Phase 1 Report

ENERGY IN LOW-INCOME URBAN COMMUNITIES
(Contract Number R8146 - Barriers to access to modern energy in slums)

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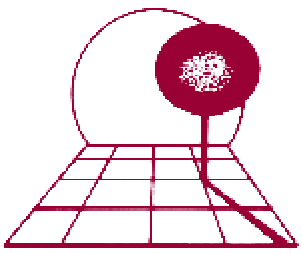

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1 Executive Summary

This Phase 1 report marks the transition in R8146 from Phase 1 to Phase 2.

The key question in the transition is whether the approach used i.e. the combination of household data with a non parametric statistical analysis, will inform policy making. This report presents the findings of the preliminary analysis of data generated by the Indcare Trust from the household survey conducted in three communities within Delhi. The preliminary analysis is intended to illustrate the type of data available, and to demonstrate the types of conclusions that can be drawn from the data and its analysis.

Outputs

1. Review of electricity industries and pro-poor policy instruments, drawing on other utilities and key players in partner countries.	The review was made available at (January 2003) and a copy is not included here.
2. Consolidation workshop (India); partners compare results from Output 1, consultation with local supplier(s).	Preliminary surveys have been conducted with partners in all three countries, and these included a range of stakeholder interviews. The team workshop was hosted by the Indcare Trust in Delhi, and the questionnaire was developed and piloted.
3. First country survey (India); detailed data on barriers to access gathered from key stakeholder interviews and household surveys; preliminary analysis of barriers to access.	Indcare Trust subsequently carried out a 207 sample household survey and entered the data into electronic format. Both Indcare Trust and Gamos were then able to conduct analysis on the data. Findings from the preliminary analysis are presented in a separate document 'Preliminary Analysis – Delhi Data'.

Country Contexts

The three country contexts are quite different:

- Delhi – recently liberalised, services delivered by private companies, no obligation to electrify low income communities, characterised by high losses (theft)
- Philippines – well established market supplied by private companies, high degree of electrification, losses recently reduced by reducing levels of bureaucracy.
- South Africa – Khayelitsha chosen on the basis that the operation of a local private utility company provides an interesting alternative to the municipalities as local distribution companies; prepaid technology.

The issues raised in the preliminary surveys include:

- There is commonly a high degree of bureaucracy required in order to get a legal connection e.g. registration documents for the house.
- As the poor tend not to be able to meet these criteria, they are subject to additional financial obstacles to overcome these hurdles e.g. fees paid to fixers.

- The importance of safety, which is compromised where people take illegal connections;
- Urban planning processes – utilities have traditionally been prohibited from making supplies available in illegal communities, but models are emerging under which the private sector is prepared to take the risk associated with providing electricity to informal settlements.

Preliminary Analysis

The preliminary analysis has been carried out on data from a household survey sample of 207, taken from three communities in Delhi. The analysis has concentrated on comparing data from groups with different types of electrical connections. Non parametric statistical tests have been used (primarily Mann Whitney U test and Spearman Rank Order Correlation Coefficients), and only relationships over the 95% confidence limit have been reported.

Expressed willingness to pay for legal connections is high, especially amongst those who currently have illegal connections, but the problem is that supplies are not available. It is interesting to put this in the context of how much people pay for illegal connections - whilst one third pay nothing, the remainder pay similar amounts as others pay for legal connections. Where legal supplies are available, only few claim to make illegal connections. Despite the fact that people cite cost as the most difficult obstacle to legal connections, willingness to pay appears to be only weakly linked to indicators of household financial (wealth) status. Attitudes that appear to influence willingness to pay are the views that securing a supply is a communal responsibility (enhances willingness to pay), and that electricity is a basic right (impedes willingness to pay).

When looking at the responses of those with no connections, it is clear that a positive intention to connect to an electrical supply, is in fact an intention to connect to an illegal supply (bear in mind that legal supplies are not available). When looking at barriers preventing this group, and those with illegal connections, making legal connections, it is clear that voltage problems are important. The main benefit of legal supplies appears to be reduction of power cuts – nevertheless, customers still complain of voltage instability (drop and surges), and the perception of voltage drop problems appears to act as a barrier to making legal connections. Safety is an influential factor; not only is safety ranked as the most important characteristic of fuels (in the context of choice of fuels), but concerns about electrical safety act as a driver in securing a legal connection.

There is general agreement across the sample that strong local relationships are essential in securing an electrical supply, and this is most acute amongst those with illegal supplies. The data then shows how respondents in different circumstances value relationships with different entities (institutions and people).

The analysis highlights some interesting features that will be of value to policy makers looking at urban electrification programmes:

- community based connection programmes may be able to foster a spirit of paying by reinforcing communal rather than individual responsibility for securing electrical supplies;
- In order to increase payment rates, information campaigns should addresses the view that electricity is a basic right, especially in communities where theft is common.

- Electrification campaigns should develop messages based on electrical safety issues in order to encourage people to pay for legal connections.

Innovative electrical distribution in high risk communities

Things are changing as liberalised markets evolve, and models are emerging under which the private sector is prepared to take risks.

Traditional problems:

- *There is a view that those in illegal settlements should not be provided with electrical supplies, as to do so would confer some legitimacy on their settlement.*
- *Most illegal settlements are also likely to be subject to urban redevelopment sooner or later, in which case it makes no sense to provide electrical services which only have to be pulled down.*

New solutions:

- *With the advent of local, private electricity companies, local authorities and government structures can become disassociated from electricity service provision, and there need no longer be any contradiction in the supply of electricity to illegal settlements;*
- *Banjara camp in Delhi is an example of a small company taking the risk of installing a small distribution network in a slum community; when asked about the possibility of eviction of the community, their response was that they would simply remove their equipment in the hope of using it in another location.*

Ongoing – the Log Frame

The Goal and Purpose should remain as in the contract. Findings demonstrate a strong potential for those with no connections and those with illegal connections to connect to legal supplies, and they highlight some of the factors acting as barriers (and drivers) which should be addressed as part of electrification programmes. As such, the project has demonstrated its ability to inform pro-poor policy.

Contents

Glossary

Chula	mud stove for cooking, uses wood.
Crore	10,000,000 (10^7)
Jhuggie	small, informal dwelling, usually found in slum communities
kacha,	construction of mud, with a thatched roof or a polythene bag covering the roof
Lakh	100,000 (10^5)
Pucca	full concrete construction with foundations
Semi pucca	construction of bricks of mud or concrete, but with no foundation
p value	probability that differences between two groupings have occurred by chance

Acronyms

BSES	BSES Ltd. (formerly known as Bombay Suburban Electric Supply Ltd.)
DDA	Delhi Development Authority
EDRC	Energy for Development Research Centre (project partner)
HV	High voltage
IPPs	Independent power producers
JJ clusters	Slum clusters (discrete communities within the city)
JJ Department	Slums department
kV	Kilovolt
LV	Low voltage
MCD	Municipal Corporation of Delhi
MD	Maximum demand (usually in kVA)
MLA	member of legislative assembly
NAPOCOR	National Power Corporation (Philippines)
PHILRADS	Philippine Relief and Development Services (project partner)
PNE	PN Energy (a company)
PSP	Private sector participation
RWA	Residents welfare association

Exchange Rates

Approximate exchange rates (at time of field work):

India	rupees	75	Rs/£
Philippines	peso	90	P/£
South Africa	rand	13	R/£

2 The Project

Goal: Improved access to clean energy in poorer households

Purpose: to promote a pro -poor policy in PSP to improve the access and affordability of electricity services to the urban poor.

Outputs

1. Review of electricity industries and pro-poor policy instruments, drawing on other utilities and key players in partner countries.
2. Consolidation workshop (India); partners compare results from Output 1, consultation with local supplier(s).
3. First country survey (India); detailed data on barriers to access gathered from key stakeholder interviews and household surveys; preliminary analysis of barriers to access.

Phase 2 – Comparative analysis

4. 2 country surveys; detailed data on barriers to access gathered from key stakeholder interviews and household surveys; analysis of barriers and identification of possible options, including cross country comparison (i.e. a range of policy options to improve access)
5. set of policy reports tailored to each of major stakeholder groups

DFID has a great deal of experience of working with the liberalisation of electricity markets, and associated issues of social protection. The preliminary activities within Phase 1 were intended to identify the factors influencing access to electricity and constraints to use. The team then developed a field survey methodology and applied it in one country context. The preliminary analysis is intended to illustrate the type of data available, and to demonstrate the types of conclusions that can be drawn from analysis. Under Phase 2, the same exercise will be conducted in the remaining two countries, and a more comprehensive analysis will be accompanied by a series of policy recommendations.

3 Phase 1 Activities

The preliminary surveys identified a number of issues which affect the ability of the poor to connect to electricity, and to make good use of supplies. Further detail is contained in each of the preliminary visit reports, contained as appendices.

Delhi (Appendix 1):

- formal documentation is needed before customers can get a legal supply;
- safety of electrical connections is a problem, and is exacerbated by frequent cutting of wires
- people need to get into the habit of paying for electricity
- Delhi administration is fragmented, making it a complex process of lobbying for a utility company to make supplies available.
- Utility companies have no incentive to make supplies available in low income communities

Philippines (Appendix 2):

- Losses and pilferage has been virtually eliminated by "waiving" the requirements for a legal connection and placing the electric meters in high boards along the roads in front of slum communities, not in individual homes. Meralco sources said there are still pilferage but minimized to 2 to 3%.
- almost all households have electricity, however, 30% do not have their own electric meters (as required by law) and illegally connect with their neighbours. They also pay more than they probably would do with a metered supply.
- Access to a legal connection is hampered by bureaucratic requirements of city hall. People are unable to meet these, so they resorted to "fixers" who demand high fees.
- The issue of land ownership is usually the biggest hindrance amongst those who cannot afford to pay the fixers.

Khayelitsha (Cape Town) (Appendix 3):

- As people continue to migrate to Cape Town, they are, therefore, engaged in a continuous process of upgrading informal, unstructured shacks into planned settlements with services
- Electricity is supplied throughout the township by PN Energy, a joint venture company which only operates in the one township. They use prepayment meters exclusively, and the majority are of the voucher type (customers punch in a 20 digit number) as opposed to the magnetic card reader type.
- Local leaders then negotiate with households on who wants electricity, and appear to act as liaison with PNE. Seems to be consensus that when an area is to be electrified, everybody wants to be connected.
- Eskom and Municipalities have different standards leading to different connection costs e.g. 2,500 Khayelitsha, 4,000 Cape Town.
- One of the main problems is tripping at distribution boards – tendency for people to try to connect too high capacity appliances; current policy is for PNE to install 20A supplies.
- Customers have complaints with the system of vendors e.g. queues, insecurity, unreliable.
- The policy of providing 'free electricity' is causing some problems as it is not offered by PN Energy.
- Despite ambitious electrification targets, there remains a small proportion of residents in this low income settlement that do not have access to electricity.

