MoP – UNDP
'Access to Energy - Enhancing effectiveness in electricity distribution and end use'

Final Report 2010

INDEX

CHAPTER 1: Project Details

Project Title	Access to Energy – enhancing effectiveness in electricity distribution & end uses
UNDAF Outcome(s)	Communities are aware of their vulnerabilities and adequately prepared to manage (and reduce) disaster and environment related risk
Expected CP Outcome(s)	Progress towards meeting national commitments under multilateral environmental agreements
Expected Output(s)	Supporting national development objectives with co-benefits of mitigating climate change
Implementing Partner	Ministry of Power (MoP)
States of Implementation	Orissa and Chhattisgarh
Responsible Parties	Rural Electrification Corporation, Feedback Ventures Pvt. Ltd.
Other Partners	Orissa Renewable Energy Development Agency (OREDA), Chhattisgarh Renewable Energy Development Agency (CREDA), Centre for Environment Education (CEE), Chhattisgarh State Power Distribution Company Ltd. (CSPDCL), The Energy & Resources Institute (TERI), Winrock International India (WII), Medhaj Techno Concepts Pvt. Ltd.
Start Date	April 2009
End Date	December 2012
Total Budget	USD 1.5 million
Expenditure in 2009	USD 202,462
AWP Budget 2010	USD 744,500

1. Situational Analysis

Use of energy resources, especially those based on fossil fuels, to meet the increasing energy demand contribute to rise in emissions of greenhouse gases (GHGs), which are the major contributors to climate change. India, with large population dependent on natural resources and climate sensitive sectors, is highly vulnerable to the potential impacts of climate change. Poverty, inadequate infrastructure and insufficient resources are elements that magnify the impacts of climate change making the poor more vulnerable.

1.1 Introduction

The total CO_2 emissions from India are estimated to be about 1342 million tonnes (HDR 2007/08) that accounts for about 4.6% of the world's emissions. The projections indicate that India's CO_2 share is expected to increase to about 6% by the year 2030 to maintain its current rate of economic growth. However, the per capita CO_2 emission is only 1.2 tonnes per year (reference year 2005) compared to the world average of 4.5 tonnes per year. The major contributors of CO_2 emissions are power stations (21%), industrial processing (17%), transportation fuels (14%), agriculture by products (12.5%), fossil fuels retrieval, processing and distribution (11%), residential, commercial and other sources (10%), land use and biomass burning (10%), and waste disposal and treatment (3%).

1.2 Energy sector emissions

The Energy sector contributes nearly 70% of the total GHG emissions in India. The current energy consumption in India is approximately 600 kilogram of oil equivalent per capita annually (world average is 2100 kgoe). The demand for energy is increasing at a rate of 2.5% annually. It is projected that India needs to add 78,000 MW of installed capacity to meet the electricity requirement alone. However, the present level of consumption being highly energy inefficient, many sectors offer scope for energy conservation[1]. India being a tropical country with perennial water resources (in niche areas) offers considerable scope for most of the renewable energy technologies, namely, solar, biomass and wind.

While it is argued that thermal energy is required for survival, the electrical energy forms the backbone for growth and increased standard of living. Thereby, use of energy has direct correlation to Human Development Index. Most of higher energy consuming countries have better HDI. However, it is not considered ideal to take the path of countries like Canada, USA, which have very high HDI but also very high per capita energy consumption. Increased use of energy invariably increases carbon dioxide emissions, and India aspires to achieve a higher development index through moderate energy consumption. To achieve this trajectory, it is important to use energy efficiency and to increasingly meet energy requirements through clean energy.

1.3 Issues related to climate change mitigation in the energy sector

Despite the above efforts and provisions, a large number of issues remain unaddressed or have not lead to desired level of dissemination and impacts.

[1] The energy intensity (energy use per unit of GDP) of India's industrial output (6416 kcal/dollar) is more than three times that of the US (2400 kcal/dollar) and four times that of the UK (1574 kcal/dollar), but less than that of China (8360 kcal/dollar). The energy saving potential is estimated to be about 25% in the Indian energy-intensive sectors.

Inefficient use of energy

Tackling inefficient use of energy, which leads to both local pollution and GHG emissions, remains a major challenge in many energy-using sectors – including industries and transportation. Demonstrations have clearly showcased scope for significant improvements in efficiency and reduction in emissions. However, the challenge is taking them forward.

Use of low-grade fuels

Especially small producers use low-grade fuels, due to lack of investment capabilities. Agriculture residue, biomass, waste oil, waste cotton, discarded tyres are also being used as fuels. Few demonstrations have showed possibilities of clean technologies interventions. Given the total number of energy consuming small enterprises being 5 million (total 15 million enterprises) the potential is huge. The barriers for up-scaling these efforts appear to be institutional mechanisms to provide back up support for (i) technology package, (ii) capacity building & skill enhancement, (iii) service provider, etc.

Unsustainable dependence and inefficient use of biomass

Biomass remains to be the major source of domestic energy especially in rural India. 75% of the households still depend on biomass in rural India for cooking. In addition, large number of unorganized enterprises also depends on biomass as fuel source. The continued dependence on biomass is putting enormous stress on natural resources. The initiatives to introduce LPG, Kerosene and Biogas as cleaner fuels in kitchen have limited penetration in rural areas due to (i) lack of affordability, (ii) lack of accessibility, (iii) lack of supply, and (iv) lack of decision making on part of women. There is a need to support these initiatives to up-scale such interventions.

Lack of standardized packages of clean technologies for electricity generation

Small hydro, wind turbines, biomass gasification/steam boiler-based power, solar (lanterns, home lighting kits, mini grids) are the options for generating electricity. Pilots have been demonstrated across the country for its application for rural stand alone, captive use in industries and off recent synchronization with grid. These pilots are yet to be up-scaled. But they are faced with constraints of physical, social, institutional and economic. Some constraints identified for up scaling are,

(i) inadequate suppliers and service providers
(ii) non availability of standard packages,
(iii) lack of institutional models,
(iv) high capital cost for some renewables, and higher O& M cost,
(v) low capacity utilization factors,
(vi) inadequate capacity in the management of such systems, etc.

Given the intangible benefits of environmental friendliness, employment generation within the rural economy, there is a case to support their interventions in appropriate niche areas. Some measures could be (i) identify the gap in costs and support them through fiscal incentive, (ii) identify the barriers of technology related aspects and strengthen the supply chain and (iii) create skill levels at all levels to run such units.

Lack of efficient electricity distribution, management

Aggregate Technical and Commercial (AT&C) losses are very significant in India (40%). The 11th FYP GoI plans to reduce them to 15%, which would mean reduction in installed capacity better revenue realization and improvement in quality of power. Management of billing, collection of revenue and control of theft of electricity are another set of problems that are facing the electricity

companies. Rural Franchisee is a model to involve rural youth for these activities. In addition to enhancing the efficiencies in the activities mentioned above, it has potential to create rural employment.

Inefficient electricity end use appliances

Many end use appliances using electricity are extremely inefficient consuming much higher quantities of energy. These could be due to reasons such as faulty designs of appliances, faulty installations, which can be easily addressed.[2] Such measures have been piloted and results are encouraging. However, it is also essential to (i) create awareness and knowledge on such devices, (ii) provide finances to implement them, (iii) make the products available wherever required with adequate support systems, (iv) proper marketing arrangements, and more importantly, (v) guidelines to ensure these are mandatory.

Lack of adequate financing

The international financing and market mechanisms provide support to protect the global environment while meeting the local development priorities; however, they are limited and are associated with uncertainties of scale and transactions costs.[3]

Insufficient knowledge on options to counter climate change

While several initiatives to counter climate change are ongoing - some in pilot stages and some ready for replication - lack of adequate knowledge poses a barrier to choose and adopt.

2. Scopes and Strategy

Access to clean energy is an important ingredient of any energy and development policy with a direct bearing for GHG mitigation. Efforts would be undertaken under the project for demonstrating mechanisms for management of energy/electricity at the district level. The quality and delivery of services, including lower AT&C losses, contributes to energy savings.

2.1 Design framework for quality and delivery of services, including lower AT&C losses

Based on a review of the existing policies, successful model/pilots within and outside the country, a framework would be developed for inclusive planning for the select geographical areas wherein access to clean energy services is low. In addition, pilots to help fill the gap to existing experiences will be developed. The project will centre on the following components in at least four

[2] For example, only 2% of energy gets translated to light in incandescent bulbs. Electrical pump-sets used in agriculture run at 22 to 25% efficiency against a potential of 50%. Diesel pump-sets used to irrigate lands run at less than 10% efficiency (against 20 to 25%). Refrigerators and air-conditioners in India also consume much higher electricity than those used in developed countries. Electrical motors run at lesser efficiency than those in developed countries. Nearly 40% of electricity is consumed to run motors make it one of the important sector to see the means to enhance efficiency.

[3] For instance, GEF procedures for availing funds are complicated and time consuming. While steps have been taken to improve the level and pattern of funding and simplifying procedures, and there is provision for Project Preparation Grant (PPG) funds for project development, this remains a major issue. Similarly, CDM project development involves several steps, which are associated with transactions costs that may be at international, national or local/project level. These costs include: project development costs (project development, preparation, negotiation, and consultation), registration and share of proceeds for the adaptation fund (2%) as mentioned in Article 12, and monitoring and verification costs, etc. Here too, efforts have been made to simplify procedures and provide support for project development – for small-scale CDM particularly the transactions costs are reduced substantially and estimates indicate a decline of more than 50% to 67%; however, still the CDM faces high transactions costs. Some estimates have shown that these costs for small-scale CDM projects may be as high as at 110,000 USD or more (World Bank 2005). In addition, CDM at present is relevant as a financing option with economic criteria at the fore, and evidence from existing portfolios indicates that the aim of facilitating sustainable development in developing countries remains largely theoretical (Soni 2007).

UNDAF states (Chattisgarh, Jharkhand, and Madhya Pradesh – based on prominence of the energy access issues). All the experiences will provide inputs to formulate a policy for Accelerating Access to Clean Energy. This component is depicted in the diagram below (figure below).

