ENERGIZING INDIA: EXPANDING ELECTRICITY ACCESS IN RURAL AREAS

Towards an ‘Energy Plus’ approach for the poor:
A review of good practices and lessons learned from Asia and the Pacific

Case Study 12

ENVIRONMENT AND ENERGY
We would like to take this opportunity to recognize the Indian partners who have made financial and other contributions to the energy sector programme described in this report. These include the Ministry of Power, the Rural Electrification Corporation, the Central Institute for Rural Electrification and participating state governments and state power utilities.

“UNDP partners with people at all levels of society to help build nations that can withstand crisis, and drive and sustain the kind of growth that improves the quality of life for everyone. On the ground in 177 countries and territories, we offer global perspective and local insight to help empower lives and build resilient nations.”

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### Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>APRC</td>
<td>Asia-Pacific Regional Centre</td>
</tr>
<tr>
<td>AT&amp;C</td>
<td>aggregate technical and commercial</td>
</tr>
<tr>
<td>BPL</td>
<td>below poverty line</td>
</tr>
<tr>
<td>BST</td>
<td>bulk supply tariff</td>
</tr>
<tr>
<td>CPSU</td>
<td>central public-sector undertaking</td>
</tr>
<tr>
<td>DDG</td>
<td>decentralized distributed generation</td>
</tr>
<tr>
<td>DPR</td>
<td>detailed project report</td>
</tr>
<tr>
<td>GoI</td>
<td>Government of India</td>
</tr>
<tr>
<td>IEA</td>
<td>International Energy Agency</td>
</tr>
<tr>
<td>INR</td>
<td>Indian rupee (currency)</td>
</tr>
<tr>
<td>NGO</td>
<td>non-governmental organization</td>
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<tr>
<td>NHPC</td>
<td>National Hydro Power Corporation</td>
</tr>
<tr>
<td>NSSO</td>
<td>National Sample Survey Organization</td>
</tr>
<tr>
<td>NTPC</td>
<td>National Thermal Power Corporation</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>operations and maintenance</td>
</tr>
<tr>
<td>REC</td>
<td>Rural Electrification Corporation</td>
</tr>
<tr>
<td>RGGVY</td>
<td>Rajiv Gandhi Grameen Vidyutikaran Yojana</td>
</tr>
<tr>
<td>SERC</td>
<td>State Electricity Regulatory Commission</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
</tr>
<tr>
<td>UNPD</td>
<td>United Nations Population Division</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>USD</td>
<td>United States dollar (currency)</td>
</tr>
</tbody>
</table>
Synopsis

Project title: Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY)\(^1\)

Country and region of implementation: The Republic of India (country-wide)

Focus area (technology/energy service): Developing village electricity infrastructure and providing electricity connections to rural households

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Duration: 2005-2012

Costs: INR 287 billion (USD 5.8 billion)\(^2\)

Project brief: The Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) is a national government-run programme focused on constructing and improving access to rural electricity infrastructure. The Government of India launched the programme in 2005 with ambitious targets of the electrification of all households and provision of free connections to 23.4 million below poverty line (BPL) households by 2010.

Strategically positioned within the existing policy framework, RGGVY is able to operate more actively than previous government programmes. Its advantages include the following:

- it receives 90 percent of its funding from the central government;
- central-level public-sector organizations support state-level government utilities in implementation;
- it applies decentralized management and operations through franchisees; and
- it benefits from local community involvement.

By April 2010, RGGVY had electrified 79,135 out of 118,499 targeted villages, and 10.5 million BPL households (or around 60 million rural poor) have been connected to the electricity grid by the programme.

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1 Translated into English as ‘Village electrification programme’
2 INR 1 = USD 0.02026, as of 23 September 2011 (www.xe.com).
Energizing India: Expanding electricity access for the masses is one of 17 case studies which, together with a report titled ‘Towards an ‘Energy Plus’ approach for the poor: A review of good practices and lessons learned from Asia and the Pacific’ and an Action Agenda Note, comprise a review of good practices and lessons learned in energy service delivery to the poor. Commissioned and facilitated by the United Nations Development Programme Asia-Pacific Regional Centre (UNDP APROC), this case study identifies key characteristics that have helped poor households and communities gain access to modern energy services, and to derive valuable lessons for future energy access activities. This case study is the product of an intensive collaborative process and we wish to acknowledge the many contributors, without whose generous support this work would have been impossible.

We express special gratitude to the main researcher and writer of the case study, Balachandra Patil, whose expertise and knowledge established the basis of this report. UNDP is also grateful to Kapil Mohan and Atul Trivedi who provided valuable guidance, resource materials and reviewed the case study.

Special thanks to Thiyagarajan Velumail, supported by Soma Dutta, Lara Born and Butchaiah Gadde, for his technical leadership and guidance in the conduct of the 17 case studies.

Felicity Chard, David Galipeau (Chair), Daniela Gasparikova, Arun Kashyap, Faris Khader, Maya Nyagolova and Ashley Palmer of the UNDP-APRC Knowledge Products Review Committee (KRC) kindly provided a final review and endorsement of this publication.

The case study also benefited from the rich and fruitful interactions of the 9-12 November 2009 writeshop participants, including Praveen Arakkal, Expedito Belo, Lara Born, Ivo Besselink, Mamta Chander, Karma Chogyal, Beau Damen, Soma Dutta, Butchaiah Gadde, Geraldine Huet, Thomas Lynge Jensen, Xin Liu, William Mohns, Wattanee Niyomyath, Sunjita Pradhan, Kamal Rijal, Bhupendra Shakya, Bala Ram Shrestha, Kiran Man Singh, Dean Still, Yusuke Taishi, Pia Treichel, Kapila Subasinghe, Vernon Ray Vinluan, Veronica Villavicencio, Julien Wallet-Houget and Sirintharat Wannawong. Special thanks to the writeshop moderators Kamal Rijal and Thiyagarajan Velumail. In addition, the case study benefited greatly from an intensive peer review. Special thanks are due to Thomas Jensen, Veena Joshi, Sivanappan Kumar, Kamal Rijal, Kiran Man Singh, Shirish Sinha and S.N. Srinivas of the Technical Advisory Committee for providing a detailed review that guided the finalization of the case study. We would also like to acknowledge Soma Dutta’s support to the case writer in preparing the final case study.

UNDP APROC in Bangkok was responsible for the facilitation and conceptualization of the 17 case studies and the associated report. We thank the core team, comprising Saana Ahonen, Aalok Awalikar, Lara Born, Soma Dutta, Butchaiah Gadde, Thomas Lynge Jensen, Pratima Mathews, Wattanee Niyomyath, Thiyagarajan Velumail and Julien Wallet-Houget. Thanks to Sirintharat Wannawong, who has been instrumental in supporting the entire process administratively.