The preliminary survey process was guided by the Literature Review, which was submitted to DFID earlier (January 2003) as a special contract condition.

Experience from each country was collated at the team workshop. The objective of the workshop was to design a detailed questionnaire which could be used in all three country contexts. This was the main output from the workshop. A brief workshop report is attached in Appendix 4. This exercise was of particular value in promoting ownership of the research process by each of the partners, and in ensuring that the instrument will be applicable (with minor modifications) to each national context. The questionnaire used in Delhi is presented in Appendix 5.

The Indcare Trust then ran the questionnaire survey in three communities of Delhi, designed to provide a stratified sample to represent the different types of community identified as of interest. The data was entered into Excel spreadsheet format, and later imported into SPSS

format. Indcare were then able to carry out preliminary analysis on the data in Excel format, and Gamos carried out further analysis using SPSS.

4 Results from Data analysis

4.1 Description of the sample

Type of community and name of community are synonymous i.e. all respondents from within a named community are deemed to live in the same type of settlement:

Inderpuri	slum – spontaneous, illegal settlements, often well established over time, tend to arise in developed areas
Holumbi Kalan	resettlement – planned settlements, tend to be on the outskirts of the city
Vikas Nagar	unauthorised – people buy plots of land from original landowners.

It might be assumed that this typology of community follows an order of 'wealth' – slum dwellers being poorest, and those with sufficient money to buy land in unauthorised areas being most wealthy. However, the data on household expenditures does not bear this out; both household earning index and sum of household expenditures is highest amongst slum dwellers, and respondents in unauthorised communities have the lowest reported levels of expenditure.

The total sample of 207 is divided equally between these three types of community:

Inderpuri	68
Holumbi Kalan	70
Vikas Nagar	69

The characteristics of type of community are quite distinct:

- The Resettlement community is legal, permanent, home owners;
- The unauthorized community is illegal, temporary, mostly owned.

Only in the slum community is there diversity of intention to stay and rental status. People have stayed longest in the slum community (mean = 12.1 years), and have only recently arrived in the resettlement community (mean length of stay = 1.8 years). Communities are also quite distinct in the types of electrical connections that people make:

Table 1 Types of connections found in types of communities

	Type of Community			Total
	Slum	resettlement	unauthorised	
not connected		28	2	30
Illegal	68	29	1	98
Flying		11		11
Metered		2	66	68
Total	68	70	69	207

Earned income for most households is estimated to be around the 3,000 Rs/month range and less than 10% are over 6,000 Rs/month (N.B. it is expected that there is a significant error in these responses).

The levels of unearned income registered are too low to be significant; one senior citizens pension, 3 widows' pension, and one person with rental income.

The mean proportion of household expenditure spent on energy is 14%, but there is an even degree of spread within the responses – 15% of households spend less than 9% on energy, and 16% spend more than 19% on energy (14% $^{+}$/- 5%).

4.2 Statistical Analysis

The analysis of factors acting as barriers to getting electrical connections (in the future) is based on responses to questions regarding willingness to pay for a legal supply, intention to connect to an electrical supply (be it legal or illegal), and intention to connect to a legal supply. The analysis uses non parametric statistical tests, so when looking at the influence of groupings, the Mann-Whitney U test has been used. Tables present the probability (p value) that differences between the two groupings have occurred by chance. Generally, only differences with a probability of less than 0.05 have been taken to indicate a relationship. Similarly, when considering correlations between two variables, only where the p value associated with a Spearman Rank Order Correlation Coefficient is less than 0.05, and the correlation coefficient itself is greater than 0.2, has it been assumed that a valid relationship exists.

4.3 Choice of fuels

Gas is the fuel of choice for cooking amongst those with legal electricity connections. Where people have access to kerosene on ration cards, it tends to be kerosene. Even amongst those who steal electricity it is not commonly used for cooking as quality of supply is inadequate. It is, however, used for heating (space heating and water heating) where quality of supply is not critical. In the absence of illegal electricity, the choice is wood and kerosene. There is evidence that an illegal connection appears to be a second choice coping mechanism, whilst the wealthy can pay for alternative fuels.

There is a high degree of consistency when it comes to preferred fuel for domestic activities, with the following preferences expressed by all categories of electrical connection:

Cooking	– gas
Space and water heating	– electricity

It is noted that electricity is used extensively for space cooling (coolers and fans), and this is a priority need for electricity especially in summer, but it should be recognised that there is no choice of fuel associated with this task.

When asked about their attitudes towards the main fuels, respondents are most positively disposed towards gas, and least keen on kerosene, and this is true for respondents with all types of electrical connection. Safety and access are the most important characteristics of fuels – economy is near the bottom of the list.

Relationships are an important factor in securing an electrical supply, especially amongst those with illegal connections. This group regard city officials, political leaders, and community leaders as most effective – this reflects the fact that some political leaders effectively sanction the practice of theft, and political contacts can protect residents in case of disconnection.

4.4 Willingness to pay

- Willingness to pay for a legal connection is strongest amongst those with illegal connections.
- Amongst those with no connection there is a positive intention to connect to a supply, but intention to connect to a legal supply is negative, indicating that it is illegal connections that will be made. (N.B. legal connections are not available).
- Amongst those with illegal connections, willingness to pay is higher where people hold the view that securing a supply is a communal responsibility.
- willingness to pay appears to be enhanced by vulnerability of forced expulsion. This may reflect an eagerness to secure a legal supply, which may in turn confer some degree of legitimacy on a tenure and reduce the risk of expulsion.
- Willingness to pay appears to be only weakly linked to wealth indicators, despite the fact that the most commonly reported difficulty with legal supplies is the cost.
- Perceived difficulty in meeting requirements of getting a legal supply is important.
- Where the view is held that electricity is a basic right, it impedes willingness to pay (amongst those with illegal connections)

An illegal connection is not a free connection. Although the mean cost of an illegal connection is around 100Rs, this hides the fact that one third pay nothing for their connection (many report making the connection for themselves). The mean cost of a connection amongst those who do pay is around 150 Rs, which is the mode cost of a metered connection. People with legal connections tend to spend nearly twice as much on internal wiring as those with illegal connections.

High levels of willingness to pay are confirmed by the data on how few people use illegal connections when given a choice (unauthorised community where supplies are available in the neighbourhood).

4.5 Intention to connect to a legal supply

- Where people intend to connect to an electrical supply it is illegal supplies that people intend to connect to – metered supplies are not available.
- Perception of safety is the only characteristic of electricity that appears to be influential across a range of groupings. Those who have concerns about electrical safety will be more likely to make a legal connection.
- The efficiency and convenience of wood are influential. This simply shows that where people have a positive view of wood, they have a weak intention to connect to legal electricity supplies, indicating that wood is in some way an alternative for electricity (note wood is commonly used for heating and water heating).
- Low voltage is a barrier to legal connections; those people who report (perceive) frequent problems with low voltage exhibit a weak intention to connect to a metered supply.
- Attitude regarding whether electricity is an individual responsibility is an influential factor amongst those with illegal connections; where people believe electricity provision is a community responsibility, they have a weaker intention to connect to a legal supply.

- Amongst those in rented accommodation, perceived vulnerability to expulsion appears to act as a driver to getting a legal connection; securing a legal supply may in some way reduce their vulnerability.
- Vulnerability to expulsion acts as a barrier amongst those who are not connected.
- Intention to connect to a legal supply is not influenced by financial (wealth) status of households, nor is it influenced by perceived difficulty in getting a legal supply.

The main benefit of legal supplies appears to be reduction of power cuts – nevertheless, customers still complain of voltage instability (drop and surges). There is a strong relationship between the issue of officials cutting supplies and the payment of bribes. This may suggest that officials are taking bribes so as not to cut illegal supplies. While this second level exploitation of illegal supplies continues the risk of fire and electrical shock will remain high in areas without access to metered supplies.

4.6 Potential conclusions

This section serves to illustrate some of the more interesting findings from the analysis. This information will most likely be of value to institutions involved with electricity industry restructuring, particularly where there are concerns over willingness to pay. It should also be of interest to institutions concerned with planning, and the provision of electricity services. The following are examples of how the findings could be integrated into policy:

- Where people regard securing an electricity supply as an individual responsibility, they tend to take an illegal supply. There may, therefore, be some merit in coordinating community based connection programmes in order to foster a spirit of paying.
- Legal connections appears to provide some form of incentive to those who regards themselves as at risk of expulsion, so there may be some means of linking electrification programmes to development plans to maximise payment rates.
- People will pay where supplies are made available;
- There is a need for an information campaign that addresses the view that electricity is a basic right, especially in communities where theft is common.
- Electrification campaigns should develop messages based on electrical safety issues in order to encourage people to pay for legal connections.

Consultation activities under which findings of the surveys are presented to local experts are included in Phase 2; this is designed to ensure that recommendations are ‘tested’.

4.7 Potential further analysis

The preliminary analysis has concentrated on making comparisons between groups with different types of electrical connections. Differences in the consumption of fuels by settlement types, and differences in the expenditure on energy by household and occupancy has not as yet been explored, nor have differences in attitudes and intentions by energy expenditure as a proportion of household income. These issues represent areas for additional analysis. This will provide further understanding regarding factors influencing fuel choice and use.

5 Review of Log Frame

The Goal and Purpose should remain the same. Analysis of the data from Delhi has generated some interesting findings, which contributes to the growing body of knowledge on the topic of social protection. Findings demonstrate a strong potential for those with no connections and those with illegal connections to connect to legal supplies, and they highlight some of the factors acting as barriers (and drivers) which should be addressed as part of electrification programmes. As such, the project has demonstrated its ability to inform pro-poor policy.

Outputs for Phase 1 have been delivered.

