7 Survey Results

7.1 Introduction

Basic arrangement of BPL technology integration to the backbone as shown in the figure 13 below.

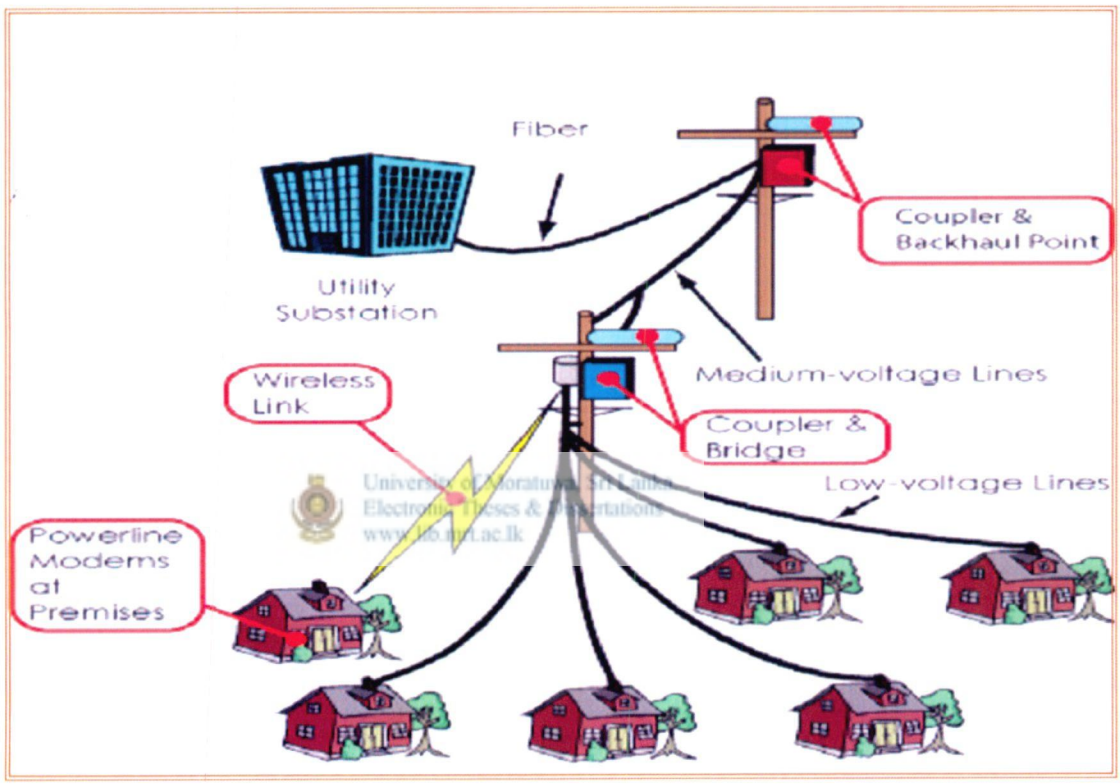

Figure 13- Basic Configuration (courtesy: University of Technology, Jamaica)

The questionnaire was offered in English and sent to 50 persons through hard copies, emails and meeting them personally from various sectors aiming to find out the validity of the Hypothesis .The following shows the statistics related to the questionnaire. Generally every one has understood the questionnaire.

Mode of sending Questionnaire	Total sent	Total received
By Hand	10	10
By Email	35	28
By fax	4	02

Table 25-Survey questionnaire Results summary

Figure 14- Questionnaire Sent /Received

The intention of the survey is three fold

1. To identify potential CEB customers, area wise through their monthly bill in August 2006
2. Their willingness to accept bundled services over BPL
3. Their literacy on Telephone, Computer, Email and Internet usage

7.2 Hypothesis

If a CEB customer pays Rs 2000/= or above as electricity bill in month in July2006 are potential customers who would be accepting BPL services at competitive prices.

7.3 Primary Results

Monthly Bill	No of customers	Willingness to accept BPL Services	Computer Usage at Home	Internet user in the office	Internet at home
Less than 1000 rupees	2	1	1	2	0
Between 1000-2000	3	2	1	2	0
Between 2001-3500	28	20	15	25	5
Between 3501-5000	4	4	3	4	2
Above 5000	3	3	3	3	2

Table 26-Primary Results

7.4 Secondary Results

1. **Testing of Hypothesis** -Those with electricity bills above Rs.2000 (July 2006) are potential customers for accepting BPL services

   - Rupees 2001-3500 Category 20/28 = 71.4%
   - Rupees3500-5000 category 4/4 = 100%
   - Rupees 5000 category 3/3 = 100%
   - **Average (20+4+3)/35 = 77.14%**

2. Average Internet Literacy rate (above 2000>), 32/35 =91%
3. Only 10% use computer at home for emails and Internet and 75% of them use Emails at office while 60% have an access to Internet in the office.
4. No of successful customers, among the survey group who are willing to accept BPL services, irrespective of electricity consumption 30/40 =75%
5. No of customers who has computers at home (above 2000 Rs/month) 23/35 =66%
6. Monthly Internet charge is generally Rs 200/= and the telephone bill is around Rs 2500/= at home and Rs 2300/= for Internet at office among the successful customers.

7.5 Survey Summary

From the survey group 90% have required literacy to computers and pay higher values for Internet telephones and mobile phones. Most of respondents don't know their office packages and expenses for communication needs. Generally electricity bill over 2000/= rupees in the month of July 2006,could be considered as potential customers (77.14%) who would love to accept BPL services to cut down costs and to get bundle of services through.