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Team Leader
Environment & Energy
UNDP Asia-Pacific
Preface

Asia-Pacific has achieved remarkable economic growth and socio-political progress in the past two decades, with almost every country in the region experiencing a concomitant decline in poverty.

Despite this progress, 800 million people in the region remain without access to electricity and almost 2 billion rely on the traditional use of biomass for cooking. India accounts for a significant share of this population. The issue is most serious in rural areas, where almost 70 percent of India’s population resides. While good progress has been made with expansion of electricity, many remote rural areas remain un-electrified, since connecting them to the national grid remains very expensive.

The poor often live in subsistence economies that do not generate cash surpluses, limiting their purchasing power and opportunities to shift to modern energy services. As a result, they have to invest more of their income and time in obtaining energy, and tend to use traditional energy services and fuels. Women and children are particularly affected, spending many hours a day collecting fuelwood and preparing meals in the kitchen. Smoke from inefficient stoves in poorly ventilated homes kills 1.6 million people worldwide every year; the majority of victims are women and children younger than five years. Indoor air pollution is the fourth-biggest killer in the developing world.

Asia-Pacific countries have applied many cutting-edge practices in providing energy access to the poor, including innovative financing mechanisms. Apart from satisfying basic needs, energy services can act as an instrument to empower women and disadvantaged communities; as an entry point to mobilize communities to take charge of their own development; and, most importantly, as a means to livelihood enhancement and poverty reduction. However, the scale of expansion of energy access projects has been far from sufficient.

UNDP has been working with its country partners to address these energy poverty issues, aiming to meet user needs, broaden energy supply options and link these efforts in achieving the Millennium Development Goals. Between 2009 and 2011, the UNDP APRC reviewed 17 energy access programmes and projects implemented by various development agencies and the private sector in the region. These projects were documented as 17 case studies (including this report), a report titled ‘Towards an ‘Energy Plus’ approach for the poor: A review of good practices and lessons learned from Asia and the Pacific’ and an Action Agenda Note. Together, these documents provide practical guidance for policymakers and development practitioners in designing and implementing future programmes and projects that ensure the delivery of low emission, affordable and reliable energy services for poverty reduction.

This case study documents RGGVY, an Indian government-led rural electrification programme that brought electricity to nearly 12 million households through construction and decentralized operation of electricity distribution infrastructure. Based primarily on desk research, this report presents an analysis of implementation efforts, costs and achievements of RGGVY since its launch in 2005. The analysis focuses on 10 states with the highest and the lowest levels of rural household electrification in 2004-2005.

Nicholas Rosellini
Deputy Assistant Administrator & Deputy Regional Director
Regional Bureau for Asia and the Pacific
1. Background

1.1 Definitions

Village electrification. This report uses the following definition of village electrification, as promulgated by India’s Ministry of Power in 2004:

“A village would be declared as electrified if:

1) Basic infrastructure such as distribution transformer and distribution lines is provided in the inhabited locality as well as the dalit basti/hamlet, where it exists;
2) Electricity is provided to public places like schools, gram panchayat offices, health centers, dispensaries, community centers etc. and
3) The number of households electrified should be at least 10 percent of the total number of households in the village”.

Intensive village electrification. This term refers to the improvement of electricity infrastructure within the village to the point where all consumers (households, the private sector and the local government) can acquire connections if willing to pay for it. Intensive electrification typically involves improving transmission and distribution lines and providing the adequate number of transformers.

Household electrification. This term refers to connecting households to the electricity grid. Terms ‘electrification’ and ‘grid connectivity’ are used interchangeably throughout the report.

Electricity access. Village and household electrification does not automatically ensure electricity access. Rather, access is a function of availability and affordability, where electricity is considered:

- ‘available’ if the household is within the connection of a reliable electricity network; and
- ‘affordable’ when the household is able to pay the up-front connection cost and electricity usage costs.

Thus, lack of electricity access could be due to the following reasons:

- lack of physical access because the village remains un-electrified or the household is not connected to the grid in an electrified village;
- lack of adequate generation and supply of reliable electricity resulting in frequent interruptions, blackouts and voltage fluctuations;
- lack of economic and financial access due to high initial cost of connection and low income levels; or
- behavioural and social factors such as ignorance, indifference or lack of information.

1.2 Electricity access and economic development

The strong relationship between electricity access and economic development is well established. Generally speaking, households with electricity access have more opportunities to raise their incomes, escape poverty and contribute to economic development.

Figure 1 illustrates this link in the Indian rural context. The graph plots household electricity access levels in 10 states against three indicators: per capita household electricity consumption, per capita income and incidence of poverty. The incidence of poverty is measured in terms of head-count ratio of poverty. The results show that states with better electricity access have a lower incidence of poverty, higher per capita income and higher per capita electricity consumption.

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3 RGGVY, 2010.
1.3 Energy and electricity access in India – current status

Lack of access to modern energy services. India accounts for a significant share of the global population deprived of access to modern energy services, including electricity (see Figure 2). In 2005, India was home to approximately 832 million people who depended on biomass for cooking and 390 million who used kerosene for lighting.

The issue is most serious in rural areas, where almost 70 percent of India’s population resides. Rural areas tend to have access only to inadequate, unreliable energy services, and rely heavily on traditional biomass fuels.

Lack of access to electricity. World Energy Outlook 2010 estimates that some 404 million people in India remain without access to electricity, compared to 420 million in 2001.

The extent of rural electrification varies widely among states and regions. In 2005, more than 90 percent of villages in southern and western India were electrified, whereas in Uttar Pradesh, Bihar and Orissa this number was below 60 percent (see Table 1). The poor performance of these states is due to a range of factors, including high poverty levels, administrative inefficiency and apathy, lack of targeted state-level programmes, political interference and resource constraints.

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5 Modern energy services are defined as including (a) electricity; (b) modern fuels to meet cooking needs (electricity, liquid fuels including LPG, natural gas, kerosene, ethanol and biofuels, but excluding traditional biomass such as firewood, charcoal, dung, crop residues and coal); and (c) mechanical power for productive, non-industrial applications such as water pumping and small-scale agro-processing.

As illustrated above, grid connectivity of a village does not necessarily equate to 100 percent household electrification. In 2005, 55 percent of rural households in India were electrified. Household electrification rates ranged between 10.1 percent for Bihar to 95.5 percent for Punjab. The distribution of electricity consumption across rural households is illustrated in Figure 3. An electrified rural household in India consumed, on average, about 470 kWh per year, compared to a global average of 665 kWh.

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**Figure 2: Population without access to modern energy for cooking and lighting, 2005**

<table>
<thead>
<tr>
<th></th>
<th>World</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural Cooking</td>
<td>34%</td>
<td>23%</td>
</tr>
<tr>
<td>Rural Lighting</td>
<td>28%</td>
<td>9%</td>
</tr>
<tr>
<td>Urban Cooking</td>
<td>9%</td>
<td>23%</td>
</tr>
<tr>
<td>Urban Lighting</td>
<td>9%</td>
<td>9%</td>
</tr>
</tbody>
</table>


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The estimate is based on the national sample survey data (NSSO, 2007) and data from the Ministry of Statistics and Programme Implementation (MoSPI, 2006; MoSPI, 2007).