Outputs for Phase 2 should remain as in the contract. It should be pointed out that the contexts in the Philippines and South Africa are quite different to those in Delhi, as is evident from reading the preliminary survey reports (Appendix 1 to Appendix 3). Both the community development processes and the planning of electrical services are more structured in these two countries. It is likely that the findings will, therefore, be quite different. In the Philippines, the issue of interest will be households with flying connections, and how they may be financially penalised by not having metered connections. In South Africa, the survey data should be able to highlight how those on the wrong side of the planning fence are disadvantaged by lack of access to electricity. However, every effort will be made to find the commonality between countries and therefore the generic policy implications.

Note that the interviews referred to in the measurable indicators have been carried out during the preliminary surveys. It is proposed that the household survey sample sizes be increased to 210 (as in Delhi) as it is proving difficult to get varied samples through the stratification design i.e. when taking a number of different communities, each appears to be quite distinct, having its own characteristics. It is expected that additional costs can be met from within the existing budget (by taking from overheads).

With regard to risks, experience from this project (and R8147) has shown that both companies and government institutions can be sensitive about electricity liberalisation processes; one symptom is that institutions can rapidly change their position with regard to cooperation. Where processes are driven by intense political pressures (e.g. structural adjustment programmes) it may be especially difficult to force new information into the decision making process.

All else should remain as in the existing contract.

Appendix 1

Visit Report – India (Indcare Trust, Delhi)

By Nigel Scott (Gamos) and Priyanka Awasthi (Indcare)

1 Background

1.1 Categories of dwelling

There are 3 basic categories of settlements for low income communities:

- Slums – some arise on "unsafe" land and tend to be in low visibility areas such as sewers, rail tracks, whilst others arise on small pockets of land within residential areas of the city, such as behind the temple e.g. Shankar Garden
- Resettlement colony – households are allocated 12.5 or 18 square yard for a plot – brick built. E.g. Shiv Vikar
- Unauthorised colony – private land is sold to property developers, who put in roads and divide into plots for sale to individuals with sufficient cash to buy e.g. 500,000R for 1 acre (Vikas Nagar).

In addition to this there are temporary workers who may live in tents at the side of streets of constructions sites, and there are the homeless, who sleep on the side of the road but have no family or possessions.

Living conditions

P lives in a small, one room jhuggie with brick walls, cement sheet roof and plastered cement floor. The slum settlement where she lives has been here for 40 years, although she has only lived here for 20 years. During this time her home has been bulldozed 5 times, most recently 3 years ago. Her home is now one quarter of the size it used to be.

She lives with her husband and 2 sons, one of whom is getting married next year, so she wants to have another home by then. She has paid 90,000 Rs for a plot in an unauthorised area.

1.2 Privatised industry in Delhi

From 1997 and until recently, all aspects of the electricity industry in the state of Delhi were the domain of the Delhi Vidyut Board (DVB). The outcome of a privatisation process is that bulk purchasing and high voltage transmission in the municipality is now the responsibility of Delhi Transco, a company, and customers are served directly by three distribution companies:

- Bombay State Electricity Suppier (BSES);
- TATA
- New Delhi Municipal Council (NDMC)

Although a divestiture to distribution companies, the government still has a minority shareholding. The principal motivation behind the privatisation initiative was a reduction of

losses. The government will make a contribution towards covering the cost of losses during a 5 year period.

Subsidies are managed through the tariffs, which are the responsibility of each regulator. Details can be found in the Retail Tariff Order recently published by the regulator.

In Janak Puri district, for example, where Indcare are based, there are 76,300 customers, 73,000 of which are domestic (96%).

Embedded generation is permitted, but there are no cases in Delhi. A licence is needed to operate even a backup generator >25kW.

2 Supplies in Practice

2.1 Single point of delivery system

BSES will provide power directly to good customers (require proof of address etc.), and will only provide supplies to unauthorised areas through a sub contractor, who takes the risk. The general preference of BSES is to use the single point of delivery system (sub contractors). The contractor must be proposed by community associations (such as RWA) and MLA. Means of access for different areas:

- Group housing (private residences) – the developing agent goes to BSES who estimate the capacity needed for the development. The Developer then puts up 40 – 60% of the security needed for the LV network. BSES installs the network, and the cost is recovered through installation charges to households.
- Unauthorised areas – request from community groups (RWA), MLA, or councillor, who must recommend sub contractor. The sub contractor then pays security (40,000 Rs/ 100 kVA). The contractor takes the risk of installing the network.
- Resettlement areas – government land, so government has responsibility to get electricity supply e.g. Shiv Vihar is DDA land – BSES have given an estimate to DDA, now DDA need to provide security (deposit) before the installation can proceed. BSES will install, as it is authorise settlement, although they still prefer the single point of delivery arrangement.

Banjara Camp

A building company had experience of managing loans to house buyers, so they responded to avert in the paper inviting tenders to supply slums areas.

They have installed the entire LV network: 3 ph cable, distribution boards, meters and home distribution boards. Total cost 750,000R for 500 points, giving an average cost of 1,500Rs. Each pole box has 36 point capacity, but presently using about 25 per box – 18 poles, gives 450 homes. They charge 1560 for connection and people can buy on credit using a loan given at 5%.

They have experienced problems with acceptance by the community, and used "muscle power", but things have settled down now.

The key to their success in reducing theft is regular spot checks. They read meters to check on the meter readers they employ, and they look for illegal connections. They also have a 3 phase supply to pole mounted distribution boxes, which makes it more difficult to steal.

This is a slum area, and potentially subject to eviction; in this event they would simply remove their equipment in the hope of using it in another location.

Modi is a local sub-contractor with a 7 year contract to install connections (costs recovered), maintain the LV network, and collect bills. They have to pay BSES on the HV meter, and get 25% commission on sales. Sub-contractors generally have 5 year contracts.

What happens when the sub-contractor goes bust? Transco said that RWAs have to take responsibility for the local network. One company gave an example of another sub-contractor which was running at a loss, but which was protected from legal action by influential contacts (and the general political will to see sub-contractors succeed?).

Why are private contractor effective at reducing theft?

- Lady in unauthorised area is not willing to get a stolen supply because Private contractor can come to her house and shout at her, which will be embarrassing in front of the neighbours.
- If there is regular monitoring, authorities can cause regular problems, so it is better to have a legal connection.
- Regular spot checks. The sub-contractor reads meters to check on the meter readers they employ, and they look for illegal connections. They also have a 3 phase supply to pole mounted distribution boxes, which makes it more difficult to steal.

2.2 Getting a connection

Legal.
A private sub-contractor to BSES (Modi) runs the local distribution network in Vikas Nagar unauthorised settlement. The connection fee is 3,500R. The consumption tariff is 165R for 100 kWh (flat fee payable irrespective of use), then additional units charged at 2.50R/kWh. Some people are not able to pay connection fee – Indcare has provided loans to some. There are complaints that no electricity was available initially but they still had to pay bills – and 50R penalty after 3 months. They protested again, and again were beaten by police. Modi paid the police, but now Modi has good relations with communities and they talk.

Illegal
Where the source is nearby, people make their own arrangements to make a connection, and each household has the skills needed (e.g. Shankar Garden). People hang thick cable from nearby 3 phase supplies to their settlement and hang on a pole, then star connections to 3 - 4 houses. Each house creates their own earth using a salt pack. People do wiring themselves; they have no training and learn by mistakes. People either take their own supply, or collaborate with others. Where the source is remote, a higher degree of coordination is required in order to maintain a high capacity cable from the source to the community where it is used (e.g. Shiv Vihar). In such an area, there is a group of young men who provide this service. Each supplies only around 10 houses, and whilst there is a degree of cooperation between them to ensure the main supply is maintained, there is also a degree of competition e.g. cutting wires to each other's customers.

Boys learn how to make connections from government officials, whom they pay. The police are also reported to take 100 / 200 R from boys.

2.3 Procedures for getting supplies

The formal procedures for securing an electricity supply in low income areas (where land tenure may not be straight forward) are not clear, as they are closely tied to urban planning processes. Responsibility for urban development lies with the land owning authority, of which

there are several in the city of Delhi:

- Municipal corporation of Delhi
- Delhi development authority
- New Delhi Municipal council
- Private land owners

It is not clear that there is an obligation to provide electricity as part of a basic services package, although it is evident that this is regarded as highly important, and is often promised by politicians. The situation is made more complicated by the recent privatisation of electricity services (May 2002), which means that provision and operation of supplies has now been removed from government authority. The result is that, in order to secure a supply, people will pursue a range of players e.g. politicians, planning authorities, electricity companies.

At a community meeting (resettlement area), the local councillor said that electricity would be made available to an unserved unauthorized area through a private contractor, but at a subsidized connection rate (of 1,100 Rs).

Residents of an unauthorized settlement (Vikas Nagar) used to steal electricity (4 years ago), when the municipality came to cut the cables, they protested to the MLA; he didn't help so they went to the Delhi minister of electricity – he was unable to help because the settlement did not exist. In 1998 the government introduced the "as is" policy, where households were asked to make a contribution in recognition of power they had "stolen", and then to make a flat rate contribution of 2R/sq. yd/month, but this was subject to misuse. After further lobbying of the MLA, in 1999 they introduced the single point of delivery system under which a bulk meter was installed on the 11kV side of transformer and the utility charged Residents welfare association (RWA); households were charged a flat fee of 200 R/month. When the transformer blew, they were without power for 6 months. Finally, a private sub-contractor was appointed to supply the area.

Slum community in south Delhi used to steal electricity, but paid a regular contribution of 100 R/household to officials. They then had a private sub-contractor system imposed on them. The distribution company officials cut their illegal connections, and the supply was off for 1.5 months before they agreed to allow meters to be installed.

Municipal Corporation of Delhi Electricity Department came round Shankar Garden in 1998 promising metered supplies and took deposits of 330R, but nothing materialised. Experiences like this have led to a distrust of authorities, and private sub-contractors now appreciate that people are not willing to make downpayments for services.

3 Costs and Payments

3.1 Illegal supplies

It is asserted that people can pay as much, if not more, for illegal supplies than metered customers with legal connections.

Cable costs 10R/m – cost can be 1,000R; cut on average every 6 months. If near the pole, only need 1 bundle of wire, costing 300 – 400 R, up to 3 bundles (900 – 1,200 Rs) for those further away.

In Shiv Vihar (resettlement area) there is no formal supplier of electricity; it is estimated that 5 – 10% of the community have illegal connections. People pay a monthly amount to young men who provide service; this varies according to the type of connection (live and neutral, or live only):
"2 phase" – 250, 250 Rs/month,
"1 phase" – 200, 150 Rs/month
One woman pays nothing as her sons are engaged in providing the service.
Those without electricity find the cost too high (although the poor quality of supply will also influence this decision). "Customers" understand that they pay for the repair and replacement of cables, which regularly get cut.