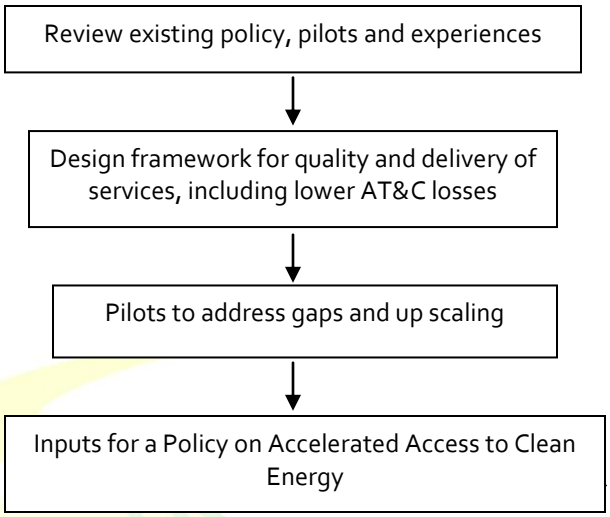


Figure 1: Strategy for Accelerated access to clean energy

2.2 Support Pilots to address gaps and up scaling

For demonstrating management of energy and electricity, a R-APDRP project area will be chosen in the state of Chhattisgarh. Rural franchisee will be strengthened for improving quality of power and enhance revenue collection which would also provide livelihood at the local level. One to two Grama Panchayats with electricity will be chosen to demonstrate energy efficiency in villages focusing on (i) mandated energy provisions to citizens by GP, and (ii) end use appliances like agriculture pump sets, changing from incandescent bulbs to fluorescent/CFL, etc.

2.3 Development of National strategy for "Accelerated clean energy access"

The lessons learnt from the interventions shall be analyzed, reviewed and debated through the platforms of workshops, symposia, field visits and Solution Exchange. The learning will serve as inputs to the process for developing a national strategy for "Accelerated clean rural energy access".

3. Project Objectives

Access to clean energy is an important ingredient of any energy and development policy. Efforts would be undertaken under the project for demonstrating mechanisms for management of electricity at the district and community level.

The project aims to support activities to enhance electricity service delivery and reduction in Aggregate Technical & Commercial (AT&C) losses through institutionalizing and capacity building of rural power distribution franchisee, increasing efficiency of energy services mandated to village panchayats, scaling up of Decentralized Distributed Generation and use of IT enabled services for energy audits and tracking energy flows. These components align with the Rajiv Gandhi Gramin Rural Vidyutikiran Yojana (RGGVY), and the Restructured Accelerated Power Development and Reforms Programmes (R-APDRP), of the Government of India.

High AT&C losses and increased emissions from the energy sector

Key Problems

Inefficient use of energy	Inefficient distribution and revenue realization	Lack of Knowledge and Awareness	Lack of Affordable & Reliable finance

Key Strategies

Improving Energy Efficiency:	***Scaling up Rural Franchisee***	***Capacity Building and Awareness Generation***	***Supporting partnerships to leverage finances***
Identification of scopes of energy conservation and increased efficiency Implementation of energy conservation and efficiency plan with Gram Panchayats and local communities Establish a model for institutionalizing energy efficiency interventions at Gram Panchayat level	Financial model development And franchisee selection process management Appointment and monitoring of franchisee in selected areas Upgrading Collection based distribution franchisee to Input based franchisee and documenting the process	Prepare Detailed Project Report for Energy Audit and Accounting in rural areas Targeted capacity building of community on energy planning and conservation Creating awareness and capacity building of prospective and selected franchisee	Upscale the Decentralized Distributed Generation Leverage partnership and resources Establish a micro credit fund to support rural energy sector intervention in Orissa

Key Deliverables

Targeted reduction in energy consumption i.e. 20% of baseline energy consumption Establish a model for institutionalizing energy efficiency interventions at the Gram Panchayat level Improved management of energy resources, energy efficiency and services delivery	Institutionalizing Franchisee in 15 areas in Orissa Innovative financial model development Institutionalizing Franchisee Monitoring Cell in the Distribution Companies Share the learning of institutionalizing franchisee with the Ministry of Power and State	Increase awareness amongst community on energy planning and conservation Improved institutional capacities and skill sets allowing mainstreaming of energy in rural development Removal of knowledge barriers enabling rural communities to implement projects on sustainable and efficient use of energy	Increased outreach of the state to access funds under the DDG scheme Enhanced financial inclusion and participation of the rural community in energy sector Increase in energy related enterprises and services in the rural sector

Decrease in AT&C losses and increased energy efficiency leading to reduction in GHG emissions from energy sector

Figure 2: Flow Chart of Project Design

CHAPTER 3: Results in 2009

The core mandate of the project is to review existing policy, pilots and experiences and implements pilots to address gaps and enable scaling-up. The project will up-scale implementation through provision of technology and knowledge packages, strengthening supply services (manufacturer and market development), demand development (by facilitating livelihoods), awareness, capacity building and skill development.

In the year 2009 the project was launched in Orissa in September 2009. Orissa was chosen as the pilot state under the Access to Energy project because the rate of electricity penetration in Orissa is low at 22-23%. Ministry of Power, Government of India is investing around than Rs.4000 crores under RGGVY in Orissa. The project implementation was designed to dovetail with the broader emphasis of Ministry of Power on infrastructure and in highlighting the learning from the past years of implementation of RGGVY. The following activities were implemented during the year 2009:

1. Institutionalizing the rural power distribution franchisee system:
   - 15 sub divisions chosen in consultation with the state power distribution companies
   - Review of the existing training material with focus on Franchisee
   - Collection of baseline data

2. Strengthening and scaling up of the Decentralized Distributed Generation:
   - Intervention framework developed in partnership with Orissa Renewable Energy Development Agency (OREDA)
   - Photo documentation of renewable based rural electrification sites initiated
   - Energy efficiency and energy conservation manual for Gram Panchayats developed

3. For increasing efficiency of electricity end use in villages the following activities are proposed:
   - 5 Gram Panchayats chosen for the interventions in consultation with the state power distribution companies
   - Collection of baseline data completed
   - Community mobilization in selected area around energy efficiency issues initiated
   - Identification of success case study of such demonstration in India and exposure visits of stakeholders

During the baseline studies and community mobilization the project identified two major gaps in capacity that restricts the scaling up of electricity related services and enterprises, especially rural franchising and energy efficiency:

1. Lack of knowledge and awareness;

2. Lack of financial capacity and access to reliable and affordable financing

The above also restricts the energy and electricity market from being more inclusive and providing livelihood opportunities for the rural poor and unemployed. The project will be working extensively on removing the barrier of knowledge and awareness at various levels including the grassroots communities.

CHAPTER 4: Annual Work Plan 2010

Project Targets for 2010	PLANNED ACTIVITIES	Month of completion	RESPONSIBLE PARTY
Target 1 for 2010: 3 reviews on gaps and upscale rural electrification schemes completed and shared with various stakeholders	Review report on socio-economic impact of the Rajiv Gandhi Grameen Viduytikaran Yojna	On-going	TERI
	Study on gender, quality of life and power	On-going	Winrock International India
	Photo documentation of renewable based rural electrification sites	December	Project Management
Target 2 for 2010: 15 rural franchisee model initiated in the chosen areas	Over viewing the status of 33/11 KV metering including determination of requirement of meters, CTs/PTs Cables	February	Feedback Ventures Pvt. Ltd.
	Establishing baseline parameters for the franchisees	March	
	Survey of the franchisees for the selected areas	March	
	2 Workshop for selected probable franchisees	March	
	Financial Model Development and approval from Utility	June	
	Workshop for selected probable franchisees	August	
	Franchisee Selection Process Management including marketing of the franchisee area	December	
Target 3A for 2010: 2 DPRs developed for DDG with OREDA	Intervention framework completed with OREDA	January	OREDA
	2 Stakeholder consultations for sharing intervention framework and DPRs	February & October	
	2 DPRs developed and submitted to MoP	December	
	Audio visual documentation of Komna DESI project completed	December	
Target 3A for 2010: 5 DPRs developed for DDG with CREDA	Intervention framework completed with CREDA	May	CREDA
	Stakeholder consultation for sharing intervention framework and DPRs	May	
	11 DPRs developed and submitted to MoP	November	
Target 4 for 2010: 2 Gram Panchayats undertaking energy efficiency	Baseline for energy consumption and energy efficiency completed in selected Grama Panchayats	January	Centre for Environment Education

measures	Energy Planning exercise completed with two Gram Panchayats	June	
	Village Energy Committee formed	September	
	Energy efficiency measures undertaken in two Grama Panchayats	December	
	Scoping study on increasing energy efficiency in local SMEs and rural buildings	December	
Target 5 for 2010: DPR prepared for Energy Accounting & Auditing in Rural Areas under RGGVY	Area selected in consultation with state government	August	Chhattisgarh State Power Distribution Company Ltd/Medhaj Techno Concepts Pvt. Ltd.
	Consultant appointed for preparation of DPR	September	
	Baseline data collected and analyzed for As-Is report	October	
	DPR completed	December	
Documentation, Monitoring and Reporting	Access to energy website launched	November	Project Management
	Posters developed & disseminated on Energy Efficiency and Rural Franchisee	January - December	

CHAPTER 5: Socio Economic Review of RGGVY

The project initiated a review to ascertain the socio economic impact of the Rajiv Gandhi Gramin Vidyutikaran Yojna in the state of Orissa in partnership with The Energy & Resources Institute (TERI), through a temporal field based action research.

Electrification of the villages under RGGVY has impacted the livelihoods and social patterns of rural poor with corresponding benefits in terms of enterprise development, education and health benefits etc. The impact of this scheme also extends to accelerated growth of rural economy with growth in income and social standards. This socio-economic impact study intends to evaluate availability, affordability and accessibility of electricity, which could be having significant impact on social and economic condition of people. The socio economic impact of RGGVY will be measured in terms of electrification being an instrument in providing accessibility to basic amenities such as water, education, health and also livelihood promotion particularly for the poor and deprived. The proposed evaluation intends to assess improvement in the living conditions of the rural poor and increased accessibility to basic services. The scope of the study included the following –

i. Identification of area in discussion with the state department of energy
ii. Estimation of percentage of electrified households within newly electrified villages
iii. Collect information about the socioeconomic parameters in the villages that
    1. have recently been connected – 2 villages,
    2. are about to be connected – 2 villages, and
    3. could be connected in the future – 2 villages.
iv. The benefit to poorer households from being connected, in terms of enterprise development, health benefits, lower purchases of substitute energy items, the ability of additional income from work at home, and educational benefits for the children.
v. The study will include detailed socioeconomic analyses including the effect on the quality of life of the rural household.
vi. Dissemination of the information obtained in terms of infrastructure development as an effect of rural electrification.
vii. Identification of case studies, success stories and lessons learnt from the field level interventions.
viii. Review the shift in the energy mix in the 6 villages post electrification, especially with reference to the use of kerosene in rural households and to the extent to which the supplied electricity is able to meet the demands adequately. Projection will be made regarding the impact on reduction of kerosene consumption and consequent subsidization at the district/state level.
ix. The development parameters including health and education should give disaggregated data for women, men and children, restricted to primary data collected from field. It will identify the cause and effect relationship between electricity consumption and improvement in development parameters as indicated in the UNDP HDI.
x. Desk review to quantify the economic benefit of electrification and hence the cost-benefit of supplying electricity to rural areas vis-à-vis the subsidization.
xi. The list of MDG and HDI indicators will be referred to while finalizing the final list of socio-economic indicators.
xii. To study the possibility of converging development planning at the district level to augment the benefit of grid expansion.