The hypothesis developed was justified as correct

Most of them use Internet and emails at the office, but like to have that at home if that is affordable.

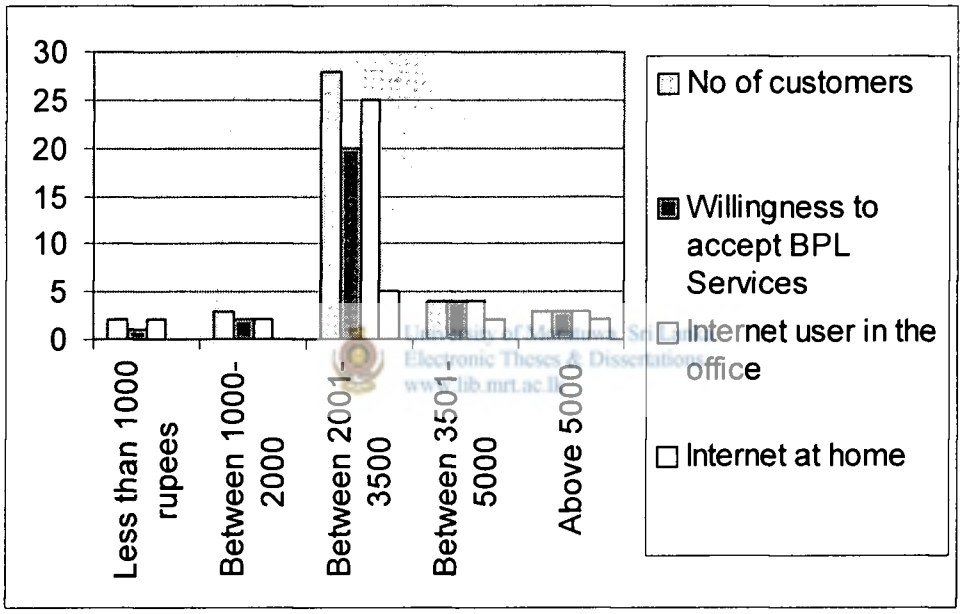

Figure 15- Questionnaire Results Summery

7.5 BPL pilot project – Identification

From the CEB database, Customers whose electricity bills were above Rs 2000 in August 2006 were identified area wise as potential customers (Table-29). The survey results revealed that 75% from the potential customers are willing to accept BPL services. The reasons being, low cost and bundled services in one bill. Having identified that, CEB can implement pilot BPL project in potential areas such as Colombo, Dehiwala, Ratmalana, Kandy and Kurunegala etc. CEB electrical boundaries (Area) are marked in the following picture.

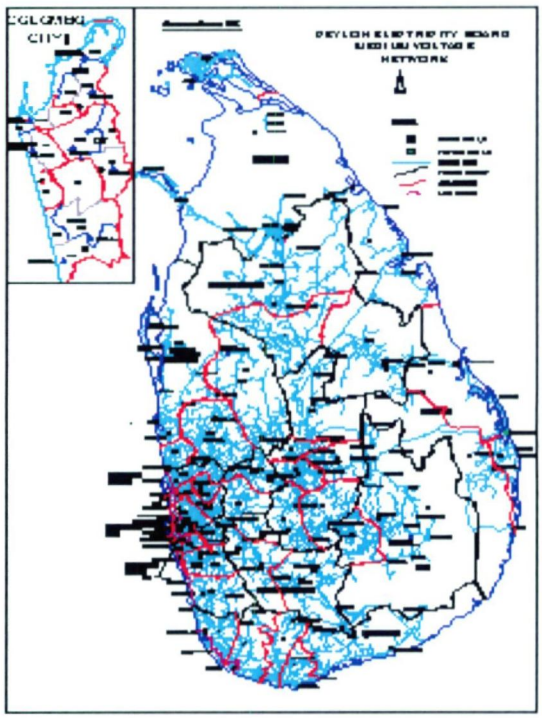

Figure 16- **CEB Area Boundaries**

Various business models have been developed for access to BPL providers. One business model is the utilities company leasing access to their power lines to a provider.

Model-1

In this model, the utility company would collect a regular fee for use of their power lines for data communication and need not have to worry about buying new equipment, customer service or marketing.

Model-2

In another model, the utility installs new equipment and establishes service but leaves the consumer side of business to an established Internet Service Provider (ISP). Finally, the utility company can control all aspects of the business from installing the equipment to marketing the services. This is an area where the utility companies have the least familiarity but it is the most lucrative of all models

- ✓ **CASE STUDY –1**

A study done in a Europe has optimism that Capital expenditure per home passed would be around 100$ to 180$ depending on the generally above 6 customers /transformer penetration.

The attractive value addition (more IP based services) would make people interested resulting in impressive deployment.

✓ **CASE STUDY–2**

BPL Financial Costs ("Powering the Broadband market in 2005 and beyond", February-2005, Millenium research council)

There are number of costs involved in considering BPL models. Initially, there are the costs to BPL providers for the purchase and installation of the necessary BPL equipment along with the electric infrastructure. Secondly, both residential and commercial customers must pay one-time upfront costs for hardware such as BPL modems and subsequent monthly fees for the services.

According to an April 2004 *Electric Utility Week* article, the cost to a utility to deploy a BPL network to one million customers is estimated to be approximately $100 million to $150 million, with the average cost per home passed between $100 and $150. Other cost estimates per home expand the possible range to between $50 and $200. Experts from the industry have stated that installing repeaters, which carry and amplify the data signals along the medium voltage power lines, could cost between $1000 and $5000 per unit. Fiber networks, heralded as the future of broadband, are also seeing costs decline, but still cost a minimum of $800 per home to deploy.