Wiring in the house costs 200 – 300 R.

Electricity staff came to disconnect illegal connections, so residents paid them 400 – 500R (per household) not to bother. They soon realised that, if this were to continue, it would be expensive, so now when the authorities come, people disconnect their supplies, then wait till dusk and reconnect.

3.2 Legal supplies

It is still early days for the private sub-contractors, but already it is becoming evident that consumers are paying different amounts for both connections and units:

Modi customers (unauthorized area) claim the connection fee is 3,500 R, and the tariff is 165 R for first 100 kWh, (flat fee payable irrespective of use) followed by additional units at 2.50 R/kWh. Because of the banded tariff structure, people tend to use up to 100 kWh/month, then steal. Some people are not able to pay the connection charge and have taken out a loan from Indcare. In the course of a group discussion, members enquired of Indcare about securing loans of 5 – 6,000 Rs for building a house, which indicates the relative magnitude of the connection cost. Modi officials claim the connection charge is 3,200R (3,000 cost + 200 service charge); meter is 600R, remainder is cost of cabling and poles.

No subsidies are available from government to help cover the cost of extending infrastructure. Providing a supply is the responsibility of the development authority (e.g. DDA) who may chose to provide part of the infrastructure. There are limits to connection charges a sub-contractor can levy, according to contribution made by authorities:

- poles & cables – contractor provides domestic cabling & meters 1,400R
- Poles – contractor all cabling & meters 2,600R
- Nothing – contractor poles, all cabling & meters 3,000R

Cost of cable, box and switch inside the home is around 500R.

At Banjara camp (slum area):

1,560 Rs/connection; can buy on credit- given loan at 5%.

Energy	1.50 R/kWh
meter rent	12 R/mth
electricity tax	5%

Customers claim that the connection cost ranges from 1,500 – 2,000 Rs (Banjara Camp). They claim there is a range of minimum tariffs ranging from 150 – 1,000 Rs, but the bills indicate there is a unit charge of 1.50Rs/kWh.

Example bill from another private sub-contractor:

Energy	3.00 R/kWh.
Meter rent	10.00 R/month
Other charges	20 R/month

At Banjara Camp, bill payment date is 10th of the month, and late payment attracts a 3% charge. If they haven't paid by 17th then they get disconnected, which attracts 20R reconnection charge. The sub contractor's staff estimate that 20% of customers pay late and 25% of customers get disconnected. Of those disconnected, 80% pay by the end of the month, leaving a significant number of households (5%) who remain disconnected (not for long if the customer base remains roughly constant).

Modi, on the other hand, take a flexible view of non-payment, believing that if they cut people off, then they will simply steal.

4 Networks in Low Income Urban Communities

4.1 Approach to theft

"Illegal supplies are legal" (local councillor). Residents confirmed that they have complained to their councillor about the lack of electricity, and he has told them to use illegal connections.

One household in a slum area was adamant that their electricity is free, not stolen. *"If the government provides poles, then it is free"*. Electricity is stolen when meters are tampered with (especially in residences). People believe that the government pays for free electricity.

Modi cannot check on stealing. They pay locals to keep an eye out for illegal connections (which even they can't do at night), and to collect payments. They pay boys to go round houses and read meters each month.

The police only respond to complaints from the utility, in which case they will send officers to accompany officials to ensure their safety.

Everybody knows that theft goes on in slums, but electricity use is small so BSES take no action. The threat of imprisonment is no deterrent for these residents (they would prefer to have electricity) and they have no money to pay fines, so there is nothing they can do to enforce legality. They do get concerned when there is a large load (stolen) that affects the system e.g. stealing to supply residential housing colonies.

CMD Delhi Transco is of the view that losses from illegal connections are significant (14%).

4.2 Technical characteristics

Design MD for slum dwelling is 1 kVA / connection, compared with 3 kVa/connection for residential homes (the official figure is 0.25 kVA).

Demand will always grow. This is true for entire network as well as low income areas.

Network capacity was 3.8 GW last year, 4.7 GW this year (24%), rising to 6.0 GW next year (28%).

Although sub-contractors are expected to adhere to installation standards, in practice no standards are imposed by BSES – they are only concerned with receiving their security payment for the supply.

5 Urban Planning

5.1 Policy for improving the Slums

Delhi is one of the fastest growing cities in India, with a population growth of 5 to 6 lakh[1] every year. The annual rate of increase in the population is more than 5.2% for the last three decades. Each year 2.5 lakh people are added to the population of Delhi leading to a rise in the problem of slums and squatting settlements. To ensure a decent housing for this population that is growing as one reads this document the Slum and JJ[2] Department of the MCD has adopted a three pronged strategy to tackle the problems of JJ clusters:

1. **Environmental Improvement in Urban Slums**: Basic amenities such as water, toilets, bathrooms, drainage, pavements, dhalaos (garbage bins), Basti Vikas Kendras (community centres), Shishu vatikas (crèches), and community spaces are extended to the JJ clusters within a norm of Rs. 800 per capita. Delhi Government provides necessary funds to the tune of Rs 20 crores for this purpose (adequate only for only 50,000 jhuggies). What is provided is equally important: primary schools, dispensaries, streetlights, and peripheral infrastructure services like roads, transport, parks, workplaces and hospitals.

2. **In-Situ Upgrading**: Re-alignment of plots and widening of pavements etc. is followed in those cases where the JJ clusters are likely to continue for the next 10 to 15 years, and where the land owning agencies gives a 'No Objection Certificate' saying that the land is not required for that period of time. However, due to reluctance on the part of the land owning agencies to issue such No objection Certificates, this scheme is not the first choice of the authorities.

3. **Relocation**: This is done where the land owning agency want land for a project implementation "of public importance" and also agree to contribute a sum of money per jhuggi towards the cost of relocation. The cost is borne by Delhi government and the jhuggi dweller as well.

In practice there is stiff opposition (from residents) to upgrading slums, and the land owning agents are reluctant to hand over land rights to land that is of potentially high value in good residential locations. Consequently, relocation is most common, whereby slums evictions take place and residents are moved to allocated resettlement areas, which tend to be located around the perimeter of the city. This increases vulnerability on a number of counts:

- sources of employment tend to be in the centre of the city – people loose jobs and need

[1] 100,000
[2] Slum clusters

to travel
- services are often not available in resettlement areas – living conditions can be worse than in slums;
- social groupings can be broken, and different ethnic groups can end up living together, leading to conflict;

During relocation processes, entitlement to a plot in the resettlement zone depends on a resident being able to prove citizenship of Delhi; this can be done through:
- possession of ration card;
- registration on voters roll (registering before election, or being covered by census every 10 years).

5.2 Benefits of electricity

Electrification is important for providing street lighting; major impacts:
- Reduction of crime e.g. drugs, theft, smash and grab from cars
- Reduction of road accident fatalities.

The police have no direct role in electrification, but can liaise with residents associations, for example, and may recommend installing street lighting (example of residents association paying for street lighting in large wooded area where criminals used to run and hide).

There are law and order issues associated with the quality of supply, in as much as the police have to deal with demonstrations and clear road blocks, which are common means of protesting if supplies are down for more than 2-3 days.

Priority services people require of the government are:
- Light (Electricity)
- Safe drinking water
- Drains / sewage

Other issues raised include standing water (mosquitoes, smell), toilets (in Shiv Vihar there are public toilets, but residents have to pay to use), roads, transport (people have to travel from resettlement areas to work), community centre / public space for family functions.

6 Focus Groups

Group1 – mixed resettlement area, Shiv Vihar (no electricity, some steal) and unauthorized area, Vikas Nagar (private sub-contractor)
Group 2 – all from slum (all steal)
Group 3, 4 – all in resettlement area (Group 4 resettled from a colony with electricity).
The principal topics for discussion were divided between these groups:
- Groups 1 and 2 – use of energy, including costs, consumption, problems and priorities;
- Groups 3 and 4 – household finances, including earnings and expenditures, and electricity costs.

6.1 Energy consuming activities

Types of **cooking** (in order of frequency of use given by Group 1):
- Kerosene stove

- LPG
- Chula (wood)
- Cow dung cakes
- Coal furnace

For cooking chapatti, preference is for wood chula, gas, then kerosene (not hot enough), but chula requires space outside the home. Gas is the preferred fuel:

- Kerosene stove makes a lot of noise,
- Kerosene takes longer,
- gas is convenient

Gas costs 250 R/cylinder (lasts 15 – 20 days), but an alternative is needed during the 2/3 days it takes to refill. Kerosene costs 17/18 R/ltr, although the ration (Public distribution system) includes a 5ltr bottle for 50R. Electricity is too expensive.

Most have electricity for **lighting**. Those without use:

- kerosene lamp
- Candle
- Diya – earth lamp with wick - kerosene, mustard oil
- home made kerosene lamp from small bottles.

Most people (Group 1) **bathe** in cold water, even in winter. One lady uses gas, and one used to use electricity (stolen) before being evicted. Group 2 use hot water, heated by electricity (rods) or chula (wood is free), or kerosene stove if in a hurry.

The family of one lady has lived in the area for 12 years, and they used to steal electricity from the nearby tubewells. However, for the last 3 years they have lived as tenants in a house owned by her brother-in-law, and the electricity distribution is now handled by a private sub-contractor.

They remain without electricity because the owner refuses to pay for a connection, and they are not prepared to pay for a connection as they run the risk of being asked to leave at any time.

They have no room **heaters** (but will benefit from gas and kerosene cooking stoves). They are afraid of getting shocks from heaters (only one women uses – with illegal supply).

All in Group 1 get **ironing** done by person in the market (costs 1 R/item, 3 R/saree), with the exception of one lady who uses an electric iron at home. All in Group 2 have electric irons, but go to the market if the power is off.

The group reported that many people have **clothes washing** machines, although only one member had a machine (but no electricity to use it).

Most people have **fans and coolers**[3], used for keeping mosquitoes off at night in summer. A poor alternative is to wipe the floor with water.

Only one lady in Group 1 has a **refrigerator** (although it doesn't work), and one in Group 2. People use earthen pots to keep water cool (ice can be bought from the market), and only cook as much food as is needed. Comment that there is no space (in jughie) for a fridge.

