCOMs from selling power outside the state while undertaking load shedding within the State. Overall there is need for greater transparency and accountability in load shedding which can be partly achieved by mandating good practices such load shedding protocol as done in Maharashtra. Like R-APDRP, push needs to be given for automatic metering for all feeders. Respective state and regional LDCs can assist SERCs in monitoring compliance of DISCOM to load shedding protocol.

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Annexure 1

Table A-1 below shows indicative number of households that will benefit based on backward districts identified by planning commission report of Inter ministry Task Group on redressing growing regional imbalances, 2005. Using these districts as basis, Table A-2 shows the power & energy requirement based on calculation method mentioned above.

State	Total no of Districts	No of Backward Districts	No of HH in Million in Backward districts (2011 Census)
Bihar	38	36	22
Uttar Pradesh	75	30	13
Madhya Pradesh	50	20	5
Jharkhand	24	17	6
Orissa	30	15	4
Chhattisgarh	27	9	2
Rajasthan	33	9	3
Andhra Pradesh	23	8	5
Assam	27	8	2
West Bengal	19	5	4
Maharashtra	35	4	1
Meghalaya	7	3	0.4
Manipur	9	2	0.08
Nagaland	11	3	0.1
Gujarat	26	1	0.4
TOTAL	--	**170**	**68**

Table A-1: list of backward districts identified by planning commission report

State	Population in Million (2011 Census)	No of HH in Million	MUs per year (30 uints/month/HH)	MW Load (200 W/HH)
Andhra Pradesh	26	5	1990	1106
Assam	9	2	658	366
Bihar	103	22	7802	4334
Chhattisgarh	11	2	805	447
Gujarat	2	0	163	90
Jharkhand	28	6	2150	1194
Madhya Pradesh	23	5	1796	998
Maharashtra	6	1	443	246
Manipur	0	0	32	18
Meghalaya	2	0	143	79
Nagaland	1	0	47	26
Orissa	19	4	1421	789
Rajasthan	14	3	1077	598
Uttar Pradesh	62	13	4713	2618
West Bengal	19	4	1479	822
Total	324	68	24719	13731

Table A-2: State & district wise, power & energy requirement

Allocation based on normalization of centre sector share

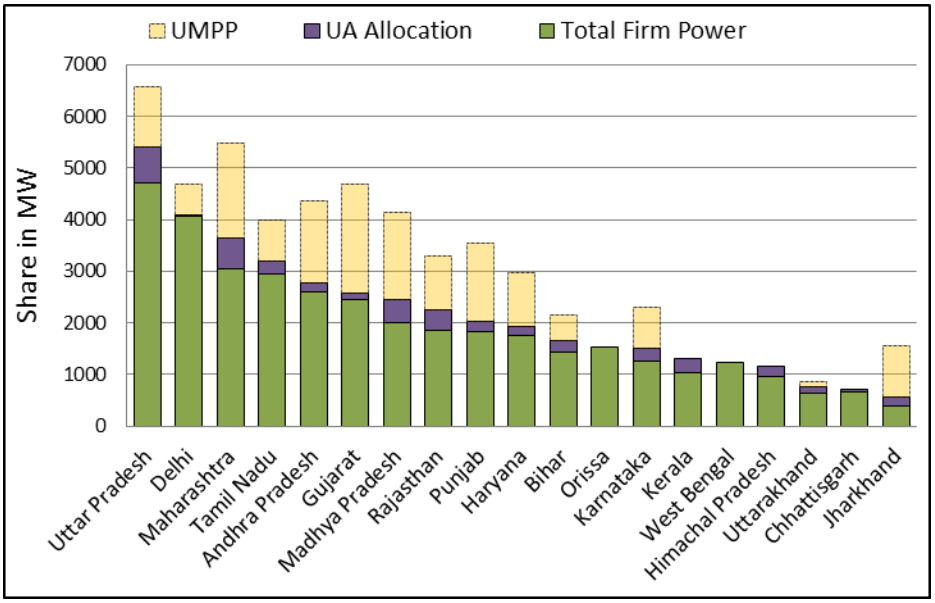

Figure A-1: State-wise historical allocation of Central Sector power

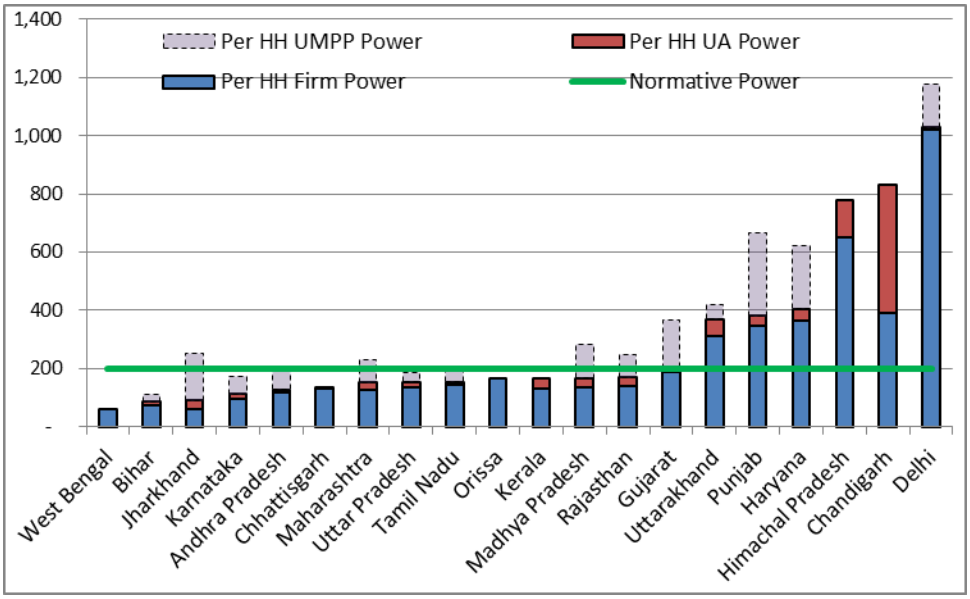

Figure A-2 State wise per household allocation of Central Sector and UMPP power (in Watts)