Consumers in the various BPL developments across the nation on average are paying $30 per month for BPL services. For example, residential customers in Manassas, Virginia pay $26.95 per month while Cinergy customers in the Cincinnati, Ohio area pay between $29 and $39 per month. These prices are in line with average costs for DSL and cable modem services. The up-front costs for in home BPL hardware range between $30 and $300 depending on the type of BPL system developed in the customer's community and whether the provider charges the customer for hardware.

✓ **CASE STUDY-3**("Powering the Broadband market in 2005 and beyond", February-2005, Millenium research council)

"The **Ambient** Collaboration with **Con Ed** involves two different deployments of power line communications Technology. The first pilot program involved installing **Ambient** equipment that enables broadband transmissions over power lines in a **Con Ed** substation in Westchester Country, NY. The limited deployment provided Internet access to two Con Ed employees who lived within one mile of the substation and to the Ossining, NY police department. **Bandwidth speeds between 3.5 MBPS and 7 MBPS were available to the customer premises!"**

✓ **CASE STUDY -4 by Corinex**

Capital Expenditure ($)/ Customer	No of Customers /transformer	Cost recovery/Months
1250	5	48
1150	5.5	38
1100	6	36
950	6.75	32
850	10	23
425	20	14

Table 27-Corinex Case Study

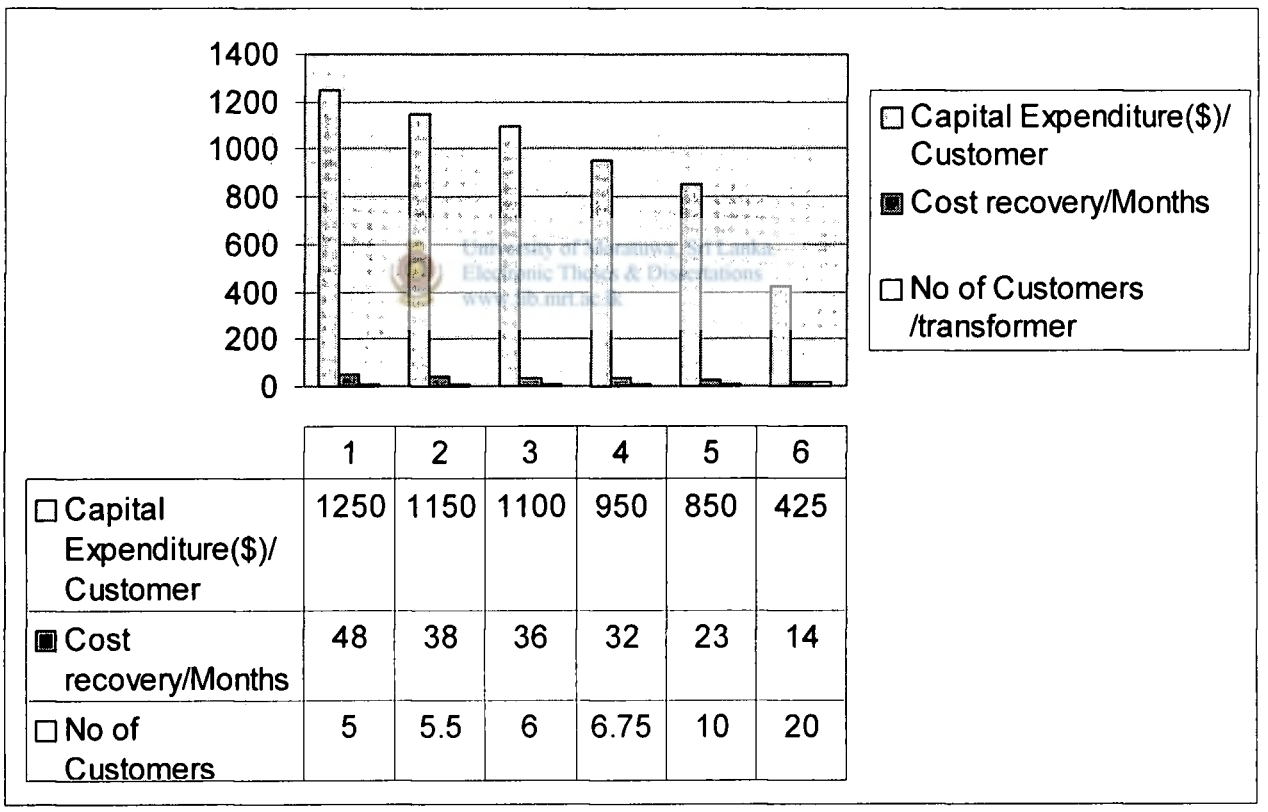

Figure 17-Corinex BPL Summery

Utilities can achieve an ROI in less than two years with an average of 700$ or less capital expenditure per customer

✓ **CASE STUDY-5, by M/s Dialogue Telekom Ltd (DTL) and M/s Addex Pvt Ltd in Sri Lanka**

M/s Dialog is in the process of providing 50 broadband service connections initially to a condominium. For which hardware for the control units and repeaters were accounted at approximately. Rs. 1.5 million and 2 MB shared bandwidth with following features

- All connectivity will be provided using sate of the art power line communication technology
- The Investment required in providing all necessary equipment for backend connectivity and distribution will be born by Dialog.
- Dialog proposes to share 20 modems among all interested residents for a period of 1 week each for testing, which would be provided free of charge. DTL proposes for the management corporation to provide us with a list of interested parties where DTL could provide the connectivity on a first come first serve basis.
- The public areas, which include the main lobby, restaurant and swimming pool areas would be provided with Wi-Fi connectivity at Dialogs cost.
- Wireless Kiosk in a designated public area for the use of those who do not posses a computer will be provided
- A 2 Mbps link will be used to backhaul the traffic from condominium premises to the Internet via Dialog ISP switches. The links would be upgraded as per demand.