Approach of the Study

Secondary information related to the electrification of villages under RGGVY will be collected from the sources like the Orissa NESCO, CESCO, SOUTHCO, Rural Electricity Corporation Ltd., District statistical office, Department of Rural Development and Panchayati Raj etc. This will help in developing an understanding of the effective changes in the life of the people in the villages after implementation of RGGVY.

Data collection at Village Level (Case Study Method): Case study method would be applied to get comprehensive and intensive study of the economic development of the villages after electrification under RGGVY. Six villages would be chosen, one each in the four zones, where electrification was done under RGGVY and two controlled villages, which are not electrified under RGGVY. The secondary data collected from the panchayat and block would be cross checked through informant interviews, focused group discussion and archival analysis.

Results – 2010

In the state of Orissa, 10 villages had been selected in consultation with the state energy department under the categories: un-electrified villages, villages with poor electrification and completely electrified villages.

S. No	Dist.	Block	Gram Panchayat	Village	No. of connection	No. of HH
1	Puri	Nimapara	Balanga	Nuagopalpur	117	150
2	Puri	Nimapara	Goadkhera	Pondaswar	50	68
3	Angul	Chhedipada	Bahalsahi	Languli	85	126
4	Angul	Chhedipada	Kanaloi	Karnapal	69	107
5	Ganjam	Kukadakhandi	Kankia	Maduri Ramdiha	42	53
6	Ganjam	Kukadakhandi	Kankia	Khondala	35	35
7	Ganjam	Kukadakhandi		Tamana	85	85
8	Mayurbhanj	Joshipur		Badapahad		127
9	Mayurbhanj	Joshipur		Badsialinai		133
10	Mayurbhanj	Joshipur		Sansialinai		69

Table 4.1 Villages Selected for the Review

The detailed Household survey covering approximately 600 households has been completed till December 2010. Over 30 FGDs were conducted amongst different stakeholders. The data collation and analysis is in progress.

The preliminary analysis of the data collected from the grass root level show the following trends –

- Increase productive working hours and increase in income of petty shop owners – they are now able to sell cold drinks owing to refrigerators, electrical items like wires, bulbs, switches, sockets etc.

- Use of mobile phones has increased impacting income and exposure levels
- There is an increase in study hours and home work is completed more regularly. Knowledge about current affairs and attendance in schools has also improved
- Open defecation has almost stopped due to street lights and exposure to good practices of health and hygiene through television

CHAPTER 6: Addressing Gender Concerns in Rural Electrification

Energy access improvement influences significantly socio-economic factors such as health and education. Furthermore, it has substantial ripple effects on other factors, for example, economy, gender equality, environment, etc. Several studies have indicated that there benefits of electricity are not gender neutral, as women and men perceive the need for and use of electricity quite differently from men. While there is a clear link between gender, energy and poverty, there is a need to further research to document exactly the processes and results of energy interventions.

Although energy policies are often perceived to be gender neutral, decisions might have different implications for women and men wherever their home, work, and community roles differ. Attention to these sorts of differing interests is needed in order to achieve effective and equitable distribution of energy services.

In the above context, the project initiated a study on the impact of rural electrification on key gender development indicators in partnership with Winrock International India (WII). The key focus of the survey is to specifically understand and quantify the impact on poor women and the possible role they can play in electricity related interventions. The key research components of the study includes:

A. **National level:** For this, examples from the global and national studies can be drawn
   - Establish the linkages between and impact of rural electrification on women along the following parameters/indicators:
     - Key human development indicators that especially affect women such as education, maternal and child health, income, safety, mobility among others.
     - Time
     - Entertainment and exposure
   - Collate a few replicable good practices on addressing gender concerns in rural electrification programmes, not restricted to grid based electricity, in India
   - Review RGGVY from a gender lens and suggest entry points for gender mainstreaming in the programme
   - Review, reference and collation of similar studies undertaken in other states

B. **State level in Orissa – taking 10 villages across Orissa**
   - Understand the perception of women, men and children on the use of electricity
   - Understand and evaluate the benefits accrued to women due to access to electricity
   - Understand the role of women as planner and implementers of electricity related interventions such as the franchises, Panchayat members, members of village/community level energy/electricity organization etc and the impediments to better inclusion
   - Understand the perception of officials, community at the local level on the role of women as planners and implementers of electricity related interventions such as the franchises
   - Suggest entry points for gender mainstreaming in the UNDP supported project activities for RGGVY

Approach of the Study

The methodology for the study was divided into two parts, first focusing on secondary research for global, national and state level review and the second, dealing with primary research divided into quantitative and qualitative data focusing on setting the baseline in the selected villages in the State of Orissa.

The methodology for the study dealing with the national level components focused on secondary research for global, national and state level review. Further in-house expert consultation was carried out to arrive at recommendations for gender mainstreaming in the rural electrification policy. A comparative picture of Energy/electrification policies with three developing countries from Africa summarized, after analyzing in depth respective energy policies. At the second level, quantitative assessment was planned for calculating gender-budgetary provisions of RGGVY.

The methodology adopted for the study at the state level was participatory in nature and an attempt was made to ensure participation of the local people, especially women and the villagers. Wherever possible, a general meeting was initiated in the villages before initiating the survey.

Results – 2010

Two Countries viz. South Africa and Tanzania, who have been pioneers, post liberalization era in including gender within their energy policy have been analyzed in detail and presented as best practice model. It is evident from the preliminary RGGVY analysis and study of best practice models that RGGVY in its present shape is not gender inclusive. Step-by-step recommendations for mainstreaming gender into rural electrification policy have been suggested at policy, program and organizational level, which would be further fine-tuned and added upon with reference to the field level findings.

In the state of Orissa, 10 villages had been selected in consultation with the state energy department under the categories: un-electrified villages, villages with poor electrification and completely electrified villages. 20 percent of the households per village were taken as the sample size and primary household data collection has been completed.

S	District	Block	GP	Village	Status	Total HHs	Sample HHs
1	Bhadrak	Basudevpur	Krishnapur	Ramchandrapur	Electrified	170	40
2	Bhadrak	Basudevpur	Krishnapur	Krishnapur Bandsahi		60	20
3	Bhadrak	Basudevpur	Krishnapur	Kasimala Goth			
4	Bhadrak	Basudevpur	Biras	Biras Sasan		172	36
5	Phulbani	Ambapada	Jamjhori	Jamjhori	Un-electrified	239	41
6	Phulbani	Phiringia		Gondpada	Recently Electrified		
7	Nayagarh	Bhapur	Bijipur	Bijipur	Electrified	121	25
8	Puri	Brahmagiri	Amapada	Thorana	Electrified	126	25
9	Puri	Brahmapuri	Kaanlapada	Luniapadar	Un-electrified	213	40
10	Puri	Kanas	-	Khandahata	Recently Electrified	181	40
					Total	**1,514**	**327**

Table 5.1: ***Sample Distribution***

CHAPTER 7: Photo documentation of Renewable based Rural Electrification Sites

The Photo Documentation on Renewable Energy based Remote Rural Electrification projects were initiated in 2009 in partnership with Via Interactive Technologies Pvt. Ltd. The objective of the publication is to showcase the efforts, the lessons and most importantly the hopes and aspirations that renewable energy based remote rural electrification projects have brought into the lives of the grass root community in the villages. Using the visual impact of photographs, the aim is to document the affect of electricity on key Human Development Indicators. The publication also uses photo stories to document successful case studies emerging out of these projects. It brings out the human face of electrification in these remote locations with the aim of bringing forth the importance and need of investing into such projects.

Audio visual documentation of the following sites funded through different Government and donor programmes was completed in 2010 –

Sl	Name of Project	Location	Technology	Funded by	Implemented by
1	Thullapally Micro Hydel project	Kerala	Micro hydro	GEF Small Grants Programme	Malanadu Development Society
2	Community Solar Power Plant	Madhya Pradesh	Solar power plant		Development Alternatives
3	Komna DESI project	Orissa	Solar PV and home lighting	UNDP	OREDA
4	Village Energy Security Programme	Orissa	Solar PV and home lighting	TERI	Sambandh
5	Biomass Energy for Rural India	Karnataka	Biomass gasifier	UNDP	BERI Society
6	DDG Based Biomass Gasifier System	Chhattisgarh	Biomass gasifier	NTPC	TERI
7	Biofuel based remote village electrification project: Enlightening the lives of tribals	Chhattisgarh	Bio diesel	Swiss Development Corporation	Winrock International India
8	Scaling-up Alternative Fuels/ Energy Sources and Women through Credit, Self Help and	Rajasthan	Biogas	GEF Small Grants Programme	IBTADA

CHAPTER 8: Institutionalizing Rural Power Distribution Franchisee

The aim under this project was not merely institutionalizing of Franchisee models. The task was to go beyond the prescribed path and to initiate for the first time, adoption of a progressive franchisee model allowing a transition from Collection based models to Input based models (Capex based and otherwise) in an allotted time period thereby allowing the operating franchisee to understand the area better and stabilize prior to taking higher responsibility while simultaneously giving the utility the opportunity to evaluate performance at a low risk.

Few innovative and path breaking initiatives too have been introduced which should lay the path for further replication wherever franchisee models are adopted in future. Spot Billing has been introduced in the context of Rural Franchisee operations, reducing Bill Distribution and Meter Reading time while enabling synchronization with existing system. Innovative funding mechanism for sustainability of the aspiring rural entrepreneurs having the technical expertise but lacking on financial strength have been devised under the aegis of UNDP.