8 UNESCAP, 2009.
Table 1: Rural electrification in selected Indian states, 2001 and 2005

<table>
<thead>
<tr>
<th>State</th>
<th>Villages as per 2001 census (no.)</th>
<th>Village electrification in 2001</th>
<th>Village electrification on 31 March 2005</th>
<th>Household electrification (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Least-electrified states</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bihar</td>
<td>39,015</td>
<td>49.3</td>
<td>20,006</td>
<td>51.3</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>97,942</td>
<td>58.2</td>
<td>56,977</td>
<td>58.2</td>
</tr>
<tr>
<td>Assam</td>
<td>25,124</td>
<td>75.9</td>
<td>19,342</td>
<td>77.0</td>
</tr>
<tr>
<td>Orissa</td>
<td>47,529</td>
<td>79.2</td>
<td>26,235</td>
<td>55.2</td>
</tr>
<tr>
<td>West Bengal</td>
<td>37,945</td>
<td>83.6</td>
<td>32,190</td>
<td>84.8</td>
</tr>
<tr>
<td>Most-electrified states</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gujarat</td>
<td>18,066</td>
<td>99.3</td>
<td>17,823</td>
<td>98.7</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>15,400</td>
<td>100.0</td>
<td>14,621</td>
<td>94.9</td>
</tr>
<tr>
<td>Karnataka</td>
<td>27,481</td>
<td>97.4</td>
<td>26,971</td>
<td>98.1</td>
</tr>
<tr>
<td>Haryana</td>
<td>6,764</td>
<td>99.9</td>
<td>6,764</td>
<td>100.0</td>
</tr>
<tr>
<td>Punjab</td>
<td>12,278</td>
<td>100.0</td>
<td>12,278</td>
<td>100.0</td>
</tr>
<tr>
<td>India (all states)</td>
<td>593,732</td>
<td>79.9</td>
<td>439,800</td>
<td>74.1</td>
</tr>
</tbody>
</table>

Sources: Census of India, 2001; NSSO, 2007.

Figure 3: Monthly average electricity consumption of rural households in India, 2005

- 0 kWh: 45%
- 20 kWh: 13%
- 40 kWh: 31%
- 60 kWh: 11%
1.4 Electricity generation, distribution and transmission

In India, electricity supply is primarily the domain of state governments, with state power utilities responsible for electricity generation, transmission and distribution. The role of the Government of India (GoI) has been largely limited to legislation and policy. However, the establishment of the National Hydro Power Corporation (NHPC), the National Thermal Power Corporation (NTPC) and other central public-sector undertakings (CPSUs) has reduced state-government dominance in power generation and interstate power transmission. In addition, power generation was opened to private-sector participation in 1992. However, state power utilities still retain control in transmission and distribution within the state.

1.5 Electrification policy framework

Major laws and policy initiatives in India’s electricity sector (with focus on rural electrification) are described below.

The Electricity Act 2003. The act modified the legal framework governing the electricity sector, with the aim of introducing competition, protecting consumer interests and providing universal access to electricity. Specifically, the act focuses on open access in power transmission and distribution, de-licensing of power generation, and distribution and power trading.

The act also includes specific provisions for expanding rural electrification. However, the states, due to their poor financial situation, had been unable to fulfill this responsibility. Consequently, the act was amended in 2007 to stipulate that state governments and the GoI should jointly endeavor to provide electricity access to all areas (including villages and hamlets) through the development of rural electricity infrastructure and electrification of households. The act also mandates the formulation of a Rural Electrification Policy (described below).

The National Electricity Policy 2005. The policy aims to accelerate the development of the electricity sector. It deals with availability of energy resources and technologies, the economics of generation and energy security.

The policy explicitly states that electricity is a basic human need and an essential requirement for all facets of life. It stipulates that national socio-economic development depends on making critical infrastructure and electricity supply available to rural areas at reasonable tariffs.

The policy contains the following goals and targets:

- electrification of all households by 2010 and demand for power fully satisfied by 2012;
- efficient supply of reliable and quality power at reasonable rates;
- minimum annual per capita availability of electricity of 1,000 kWh by 2012;
- minimum lifeline consumption of 1 kWh per household per day by 2012;
- financial turnaround and commercial viability of the electricity sector; and
- protection of consumer interests.

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9 A CPSU is a corporation where management control rests with the GoI.
10 Gokak, 2003
13 Electricity Policy, 2005.
The policy makes the following recommendations:

- the Rural Electrification Corporation (REC), a GoI enterprise, should serve as the nodal national implementing agency for the policy;
- the GoI should provide necessary capital subsidies and soft long-term debt financing for investment in rural electrification;
- an appropriate institutional framework should be created to develop, operate and maintain rural electrification infrastructure;
- commercial viability of the sector should be ensured by recovering the cost of electricity and related operations and maintenance (O&M) from consumers. This excludes households below the poverty line (BPL), who would need to be subsidized (‘lifeline support’). O&M and cost recovery should be managed by electricity utilities through appropriate arrangements with gram panchayats, local authorities, non-governmental organizations (NGOs) and franchisees; and
- capacity development through education, training and awareness programmes is essential in promoting effective stakeholder participation.

**The Rural Electrification Policy 2006.** This policy elaborates on the National Electricity Policy 2005 by making specific recommendations for implementation of a rural electrification programme. These include the following:

- each state government is to prepare a Rural Electrification Plan aiming to provide access to all households;
- the Ministry of Power, in association with the Ministry of Panchayat Raj, is to establish a coordination mechanism for implementing various schemes;
- to ensure involvement of local communities, state governments are to set up district-level committees under local administrations with representatives from concerned district-level agencies, consumer associations and other stakeholders. Since women suffer the most from limited energy access, their participation should be ensured;
- to ensure financial sustainability, least-cost options must be exercised, after taking into account the full life-cycle costs, and the explicit and implicit subsidies. Efforts should be made to increase demand for electricity by promoting economic activities with active involvement of consumers;
- specific policy provisions are needed for stand-alone systems in rural areas;
- specific policy provisions are needed for bulk electricity purchase and management of local distribution; and
- franchisees must be deployed to manage local distribution networks, thus ensuring revenue sustainability and improved services to the consumers.

**The National Tariff Policy 2006.** This policy aims to ensure financial viability of the power sector, attract investments, ensure availability of electricity to consumers at reasonable rates, and promote transparency and consistency in regulatory approach for tariff setting.