Financial considerations

- A monthly rental of Rs. 3,000.00 will be charged for the services rendered.
- The power line modem to be used at the apartment would be priced at Rs. 10,000.00 each Credit card, KIT card and SMS based authentication will be available for visitors would wishes to use the Wi-Fi facility at the lobby.
- Dialog would share with the Condominium management 10 % of the revenue earned through service provisioning at the premises up on reaching 50 residential accounts.
- Customer support would be provided 24 x 7 with visits to resolve issues during working hours

In addition, Dialog wishes to provide other broadband related services that would be launched by Dialog for the use of the residents. These would include Internet Shopping and delivery, IP TV and content provisioning.

✓ **CASE STUDY-6, Main.net Communications- Commercial deployments**

M/s Main.net communications has deployed a BPL system capable of several thousands users in Manassas Virginia, with following facilities.

- 28.95 $/month including high speed, always on Internet access, 5-Email addresses with web mail
- 5 Mbytes personal web space
- No long term contract
- 15 times faster than dial-up

7.6 Findings from Case Studies

Finding	Reference
• Capital Expenditure/Home passed is 100-180$ for above 6 Customers /Transformer penetration • More IP based Services – Drive People to penetrate more	Case Study –1
• Average cost per home passed 100-150$ • Repeater cost 1000-5000$ then the average cost expands to 50-200$ • If fiber used instead BPL, cost would be 800$/home passed • Average monthly rental around 30$	Case Study –2
• Within one-mile radius in New York Bandwidth speeds between 3.5 MBPS and 7 MBPS were available to the customer premises.	Case Study –3
• If there are 20 customer/Transformer, within 14 months, the Capital cost of 425$ can be recovered • Average of 700$ capital expenditure per customer required.	Case Study –4
• 2Mbps shared bandwidth for 50 customers would cost Rs 1.5 million (300$ per customer) • Monthly rental Rs 3000/month • Modem costs nearly Rupees 10000/= • More Services Offered	Case Study –5
• High speed internet for Monthly rental of 28.95$ • 5 Email accounts with web mail	Case Study –6

Table 28- Finding from BPL case studies

7.7 Selection of a Pilot project by CEB

Colombo city comprises four electrical areas viz. Colombo East, West, North and South.

It is advisable to go ahead with a pilot project than going into a large-scale project due to following facts.

- This will be the first access level deployment study in Sri Lanka.
- Real Cost and technical implication are not yet experienced.
- Technology and the image for BPL is still new to Sri Lankan customers
- IEEE working group has yet to release it's standard
- Customer behavior in this regard is still not completely visible
- Trust and the loyalty on the Utility.

From the CEB data bases potential customers are identified in each district .The Colombo city can be used for a model for BPL deployment as customers are closely, uniformly distributed over the area. Further it can be reasonably assumed no of breakdowns /outages are minimum compared to other areas in Sri Lanka.

Area Name/Bill Rs	2000 ≤ 3500	3500 ≤ 5000	5000 ≤	Total
Colombo North	4500	1546	2188	**8234**
Colombo East	3527	1364	2849	**7740**
Colombo South	5288	2680	7444	**15412**
Colombo West	3053	1501	5444	**9998**
Dehiwela	5445	2140	3072	**10657**
Avissawella	1398	413	624	**2435**
Ratmalana	4635	1315	1685	**7635**
Kalutara	1394	316	370	**2080**
Homagama	3239	803	987	**5029**
Horana	1855	491	697	**3043**
Sri J'Pura	4574	1416	2136	**8126**
Kandy City	2440	883	1445	**4768**
Peradeniya	1057	292	361	**1710**
Kundasale	730	220	395	**1345**
Katugastota	1156	288	450	**1894**
Matale	1402	429	670	**2501**
Nawalapitiya	699	253	339	**1291**
Trincomalee	1196	344	548	**2088**
Kalmunai	1174	267	374	**1815**
Ampara	1185	362	725	**2272**
Batticoloa	1752	467	672	**2891**
Kegalle	1299	400	675	**2374**
Weligama	946	292	396	**1634**
Galle	1997	495	801	**3293**
Matara	1371	393	729	**2493**
Ambalangoda	1474	404	539	**2417**
Hambantota	1548	548	913	**3009**
Chilaw	2831	877	1329	**5037**
Kurunegala	2120	655	1214	**3989**
Wariyapola	1131	364	501	**1996**
Kuliyapitiya	1608	514	838	**2960**
Wennappuwa	2138	683	1096	**3917**
Kekirawa	892	282	430	**1604**
Anuradapura	1741	545	995	**3281**
Minneriya	1201	454	762	**2417**
Kahawatta	1409	480	685	**2574**
Ruwanwella	675	218	235	**1128**
Ratnapura	1705	539	823	**3067**
Ginigathhena	618	172	277	**1067**
Diyatalawa	954	346	477	**1777**
NuwaraEliya	1175	411	761	**2347**
Badulla	1508	474	706	**2688**
Jaffna	1482	428	680	**2590**
Vavuniya	927	301	495	**1723**
Veyangoda	1740	439	734	**2913**
Ja-ela	3534	849	940	**5323**
Gampaha	1934	574	832	**3340**
Negombo	3926	1082	1653	**6661**
Kelaniya	3722	906	1143	**5571**
Total	**99305**	**31915**	**55134**	**186154**

Table 29- July 2006 Ordinary Electricity Bill above 2000 Rupees in Sri Lanka

Following Statistics have been derived from network data, consumer statistics, reliability data, Losses and Financial data published by management information region –1 CEB, 2006 August and analyzing the CEB data base for prospective customer (July bill above 2000 rupees –2006).