In January 2010, 15 areas were selected for institutionalizing franchisee under 4 DISCOMs, of which 3 are led by Reliance (WESCO, NESCO, SOUTHCO) and 1 by CESU. For the pilot project implementation, the areas shortlisted were ones which had significantly progressed under the RGGVY scheme. While the initial processes of baseline establishment, area due diligence, agreement documentation and incentive plan deliberations took off well in the Reliance areas, CESU areas had to be put on hold owing to internal management issues and slow progress and eventually, UNDP-MoP jointly decided to re-allocate the five areas previously under CESU to 5 more areas under Reliance. Similarly two areas under NESCO (Basta and Jamsuli) owing to statistical misinformation had to be changed to other two at a later stage of implementation.

Under the Annual Work Plan 2010, the following activities were undertaken –

- **Area Selection** – Detailed the profile of the areas identified to be covered under the pilot project. Identification was done using a matrix involving a set of weighted parameters basis which areas were zeroed down upon. 15 sub-divisions in 6 districts were identified for institutionalizing the rural electricity distribution franchisee in Orissa.

This was followed by an area survey that elaborated the technical and commercial analysis, through the primary data sourced via site visits, physical inspections of the network infrastructure and data sourced through secondary sources.

The main objective of franchising a particular area is to enhance revenue, decrease losses and increase consumer satisfaction level. At the same time, it is also expected that the franchised area would offer tangible benefits not only to the utility but to the franchisee as well to make the concept of franchising a viable and remunerative proposition for all.

In keeping with the objective stated above, due diligence was done on evolving the parameters basis which the areas were rated. Parameters which were considered for area evaluation are presented in Fig 6.1.

Score Card (Scale of 5 in each category and Max of 25)						
Subdivision Name	**Number of Consumers**	**Revenue Assessed**	**Connected Load**	**AT& C Losses**	**Collection Efficiency**	**Total Score**
Area	5	4	3	5	3	**20**
Area 2	4	5	3	3	2	17
Area 3	4	4	5	1	2	16
Area 4	4	5	5	1	1	16
Area 5	3	2	3	3	4	15
Area 6	2	2	2	2	2	10

Fig 6.1: Parameters for Area selection and illustrative scorecard for area selection

- **Franchisee Scheme Design** – A unique Franchisee Scheme was developed after due diligence was done on the baseline parameters, survey findings and the existing Franchise models. It includes a progressive transition of the Collection model onto the Input model within a time frame of 9 months. A roll out plan was devised in accordance to achieve the same.

Though the input based franchisee scheme exhibits sound potential for revenue performance improvement, it needs basic metering infrastructure to be in place. All boundary points of the franchised area shall have to be metered accurately to account amount of energy injected in the franchised area. Franchisee will be issued bill based on that. Also, all the consumers in franchisee area shall have to be metered accurately so that franchisee can issue energy bills to them.

Presently, DISCOMs are not equipped with such metering infrastructure. It needs investment and sufficient time to install such meters. Therefore, it is proposed that for the first phase collection based distribution franchisee would be implemented and eventually in due course of time, say 6 to 9 months, it shall be upgraded to input based distribution franchisee in the next phase.

Model A	Revenue Collection Franchisee	Revenue Collection Model appropriate in the beginning but should be limited to a time frame – not suited for long term.
Model B	Revenue Collection linked to Input Energy	Input based Revenue Collection Model is a practical model as DF becomes partner in loss reduction without having to purchase electricity and blocking financial resources
Model C+D	Energy purchase, sell and collection franchisee + O&M	Input based Franchisee have limited takers in rural areas – franchisee unit, consumer mix, flat rate consumers, willingness and ability to pay, availability of franchisees with background of power and financial resources, state of distribution system pose major deterrents

Table 6.1 Highlights of Model A, B, C

Fig 6.2: Scheme Roll-out

Elements of the scheme design:

For collection based franchisee scheme revenue collection is the single most critical parameter. This scheme only targets reduction in commercial losses. There are two prime elements – collection efficiency and consumer coverage.

Collection efficiency: This is a ratio (expressed in % terms) of revenue collected per revenue billed. It is affected by consumer behavior of the respective area.

$$\frac{\text{Revenue Collection} \times 100}{\text{Revenue Billed}}$$

Consumer coverage: This is a ratio (expressed in % terms) of number of consumers paid per number of consumers who are issued the bills. It reflects consumer's intention of paying energy bill. Number of consumer paid is measured by number of money receipt generated in the respective revenue cycle.

$$\frac{\text{No. of Consumers who paid} \times 100}{\text{No. of Consumers who were issued bills}}$$

Elements of incentive structure

Franchisee performance matrix – CCE: Collection based franchisee shall encourage more people to pay and thereby realize more revenues from them. Increasing consumer coverage will ensure long lasting improvement in revenue collection as well as collection efficiency of the area. A new performance matrix Coverage Collection Efficiency (CCE) is defined for that.

CCE = Collection efficiency X Percentage of billed consumer who have paid

Targets: Franchisee is given the targets relative to the baseline performance of the area. Incentive slab boundaries are defined with reference to baseline performance.

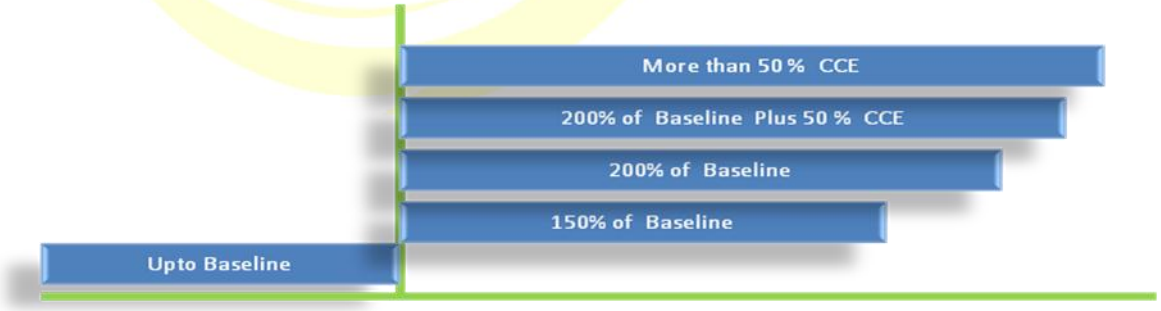


Fig 6.3: Incentive Targets

- **Incentive pattern:** Incentive is designed as marginal improvement in respective slab from the previous slab. Such structure is referred as telescopic structure of incentives. Here, is the payout of telescopic incentive structure.

- **Franchisee Training:** It is very important for the prospective franchisee to know the various elements of electricity distribution business related to management, technical and commercial aspects. There were workshops organized at Tangi and Kendrapada area of CESU, NESCO, SOUTHCO and WESCO.

The objective of these workshops was to disseminate knowledge to the participants about the conceptual framework for various models of rural franchise agreements, basics of distribution business covering management, technical, commercial and legal aspects and to help them understand and apply mechanisms for quick efficiency gains and improved customer service. The workshop was also expected to help the participants to understand the business sense of the franchisee concept and the process of franchisee appointment.

- **Survey of Franchisee:** A survey of potential players was done to help in assessing the availability of skill, expertise, creditworthiness, their existing remuneration or returns, their ability and willingness to assume risk and specific requirements for engagement as franchisees.

Sl no	Decision Parameters	City Based Trader	Individual/ Local small businessman	NGO/ Cooperative/ Local bodies /SHG/PRI
	1. Competence			
	Financial Position	High	Moderate	Low
	Security Deposit (2 months revenue)	No issue	Bargaining to lower	Organising such an amount is difficult
	Business Experience	High	Moderate	Low
	Revenue Size	> Rs 15 lakhs	Rs 15- Rs 5 lakhs	< Rs 5 lakhs
	Maintenance work	Can handle easily	Unsure	Needs capacity building
	Confidence in dealing with licensee/utility	High	Medium	Low
	Confidence to organise internally	High	Medium	Medium
	2. Requirements			
	Support of State Government	Low	Moderate	High
	Understanding of regulatory requirements	Good	No	No

Table 6.2 Probable Franchisee- SWOT analysis of the franchisee area

Results – 2010

Location	Participant	LOI Issue Date	Response	Remarks
WECSO				
Paikamal	Ahwaan	9th August 2010	Operation under progress	Changes in Monitoring mechanism are under process.
Bargarh III	Koshal SHG	9th August 2010	Agreement Signed on 11th October 2010	DSM cell represenative visited franchisee area on 23rd Dec'2010 for coordination meeting to address franchisee concerns.
Bhatli	Koshal SHG	9th August 2010	• On 22nd Dec'2010 Koshal requested for time extension till 31st Dec'2010 for submission of security deposit. • On 31st Dec'2010 Koshal intimated that only 50% of security deposit was arranged and thus could not prepare Bank Guarantee • Koshal requested to allow submission of security deposit in two installments.	Decision to be taken by CEO
Sohela	Kings' Associate	9th August 2010	• Participant requested to extend flexibility in submission of Bank guarantee. • CEO accepted the request and to support franchisee agreed to take security deposit in two installment	Despite of several phone calls; No response is received from participant
SOUTCO – Phase I				
Bhanjanagar II	Pace Computers	7th August 2010	Pace Computers was sent rejection letter by CSO Thereafter Indu Projects was willing to take on the area; later expressed inability to sign agreement due to absence of clarity in migration path from collection based franchisee to Input based franchisee.	Area to be included with new areas for EOI

Buguda	Indu Projects	7th August 2010	Indu Projects has sent a letter expressing inability to sign agreement due to absence of clarity on the migration path from collection based franchisee to Input based franchisee.	Area to be included with new areas for EOI
Beleguntha	Odisha	7th August 2010	Consultant contacted participant over phone; participant has expressed its unwillingness to take up area for Collection based franchisee	Area to be included with new areas for EOI
SOUTHCO – Phase II				
Saroda	New Area		Modified Incentive scheme is under discussion and to be finalize	• Field was visited on 26th Nov'10 for due diligence of technical data provided by CSO. Commercial data pertaining to area was validated and clarification was sought from CSO to freeze baseline figures.
Bhanjanagar I	New Area		Modified Incentive scheme is under discussion and to be finalize	• Field was visited on 26th Nov'10 for due diligence of technical data provided by CSO. Commercial data pertaining to area was validated and clarification was sought from CSO to freeze baseline figures.
NESCO – Phase I				
Bhandaripokhri	Power Tech Consultants	4th November 2010	Participant has not responded to the letter sent on 2nd Dec'2010 for withdrawal of LOI if Franchisee Agreement is not signed on or before 11th Dec'2010.	Area to be included with new areas for EOI
NESCO – Phase II				
Tihdi	New Area		Modification in incentive scheme is under discussion with CEO; on finalization EOI will be published	• Commercial data is incomplete, follow up at CSO and site is done • After several reminders technical data has been received and site visit for due diligence made on 27th and 28th Dec'2010.