[3] A cooler unit comprises a fan which forces air through a spray of water.

Table 1. Electrical appliances

	Group 1 resettlement	Group 1 unauthorised	Group 2
Light (bulb)	3	6	4
Light (fluorescent)	2	2	
Cooler	2	3	2
Tv	5	6	4
Fan	5	4	1
Radio / tape	3	5	2 (+1 not working)
CD system	0	1	
Video game	0	2	
Heater	0	1	1
Fridge	1	2	1
Iron	2	6	2
Rods (immersion water heater)	1	3	1
Washing machine	0	1	

Top priority is unanimous (Group 1) – cooling (cooler and fan), followed by refrigeration; however, discussion revealed that priorities change with the seasons – in winter the top priority is lighting. Group 2 is lighting followed by cooling. Group 3 is cooling, then lighting.

6.2 Problems with supplies

Problems with **illegal** supplies:

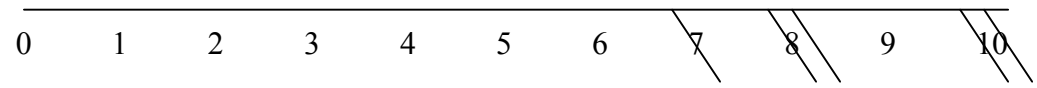
	Group 1	Group 2	Group 3	Group 4
Unreliable	tend to have power in the morning, but not at night.			
Low voltage	fans move too slowly, lights are dim. Reluctant to put in higher capacity cable because of risk of having it stolen.		can be so bad that fans don't turn	especially at night, light is dim and fans won't turn making it impossible to sleep at night.
Cutting wires	can be stolen by drug addicts and alcoholics for selling, can be taken by other users who have a faulty wire	Officials and neighbours can cut and take wires	they don't know who cuts wires	
Shocks	If they have wet hands or feet	man got struck by broken wire		
Fire	electricity causes more fires than gas, but consequences of gas are more severe			
Expense		Replacing wires; officials looking for bribes (recently refused)		
Fusing (voltage surge)		2 bulbs fused yesterday – had to pay 20R for 2 new bulbs		

Problems with **legal** supplies:

- Power cuts – most inconvenient if cut off at night when fans and coolers are used to control the hazard of mosquitoes (bear in mind that cooling is the top priority use of electricity in summer).
- Too expensive.

One young man who services illegal connections to ten households in a resettlement area with no formal supply was caught by the police the day before yesterday. The police regularly patrol the area (by car) as this is a notorious area, and caught him red handed - up a ladder. This was his first time to get caught. He was released after 15 - 20 women went to the police and complained of the problems they face due to a lack of electricity.

When trying to gauge satisfaction of people from Vikas Nagar (resettlement colony) regarding the single point delivery system (operated by Modi), it was revealed that although some people had problems (e.g. personal dislike), residents appeared to be satisfied with the delivery of services (see following chart).



0 = completely dissatisfied
10 = completely satisfied

Figure 1 Levels of satisfaction with Modi service provision (by residents of Vikas Nagar)

6.3 Perceived benefits of legal supply

Advantages of a legal supply (Group 1):

- Continuous supply;
- Appliances will not fuse;
- People pay for electricity either way (legal or illegal connections); a metered supply will offer some security (principally against cutting of wires) in that it will supply only their own dwelling;
- Can use all appliances they want (can't with illegal supply).

Prefer meters because (Group 2):

- Scared at present that people will cut cables – people can come at any time;
- Pay a lot for cables; can pay 100 – 200 R/month, even up to 500 Rs when officials take complete wire;
- Meters would be secure;
- Only problem would be payment, but that exists at present;
- Equipment gets fused with illegal supplies, which costs a lot.

With metered supply, just have to pay the bill. Will be much more convenient.

One lady doesn't like the idea of her children stealing electricity from a high voltage cable (danger?).

People are prepared to pay:

- Group 1 are prepared to pay. Prefer to pay in instalments – paying 3,000R in one go is hard.
- All (Group 2) want electricity and are prepared to pay, but not that much (3,000 Rs) for small huts.
- Group 3 are definitely willing to pay, as they are paying at the moment. Although some households would be able to pay 3,500 R connection charge, others wouldn't; 2 instalments was suggested – most households would be able to pay 100 R monthly instalments.
- Group 4 are prepared for government or private utility to make supply available, but payment has to be in at least three instalments. Willing to pay around 100R/month; mention of 500R instalments.
- Some people (slum area) could pay 3,000 R connection fee, but most could not even raise 500 Rs.

6.4 Private or Government Utility?

In Group 1, customers of private sub-contractor were satisfied (see Figure 1); marks were lost because of expense. However, the group as a whole would prefer to be supplied by a

government utility, as this would be cheaper.

Group 3 would prefer a government utility – private companies are more expensive.

Group 4 would prefer government utility - cheaper, and proper supply. "Where it is privatised it is not good for us" - costs more to install meter, and meter runs faster.

6.5 Domestic Finance

Group 3 husbands are construction workers and vendors. Most women do not have waged jobs, some work with husbands as vendors. Waged labour may bring in 80 – 100 R/day, even up to 150 R/day, but it is unreliable. There are certain times when labour is not required – especially during monsoons. Group 4 are motor mechanics, vendors, construction workers, tailors (making school bags), exports, rickshaw pullers. Most of these do not seem to be seasonal, but income is unreliable as they receive daily wages.

Principal household expenditures (Group 3):

- Education – government school is 30R/month plus 300R tuition fees
- Clothes
- Food

Toilets – 30R/month

Household expenditures (Group 4):

- rations for the day - 90 / 100 per day
- clothing
- gas cylinder - 250 R, lasts 15-20 days
- education

Times of high expenditure include:

- festival times - Divali, Raki - 5 sisters, has to give 100 R to each
- marriage
- death

Spot check on number of residents in a household:
6,9,5,4,6,7,6; average = 6

7 Acronyms

JJ Departments
MCD Municipal Corporation of Delhi
jhuggies small house
MLA member of legislative assembly
RWA residents welfare association
DDA Delhi Development Authority

8 Summary

8.1 Barriers – information from Focus Groups

- Applicant needs photocopy of land tenure card to get connection (resettlement area).
- Safety – authorities cut cables, which are expensive, so people join remaining small pieces; the joined cable can then come apart (example of man recently injured by falling cable).
- Fire – wire broke and fell down, causing fire; person ran to disconnect main supply.
- Shock – casual, serious, and fatal.
- Fires 1 – 2 per week. Fires (and shocks) are more common in dry and monsoon seasons. If rain is forecast then people disconnect wires to prevent damage.
- Legal status of land ownership. A constraint to electrification of unauthorised households was lifted in 1999 when the government revised policy to enable them to become registered and, therefore, eligible for electrification.
- Need to get people in the habit of paying.
- Need good billing / payment before you can introduce paying by instalments (e.g. connection charges, energy efficient appliances).
- complaints from focus group discussions (FGDs)
- ability to pay – instalments
- Delhi administration fragmented
- Community needs to be organized in order to successfully petition DDA or distribution company for a supply.

8.2 Other interesting things

- Community at Vikas Nagar, an unauthorised settlement, used to steal electricity from tubewells only 4 years ago.
- People are no longer prepared to make up front payments to get services. One group of residents claimed to have paid 330R to the municipality back in 1998 for supplies, but received nothing. A private sub-contractor confirmed that they need to take out a loan to raise money for investment in infrastructure.
- Private distribution companies are under no obligation to increase number of connections.
- Where electricity is free (stolen), people prefer not to use equipment to stop it from wearing out.
- There is a degree of acrimony between slum residents and residents of neighbouring residential areas. Slum residents claim they will threaten any individual who complains,

and accuse them of being just as bad at stealing electricity.

- Perception on behalf of slum dwellers (who steal electricity) that privatisation will have no impact on them – they don't pay and get no service so why should a private company be bothered with them?

- Although RWAs generally petition authorities for the removal of slums, there is a view that poor conditions cause social problems so it is best for them to have services, and there is a recognition that they provide a useful source of labour – the resettlement policy will cause problems with lack of labour.

- No institution takes the initiative to run any education programmes, either energy efficiency or safety.

- The community at Banjara camp is split into two; whilst one half reluctantly accepted meters, the other successfully resisted the new systems as they are better organized.

- Electricity tax is levied by the municipality.

- DFID Orissa impact assessment programme is gathering info on impact of electrification on poor (including urban); will gather livelihood info such as:
    - Affect of street lighting – security
    - How people spend their time in the evenings – getting together as communities
    - Income generating activities
    - Gender issues
    - What impact has privatisation had on poverty?

- People moving into resettlement area (e.g. Shiv Vihar) have appliances but cannot use because there is no electricity supply.

- Slum residents want permanent roof (plastic sheets, tin sheets, want cement sheet) and sewage before getting legal electricity supply.

- (Group 2) need a community meeting to decide on connection costs, and to decide whether they are being given a fair deal by the private contractor.

- Officials had earlier come (to Shankar Garden) and asked people to have communal meters installed (one per 3 - 4 houses), but they refused because houses have different numbers of appliances.

Appendix 2

Visit Report – Philippines (Philrads, Manilla)

By Soc Evangelista

Activities Undertaken:

1. Initial survey among energy-related agencies and companies:

   a) Department of Energy (DOE), the national government agency that is mandated to ensure a stable and affordable supply of energy. The DOE regulates all energy and electricity related activities in the country.

   b) National Electrification Administration (NEA), is an agency under the DOE. It is tasked to provide and oversee electricity service, especially in areas not covered by private electricity distribution companies. The NEA supervises and regulates electric cooperatives throughout the country.
   c) MERALCO, the Manila Electric Company, the biggest electric distributor in the country. It serves Metro Manila and 8 neighbouring provinces. It is run by a private company, although its biggest stockholder is the government.

   d) VECO, the Visayan Electric Company, the electric distributor for Metro Cebu. It is privately owned and operated.

   e) NEA, Regional Office for Central Visayas, which oversees electric coops in Cebu and three other provinces.

   f) CEBECO I, II and III, the highly successful electric cooperatives in Cebu province.

   g) MECO, the Mactan Electric Company, service provider for Mactan Island, off Cebu City. The island contains the Cebu International Airport, export processing zones and beach resorts and numerous other business. It has also a booming slum community where most of the PHILRADS projects in cebu are located.