Description	Numbers
No of Transformers	1053
No of Customers	140939
11Kv/33Kv lengths/km	699.07
230v/400v lengths/km	734.32
Estimated prospective customers from Colombo City for BPL	40527
Optimistic penetration 40527/1053(customers/transformer)	38.5
Total penetration 40527/140939	28.7%

Table 30-Basic Data for a Pilot Project in Colombo City

Area	Potential Customers
Colombo North	**8234**
Colombo East	**7740**
Colombo South	**15412**
Colombo West	**9998**

Table 31- Potential customers, Area wise in Colombo City

7.8 Basic Model for Colombo City – BPL Pilot project implementation

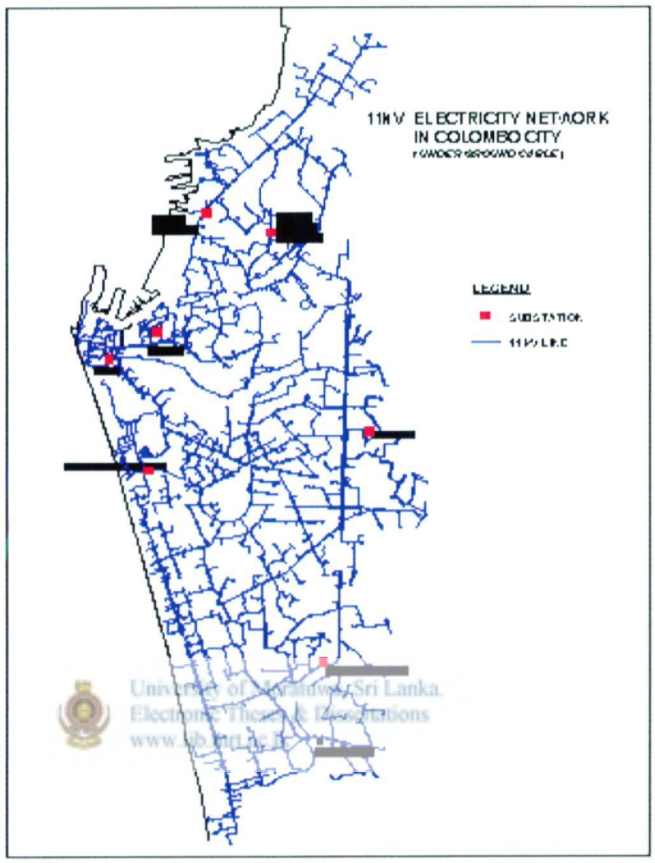

Figure 18-**Colombo City 11kV Network**

From the above findings, It is reasonable to assume 20 customers /transformer even though we find nearly 40 customers for the same .As this is going to be a pilot project, in which the average cost for home passed can be in the order of 425$ as highlighted in the **Corinex Case** .To be competitive in the prevailing market conditions Rupees 1500/= or Rs 2000/= can be considered as the monthly rental compared to ADSL monthly rental of Rupees 2250/= home package (Office Package is around Rupees 6000/=). Up front cost of 50$ could be the modem cost against the rupees 17000/= charged by SLT for ADSL routers in the year 2006 latter part.

- Possible cost requirement for home passed per transformer = 425$
  = 42500 Rupees
- Cost requirement for 20000 customers connected to 1000 transformers
  =42500 x 1000
  =42.5 mRs Rs

- Total cost necessary including 10% management expenses = 47 mRs Cost
- Recovery using Rs 1500/= monthly rental = 47000/1500
  = 31.3 months
- Recovery using Rs 2000/= monthly rental =23.5 months

Hence it is obvious that the cost could be recovered almost within two to three years. This will be most attractive with more IP based Services. It is seen that in "M/s dialog Telekom" proposal their cost of 1.5 million rupees for 50 nos BPL users can be recovered within one year. Hence recovery within two years in this pilot project is fairly justifiable.

8. Discussions and Recommendations for Future Research

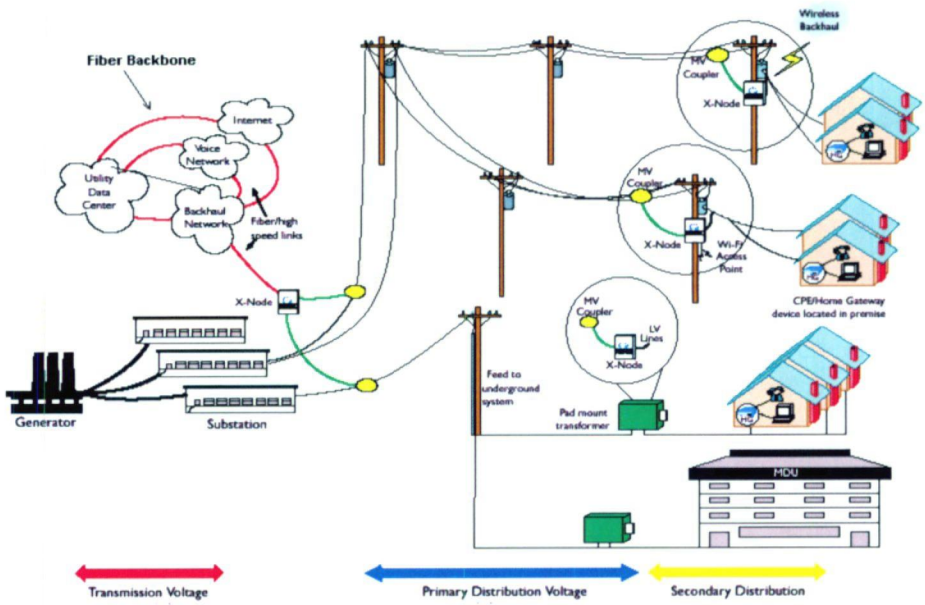

Figure 19-Backbone and BPL Integration (courtesy: www.ambientcorp.com))