Basudevpur	New Area		Modification in incentive scheme is under discussion with CEO; on finalization EOI will be published	• Commercial data is incomplete, follow up at CSO and site is done • After several reminders technical data has been received and site visit for due diligence made on 29th and 30th Dec'2010.
Bari ESD	New Area		Modification in incentive scheme is under discussion with CEO; on finalization EOI will be published	• Technical data and Incomplete Commercial data received • Data analyzed and validated; Inappropriateness of commercial data has been communicated • Site visit for due diligence of technical data is made on 31st Dec'2010.
Bahanaga ESD	New Area		Modification in incentive scheme is under discussion with CEO; on finalization EOI will be published	• Commercial data received, analyzed and validated; • Inappropriateness of commercial data has been communicated • Site visit is schedule on 3rd Jan'2010.
Deogarh	New Area			

CHAPTER 9: Increasing Efficiency of Electricity End Use in Gram Panchayats

The overall objective of the project was to provide energy planning, and energy efficiency services in rural areas of Orissa. It was planned that this objective will be achieved through supporting the local community and the Gram Panchayats – primarily on energy efficiency measures and also by providing capacity and awareness building support on the use of renewable energies. The project provided continuous support to these local stakeholders, which has resulted in a broader understanding, use and implementation of energy efficiency techniques and renewable energy sources. Some of these interventions have been institutionalized in the form of local village and community based institutions based groups.

Energy use survey has been completed in 20 villages and from the data analysis, it was learnt that in the domestic sector, about 31% of electricity is used for illumination, mostly through incandescent bulbs. The use for cooling appliances, i.e., fan accounts for about 33 %. There is enough scope of reduction of consumption of electricity in these two areas by using alternate technology (i.e. CFL, LED, electronic regulator, etc) by the community. Also, some villages have SMEs like Rice Hullers and Leaf-Cup making machines that consume large quantities of electricity and are largely unmetered.

It was also observed that there is lack of awareness and knowledge among the community regarding the proper energy use and planning for energy management. Given the large rural population in the state, the total quantum of electricity consumed in rural sector is substantial. Hence there is a need for changing the consumption pattern by creating awareness & promoting practices that champion the cause of conservation of electric energy in these villages. The current project also addressed these issues through community involvement and capacity building.

The selection of villages was done after a detailed consultative process with key agencies in the state namely, Rural Electrification Corporation, Orissa Renewable Energy Development Agency, Orissa Electricity Regulatory Commission (OERC) and electricity distribution companies. Based upon the above discussions, the following list of criteria for village selection was drawn up:

1. Electricity Consumption pattern of the community taking into consideration the Distribution Transformer with the minimum capacity of 63 KV or more.

2. The following additional criteria:
   a. Proximity to industrial belt
   b. Semi-urban area where commercial load would be more
   c. Gram Panchayat at coastal belt where the consumption pattern on street light, domestic use, agriculture, institutions (schools, etc.) may be studied

3. The area is well irrigated and has high population density and per capita income

4. The area with representation from maximum types of consumers.

These villages have energy use in all the broad 5 categories i.e. domestic use, community use (use of electricity in places like schools, hospitals, temples, etc.), use for agriculture, drinking water supply pump and Small and Medium Enterprises (SME).

Name of the District	Name of the Block	Name of the GP	Name of the Village	No. of House Holds	Population	Total Consumption in Units/Year
Balasore	Basta	Mathani	Badakhudi	400	2500	409644
		Darada	Chakadra	180	1500	404967
	Jaleswar	Khuard	Khuard	232	970	689860
			Purunapani	295	1200	347677
			Uparkundi	200	960	463901

Table 7.1 Villages Selected for Implementation

Under the Annual Work Plan 2010, the following activities were undertaken:

Community interactions: In the 5 project villages formal and informal meetings were held with the community members, SHGs, PRI members, housewives and various opinion leaders. This led to rapport building, formation of village energy committee and during distribution of CFLs. The table below provides the number of meetings conducted in the 5 villages:

Type of meetings	Number
Formal meetings	19
Informal meetings	788
Awareness programmes	14

Table 7.2 Number of Village Meetings

Detailed discussions were done on basic needs of energy, source of fuels, various issues of energy use, etc. Approximately 900 of community members participated in these meetings. Out of these approximately 400 women participated in the meetings.

[It was noted that while no women attended these formal meetings during the initial months, with constant interaction and rapport building activities in the village, the number of women attending the meetings gradually increased]

Formation of Village Energy Committee (VEC): VECs has been formed in 5 project villages and President, Secretary, Treasurer and other 7 members of these committees have been chosen through participatory meetings. For the formation of VEC, resolutions were drawn up in the meetings with the community members and opinion leaders in each of the villages.

[Membership of at least 33% females in each VEC was made mandatory]

The decision on the initial deposit amount for each CFL was also taken by the community in village level meetings that the VECs facilitated. Each VEC also identified 8 community mobilizers who worked closely with the CEE team for all activities like survey of households, collection of initial deposit from households and finally in the distribution of CFLs.

Capacity building activities: For capacity building and awareness generation of villagers several programmes were conducted both at the community level as well as the school levels.

a. Orientation program for Village Energy Committee (VEC) was conducted in the month of September 2010. The objective of this program was to motivate the VEC representatives to take up awareness drive on energy efficiency in a more effective and sustained manner in their respective villages.

b. Subsequently, awareness generation program for community members have been held in all 5 villages during the months of October and November 2010 with the objective to make villagers aware about energy efficient techniques, energy efficient products, the use of renewable energy like solar pumps, solar cooker, Bio gas plant, gasifier stove, and other activities like plantations, etc.

[Approximately 400 of community members participated in the program out of which 58 were female participants]

c. Awareness generation program with about 12 school teachers and 550 students were conducted in 5 villages during the months of October and November 2010. The main objective of this program was to raise awareness on energy efficient equipments and technique for conservation of energy. In these awareness programs the discussions were held about source of energy, types of energy, use of energy in daily life, energy efficiency techniques like switch of all electrical appliances when not in use, closing leakage of water pipes etc.

Household survey: House hold survey has been completed in all project villages by the community mobilizers with the help of project team. The survey results were analysed by the project team and after compilation of the data the exact requirement of CFLs and electronic regulator (for fans) was known. As per the data analysis, the numbers are as below:

- Total Households in five villages – 991
- Total CFLs required – 4000
- Total electronic fan regulators required – 1500

Implementation of Energy saving measures in the villages: The HH survey enumerated that most of the households used 100 W incandescent bulbs for lighting. It was decided that for each 100 W incandescent bulb, one 23 W CFL and for every 60 W incandescent bulb, and 18 W CFL were to be provided to all the households.

It was decided that the CFLs would not be given free of cost to the households but they would have to pay a token amount. An amount between Rs 20 and 30 was decided by the community with facilitation from their respective VECs. This amount was deposited in the VEC's bank account and was to be used for replacing the CFLs that became un-operational after the warranty from the manufacturer expires.

To measure the change in electricity consumption, 30 single phase static meters were installed. The logging of information was monitored by the VEC with the help of community mobilizers to compare the consumption difference. The results of this data from 14 of these static meters are given in the table below:

	Daily consumption in kWhrs			
	Before CFL	**After CFL**	**Decrease in consumption**	**% decrease in consumption**
HH1	3.29	1.31	1.98	60.2
HH2	5.34	2.46	2.88	53.9
HH3	1.89	0.64	1.24	65.9
HH4	3.49	1.89	1.61	46.0
HH5	1.89	0.94	0.94	50.0
HH6	2.52	1.30	1.22	48.5
HH7	3.20	1.53	1.67	52.1
HH8	4.03	2.05	1.98	49.1
HH9	8.06	3.33	4.73	58.7
HH10	1.35	0.83	0.52	38.5
HH11	4.24	2.50	1.74	41.1
HH12	3.68	1.33	2.34	63.7
HH13	1.61	0.92	0.69	42.8
HH14	1.14	0.54	0.60	52.7
		Average		**51.7**

Table 7.3 Reduction in Electricity Consumption after installation of CFLs

Scoping study on increasing energy efficiency in SMEs: In all the villages, a majority of the households are engaged in making leaf cups or plates out of the *sal* tree leaves. These leaf cup making machines use electricity for heating the dye that moulds the leaves into cup or plate. Most of the leaf-cup making press use 750 Watt element and the leaf-plate making press uses 1000 W elements. Further these are local contraptions without any standardization and do not have any controls on the heating. Hence to regulate the heating of the dye and mould, the workers use bicycle chains as a rheostat and also

they have one 100 W incandescent bulb to guage the voltage available. This makes these machines very inefficient.

A scoping study was carried out and several measures were suggested for the leaf cup/plate machines and rice hullers:

i. Voltage regulation (through transformers)
ii. Selection of right kind of heating element
iii. Provision of voltage regulation and automatic cut-off
iv. Voltage indicator instead of incandescent lamp
v. Earthing connections
vi. Regular greasing and maintenance
vii. Improved wiring and connection (minor)

A voltage regulator cum thermostat has been designed to be installed with the leaf-cup making machine. It is estimated that about 20% of electricity would be saved in each machine by using this device. Given the huge number of such machines, that use an estimated 289 MWhrs of electricity annually, the savings would be about 58 MWhrs annually.

New initiatives undertaken – street lights: None of the five project villages had street lights and there was a demand from the women in the community to install the same. Also, in absence of street lights, these villages were using of 100 W incandescent bulbs outside each house for the whole night.

The village community was involved to make the plan for the number of street lights required in the village along with the specific location where each street light would be installed. In all the 5 project villages it was resolved at the village community meeting that the payment of the bill for the street light would be done through the respective VEC. The VEC would collect money from each household to meet the cost of electricity consumption of street light.

[It was mandated that the planning process for installing street lights should have involvement of women from the village and their views should be incorporated]

CHAPTER 10: Scaling up of the Decentralized Distributed Generation

The Ministry of Power has developed a framework for operationalising Decentralized Distributed Generation (DDG) projects through which the DDG and renewable project developers will get a boost. This will ensure that energy needs of remote village and hamlets are met through scaleable, replicable and technologically and financially efficient models. Developers could be State agencies, private sector developers, NGOs and other institutions. The potential energy developers are encouraged to apply for setting up DDG projects on a transparent and technically and economically efficient basis.