2. Summary of Philippine Energy scenario:

   a) The main generator of energy is the National Power Corporation (NAPOCOR). It is government owned and operated, although it is being privatized. It taps various sources of energy like geothermal, hydroelectric, natural gas, coal. It also maintains diesel powered plants. It sells electricity to companies and electric cooperatives and also directly to big industries.

   b) Besides the NAPOCOR, there are independent power producers (IPPs) which sell power to utilities and to NAPOCOR itself. They were started in the early nineties when the country, especially Metro Manila, experienced long power outages, due to aging power plants and fast growing demand.

   c) A new government corporation was formed two years ago, called the National Transmission Company, or TRANSCO, to handle the transmission job of energy from NAPOCOR and IPPs to the utilities. It maintains the transmission lines scattered

throughout the country. It used to be a part of NAPOCOR, and is also being privatized.

d) The electricity distribution is handled either by electricity companies (as in the case of Metro Manila, Metro Cebu, Metro Davao, Cotabato City, Iloilo City, and Cagayan de Oro City), or the electric cooperatives (rest of the country). Most of the companies are private, but their operations (like rates, margin of profits, etc.) are heavily regulated by the government through the Energy Regulatory Commission (ERC). The ERC regularly conduct community hearings and forums regarding electricity matters. The inputs from these hearings are included in their policy formulation.

e) The electric coops are under the supervision of the NEA (although there are on-going reorganization plans) and are also regulated by the ERC. The coops are governed by independent boards of directors elected by the members themselves, but the management is appointed by the NEA. The NEA likewise helps sets up rates, and monitors coop elections. Sometimes the NEA takes over in cases of mismanagement of payment defaults (to NAPOCOR). Any profits generated by the coop (allowed by ERC) are brought back to the consumers in terms of lower rates.

f) As of the present, there is abundant power supply and less demand because of the slowdown in business activities and non-operation of several large industries like steel and petrochemical companies. In fact, the consumers have the burden to pay for the unused power provided by IPPs (contracted by the government).

g) The government, through the energy plan, is relying more on sustainable, environment-friendly sources like natural gas, geothermal and hydro (water systems) sources to lessen dependence on imported petroleum.

3. Other related facts:

a) Access to electricity in urban areas is almost universal. For the MERALCO franchise areas, it is 100% for Metro Manila and 98.15% for the whole system. In Metro Cebu, it is also very high, more than 90% including mountainous areas.

b) Losses and pilferage occurred mostly in slum areas, where residents put “jumpers” that directly connects electricity from the main lines to their homes. This was when the company would not serve slums due to their “lack of requirements” like land titles and building permits. However, this has been virtually eliminated by “waiving” the requirements and placing the electric meters in high boards along the roads in front of slum communities, not in individual homes. Meralco sources said there are still pilferage but minimized to 2 to 3 percent.
c) The consumer picture in Metro Cebu is best described by the recent research survey made by PHILRADS.

d) Per NEA, access to electricity is less universal in rural areas. Although all towns and cities have electric service, only 85% of the villages have the service and 70% of all households (under electric coops’ coverage) are energized.

e) According to NEA, access to energy service is constrained when:

- there is minimal load, like in a small coverage area where there are few consumers to share the cost. This means increased cost of distribution.

- The area is inaccessible to distribution lines like absence of roads or mountainous

- There is also the problem of right-of- way, when landowners does not allow electric lines or posts to be located in their properties.

- There is also the problem of slum communities hot having the proper documents needed. NEA said the electric coops and presumably the electric companies are "lenient" in imposing the requirements.

- There are people in the community who makes a formal protest on connection. This usually involved ownership disputes, but consisted oniy a very few cases.

f) Pilferage in the electric coops is very minimal, about 2%. in Cebu, it is less than 1%. Usually, the coops encounter problems because of mismanagement. There are also problems of payment in areas with security problems like some Muslim provinces in Mindanao. Here. Also some warlords who are also politicians dominate coops and often has conflicts with NAPOCOR. In these areas also, transmission lines are often toppled down by lawless elements.

g) The current billing of electricity use in the country follows a so-called "unbundling" of rates for "transparency" purposes. A typical electric bill (monthly) enumerates all the components, like basic generation and transmission rate (plus allowed profit margins), plus PPA or power purchase adjustment (the cost of unused electricity generated by IPPs), CERA or currency adjustment rate (if the company or coop has a foreign loan), and energy tax (for private companies (not coops). Sometimes, the coops put in wage adjustment.

h) The companies are allowed a "systems loss" (losses in transmission, pilferage) of 9.5%. Beyond that they have to absorb the cost.

i) For electrical connection process, a typical coop would require:

- P5 coop membership fee
- P50 service charge
- P1,500 cost of electric meter (varies)
- Cost of service drop wire (varies, depending on the length needed/distance of the house from mainline or post). The wire typically cost P 18.50 per meter.
- Documents needed: Building permit, electrical permit from the town's engineer's office
- *Process:*
  - 2-3 days application acted upon after application
  - Distance is a maximum 75 meters from a pole.
  - An accredited village technician installs the connection and house fixtures.
  - If there is a protest from a homeowner, the coop acts on it. The applicant must have permission from the house owner.

Community Research on Access and Use of Electricity Service among Urban Poor Communities

The Research and Evaluation Unit of PHILRADS made a research survey on the access and use of electricity service among urban poor communities in Metro Cebu, as supplemental data

for the Gamos research project. The survey was done on March 20-26, 2003. The six communities selected are recipients of PHILRADS projects in the province (consisting of micro-enterprise development and communal water supply). The 162 respondents were randomly selected in the area, with the interviewers going to every third house within the community limits.

Findings:

1. Most of the respondents' houses are made up of light materials such as wood, bamboo and nipa thatch (54%) and located in the fringes of the communities (foreshore and public areas), and even in shallow seabeds (stilts).

2. Most household heads (or members who are breadwinners) are either employed as factory workers in the nearby export processing zone (38%) or are engaged in small business/vending (12%), driving passenger jeepneys (10%) or working as construction laborers (9%). The vast majority (72%) have monthly incomes of P5,000 ($94) or less. The average income of all respondents is estimated at P5,238 per month.

3. For electricity connection, almost all households (160 of 162 respondents, or 99%) availed of modern electricity. However, 30% do not have their own electric meters (as required by law) and illegally connect with their neighbors. Although electricity is relatively cheap (P4.50 per kwh) and the minimum monthly billing is only P34 (per electric company), those without direct connection pay up to P150 per month (to their neighbors) for 2 lamps (20 watts) and 1 T.V. set. The more outlets, the bigger payment. Normally, they would not even reach the minimum with this amount of use.

4. Average monthly electric bill (for all HHs with electricity) is P271. This is about 5% of the average monthly income.

5. The most often cited factor that hinders direct connection to the main line are the requirements imposed by the city hall. These are needed before the electric company can act on the application. For the government, house electrical connection presumes that the household complies with all the rules of housing. So, it requires documents like land titles, tax declaration, building permits and several clearances - papers that most of the poor people obviously do not have. They are living as squatters ("informal settlers" in development parlance) in public, private and prohibited lands like mangrove areas. So they resorted to "fixers" who demand high fees.

6. In the survey, the respondents cited the high initial cost (meters, fees, wirings and fixtures).as hindrance to direct connection. The average cost given by the respondents is P3,810 (both those who have meters (direct) and illegally connected). For those who want their own meters, the initial cost is P5,000 to P6,000, package price of the electrician who fixes everything up, from permits to wiring. The actual cost of connection (as per electric company) is only about P1,500 for the meter and fees (minus the fixtures inside the house). Many would have preferred direct connection because the monthly bill is much lower.

7. About 2/3 of the respondents (66.7%) consider the requirements of the electric companies (VECO and MECO) as easy to comply, provided they have the funds to pay the fixers. Some of them also availed of the services of the relatives who have knowledge in electrical connections. Although the service of an accredited electrician is required on paper, it is easy to do away with this requirement, as few installations are monitored.

8. Those who responded that the requirements are difficult to comply with (13%) are those who have no money to pay the fixers or who tried to apply without their help. The issue of land ownership is usually the biggest hindrance.

9. Most respondents are satisfied with the service of the electric companies in installing their electric connections (48%). The companies immediately install the electric service, provided their application papers are in order. Of those who were not satisfied (23%), they cited the fact that they themselves installed the fixtures and the connections (to their neighbors), or that the companies do not approve any application without permits. A considerable number (24%) gave no answer.

10. Most respondents said they are familiar with process of electricity connection, like installation of wiring, meters and circuit breakers (57%). Some of them just hired electricians to do all the work for them, especially with regard to the document requirements. More than 2 % did not respond.

11. For uses of electricity (besides light which is mentioned by all households), HHs use it mostly for their T.V. sets (76% have them), electric fans (32%), refrigerators (29%), radio/cassettes (27%), VCD/VHS (23%) and Karaokes (20%). About 20% said they use electricity foe their home business (vending, food processing, eatery, etc.), with the refrigerator as the appliance most frequently used.

12. Although 85% made no additional comments, those who did cited high electricity connection cost and difficult requirements needed to apply.

Thank you.

Appendix 3

Visit Report – South Africa (EDRC)

(17/3/03 – 21/3/03)

Nigel Scott (Gamos) and Nthabiseng Mohlakoana (EDRC)

1 Background

1.1 Categories of household

Khayelitsha is township of Cape Town, located 30 km to the east of the main city. Estimates of the number of residents vary, ranging up to 900,000. This population is not a homogeneous group, and the following typology of households is proposed for the research:

- Formal – private (occupied by professionals);
- Formal – municipal; where residents from informal households have been rehoused (may be known as RDP houses);
- Informal, planned – tenure rests with municipality, but services are provided;
- Informal, unstructured – shacks with no sanction from municipality and no services.

It is proposed that the project considers the last 3 of these:

- these are potentially of same socio economic status.
- Track how households move up through these categories.

1.2 Electricity Supply Industry

Eskom have a licence to supply certain areas (mostly rural), and a large number of municipalities have licences to supply urban areas (including townships) with grid electricity. PN Energy was set up to provide services to Khayelitsha township This was a particular problem to the municipality – it is large, and people refused to cooperate with weak municipality (Tygerberg), so the licence was switched to Eskom. However, this was also seen as closely associated with the government at the time (early 1990s). PN Energy was presented as independent company – at the initial stage it was a joint venture between Eskom, EDF, E. Midlands electricity (until bought by PowerGen and withdrew from the Joint Venture). E. Midlands have experience in India, Bangladesh, Pakistan. People are unhappy about involvement of foreign companies especially because they feel that they are not part of the decisions made by the PNE board of directors - story of petrol bomb thrown at PN Energy premises (PNE say mistaken identity – thrown in error).