This thesis is focused to meet CEB utility communication needs using it's right of way advantage. Installations of fibers (OPGW) for backbone and access through LV power lines have been considered.

In the BPL network, like other high-speed communication networks, segmentation of the network has been provided by means of modems, routers and switches. During the initial phase of network deployment, the number of subscribers will be low, thus it will be cost effective to bridge the network segments. However, as the number of subscribers increase, network switches or routers can be used to maximize the bandwidth availability to the user. At higher subscriber densities, bandwidth can be maintained by using additional backhaul connectivity points. The data communication network overlays the utility distribution network and hence it requires a number of intermediate devices such as nodes: These nodes are positioned at the substation (S), repeaters(R) in the mid span, at the distribution transformer (X), and in the subscriber home in the form of customer premises equipment (CPE) or gateway (GW). Real implications and cost involvements are at stake.

The first part of this thesis has been evaluated by selling extra capacities (bandwidth) and the later has been formed using case studies to provide IP based services using MV/LV power networks by forming a techno partnership with the market leader/s. There will be a big change in future for

bandwidth demand, technology, regulatory issues etc. and existing giant players will get themselves adjusted to the dynamic changes. Hence future work will be entirely different than today as communication requirements, technologies as modes are changing and developing rapidly.

Even though there are ring topologies in the fiber backbones, 1+1 path protection will halve the available capacity. Hence if there is a rapid demand for bandwidth, must switch to the higher version of multiplexer (eg. STM –64) or change the technology to WDM or DWDM, which is valid for future.

The model for development of Fiber optic backbone will cover main cities of Sri Lanka efficiently and effectively than competitors (See Annex). Together with the indirect benefits, this backbone development can ease the CEB financial position dramatically under prevailing market condition.

The pilot project on BPL deployment can identify the viability of the project and its utility value to the country in general. The benefits can be directly related to the rural sectors and society in return.

The present monopolistic situation of SLT the E-1 bandwidth price of 290$ could go down drastically with other operators penetration. To be competitive in the field of communications, monthly charge of rupees 20,000/= for E-1 link and rupees 2000/= (or 1500/=) for BPL charges have been considered .In the worst case, 1.9 m$ (Table-22) could be considered as the starting point to after selling the total available bandwidth to have viable project.

The VPN prices have to be renegotiated as with advanced technologies like Multi-Protocol Label Switch (MPLS) that is not transparent to customer, can bring down the operators costs. The MPLS Major applications are Network Scalability, Traffic Engineering and VPNs. These re-negotiations can bring down VPN expenditure to some extent.

Total available bandwidth of E-1 can be further scale down to 64 KB channel to share among total of **186154 prospective BPL customers (Table - 29)**. Approximately 4238 x 30 =127,140 customers could use this backbone at 64kb levels simultaneously. Using Traffic analysis, these available connections can be further expanded to approximately 1.5 times. Anyway connectivity depends on the user requirement and applications. Further Analysis shows even with 80% capacity sold at the rate of Rupees 3756 per E-1 link under open market condition, gives 9% IRR that would be the worst-case scenario.

In future, this RESEARCH can be considered as the starting point, and it should include ways and means to:

- Identify the technology that is valid for future.
- Study a feasibility to determine overall costs and profitability;
- Do competitive analysis to determine who the competitor is, how those companies are offering their services and who is receiving them;
- Develop strategies to build trust among customers to become loyal customers of the Utility
- Do a broad market analysis to determine whether customers are likely to purchase those services through their electric utility provider and what the consumer penetration rates will be;

It should indicate when the utility is likely to break even and when it should become profitable.

Literature review indicates that utilities can enjoy great success in new business ventures, but the process of breaking into new markets can sometimes be confusing. That was the case in the early days of deregulation, when there were few laws in place supporting utilities looking to offer communications services.

Deregulation legislation is not going away. While some may view it as the end of a lucrative era, it has been recognized that deregulation is providing tremendous opportunities for enhanced revenue in the utility industry. Providing one or several communication services to their current client base is a viable and very profitable option for utility companies to meet, and exceed, their revenue goals this decade.

The SLT has identified that there are demands for STM-1 bandwidth at a cost of Rs 450,000/= per month. This seems to be a good trend and if the trend is there when the implementation is in progress, it is better to use STM-16 optical multiplexers to all nodes or higher version of it together with the suitable technology.

In this study real monetary quantum couldn't be identified after implementing BPL network for the benefit of the utility. There will be considerable loss reductions in the distribution sector and other indirect positive impacts, which can be calculated, in monetary terms. This would be a good area for future research work.

For BPL implementation, only one customer group was targeted and there may be a potential for others customer categories too, hence in future research work it is recommended to use wider customer base and other available technologies too.

The possible interferences, regulatory issues etc. have not been considered in BPL analysis. The pilot project can address a lot of issues in this regard.