The Rajiv Gandhi Grameen Vidyutikaran Yojana has set aside Rs.540 crores subsidy for electrification of hamlets and habitations which are not being covered under the scheme on account of their remote locations through Decentralized Distributed Generation (DDG) scheme – a sub component of RGGVY. DDG aims at utilizing suitable technologies which are locally available for generation of electricity and distributing the same in the nearby hamlets / habitations.

The Access to Energy project envisaged the scaling up and facilitating the flow of funds allotted under the scheme to the state, and ultimately to the grass root level for increasing access to electricity in the rural areas. With this objective, an intervention framework for DDG was developed for the states of Orissa and Chhattisgarh in partnership with Orissa Renewable Energy Development Agency (OREDA) and Chhattisgarh Renewable Energy Development Agency (CREDA) respectively. The scope of work under the partnership included –

a. Preparation and implementation of Detailed Project Reports –

   i. Finalize the list of villages / hamlets to be electrified through DDG in consultation with state utilities.

   ii. Assistance Pre-selection of villages, and technologies

   iii. Development, secure endorsement of respective focal points in State government and GoI and sanction of 5 detailed project reports from MoP, essentially through technical consultancy;

   iv. Coordination between the Project Proposer and Consultant;

b. Capacity building and awareness

   i. Capacity building in various functions mentioned in the DDG Guidelines;

   ii. Help Project Developers in community mobilization

   iii. Creating awareness about DDGs

   iv. Identification of case studies, and lessons learnt from the field level interventions.

Nine villages were selected spread across three districts in Orissa and eleven villages were selected in one district of Chhattisgarh -

Village	District	Number of Households	Energy Option Proposed
Orissa			
Chulbadi + 5 hamlets	Kalahandi	119	Hybrid of micro hydro and solar home lighting
Jijubari	Kandamal	177	DPR under preparation
Sonepur		205	
Atinbari		111	
Badangia		123	
Nagira	Angul	137	DPR preparation stalled due to local security problems
Tanugola		93	
Khadakha		71	
Rada		99	
Chhattisgarh			Solar PV and Home lighting
Patelpara	Korba	15	
Pandopara		37	
Pandaama		35	
Sarbahar		15	
Kantasurve		36	
Sattidand		16	
Dahihanpara		28	
Chorkadand		31	
Sonaipur		54	
Akadha		28	
Sillibhudu		51	

Results 2010 -

Planned Outputs	Actual Achievements	Issues
Development 2 detailed project reports under DDG in Orissa and Chhattisgarh	• 5 DPRs in Orissa • 4 DPRs in pipeline • 11 DPRs in Chhattisgarh	• For 4 DPRs in Angul, consultant had to suspend work due to local security disturbance. DPRs to be finalized in 2011
Creating awareness about DDG – 2 stakeholders workshops	• 2 workshops in Orissa • 1 workshop in Chhattisgarh	
Identification and documentation of case studies, and lessons learnt	• Audio visual documentation of Komna DESI project by OREDA	

CHAPTER 11: Energy Audit and Accounting in Rural Areas under RGGVY

The Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) provides robust electricity infrastructure for providing access to electricity to all households in targeted villages as per the revised definition of village electrification. Existing infrastructure in the already electrified villages is also being strengthened to provide access to electricity to surrounding majras/tolas.

RGGVY also has a mandate for 6 to 8 hours supply of electricity. Though, the electricity infrastructure to rural areas is being provided under RGGVY, the actual availability of electricity to the rural areas is being questioned at various forums including Planning Commission and Parliament. A condition of daily supply of electricity for minimum 6 to 8 hours to villages electrified under RGGVY was kept under the agreements signed with the States at the time of sanction of the projects. The actual duration of supply to the already electrified villages is however not known as there is no mechanism presently available for monitoring the same.

The project piloted the preparation of a investment grade Detailed Project Report (DPR) to Review Supply of Electricity to Rural Areas under the Rajiv Gandhi Gramin Vidyutikaran Yojna by integrating IT intervention for energy audit/accounting, capacity building and employee incentive. The DPR provided the roadmap to measure the following:

i. The actual supply and availability of electricity to the project (rural) area
ii. Preparation of baseline information on actual number of connections available in the project area
iii. Upgrading skills of relevant manpower to ensure that the system / model developed is used effectively.

The project area was selected in partnership with the Department of Energy, Government of Chhattisgarh and Chhattisgarh State Power Distribution Company Limited (CSPDCL). Gadadih sub division in Durg district was selected for preparation of the DPR.

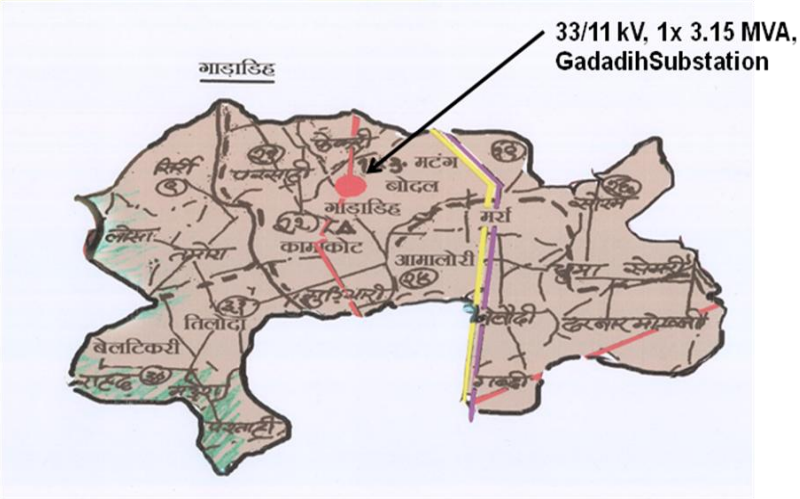


Figure 9.1 Area Map of Gadadih

Medhaj Techno Concepts Pvt. Ltd. was assigned for preparation of the As-Is area report, the project implementation and investment plan and the employee incentive scheme.

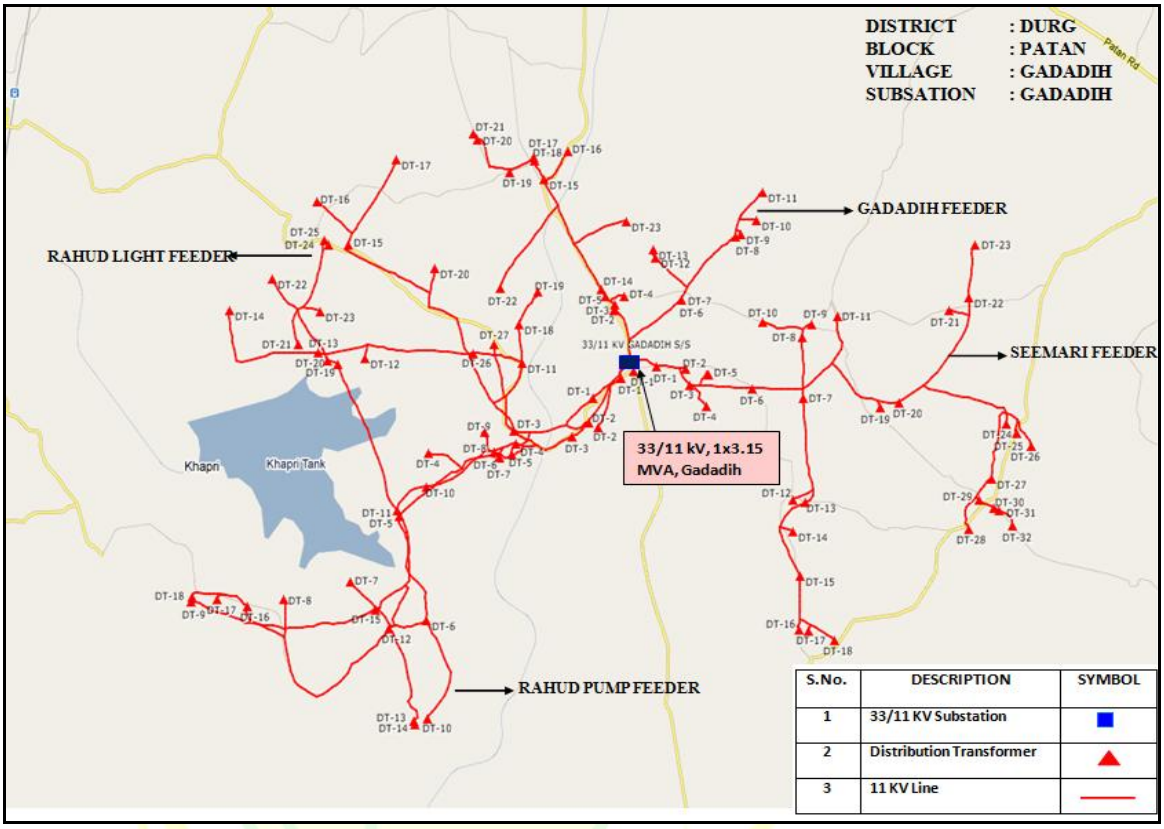


Figure 9.2 GPS Map of Gadadih Distribution Centre

For effective monitoring of supply to the Gadadih, Durg district and energy accounting/ auditing following activities were suggested:

1. Identification of a rural feeder in consultation with the State Utility and MoP. In case the feeder supplies power to both rural and urban areas, the points where the two loads are bifurcated will be located. A schematic diagram will then be drawn for clarity.

2. Feeder metering at all the 11 kV feeders at emanating points and also at rural/urban boundary (as being done under RAPDRP). These meters will have facility of recording/ downloading data as per CEA metering regulations. The data would have both quantum of energy supplied and time for which energy was supplied date wise. The meters without remote data downloading facility will require replacement with new meters with remote data downloading facility. This is to ensure that the data is collected at periodic intervals with accuracy.

3. Metering of Distribution Transformers (DTs). These meters should also have remote data downloading facility in accordance with CEA metering regulations. Data downloading facility (local downloading of data) is being provided with all the DTs being installed under RGGVY. These meters will require additional facility of remote data downloading.

However, meters with data downloading facility will be required on existing transformers as well, wherever not available (some utilities already have installed downloadable meters, which will require additional facility of remote downloading).