Khayelitsha residents in formal privately owned houses find themselves in a situation whereby they are evicted from their homes because of non-payment of their bonds to the banks. These householders have been evicted and new owners have moved in since. This is not accepted by people as they have embarked on an anti-eviction campaign whereby they evict the people that have bought these houses from the banks and move back to them without the banks permission. The fact that PNE building is situated near the area where evictions were taking place has put it in a difficult position as they have also become targets and the protesters of the anti-eviction campaign have bombed their offices. The association of PNE and the banks has not been established to find out the reasons for the petrol bombings.

PN Energy do not have licence – they are agents for Eskom. Money paid to Eskom. They get service fee.

The number of illegal connections is relatively low in Khayelitsha – it is much higher in other townships.

1.3 The Planning Process

The authorities have a duty to provide basic services to anybody who establishes themselves as resident within the area, and there are a range of bylaws intended to protect migrants e.g. they need a court order to remove a shack that has been established for more than 24 hours. As people continue to migrate to Cape Town, they are, therefore, engaged in a continuous process of upgrading informal, unstructured shacks into planned settlements with services. Areas are designated for upgrading as and when finances become available.

The only circumstances in which they should not provide services is shacks on non-municipality land e.g. sides of railways, roads, pylons. The municipality became involved in disputes with a private land owner when they provided services to shacks that turned out to be on private land.

Prior to 1986 all land was rented leasehold, but now the municipality is transferring land title to residents when it upgrades. There are now around 70,000 shacks, some of which are serviced. There are a number of planning problems emerging, such as the need to subdivide title as a consequence of the practice of erecting a shack in the yard of a dwelling. There is provision for council to give shack dwellers consent to waive compliance with building regulations. Nevertheless, people are still under an obligation to submit planning application; council planning dept can then give advice (examples of buildings falling down, man starting to dig too close to the road, kept digging 2m into road).

1.4 Residents

This is largely a cash based economy, and households rely on waged labour; there remains high unemployment in informal households.

People tend to be immigrants from other provinces (Eastern Cape in particular) coming to urban areas in search of work, with a view to sending money home. People have strong sense of their rural "home", and will travel back during holidays.

There are heavy obligations on the government to provide services, including land, water, sanitation and electricity due to the RDP policy of 1994. When people are allocated land by the municipality, they are given title, so people do not pay rent; the only people who make regular payments are bond holders (mortgages).

Most people in the township own phones (fixed and mobile), and there are a large number of public booths.

1.5 Fuels used in the township

- Paraffin – cooking, space heating, lighting;
- Electricity – lights, entertainment (TV radio), cooking (few have 4 plate stove, some have 2 plate – used for quick meals), video, fridges, kettles, microwaves, washing machines, vacuum cleaners, space heating;
- Wood – heating, cooking (businesses). Especially amongst those in areas close to the forest, which is a protected forest. They have worked with these residents to train them which are endangered species and which are alien - people remove alien vegetation, which is helpful.
- Gas – cooking. From the interview with a municipality energy officer (March 2003), he said, there were few places to buy; company did survey and found access was a problem so they put in lots of sales points. Problem is that gas is perceived of as dangerous – with good reason. When it leaks and ignites, it explodes killing whole families; by comparison, paraffin causes many more fires, but they are smaller and rarely fatal. Users are mostly women, and heavy bottles are not suitable. They did not accompany rollout with education programme, so did not get sales and only a few sales points remain (we saw BP station later); - Statistics however indicate that the dangers of paraffin are more severe and widespread[4].
- Candles – lighting.

2 Supplies to Khayelitsha

2.1 PN Energy

After the initial activity involved in getting large numbers of customers connected when operation started in 1994, PN Energy are still connecting new customers (e.g. 12,000 in 2001, 2,500 in 2002).

They have 27 staff, of which 11 are technical; most are based in the Khayelitsha office.

PN Energy describe their approach as participatory, pointing to ways in which the community are involved:

- At installation, the contractor uses local labour (3/4 people) which they get through the South African National Civic Organisations (SANCO).
- They appoint a community liaison officer (from community) who introduces the programme and gives briefings and news.

They use prepayment meters exclusively, and the majority are of the voucher type (customers punch in a 20 digit number) as opposed to the magnetic card reader type. Customers make payments at appointed vendors, who issue them with the vouchers. Some vendors are installed at residential premises within the community; others are located in strategic places (e.g. shopping mall) and run by PN Energy.

Vendors are given varying amounts of credit, and when this is used up they deposit the cash at a payment point and receive a voucher which replenishes the credit at their point of sale equipment (PC, printer, radio link).

[4] Lloyd, PJD (2002). 'The safety of paraffin and LPG appliances for domestic use'. Taken from the Domestic Use of Energy Conference proceedings

Each point of sale equipment links through to the master database twice a month in order to:

- Update customer database;
- Upload sales information.

2.2 Getting a Connection

Procedure is (as reported by councillors):

- people ask municipality for services:
- councillors represent people and present request to CT Municipality planning department (this is where decision is made);
- Planning Dept. contact PN Energy

PN Energy don't have to provide supply to temporary shacks (intended to be there less than 3/5 years).

Local leaders then negotiate with households on who wants electricity, and appear to act as liaison with PNE. Seems to be consensus that when an area is to be electrified, everybody wants to be connected. Disputes arise over type of connection.
People complain of getting "weak" electricity (unhappy with 20A (R150) connection, and want 60A (R1000) connection so they can connect more heavy current appliances).
Example of people electing to make cash payment for connection (R150) and being told that everybody has been connected under the R210 arrangement (see 3.2 below).

2.3 Planning & development

If PN Energy put in supplies to informal shacks, then it is upgraded, they have to remove and replace infrastructure. PNE approached municipality asking for areas to provide services to, but they wanted to identify areas that would remain as shacks for 20 years; the council refused, saying they have only 3 and 5 year planning frames. Eventually identified areas that they thought unlikely to change for 10 years – no written contractual agreement. It is the council's job to upgrade e.g. health dept. v. keen to upgrade.

PNE approach the council asking for areas to electrify. Council can upgrade settlement and provide services as and when finance becomes available.

There is resistance to electrification from those currently providing illegal connections to those in unserviced areas.

A topic often raised by stakeholders was whether electricity is a basic service or not, the implication being that if is, then there is an obligation on the government to provide the service (free of charge). There are a number of civil society organisations operating in the townships, occasionally with colourful political agendas, some of which are picking up on the issue of privatisation of electricity supplies.

3 Costs and Payments

3.1 Other services

The municipality tried to introduce a card system for informal shacks to pay for services (water and sewerage). They appointed representatives from the community to go to each shack to explain the system. People were to go to existing council pay points to pay R2/week. The initial idea was to remove standpipes from areas where people refused to pay, but it proved impossible to enforce payment as the people wouldn't allow disconnection, so the system was abandoned after 1- 2 years.

3.2 Payment

People can buy as much electricity as they like from vendors. Minimum purchase amount is R5, which doesn't seem to cause problems.

People on R210 system pay back: each time they go to buy electricity, 40% goes against credit, 60% for electricity (separated on vendors banking statement). People confirmed that if they pay R20 they get electricity worth R12 and R8 pays for the installation costs which are repaid over a period of time depending on how much they buy electricity for.

4 Networks in Low Income Urban Areas

4.1 Theft

Illegal connections generally refers to the practice of making a supply to another premises from a metered supply. This is not a technical loss, as the energy is metered. Community members assert that there is almost no theft from tappings upstream of meters; PN Energy are of the view that this does take place.

There is a "sweep team", sub contracted out to another private company, which looks for illegal connections and theft by analysing sales records.

People are not keen on making illegal connections – afraid that PNE will catch them, which they do. High reconnection fee (approx R2,000).

4.2 Technical characteristics

PN Energy networks are designed on 0.7 kVA / house annual MD. There is a big problem with backyard shacks – effectively doubles design load.

Card meters are more unreliable, and PN Energy are trying to standardise on voucher prepayment meters.

Demand will grow. Demand from formal housing will remain more or less constant, but shacks will be upgraded and demand will increase with economic prosperity, and as they make informal connections. Eskom and Municipalities have different standards leading to

different connection costs e.g. 2500 Khayelitsha, 4000 CT. To a certain extent this is due to different approaches to the problem of increasing demand. In township areas, Eskom are dealing with uncertain development patterns, so their approach is to design for existing demand rather than take on the risk in estimating future demand, and then invest in upgrading as and when it is required. Municipalities, on the other hand, win one-off funding to electrify an area, so their approach is to design for future loads, on the assumption that they will be unlikely to win further funding for upgrades in the future. The municipality also considers aesthetics, requiring underground cabling, for example.

4.3 Education and training

The SEED officer did energy efficiency awareness raising e.g. set up demonstration centre. PN Energy was partner in Khayelitsha schools energy awareness raising programme (2001), but there is no ongoing commitment to education by PN Energy.

Understanding of electrical use remains low – people don't understand why current is restricted by 20A trips; some people don't understand temperature for cooking can be regulated.

Compact fluorescent lamps (CFLs) are available from supermarket in the township but more expensive than incandescent light – it is the capital costs that discourage people from buying energy efficient appliances. An energy efficiency demonstration pilot project is being run (4000 homes) through the CDM process – solar water heaters, insulation, CFLs.

5 Problems

5.1 Electrical supply

- Tripping at distribution boards – tendency for people to try to connect too high capacity appliances; current policy is for PNE to install 20A supplies, but people want 60A which is too expensive for most households to afford.
- Power cuts – complaints that power goes off once every month or two (power engineer and PNE claims no problem); indications that power is scheduled to turn off. Main consequences are for small businesses, especially those that rely on refrigeration e.g. meat goes off, people go elsewhere to buy cold beer.
- Cut offs (& spikes) cause equipment damage

5.2 PN Energy Service

High cost of electricity. People served by PNE pay a premium – higher unit costs than those in other townships served by the municipality.

CT domestic prepay (incl. Vat)	44.25 c/kWh
PNE prepay	49.02 c/kWh
Premium of 11%.	

Free electricity. The CT municipality has introduced a "poverty tariff" under which all customers are entitled to 20 kWh/month of free electricity. This is not offered by PNE as the electricity is provided by Eskom.