**Bharat Nirman 2005-2009.** Recognizing the critical role played by infrastructure in poverty alleviation and economic development, the GoI decided to invest heavily in the creation and expansion of rural infrastructure. In 2005, it launched a four-year national development plan focusing on rural India – Bharat Nirman, or ‘Building India’ – for implementation during 2005-2009. This plan sought to expand quality access to six types of services: irrigation, drinking water, electrification, roads, housing and telephony. Among other objectives, the plan aimed to expand electricity services to 125,000 villages and offer free electric power connections to 23 million BPL households.
2. RGGVY: overview

In line with Bharat Nirman 2005-2009, on 4 April 2005 the GoI launched the Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY), merging a number of pre-existing rural electrification programmes. The primary focus of RGGVY is constructing and improving access to electricity distribution infrastructure in rural areas.

**Targets.** RGGVY initially sought to achieve the following targets by 2010:

- electrification of all 118,499 India’s un-electrified villages;
- intensive electrification of 354,967 already electrified villages
- electrification of all 41.5 million rural households; and
- free electricity connection (single lighting point per household) to all 23.4 million rural BPL households.

However, implementation was delayed by, among other factors, obtaining approval for RGGVY continuation under the 11th Five-Year Plan. This resulted in the following revised targets:

- electrification of 100,000 villages by March 2012 (i.e. by the end of the 11th Five-Year Plan); and
- free electricity connection to 17.5 million BPL households by March 2012.

**Key elements and activities.** Key programme elements and activities include:

- construction of 33/11 KV or 66/11 KV sub-stations and transmission lines in blocks where these do not exist;
- provision of distribution transformers of appropriate capacity in electrified villages and households;
- electrification of rural BPL households is financed with 100 percent capital subsidy from the GoI, as per the Kutir Jyoti programme. Households above the poverty line must pay at prescribed connection rates;
- electricity distribution facilities are operated by franchisees (described below); and
- establishing decentralized distributed generation (DDG) of electricity from conventional or non-conventional sources (fossil fuel, biomass, biogas, mini-hydro, geothermal, solar etc.) for villages where grid connectivity is either not feasible or not cost effective.

**Funding.** The GoI provides 90 percent of RGGVY’s funding through a capital subsidy, while REC provides the 10 percent balance through soft-term lending. RGGVY’s total budget (2005-2012) is INR 287 billion.
3. Implementation strategy

RGGVY’s implementation framework was finalized after discussions between the GoI, state governments, state power utilities and CPSUs.

3.1 Implementing partners and stakeholders

The roles of key RGGVY stakeholders are described below.\(^\text{21}\)

**The Ministry of Power** assumes the overall leadership for RGGVY implementation. It provides the policy framework and, along with other national ministries, monitors progress. Regional and state-level review meetings are held by the Ministry to review progress and resolve any bottlenecks.

**The REC** is the lead coordinating agency for the programme. It is responsible for disbursing RGGVY funds to state governments and providing an implementation framework comprising technical, logistical, project development, and monitoring and evaluation specifications. REC also convenes monthly meetings to review RGGVY progress and resolve outstanding issues.

**State governments** are the primary recipients of RGGVY funds. To qualify for funding and before proposed projects are sanctioned, state governments must make the following commitments:

- to provide a minimum daily supply of six hours of electricity in the RGGVY-built distribution networks, with the assurance of meeting any deficit by supplying electricity at a subsidized tariff as required under the Electricity Act 2003;
- to deploy, monitor and progressively upgrade franchisees for the management of RGGVY-built distribution networks (described in more detail below);
- to provide details regarding un-electrified, de-electrified and electrified villages, and information regarding electricity connections to households (including smaller settlements);\(^\text{22}\)
- to adopt a ‘three-tier quality monitoring mechanism’ to ensure quality materials and implementation, and a web-based, milestone-based monitoring system to monitor and report progress in all projects;
- to ensure that state rural electrification plans include arrangements to satisfy the village electricity demand (including generation, transmission and sub-transmission) after electrification under RGGVY. The plans must be submitted to RGGVY and include details of funding requirements and availability;
- to establish state-level coordination committees (headed by the Chief Secretary) to resolve state-level and inter-departmental issues; and
- to arrange regular meetings of the RGGVY monitoring committee (headed by the Secretary of Power) to sanction projects, determine the levels of funding and monitor their progress.

**State power** utilities have the primary responsibility for RGGVY implementation. State power utilities are responsible for developing detailed project reports (DPRs), supporting release of funds, enabling household connections and providing technical support to franchisees.

High voltage distribution systems are being installed to minimize theft and technical losses. Unlike earlier programmes, electricity metres are provided to households and other users with every connection. BPL households are also provided with energy-efficient lamps.

**CPSUs** provide consulting support to state power utilities in project development, implementation and monitoring activities. To this end, REC has entered into a memoranda of understanding with a number of CPSUs including the NTPC, the NHPC, the Grid Corporation of India and the Damodar Valley Corporation.

**Gram panchayats** assume a supervisory role by overseeing service delivery by franchisees. **Gram panchayats** provide certification upon completion.

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\(^{20}\) This section is based on reports from the GoI and other agencies (RGGVY, 2005; RGGVY, 2010; RGGVY, 2009a; DRUM, 2009).


\(^{22}\) The term ‘de-electrified’ refers to villages disconnected from the grid due to natural calamities or theft of electricity infrastructure.
Under the Electricity Act 2003, franchisees are entities authorized by a distribution licensee to distribute electricity on its behalf in a particular area. Franchisees can be NGOs, users associations, cooperatives, individual entrepreneurs or panchayat institutions. Within the RGGVY context, franchisees are entities established and authorized by state governments to operate RGGVY-constructed electricity distribution networks. RGGVY guidelines make this outsourcing by state governments a prerequisite for project approval (i.e. franchisees must be deployed before RGGVY funds are released) and outline the procedures for franchisee establishment.

The responsibilities of a franchisee can range between revenue collection to total ownership and management of the distribution network, depending on the model used. REC-proposed franchisee models are outlined in Table 2. To qualify for RGGVY funding, state governments must commit to progressively ‘upgrade’ franchisees by gradual transfer of responsibilities for electricity supply.