4. Consumer metering: The metering of all consumers is essential under the Electricity Act 2003. But the utilities are yet to comply with this condition. Majority of the agriculture consumers and single point connections (Kutir Jyoti etc.) are yet to be metered. Therefore, there is a need of 100% metering in rural areas.

S. No	Project Area Assets	Metered	Un-metered	Total
1	33 kV feeder 33/11 kV S/S	1	1	2
2	Import Points at 33 kV feeders other than 33/11 s/s	0	1	1
3	Export points at 33 kV feeders	1	0	1
4	11 kV feeders at 33/11 kV s/S	3	1	4
5	Distribution Transformer	74	28	102
6	Consumer	5714	544	6258

Table 9.1 Metering status at Gadadih

5. Data Collection: Data from the meters, which are located at substations, at rural/ urban boundaries, distribution transformers, will be downloaded and analyzed. A feeder wise report for each day for duration of supply and amount of energy supplied will be generated. This data along with meter readings of DTs and consumers will be used for energy accounting & auditing purpose and calculation of AT&C loss. This data, with field information on the quantum and time for which electricity was supplied to rural areas, will also be cross checked by SERCs.

6. Develop a KPI based system for monitoring of key parameters involving employee performance for possible incentive/ recognition
   i. Revenue/ Employee
   ii. DT Failure rate
   iii. Feeder Metering
   iv. Reliability Indices
   v. T&D Loss and Collection Efficiency
   vi. Outages

Based on the above suggestion, 3 Different Scenarios have been proposed with permutation and combination of the 4 modules of investment

- Scenario 1: Metering + Billing & Collection Centre + Data Transfer Facility + Geo-Referencing & Digitization of Distribution Network
- Scenario 2: - Metering + Geo-Referencing & Digitization of Distribution Network
- Scenario 3: Metering

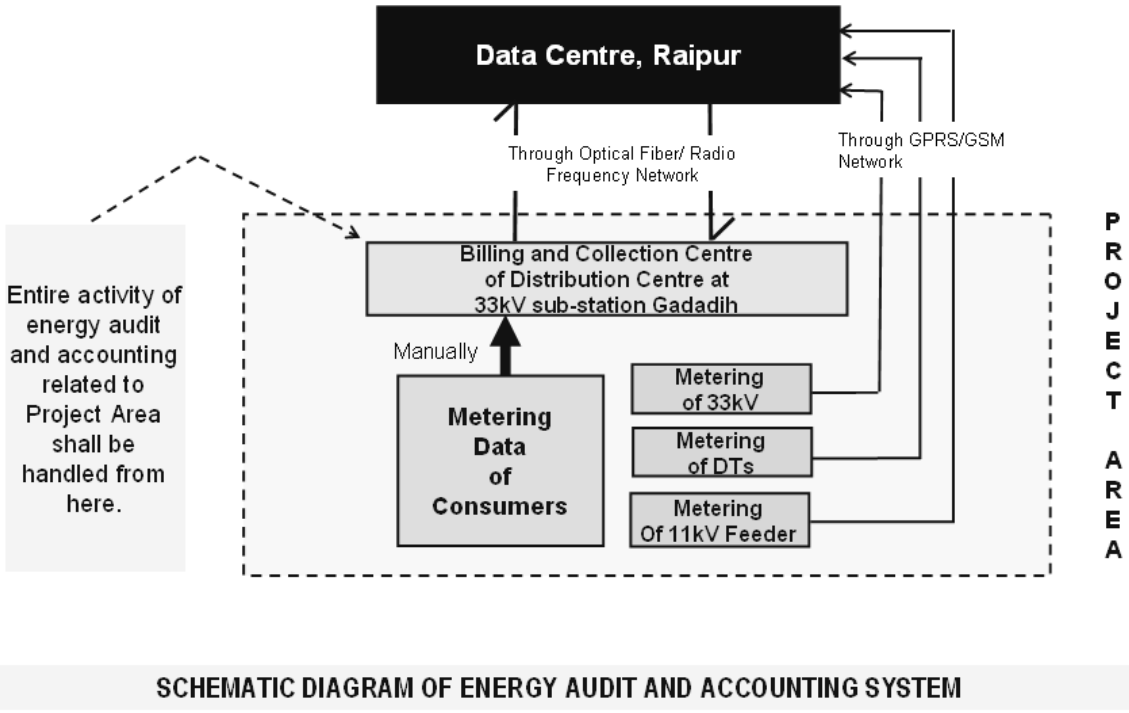


Figure 9.3 Schematic Diagram Proposed for the Project

The Detailed Project Report is under discussion with Ministry of Power, Central Electricity Authority, Department of Energy, Government of Chhattisgarh and Chhattisgarh State Power Distribution Company Limited (CSPDCL).

CHAPTER 12: Gender and Inclusion

The project has incorporated plans and targets to address gender and inclusion issues in the annual work plan document. These targets have also been incorporated into the Memorandum of Association signed with the Responsible Parties and the contractual agreements with the partners so that they become integrated into the implementation plan and will be monitored as one of the deliverables.

Under the community level intervention in the Energy Efficiency components of the project, institutional model has been developed at the grassroots level through a participatory process at the Gram Panchayat and Gram Sabha level. The village level energy plans, including community contributions were discussed in community meetings and then ratified. The community has actively participated in forming the Village Energy Committees (VEC), wherein membership of at least 33% women in each VEC was made mandatory.

As stated earlier in Chapter 9, it was noted that no women attended the formal meetings in the villages during the initial months. Through constant interaction and rapport building activities in the village, the project team ensured that the number of women attending the meetings gradually increased. The Secretary, VEC and the Sarpanch in one of the village are women. It is noteworthy that the progress of activities in this village was the fastest. Women have also volunteered to monitor and keep records of the hours of usage of lights with the help of the community mobilizers.

It was also mandated that the planning process for installing street lights should have involvement of women. The number and locations of the street lights in all the village were planned in community meetings after taking into cognizance the needs and views of the women. A women's SHG in the village has been trained to do minor operations and maintenance of street lights in the villages. They will be engaged by the VEC and the Panchayat for this purpose.

It was designed that targeted capacity building and innovation in financial modeling will be used to make rural franchising business accessible to community based organizations and Gram Panchayats. AS a result of the efforts and the constant interaction at the ground level, the two Franchisees selected so far are NGOs and SHG Federation. The initiative has been appreciated by the State Government. Under the work plan of 2011, the franchisee areas operated by NGO/SHGs will be documented in details. The operations, profitability and advantages of an existing women's SHG based franchisee in one district in Orissa is being documented under the project.

Additionally the project has initiated a detailed study on gender and rural electrification.

List of Annexure

Annexure 1

United Nations Development Programme – INDIA
CPAP 2008-2012
Annual Work Plan 2010 (January - December)

Project Title: Access to Energy – enhancing effectiveness in electricity distribution & end uses
Award ID: 00049818
Project ID: 00061123
Project Start and end date: January 2010 to December 2010
Corresponding CP Outcome(s): Progress towards meeting national commitments under multilateral environmental agreements
Corresponding CP Output(s): Supporting national development objectives with co-benefits of mitigating climate change

Project RESULTS description as outlined in approved project brief:

Project outputs	Indicators	Baseline
Policies and Schemes of rural electricity reviewed and inputs to formulate new set of guidelines	# of reviews on gaps and up scale rural electrification schemes completed and shared with various stakeholders	2
Rural franchisee system strengthened	Rural franchisee model initiated with in the 14 chosen areas	0
Decentralised Distributed Generation (DDG) scheme strengthened and up scaled	No. of DPRs developed under DDG	0
Efficiency of electricity end use in villages increased	# of Gram Panchayats undertaking energy efficiency measures	0
Enhance efficiency in APDRP	Baseline data finalized for rural APDRP area and DPR for Part A prepared	No baseline data available

Project and AWP 2010 BUDGET:

UNDP funds	Government funds	Donor funds*	Total
USD 1,500,000	**NIL**	**NIL**	USD1,500,000.(for entire project duration)
744,500	**NIL**	**NIL**	USD 744,500 (for 2010)