Additional complaints:

- unacceptable queues at vendors.
- Repair service poor

PN Energy were originally good, but service is now poor. Comment that the management used to care for the people of Khayelitsha, but no longer; this probably reflects the fact that PNE initially had to win support of community to achieve connection targets, which they did faster than expected; now little incentive to maintain good service.
A tour with one of the PN Energy technicians illustrated the types of problems they encounter:

- House 1. Circuit breaker in street cabinet had tripped (due to faulty fridge)
- House 2. DIY job on building house (replacing shack with block house), moved meter and replaced wiring (poorly); tripped anti-tamper switch.
- House 3. faulty meter number keypad.

5.3 Vendors

There are 12 vendors in the township, only 3 of which are open 24 hours/day.

There are several complaints with vendors:

- Queues – people complain of waiting hours (corroborated); we waited 15 mins.
- Insecurity – people queue in public places (claim that young men can rob people); people prefer vendors in trading centres as opposed to household areas;
- Service – only 3 vendors offer 24 hour service; complain that only 1 out of 3 windows many be operating;
- Queue jumping – young men can offer a service where they jump the queue and buy the electricity for a fee.
- Unreliable – sometimes vendors have run out of electricity (credit) – this may be due to the fact that do not do their banking on time.

Queuing. Busy times of the month are toward the end of the month when people get paid. Busy times of the week are Friday and Saturday. Busy times of the day are after school, when children can go.

From the viewpoint of PN Energy, problems encountered with vendors include:

- Some vendors pick up working with computer quickly – others struggle.
- English program is a problem for Xhosa speakers.
- People take time to change their buying habits (to new vendor);

The contract with PN Energy states that the vendor must be open certain hours, and provide security. Large vendors get 3.5% commission, others 2.5%.

The justification for not appointing more vendors is that this would dilute the potential earnings, which need to be sufficient for a living wage. However, discussion with vendors indicate that vending is not main source of household income.

5.4 Private or Municipal Utility?

Councillors believe competition would improve services. They want Eskom or CT municipality to provide power.

Comment on outsourcing of services (in context of refuse collection):

- Private contractors provide a good service, but they fear exploitation of workers;
- Management of public services is poor – not sure what can be done about it.

Energy comes up in the context of environment: electricity will mean people can avoid using harmful fuels.

6 Focus Groups

Group 1 – K Section; had recently received electricity connection; in fact they had had electricity in their homes for only 3 days.

Complaints with procedure for getting connection.

Residents claim that they were not allowed to pay cash for their installation of electricity and that PN Energy was insisting that they all pay in instalments which means that they would end up paying at least R210 instead of R150. People said that when they registered for electricity connections, PN Energy told them that they had a choice of either paying the installation costs in full (R150) or pay R210 over a period of time, but PN did not stick to what people had signed for and agreed to with PN. There were people that said they have enough money to pay the R150 instead of the R210 because they did not want debt.

When people went to buy electricity they were told that they were not on the database therefore they would have to wait at least 3 days to inquire at the PN Energy offices since it was a long weekend because of the public holiday. PN Energy were not asked why the point of sale equipment only updates the customer database twice a month.

People insisted that they wanted a community meeting with PN Energy as they felt that their needs were not taken to consideration. Although PN has a toll-free number where people can call when they have problems, this did not come up in the focus group meeting.

Problems with domestic connections:

There were people that said they would like their supply to be changed to 60A instead of the 20A that they had as they could not use more than 3 appliances at a time with a 20A supply.

Electricity awareness

A gentleman attending the meeting said that 'I do not want this weak electricity; I prefer to have a 120A electricity supply'. When asked what he would do with this level of electricity he said that he would use it for his appliances at home. This was another case of misinformation and lack of education about electricity and the different levels of supply.

To emphasise the point above, people are credited with R5 worth of electricity by PN on installation of their supply to ensure that it is working properly. The residents expected this electricity to last longer than a day. A woman said that she had used her kettle, iron, radio, television and lights and the electricity was finished within a day.

Energy Uses

People said that they use other sources of energy for their households needs such as paraffin, gas and candles.

Domestic electrical appliances vary a great deal, but one household visited had the following:

- Large fridge
- Lights
- 4 ring hob with oven
- vacuum cleaner
- radio

People said that their electricity units are used up quickly and they can't afford to pay for electricity all the time. One man said that even at night the electricity is used up even when they have only the radio on and no other appliances.

Group 2: This section of Khayelitsha has had electricity since 1994. People in this area say that they have a 20A electricity supply because they were the first few people to be provided with electricity.

Issues arising:

Inadequate capacity:

- one old man complained that he can't use his fridge, stove and TV at the same time.
- Woman complained that power supply is too low to cook with stoves (assume this is capacity problem).

Too expensive:

- old man spends at least R40/week, unlike when he first received electricity; he attributed this to the new meter boxes which have replaced the old ones.
- Old lady spends at least R50 in two weeks; she has limited appliances:
    - TV
    - Video
    - Kettle
    - 2 plate stove
    - lights
- One woman complained that she now uses paraffin for cooking because it has become too expensive to use electricity.
- People have complained about prices going up.

Free electricity.

- They want 'free electricity' like everyone else in other areas of Cape Town and don't want to be supplied by PN anymore.

- They were promised free electricity, but not sure by whom – possibly PN Energy when they first started operating.

Power cuts –

- especially when the weather is bad and these last for a whole day or even longer.
- Woman's business selling beer and meat is disrupted by power cuts.
- We have to make sure that we have paraffin and candles all the time as back up because the electricity is not reliable
- "Eskom is improving somehow" – comment from customer.

PN Energy service:

- PN is not attending to community needs as they sometimes take up to 3 days to attend to people's problems.
- Sometimes when the technicians come to fix the electricity supply, we loose electricity units when they finish and they do not want to account for them.
- The network cables are fixed quicker than the household supply problems because the other day I called PN to tell them that one of their network wires was exposed and would pose a danger to children, they came quickly to fix this, quicker than they do when you call them for a household electricity supply problem.
- The toll free number that PN has is not sufficient enough as PN is not accessible to the community. They may promise that they are coming to fix the supply but they do not come in time.

Insufficient vendors:
there are only 2 vendors serving this area and they are far from us. It becomes a problem to go there especially at night when you have to send the children. Sometimes we are told that there is no electricity available at the vendor's points or there are long queues.

Energy Uses

They tend to use paraffin for cooking when running out of units. They use paraffin for cooking samp, because it takes such a long time – needs to be on high for 2 hours (takes 1 litre paraffin); too expensive with electricity.
Prefers using flame (paraffin) to heat water, because it takes 3 kettles for a bath and that's too expensive.
Some kettles don't turn off.
Paraffin is cheaper, but has some problems e.g. can burn the house.

Energy Awareness
There were some energy efficiency programmes when electricity was first installed e.g. when he was in primary school).

7 Acronyms

RDP	Reconstruction and Development Programme
CFLs	Compact fluorescent lamps
CDM	Clean Development Mechanism
PNE	PN Energy

8 Summary

8.1 Barriers

The planning process – getting funds to upgrade unplanned informal settlements (which can't get electricity).

People want high capacity connections

Electricity is expensive (EDRC not convinced this is correct perception). People thought that it was cheaper to use paraffin than electricity as they could measure exactly the amounts they needed for different end-uses and knew how much each would cost them.

8.2 Interesting things

Eskom agreement with PN Energy is connection focused – PNE get fee for each connection, and annual operating fee based on number of connections. No quality of service component? In fact PNE did mention that there are auditors that go into Khayelitsha at least once a month for quality standards checks. They interview customers selected randomly to also check the service offered by PNE to the people.

There is a need for education and information, probably mostly at installation - how long electricity will last for, how much different appliances use.

There is only a small proportion of residents in this low income settlement that do not have access to electricity. There has been an aggressive programme of electrification arising from the Reconstruction and Development Plan (RDP).

Appendix 4

Date of the Workshop: 20-22nd May 2003
Venue: Hotel Claridges

Day One: 20th May 2003

Session One:

The Ice Breaking exercise

Each participating member introduced him/herself to the participant sitting next to them and then they introduced each other with three important things about the member sitting next to them.

Welcome

Mrs. Reeva Sood, Executive Director, INDCARE welcomed all the participants in the capacity of the Host for the three day workshop. She thanked Gamos and the participants to make the team workshop possible in such short notice. She hoped that the stay in Delhi for the participants would be pleasant.

Introduction

Dr. Nigel Scott, Gamos Ltd. started the session with greetings to everyone present.
The format for conducting the workshop was opened for the discussion and deliberation by the group. The group confirmed that the agenda was agreeable and the team workshop could be conducted in the same manner. He gave a brief introduction about the project and introduced Dr. Kevin McKemey Gamos Ltd. who would convene the team workshop.

Dr.Kevin McKemey gave a brief introduction of his work to the group present and emphasised that the outcome of the workshop will be a questionnaire and if the time allows the pilot testing of the same would be appreciable in order to take out the best questionnaire and to suit the needs of all the groups.

He then invited Philippines team for the presentation of the Preliminary Survey that was done in Philippines.

Presentation Philippines:

Mr. Socrates Evangelista and Mr. Ronaldo Ragasa, PHILRADS made presentation of the energy situation in Philippines.

Lunch

The presentation on the Situation in South Africa was made by Nthabiseng Mohlakoana (EDRC)

Presentation of the situation in Delhi, India—Priyanka Awasthi (Indcare Trust)

Session IV : **After tea**

Dr. Kevin McKemey started the session as to how to start the questionnaire. The Survey Data section of the questionnaire was discussed. :
The participants deliberated over the question Number 7 as what should be the divisions of the type of colony as is was different for each of the three countries. In India they are called the Slums, Resettlement colony and the unauthorized colony. Like wise each country has its own

How to begin for the Questionnaire
Inputs from the participants were called for and were included in the questionnaire.

Discussion on the caste system In India Specific context.

First few Questions of the Questionnaire

Day Two
The process was interactive and participative.
Pondering over the questionnaire the whole day
Each Point was taken and extensive discussion took place

Day three
Testing of the questionnaire in the field
Deliberation on the same

The final questionnaire formulated with the deliberations on the final questionnaire to suit the needs of each country.

Fri 23rd

Departure

Appendix 5

Questionnaire - Energy in Low Income Urban Communities – India

R8146 2003