Table 2: Franchisee models proposed by REC

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collection-based revenue franchisee</td>
<td>This model limits franchisee activities to billing, revenue collection, addressing complaints, facilitating the release of new connections and reporting on the status of distribution networks in the franchised area to the utility. It applies pre-fixed remunerations for achieving the target, penalties for not achieving it and incentives for exceeding it. The drawback of this model is that the franchisee is not a partner in loss reduction, since its compensation is linked to revenue collection and not to levels of electricity supply.</td>
</tr>
<tr>
<td>Input-based revenue franchisee</td>
<td>Electricity supply into a franchisee-managed area is measured by the utility, and targets for revenue collection are fixed based on the collections made as a percentage of electricity supplied to the consumers beyond the point of metering by the utility. Other features are similar to those of the collection-based model (above). The relative advantage of this model is that the franchisee also becomes a partner in loss reduction, and has incentives to reduce theft in the system.</td>
</tr>
<tr>
<td>Input-based franchisee</td>
<td>This model is similar to the input-based revenue model with one significant difference: the franchisee buys the electricity from the utility at a pre-determined rate and then bills consumers for its revenues. This model seeks to promote franchisee entrepreneurship by making it fully responsible for its bottom line.</td>
</tr>
<tr>
<td>O&amp;M franchisee</td>
<td>In addition to the operational features of the input-based model, the state power utility delegates the responsibility for O&amp;M of 11 kV and low tension feeders (including distribution transformers) to the franchisee on a monthly retainer basis.</td>
</tr>
<tr>
<td>Electric cooperative society</td>
<td>The franchisee owns distribution utility assets, and is responsible for all distribution functions including O&amp;M, metering, billing and collections, accounting and finance, procurement and system planning. Operations involve organizing the community, purchasing and managing the distribution system, repaying debts and purchasing electricity from the utility.</td>
</tr>
<tr>
<td>Electric cooperative society (operations management through contracting)</td>
<td>The board of directors of the electric cooperative society delegates the operation of the network to an external agency organization. This can be achieved through an operations contract with a fee structure and performance criteria.</td>
</tr>
</tbody>
</table>

Sources: REC, 2008; REC, 2009a.
A franchisee has the option of generating its own electricity or purchasing it from the state power utility for subsequent sale to consumers. Electricity can be bought at wholesale prices or for a bulk supply tariff (BST). The BST is determined based on the mix of consumers (residential, commercial, agricultural, etc.), current electricity prices and expected demand. Wherever feasible, competitive bidding is used to determine the BST. This is included in the state utilities’ submissions to the State Electricity Regulatory Commissions (SERCs) for their revenue requirements and tariff determinations. State governments can choose to provide additional subsidies to lower tariffs set by the SERCs. While administering the scheme, prior commitment is taken from state governments regarding determination of the BST. In the event the projects are not implemented in compliance with the conditions indicated above, the capital subsidy may be converted into interest-bearing loans.

Franchisees are deployed to achieve the following objectives:

- greater accountability to consumers;
- more efficient billing and revenue collection (ideally leading to revenue sustainability);
- improved quality and reliability of electricity supply;
- improved technical support, including O&M and repair of infrastructure;\(^{23}\)
- reduced aggregate technical and commercial (AT&C) losses; and
- generation of local employment.

### 3.2 Capacity development

RGGVY capacity-building activities are aimed at more effective energy service delivery. Two training programmes have been launched targeting people involved in electrification at the ground level; these are described below.

**National franchisee training programme.** RGGVY has developed comprehensive guidelines for establishing a franchisee. However, field experience has shown that, without formal training, franchisees are likely to experience technical and managerial deficiencies. Consequently, a national franchisee training programme is offered by the REC and the Central Institute for Rural Electrification. The programme involves numerous stakeholders, including state power utilities, regional energy training institutes, franchisees, potential franchisees and franchisee employees. The programme deals with the following topics:

- the various franchisee models available;
- managerial, technical, commercial and legal aspects of electricity distribution; and
- mechanisms for quick efficiency gains and improved customer service by franchisees.\(^ {24}\)

**National training programme for technical staff of state power utilities.** This training programme is aimed primarily at technical staff working at state utilities, i.e. staff responsible for O&M, repair and monitoring of the electricity infrastructure. Implemented with REC as the nodal agency and in association with power-distribution companies, the programme seeks to upgrade the technical skills of these employees.

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\(^{23}\) Traditionally, maintenance of rural electricity infrastructure has been the responsibility of state electricity utilities, which lack sufficient human resources for this role (resulting in defunct infrastructure).

\(^{24}\) REC, 2009a.

Providing access to electricity and water to communities.
3.3 The use of technical standards and guidelines

RGGVY stresses standardization and uniform specifications for materials used in rural electrification works (features missing in earlier programmes). To help ensure effective implementation, guidelines for project formulation, tendering of works, quality control and quality assurance are in place.

3.4 Programme costs and investments

Originally, RGGVY was expected to cost an estimated INR 163 billion (USD 3.3 billion), with a subsidy component of INR 147.5 billion. However, RGGVY has experienced an increase in scope and rising unit costs, substantially increasing the total outlay. For example, the original electrification estimate of INR 650,000 per village has been revised to INR 1.3 million for villages with normal topography and INR 1.8 million for villages in hilly, desert and tribal areas. Similarly, the BPL household electrification cost has increased from INR 1,500 to INR 2,200 per household. The cost of intensive electrification has increased from INR 100,000 per village to INR 400,000 for normal terrain and INR 600,000 for hilly, desert and tribal area villages.

Table 3 details RGGVY electrification targets and costs as of 23 April 2010. Figures for the total sanctioned, awarded and released funds (INR 263.5 billion, INR 287.3 billion and INR 209.3 billion) represent steep increases from the original estimate of INR 163 billion.

Table 3 also shows that the five least-electrified states account for over 50 percent of RGGVY’s sanctioned, awarded and released funding. These states also happen to experience the highest levels of poverty. The GoI priority of expanding electricity access in these states exemplifies its commitment to poverty eradication.

Table 3: RGGVY rural electrification targets and funding, 23 April 2010.

<table>
<thead>
<tr>
<th>State</th>
<th>Village electrification targets</th>
<th>Household electrification targets</th>
<th>Total funds (INR million)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Electrification</td>
<td>Intensive electrification</td>
<td>All</td>
</tr>
<tr>
<td>Least-electrified states</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bihar</td>
<td>23,211</td>
<td>6,651</td>
<td>6,022,036</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>30,802</td>
<td>3,287</td>
<td>1,694,075</td>
</tr>
<tr>
<td>Assam</td>
<td>13,330</td>
<td>13,330</td>
<td>1,414,828</td>
</tr>
<tr>
<td>Orissa</td>
<td>17,895</td>
<td>28,992</td>
<td>4,858,292</td>
</tr>
<tr>
<td>West Bengal</td>
<td>4,573</td>
<td>24,775</td>
<td>3,974,005</td>
</tr>
</tbody>
</table>

| Most-electrified states |                                 |                                  | | | | | |
| Gujarat                | 0                               | 17,934                           | 1,595,853 | 955,150   | 3,604  | 2,257  | 1,782  |
| Tamil Nadu             | 0                               | 12,416                           | 1,692,235 | 545,511   | 4,474  | 4,474  | 2,368  |
| Karnataka              | 132                             | 28,191                           | 1,932,797 | 891,939   | 5,953  | 8,731  | 6,206  |
| Haryana                | 0                               | 5,985                            | 569,686   | 224,073   | 1,974  | 2,227  | 1,355  |
| Punjab                 | 0                               | 11,840                           | 405,023   | 148,860   | 1,544  | 1,839  | 599    |
| India (all states)     | 118,499                         | 354,967                          | 41,524,682 | 24,645,017 | 263,496 | 287,342 | 209,278 |


25 Cost overruns are common in such large long-term programmes in India. For example, while the sanctioned amount for 235 projects under the 10th Five-year Plan was INR 97.3 billion, the awarded amount was INR 123.2 billion (a 27 percent increase)
In terms of spending, 8 and 9 percent of RGGVY funding is allocated to state utilities and CPSUs, respectively, for programme implementation and expenditures on compulsory third-party monitoring. Two percent of RGGVY’s total subsidy is allocated to research, technology and information systems development, capacity building, quality monitoring, programme evaluation, awareness and pilot studies, and complementary projects.