Techno Partnership with the market leader is highly recommended to go ahead with this backbone & BPL project. This will enhance the image of the project and trust among the people.

The potential for techno-commercial partnership must be based on core competencies in area of corporations. These areas of cooperation must be focused to the establishment of fiber optic backbone and BPL network.

8.1 Develop a Mechanism to identify Challenges-Competition

Many private telecommunication companies that were formed as a result of the deregulation of the telecom industry are offering services such as long distance telephone, wireless, Internet to residential and business customers. Many direct broadcast satellite providers also are in the mix. So electric utilities must be future oriented to rub shoulders with existing players in the arena and must be constantly vigilant in this competitive business of communications.

8.2 Trunking Mobile VHF/UHF

CEB is presently using conventional analogue VHF/UHF mobile communication system for day-to-day activities in the distribution sector. There is a high utility value with respect to operational activities in distribution sector if we go for trunking (fully digital) as CEB has other infrastructure for repeater locations, towers etc. Cost benefit analysis is yet to be undertaken.

8.3 Marketing

Marketing strategies have not been considered in this thesis. The aggressive marketing campaign would help to build the image & reputation and escalate revenue in return. The awareness of the BPL usage to citizen of Srilanka would be challenging as it takes time to adjust the mind set to new system.

It is obvious that business risk for any new venture requires market share and size analysis. Careful market research is a must

8.3 Training

Continuous trainings on professional development, technologies, maintenance of equipments etc. must be carried out regularly and maintenance teams must be deployed throughout the country with sufficient logistics. Special training must be given to maintenance groups on handling Optical Time Domain Reflectrometer (OTDR) and Optical Splicer in view of the better maintainability of the Backbone.

8.4 Spare parts- Tools

Sufficient stock of spare part and sophisticated tools must be made available with the maintenance groups to reduce the down time of the system

8.5 Redundancy

Even though there are fibers running in major power lines, with ring configurations, the use of digital wide band PLC system will give added reliability to the network incase of sabotage attempts over fibers as it requires considerable time and expertise to repair.

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10. Annex

10.1 VPN payments /Months

Location	Cir ID	Monthly Rental/LKR.	Bandwidth/kbps
T-1 CEB – HQ	8715F	9,090.00	128
T-2 CEB - HQ2	CEN2390851	8,250.00	128
T-3 Communication	CEN2434815	5,500.00	64
T-4 System Control	MD2681509	5,500.00	64
T-05 Internet Connectivity	10826F	71,040.00	256
		99,380.00	
R1-1 E1 HQ Call Center	9568F	21,000.00	E1
R1-2 E1Maligawatte	10179F	21,000.00	E1
R1-3 Front Street- Col 11	8722F	7,090.00	64
R1-4 York Street – Col 01	8721F	7,090.00	64
R1-5 Col 04	8735F	7,090.00	64
R1-6 DGM-Colcity	KPT2575923	8,250.00	128
R1-7 Col-North	CEN2434790	5,500.00	64
R1-8 Col-South	KIR2513954	5,500.00	64
R1-9 Col-East	MD2694296	5,500.00	64
R1-10 E1 Kolonnawa	10827F	10,930.00	64
R1-11 Maligawatta	10009F	7,100.00	64
R1-12 Jaffna	9687F	20,300.00	64
R1-13 Vavnia	10010F	16,494.00	64
R1-14 DGM-NWP	10828F	15,176.00	128
R1-15 DGM-NCP	10829F	18,972.00	64
		176,992.00	
R2-1 WPN	10022F	14,210.00	128
R2-2 EE-Veyangoda		10,930.00	64
R2-3 EE-Kelaniya		10,930.00	64
R2-4 Gampaha	9597F	9,930.00	64
R2-5 Ja-Ela	9596F	9,930.00	64
R2-6 Negombo	9607F	10,000.00	64
R2-7 DGM-Central	10252F	12,850.00	128
R2-8 Matale	9679F	9,930.00	64
R2-9 EE-Ampara	9827F	16,494.00	64
R2-10 Kalmunai	9661F	16,494.00	64
R2-11 EE-Kandycity	10251F	10,850.00	64
R2-12 EE-Peradeniya	10359F	9,930.00	64
		142,478.00	

Location	Cir ID	Monthly Rental/LKR.	
R3-1 DGM-Uva	9164F	13,700.00	64
R3-2 POS Badulla	9201F	13,700.00	64
R3-3 Homagama	9203F	10,000.00	64
R3-4 EE –Jpura	9165F	10,000.00	64
R3-5 Avissawella	9204F	10,900.00	64
R3-6 DGM-WPS2	9307F	10,000.00	64
R3-7 CE-Costn- Nugegoda	9309F	10,000.00	64
R3-8 Horana	9308F	11,000.00	64
R3-9 Nawalapitiya	9688F	10,857.00	64
R3-10 DGM-Sabaragamuwa	10741F	13,699.00	64
R3-11 EE-Diyathalawa		14,669.00	64
		128,525.00	
R4-1 AGM-R4, Dehiwala	9472F	9,930.00	64
R4-2 Meter Lab-Piliyandala	PYL2608715	5,500.00	64
R4-3 Ambalantota	9789F	20,244.00	64
R4-4 DGM-South,Galle	9790F	17,419.00	128
R4-5 Matara	9784F	17,419.00	64
R4-6 POS Akurassa	10131F	13,669.00	64
R4-7 POS Thissamaharama		14,669.00	64
R4-8 People's Bank- Dehiwala	9785F	13,680.00	64
R4-9 Kalutara - North	9783F	14,607.00	64
R4-10 POS Mathugama	9846F	10,857.00	64
R4-11 WPS1	10023F	14,203.00	128
		152,197.00	
	Total/Month	699,572.00	

10.2 Annex-Sample Questionnaire

Dear Sir / Madam,

I am a Post Graduate Student of the University of Moratuwa, engaged in a research study on the "effective utilization of Communication System in CEB" as a partial fulfillment of the Master of Business Administration degree program.