**Mention donor between brackets*

Agreed by (Implementing Partner): _____

Agreed by UNDP: _____

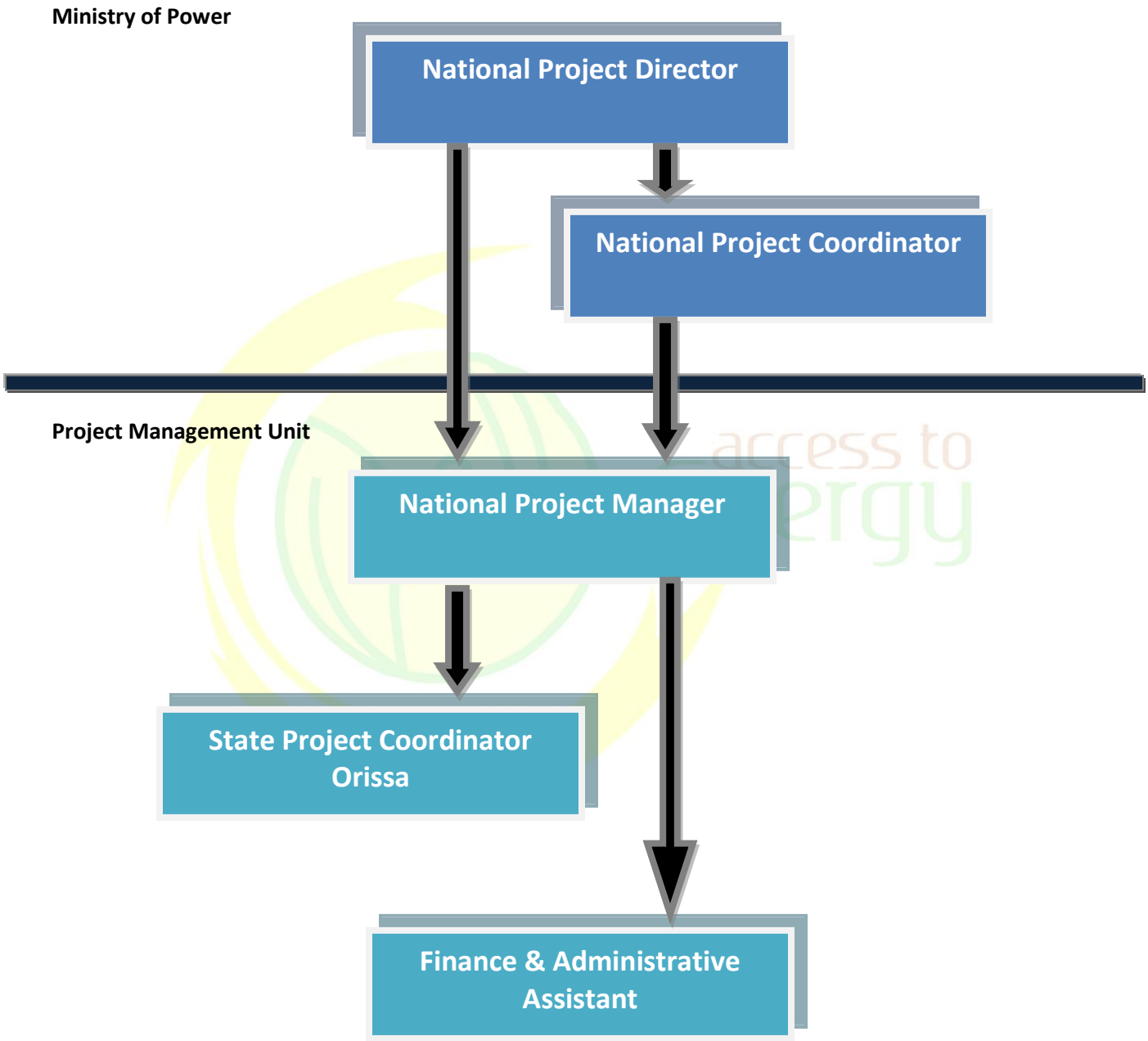
AWP Budget 2010

Project Targets for 2010	PLANNED ACTIVITIES	Indicative month of completion	RESPONSIBLE PARTY	Account Code	Budget (USD)
Target 1 for 2010: 3 reviews on gaps and up scale rural electrification schemes completed and shared with various stakeholders	Review report on socio-economic impact of the Rajiv Gandhi Grameen Viduytikaran Yojna completed.		MoP	Contractual Services - 72100	40,000
	Study on gender, quality of life and power		MoP	Contractual Services - 72100	25,000
	Hand book on renewable based rural electrification projects		MoP	Contractual Services - 72100	30,000
	Total				**95,000**
Target 2 for 2010: 15 rural franchisee model initiated in the chosen areas	Over viewing the status of 33/11 KV metering including determination of requirement of meters, CTs/PTs Cables etc.	February	Feedback Ventures	Contractual Services - 72100	
	Establishing baseline parameters for the franchisees	March			
	Survey of the franchisees for the selected areas	March			
	2 Workshop for selected probable franchisees	March			
	Financial Model Development and approval from Utility	June			
	Workshop for selected probable franchisees	August			
	Franchisee Selection Process Management including marketing of the franchisee area	December			220,000
	Total				**220,000**
Target 3 for 2010: 2 DPRs developed for DDG with OREDA	Intervention framework completed with OREDA and CREDA	January	MoP/OREDA	Meetings & Workshops - 74500	
	2 Stakeholder consultations for sharing intervention framework and DPRs	February & October			8,000
	Baseline study for DPR completed	May	OREDA/CREDA	Contractual Services - 72100	
	2 DPRs developed and submitted to MoP	December			22,500
	Total				**30,500**
Target 4 for 2010: 2 Gram Panchayats undertaking energy efficiency measures	Baseline for energy consumption and energy efficiency completed in selected Grama Panchayats	January	Centre for Environment Education	Contractual Services – 72100	
	Energy Planning completed with 2 Gram Panchayats	June			90,000

	Energy efficiency measures undertaken in two Grama Panchayats	December			
	Energy efficiency champions identified in two Gram Panchayats	December			
	Total				**90,000**
Target 5 for 2010: DPR prepared for Part A of rural R-APDRP	Consultant Appointed for R-APDRP	January	MoP	Local Consultant - 71300	20,000
	Area selected in consultation with state government	February		National Travel - 71600	10,000
	Baseline data collected and analysed for As-Is report	April		Miscellaneous (Sundries, Meetings & Workshops) - 74100	45,000
	DPR prepared for Part A of R-APDRP				
	Bid Process Management undertaken for Part A of R-APDRP				
	Total				**75,000**
Documentation, Monitoring and Reporting	Website, documentation, printing and publication	January - December	MoP	Contractual Services - 72100	30,000
	Liasoning with the relevant departments, state government and other agencies	January - December		Monitoring & Evaluation - 74500	30,000
	Monitoring, evaluation and reporting of ground level activities	January - December		National Travel - 71600	30,000
	Total				**90,000**
Project Management	**Project Management Unit**	January - December	MoP	Service Contract - 71400	57,100
		January - December		Rental & Maintenance - 73100	17,900
		January - December		Sundries - 74100	25,000
		January - December		Equipment & Furniture - 72200	7,000
	Total				**107,000**
UNDP's Support Cost	ISS – LoA will be signed by MoP		UNDP		5,000
	Communication, M&E and Audit – LoA will be signed by MoP				32,000
	Total				**37,000**
AWP GRAND TOTAL IN USD					**744,500**

Annexure 2

ORGANIZATION STRUCTURE



Annexure 2

LIST OF PROJECT OFFICIALS

Sl. No.	Name	Designation	Address
1.	**Mr. Sanjeev Kumar**	National Project Director	Director (RE) Ministry Of Power Shram Shakti Bhawan Rafi Marg, New Delhi – 110 001
2.	**Mr. Arun Kumar Singh**	National Project Coordinator	Under Secretary (RE) Ministry Of Power Shram Shakti Bhawan Rafi Marg, New Delhi – 110 001 Tele/Fax: 23719637 Email: arunksingh@nic.in
3.	**Ms. Tanushree Bhowmik**	National Project Manager	MoP UNDP Access to Energy R 55, 2nd Floor, Greater Kailash – I New Delhi – 110 048 Tel: +91 11 46681418 Fax: +91 11 46681417 Email: tanushree.bhowmik@undp.org
4.	**Ms. Shikha Srivastava**	State Project Coordinator	MoP UNDP Access to Energy UNDP, UN House – II N/4-F/41, IRC Village, Nayapalli Bhubaneswar – 751015 Tel: +91 674 2558795/96 Fax: +91 674 2558794 Email: shikha.srivastava@undp.org
5.	**Mr. Sanjib Dey**	Finance & Administrative Assistant	MoP UNDP Access to Energy R 55, 2nd Floor, Greater Kailash – I New Delhi – 110 048 Tel: +91 11 46681418 Fax: +91 11 46681417 Email: sanjib.dey@undp.org

Annexure 3

List of Project Steering Committee Members

Sl. No	Project Component	Name	Designation and Address	PSC Designation
1		Mr. Devender Singh	JS (Distribution),MoP	Chairman, PSC
2		Mr. Sanjiv Kumar	Director (Rural Electrification),MoP	National Project Director
3		Mr. Arun Kumar Singh	Under Secretary (Rural Electrification),MoP	National Project Coordinator
4		Mr. Sisir Das	Deputy Secretary (Finance),MoP	Member
5		Mr. Puneet Goel	Executive Directive (RGGVY) , REC	Member
6		Mr. R. K. Verma	Director , CEA	Member
7		Mr. S.N. Srinivas	Programme Officer, UNDP	Member
8		Ms. Tanushree Bhowmik	National Project Manager	Member, Convenor

Annexure 4

List of Project Partners

Project Component	Name	Email	Contact Details
Rural Franchisee	Mr. Devtosh Chaturvedi President	devtoshc@feedbackventures.com	Feedback Venture Pvt. Ltd, 15 Floor, Tower-9B, DLF Cyber City Phase-III Gurgaon - 122002. Phone: 0124-416 9100/416 9155
	Mr. Naveen Kapoor General Manager	naveenk@feedbackventures.com	
	Mr. Anurag Raizada Manager	anuragr@feedbackventures.com	
	Mr. V.K. Sood Chairman and Managing Director	vksood.rel@gmail.com	WESCO, NESCO and SOUTHCO Plot No. N1/22, Nayapalli Bhubaneswar – 751015
Energy Efficiency	Dr. D.P. Rath Programme Coordinator	dp.rath@ceeindia.org, ceeeast@ceeindia.org	Centre for Environment Education A/5, HIG Colony, Baramunda Bhubaneswar Phone: 0674 - 2551344
DDG	Mr. P. Krishna Mohan Chief Executive Officer	ceoreda@oredaorissa.com	Orissa Renewable Energy Development Agency S/59, Mancheswar Industrial Estate, Bhubaneswar – 751010 Phone: 0674 - 2586368
	Mr. Ashok Chaudhuri Director	ashok.oreda@gmail.com	
	Mr. S.K. Shukla, Director	skshukla@credacg.org, credacg@credacg.org	Chhattisgarh State Renewable Energy Development Agency 2nd Floor, CSERC Building, Santi Nagar, Raipur Phone: 0771-4019227/4019228 Fax: 0771-4268389
	Mr. Sanjeev Jain Additional Director	sanjeevjain@credacg.org	
	Mr. Rajiv Gyani Executive Engineer	rajgyani@credacg.org rajivgyani@gmail.com	
Energy Audit and Accounting	Mr. Subodh Kumar Singh Managing Director	webadmin@cseb.gov.in	Chhattisgarh State Power Distribution Company Limited Energy Info Tech Centre Daganiya, Raipur– 492013 Phone: 0771 – 2574125 Fax: 0771-2574 200
	Mr. K.K. Agarwal Executive Director	kk.agarwal@medhaj.com	Medhaj Techno Concepts Pvt. Ltd., G & F - 105, Sky Hi Chambers, 11/5, Park Road,

	Ms. Kratika Sharma Project Manager	Kratika.sharma@medhaj.com	Lucknow - 01. Phone: 0522-2236526,2235619
Review of socio-economic impact of RGGVY	Ibrahim H. Rehman Director, Social Transformation	ihrehman@teri.res.in	The Energy and Resources Institute Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi - 110 003, Phone: 011- 2468 2100/2468 2100/41504900 Fax 011- 2468 2144 / 2468 2145
	Mr. Asim Mirza Research Fellow	amirza@teri.res.in	
Gender, quality of life and power	Mr. Somnath Bhattacharjee Vice President	somnath@winrockindia.org	Winrock International India 788, Udyog Vihar, Phase V, Gurgaon, Haryana 122001. Phone:0124-4303868,
	Ms. Ritu Bhardwaj Programme Manager	ritu@winrockindia.org	