4. Impacts

Although the latest numbers suggest that India still has a long way to go in providing universal electricity access, RGGVY has made significant progress in terms of the absolute number of villages electrified and rural households connected. More detail is provided below.

4.1 Meeting village electrification targets

Village electrification. As shown in Table 4, nearly 67 percent (79,135) of targeted villages have been electrified by 2010, while 39,500 villages (6.6 percent of India’s total) remain without electricity. Of the 10 states chosen for the analysis, six have either achieved or are on the verge of achieving 100 percent village electrification.27

The least-electrified states pursued ambitious targets under RGGVY. Assam and Orissa enjoyed less success than other states, primarily due to delayed project approval.

Intensive village electrification. All states apart from Uttar Pradesh and Karnataka fell significantly short of their targets for intensive electrification.28 Overall, only 34 percent of targeted villages achieved intensive electrification.

Table 4: RGGVY targets and achievements (as of 23 April 2010)

<table>
<thead>
<tr>
<th>State</th>
<th>Village electrification</th>
<th>Intensive village electrification</th>
<th>Household connection (BPL and non-BPL)</th>
<th>Household connection (BPL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Target (no.)</td>
<td>Achieved (no.)</td>
<td>%</td>
<td>Target (no.)</td>
</tr>
<tr>
<td>Least-electrified states</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bihar</td>
<td>23,211</td>
<td>19,091</td>
<td>82.2</td>
<td>6,651</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>30,802</td>
<td>27,736</td>
<td>90.0</td>
<td>3,287</td>
</tr>
<tr>
<td>Assam</td>
<td>8,525</td>
<td>2,293</td>
<td>26.9</td>
<td>13,330</td>
</tr>
<tr>
<td>Orissa</td>
<td>17,895</td>
<td>7,441</td>
<td>41.6</td>
<td>28,992</td>
</tr>
<tr>
<td>West Bengal</td>
<td>4,573</td>
<td>4,106</td>
<td>89.8</td>
<td>24,775</td>
</tr>
<tr>
<td>Most-electrified states</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gujarat</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>17,934</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>12,416</td>
</tr>
<tr>
<td>Karnataka</td>
<td>132</td>
<td>58</td>
<td>43.9</td>
<td>28,191</td>
</tr>
<tr>
<td>Haryana</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5,985</td>
</tr>
<tr>
<td>Punjab</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11,840</td>
</tr>
<tr>
<td>India (all states)</td>
<td>118,499</td>
<td>79,135</td>
<td>66.8</td>
<td>354,967</td>
</tr>
</tbody>
</table>


26 Sections 4.1 and 4.2 assess RGGVY’s achievements against its initial (rather than revised) targets.
27 Annex 2 presents the RGGVY achievements in all 27 states.
28 Uttar Pradesh’s high rate of success was mainly due to setting of low targets.
4.2 Meeting household electrification targets

As shown in Table 4, RGGVY’s efforts in household electrification have been less successful than in village electrification. Only 28.4 percent of targeted households (BPL and non-BPL) and 42.7 percent of BPL households have been electrified. Most-electrified and least-electrified states fared equally poorly in achieving their set targets. Nevertheless, the absolute number of households electrified has been substantial (almost 11.8 million).

For all states apart from Karnataka and West Bengal, only BPL households were electrified. This is understandable given that BPL electrification is financed with 100 percent capital subsidy (i.e. it is free for households and state utilities) and is the prescribed measure of success for implementing agencies.

Even though electrification of non-BPL households is not subsidised, it was expected that the benefits of electricity would encourage non-BPL households to connect. However, this has not happened.

4.3 RGGVY impact on overall levels of electrification

Comparison with the ‘business-as-usual’ scenario. Figure 5 estimates RGGVY’s impact in expanding rural household electrification. The trend ‘without RGGVY’ has been extrapolated from 1991 and 2001 rural household electrification levels and the estimated number of rural households using information from the United Nations Population Division. The trend ‘with RGGVY’ is based on figures of net increase in the number of electrified households due to RGGVY, using data from the RGGVY website. The graph suggests that, without RGGVY, rural household electrification would have been 60 percent by 2010. With the programme, it reached 65 percent. This corresponds to an additional 8.8 million electrified households, or about 46 million rural people.

Figure 5: RGGVY contribution in expanding rural electrification in India

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29 UNPD, 2008.
30 RGGVY, 2010.
Increased household connection rate. Prior to RGGVY, Kutir Jyoti (1988-2006) was the main household electrification programme for the poor, reaching roughly 0.4 million households every year.\(^{31}\) In comparison, RGGVY has been connecting BPL households at the rate of about 2.6 million per year (a six-fold increase).

In addition, the rate of electrification under RGGVY has increased significantly in recent years (see Figure 6). For example, during 2009-2010, RGGVY connected 5.1 million BPL households. This is expected to continue as the GoI has awarded funding for the whole expansion programme, and about 60 percent of the funds has already been released to the state governments. Furthermore, all the state governments and power utilities have prepared the required action plans and have identified specific projects for implementation.

Narrowing the gap for BPL households. RGGVY’s focus on BPL household electrification is having an impact, as evident from the narrowing gap between the number of BPL and non-BPL electrified households (Figure 6).

**Figure 6: Annual household electrification rates, 2006-2010**

![Graph showing annual household electrification rates, 2006-2010](image)

4.4 Franchisee deployment and performance

RGGVY seeks to increase revenues and operational sustainability of rural electricity networks through a franchisee system. Table 5 presents the franchisee figures as of 30 April 2010.

\(^{31}\) See Annex 1 for more detail on previous electrification programmes in India.
Table 5: Number of franchisees in selected states, 30 April 2010

<table>
<thead>
<tr>
<th>State</th>
<th>Franchisees established</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RGGVY villages</td>
<td>Other villages</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td><strong>Least-electrified states</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bihar</td>
<td>0</td>
<td>8,341</td>
<td>8,341</td>
<td></td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>4,416</td>
<td>17,313</td>
<td>21,729</td>
<td></td>
</tr>
<tr>
<td>Assam</td>
<td>2,463</td>
<td>0</td>
<td>2,463</td>
<td></td>
</tr>
<tr>
<td>Orissa</td>
<td>0</td>
<td>8,406</td>
<td>8,406</td>
<td></td>
</tr>
<tr>
<td>West Bengal</td>
<td>10,580</td>
<td>3,800</td>
<td>14,380</td>
<td></td>
</tr>
<tr>
<td><strong>Most-electrified states</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gujarat</td>
<td>2,958</td>
<td>564</td>
<td>3,522</td>
<td></td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Karnataka</td>
<td>19,797</td>
<td>0</td>
<td>19,797</td>
<td></td>
</tr>
<tr>
<td>Haryana</td>
<td>6,237</td>
<td>0</td>
<td>6,136</td>
<td></td>
</tr>
<tr>
<td>Punjab</td>
<td>205</td>
<td>0</td>
<td>205</td>
<td></td>
</tr>
<tr>
<td>India (total)</td>
<td>52,695</td>
<td>49,672</td>
<td>102,367</td>
<td></td>
</tr>
</tbody>
</table>


Of 200,248 electrified and intensively electrified villages under RGGVY, only 52,695 (or 26.3 percent) have franchisee services. The process of establishing franchisees thus needs to be accelerated. It should be noted that the deployment of franchisees by state governments has been extended to non-RGGVY villages, which now account for 48 percent of all franchisees.

By requiring state governments to upgrade franchisees, RGGVY seeks to promote the ‘input-based’, ‘O&M’ and ‘electric cooperative society’ franchisee models. These models seek to improve infrastructure O&M and the quality of services provided by making franchisees responsible for all service delivery (including purchase of electricity from state utilities and distribution to customers, revenue collection, technical services, monitoring and reporting, and establishing new connections). In practice, however, most franchisees have engaged only in billing and revenue collection, merely serving as agents of electricity distribution utilities.

### 4.5 Capacity building

As of December 2009, 3,794 franchisees have completed the national franchisee training programme, and 10,760 employees have undergone the national training programme for technical staff. The Ministry of Power aims to train approximately 40,000 franchisees and 75,000 technical staff by 2012.32

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32 REC, 2009b.
5. Challenges and causes

RGGVY implementation has encountered many challenges, resulting in uneven regional achievements and failures to achieve certain targets. The following observations are based on the authors’ assessments and RGGVY and REC reports.33

Delayed government approvals. This is the main reason for RGGVY’s failure to achieve its village and household electrification targets. This includes delays in:

- sanctioning RGGVY as part of the 11th Five-Year Plan;
- establishing franchisees;
- finalizing BPL households lists;
- awarding projects;
- allotting land and forest clearances; and
- activating electricity supply in electrified villages.

The primary cause of these delays has been bureaucratic apathy and inefficiency.34 The extent of these challenges varies across states, explaining differences in electrification rates.

Low rate of non-BPL household electrification. The success of implementing agencies is measured by BPL household electrification, and the BPL connection cost is paid by the RGGVY. Non-BPL households must apply for connections and wait for approval that is often delayed. Furthermore, ‘borderline’ households may find it difficult to pay the connection fee. In order to improve non-BPL electrification, RGGVY needs to address these issues.

Low rate of intensive electrification. Overall, only 34 percent of targeted villages received intensive electrification. This is due to the high priority accorded by the GoI and state governments to electrification of un-electrified villages, rather than intensive electrification of already (albeit inadequately) electrified villages.

Lack of franchisee viability. A strategy is needed to promote productive uses of electricity at both household and village levels, thereby enhancing the viability of the franchisee operations. No concrete programmes currently address this issue, despite the fact that poverty is the key reason for the lack of access to electricity.

Inadequate and delayed funding. This has included limited fund allocation during the 10th Five-Year Plan and delays in sanctioning continuation of the programme in the 11th Five-Year Plan. Currently, only INR 280 billion out of required INR 420 billion has been sanctioned under the 11th Five-Year Plan.

6. Good practices and lessons learned in expanding energy services for the poor

RGGVY is the largest rural energy access programme ever implemented in India, and its design was built on lessons learned from earlier programmes.35 RGGVY’s experience so far has provided the following lessons.

Involving all levels of government in implementation. RGGVY has shown that effective stakeholder partnerships can deliver results (something earlier programmes failed to do). Previously, the responsibility for village electrification lay solely with state power utilities, who were typically constrained in human and financial resources. RGGVY brought central agencies (CPSUs), local governments and the private sector (franchisees) into the rural electrification process, improving programme implementation.

Local community involvement. Previously, the responsibility of involving the local community was left to the state. RGGVY ensures local involvement by mandating the use of franchisees, instituting district committees, and requiring certification by gram panchayats on completion.

33 REC, 2007; RGGVY, 2009a; RGGVY, 2009b.
34 As discussed in Section 1.1, village electrification equates to establishing basic village-level infrastructure and connections to at least 10 percent of households. Given the availability of GoI subsidies, achieving this goal is relatively easy, provided there is a willingness to do so.
35 DRUM, 2009.
Providing additional, well-directed and sustained funding from the national budget. Previous electrification efforts were funded primarily by state power utilities. Fearing financial losses, utilities were reluctant to expand rural electrification. Since RGGVY provides 90 percent of the programme cost as a GoI subsidy, financial burdens and risks for state power utilities are minimal.

Previous GoI electrification grants were complemented by state funds, with state governments subsequently having the authority to determine the rate and direction of rural electrification. With RGGVY, most of the funds come directly from the GoI, making it easy to release the funds directly to implementing agencies.

RGGVY is a subsidy-driven, not-for-profit programme. Unless the GoI assumes leadership and commits to long-term funding, such programmes are unlikely to be successful.

Setting clear targets and implementing ‘projects’. Unlike earlier programmes, RGGVY is implemented in mission mode, with clear, time-bound targets for village and household electrification. The release of funds to state governments is linked to the achievement of milestones. For the sake of effectiveness, various activities are bundled for quick delivery.

Generating sufficient electricity the next step. RGGVY has focused on bridging the rural ‘connectivity gap’ by improving electricity distribution infrastructure. However, establishing such infrastructure is not an end in itself; rather, it is the first important step in providing access to affordable and reliable electricity (see Section 1.1 for discussion).

India’s power sector is chronically affected by shortages as it perennially struggles to meet the growing demand. The burden of these shortages, in terms of frequency and duration, falls mostly on rural consumers. Load shedding (an outcome of shortages) ranges between two and four hours per day in major cities, four and six hours in smaller towns, and 8-14 hours in rural areas. While most common during the summer, rural power cuts occur throughout the year.

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36 Mission mode refers to targeted and time-bound programme implementation.
37 Krishnaswamy, 2010.
The GoI therefore needs to invest in generation infrastructure in addition to providing grid connectivity. There is an immediate need to focus on energy generation: the estimates suggest that a minimum of 20,000 MW of power is required to meet demand from RGGVY connections, with nearly 10,000 MW coming from rural households alone.

Electricity generation was not part of the original RGGVY design, but must now be considered. It is also necessary to go beyond lighting and provide electricity for specific productive uses.

**Upgrading franchisees for effective service delivery.** The most innovative RGGVY feature is establishing franchisees as the link between state power utilities and consumers (rural households). Franchisees are used to increase the efficiency and effectiveness of service delivery including quality, reliability and extent of electricity supply, technical support, O&M and repairs. In addition, franchisees are expected to improve revenue sustainability (through more efficient billing and collection, and controlling AT&C losses) and generate local employment.

However, currently most franchisees are merely outsourced metre-reading and bill-collection services, despite state government commitments to upgrading. In the long run, RGGVY must require all franchisees to be upgraded to input-based models.

**More efforts required in DDG.** In providing electricity access to remote villages where grid connection is not feasible, the GoI promotes DDG, either through renewable or fossil fuel-based technologies. From the outset, DDG was part of the RGGVY design. Until recently, however, no DDG projects have been implemented due to a lack of interest from state governments.

Recent initiatives expected to facilitate an uptake of DDG projects include the following:

- in January 2009, to address the issue of state government indifference, the Ministry of Power released detailed DDG guidelines that identify roles, responsibilities and procedures in DDG projects, hence removing ‘grey areas’ that hindered project uptake;
- the Ministry has also selected a panel of consultants for preparing DPRs and helping states in implementation; and
- a DPR template and guidelines for procurement of goods and services were released in March 2009 and June 2009, respectively.

### 7. Conclusions

RGGVY is an ambitious rural electrification programme that has achieved significant results. By April 2010, over 79,000 villages have been electrified, and 10.5 million connections have been provided to BPL households, benefitting approximately 60 million rural people. During the last three years, the RGGVY programme has provided connections at the rate of 3.7 million households per year.

However, challenges remain. According to the latest data, there are still 30 million rural households that need to be electrified. If India is to achieve 100 percent household electrification by 2015, current electrification rates will need to more than double. This presents a formidable task, given the fact that many states (particularly the least-electrified) have so far failed to achieve even 15 percent of their set targets.

RGGVY has so far focused on achieving rural connectivity. The logical next step is securing the electricity supply. Without secure access to a reliable and quality supply of electricity, the problem of energy access will persist.
References


Annex 1: History of rural electrification programmes in India

At the time of India’s independence (1947), only 1,500 villages nationwide had electricity. Soon after, the importance of rural electrification began to receive due recognition by the GoI.

From realized irrigation potential to efficient rural electrification. The 1st Five-Year Plan (1951-1956) emphasized support for projects that ensured the exploitation of irrigation potential. At this point, only 0.5 percent of villages nationwide were connected to the grid. The 2nd Five-Year Plan (1957-1962) designated rural electrification an area of special interest. The 3rd Five-Year Plan (1963-1968) raised the issue of efficiency in the sector for the first time.

From connected cities and towns to broad expansion in rural areas. In the 1950s and 1960s, state electrification efforts focused on cities and towns. The Rural Electrification Corporation (REC) was created in 1969 with support from the United States Agency for International Development (USAID). Based on the Tennessee Valley Authority experience in the United States, the REC was mandated to facilitate availability of electricity in rural and semi-urban areas. During its 35 years of existence, REC has financed numerous village improvement projects in electrification, pump-set and low-tension systems. REC focus has been extensive (number of villages electrified) rather than intensive (percent of households covered).

Target-based rural electrification, expansion of households lagging behind expansion to villages. The target-based approach of rural electrification was developed during the 4th and 5th Five-Year Plans, with a focus on pump-set energization and guidelines for village grid connectivity. Maximum village electrification was achieved during the 5th, 6th and 7th Five-Year Plans (1974-1990), when about 314,000 villages were electrified. Although the number of electrified villages has increased rapidly, the number of electrified households has not kept pace.

Slower progress due to both financial constraints and de-electrification. In the 1990s, progress in electrification slowed due to financial constraints faced by state electricity utilities. Meanwhile, a significant number of already electrified villages were de-electrified due to natural calamities and theft of infrastructure. As of March 2004, out of the total 593,732 census villages, 474,982 (80 percent) were electrified.

Major rural electrification programmes in India prior to RGGVY are outlined below.

Minimum-Needs Programme. The Minimum-Needs Programme (MNP) was launched during the 5th Five-Year Plan, with rural electrification among its components. Funds (grants and loans) were provided as GoI assistance to the states. Rural areas covered under the MNP were remote and difficult-to-access villages with low load potential.

Kutir Jyoti scheme. This programme was launched in the 1988-1989 financial year. Its purpose was to provide single point lighting connections to BPL rural households, including harijans and adivasi families. The programme connected nearly 7.2 million poor rural households to the grid as of March 2006. The total grant amount released for the programme was INR 6.12 billion.

Pradhan Mantri Gramodaya Yojana (PMGY). This programme was launched in 2000–2001, with a rural electrification component added in 2001-2002. State electricity utilities were designated as implementing agencies, and programme funds were provided to the states as additional assistance from the GoI.

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38 Modi, 2005.
40 This figure was calculated using a pre-2004 Ministry of Power definition of village electrification: “A village will be deemed to be electrified if the electricity is used in the inhabited locality, within the revenue boundary of the village for any purpose whatsoever” (RGGVY 2010).
42 Modi, 2005.
43 REC, 2007.
Accelerated Rural Electrification Programme (AREP). This programme was introduced in 2003-2004. An interest subsidy of 4 percent was provided on loans obtained by state power utilities from financial institutions for conducting rural electrification. Conventional and non-conventional sources of energy were covered by the programme.

Accelerated electrification of one lakh villages and one crore households. In 2004–2005, the GoI introduced a scheme of accelerated electrification of one lakh (100,000) villages and one crore (10 million) households by merging the AREP interest subsidy scheme and the Kutir Jyoti programme. Provision was made for a 40 percent capital subsidy and the balance as REC loan assistance on soft terms.

Rural Electricity Supply Technology Mission (REST). REST was initiated in 2002. Its objective, beyond conventional grid connections, was the progressive electrification of all villages and households by 2012 through local renewable energy sources and decentralized technologies.
### Annex 2: RGGVY status for all states, 23 April 2010

<table>
<thead>
<tr>
<th>State</th>
<th>Village electrification</th>
<th>Intensive village electrification</th>
<th>Household connection (BPL and non-BPL)</th>
<th>Household connection (BPL)</th>
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<td>Achieved (no.)</td>
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Energizing India: Expanding electricity access in rural areas