I would be thankful if you could spare a few minutes and fill the questionnaire based on the requirements & experience.

This questionnaire is a part of the research study to find out the feasibility of the project and to identify prospective customers who would probably be interested in using communication services such as internet, telephone etc., through Power Line (Broadband Power Line) if such services are offered by CEB at a competitive price.

The Information provided to this questionnaire will remain completely confidential and be used solely for the academic purpose and assure your anonymity. Further, if you need any clarifications please contact the undersigned at your convenience.

Thanking you.

Yours faithfully,

Eng.P.B.Mahinda Wijayashantha

Tel. No:0777917949 / 0714115632

Email No: cecomsys@ceb.lk

Date: 18/09/2006

Introduction

Broadband over Power Lines (BPL), also known as Power Line Communication (PLC) is a quickly evolving market that utilizes electricity power lines for the high-speed transmission of data services. The new low power, unlicensed BPL systems couple radio frequency energy onto the existing electric power lines, to provide high-speed communication capability. The Radio Frequency data signals are inductively coupled. During power outages, this service can be continued for a considerable time with DC power provided the line is not earthed or broken. BPL can serve as an interface between the utility and the customer

How does BPL work?

BPL systems couple radio frequency (RF) data signals onto the existing electric power lines to provide high-speed data communication. The high frequency (1 MHz – 30 MHz) data signals are transmitted through the same power lines that carry low frequency electricity (50 Hz) to household or business. This enables both the signals to coexist on the same wire.

1) What is your last month electricity bill at

   a) Office

   b) Home

2) Do you use a computer at home

   a) Yes

   b) No

   c) Intend to buy

3) Do you use internet at

   a) Office

   b) Home

4) Do you use Emails at

a) Office

b) Home

5) What is your monthly Internet charge?

a) At office

b) At home

6) What is your average monthly telephone bill

a) Fixed Phone

b) Mobile Phone

7) If you are provided with other bundled of IP based services using BPL technology, (video, IP Telephony, video surveillance, Other utility services such as automated meter reading, billing data and outage notifications, Cable TV etc) would you like to have that facilities over a Power Line, which gives you reliable high quality service at competitive price.

a) Yes

b) No

8) If your answer for above (6), is NO

Why.....

9) Any other Comments, which you feel important for this study. Pl Write/Explain

10.3 ISP packages

Suntel wOw

Packages	Base Fee	Free Hrs.	Deposits	No. of Email Acc	Additional Charges
wOw Lite	Rs. 650	30hrs	Base Fee x3	2	Rs. 1 per min
wOw Biz	Rs. 1500	150hrs	Base Fee x2	3	Rs. 1 per min
wOw Advantage	Rs. 2000	250hrs	Base Fee x2	3	Rs. 1 per min
Ten2Six	Rs. 400	35hrs	Base Fee x3	1	Rs. 1 per min

SLT net

	Light Use					Heavy Use		Networking	
	Student In box	E-mail only	Light Surfer	Regular	Premium	Business Basic	Business Plus	ISDN Network Account	PSTN Network Account
Startup Fee (Rs.)	-	500	250	1000	1000	1500	1500	1000	1000
Monthly Rental (Rs.) (Optional)	100	200	250	500	1000	2500	4000	6000	4000
6 Month Upfront Rental(Rs.) (Optional)**	-	-	-	2400	4800	12,000	19,200	-	-
Free Hrs/Month	-	-	15	30	150	250	350	150	150
No. Of Email Accounts	1	1	1	2	3	5	20	-	-
No. Of Internet Accounts	-	-	1	1	1	5	20	1	1
Free Web Space Allowed	-	-	-	-	-	1 mb	2 mb	-	-
Remarks	Note 4 & 5	5		Note 1 & 3	Note 1 & 3	Note1 - Not for ISP	Note 1	Note 2 - 1 IP given	Note 2 - 1 IP given

Eureka

	Monthly Fee	Start up Fee	Email@ddress	Internet	Free Hrs/Month Peak	Free Hrs/Month Off peak	Additional use Peak	Additional use Off peak
▪ Eureka E-mail	Rs.250.00	1500.00	1	No	60 hrs	Anytime	2/=	Anytime
▪ Epromo	Rs.495.00	1500.00	1	Yes	50 hrs	10 hrs	2/=	Anytime
▪ Eureka Plus	Rs.750.00	1500.00	1	Yes	8 hrs	65 hrs	2/=	2/=
▪ Eureka Pro	Rs.1050.00	1500.00	2	Yes	200 hrs	Anytime	2/=	Anytime
▪ Eureka Max	Rs.2500.00	2500.00	3	Yes	400 hrs	Anytime	2/=	Anytime
Promotional Package								
▪ Eureka Value	Rs.585.00	1500.00	1	Yes	35 hrs	Anytime	2/=	Anytime
▪ Eureka Budget	Rs.425.00	1500.00	1	Yes	20 hrs	Anytime	2/=	Anytime

- **Virus Guard Rs.95 - (In addition to the monthly rental)**
- **Spam Filtering Rs.95 - (In addition to the monthly rental)**

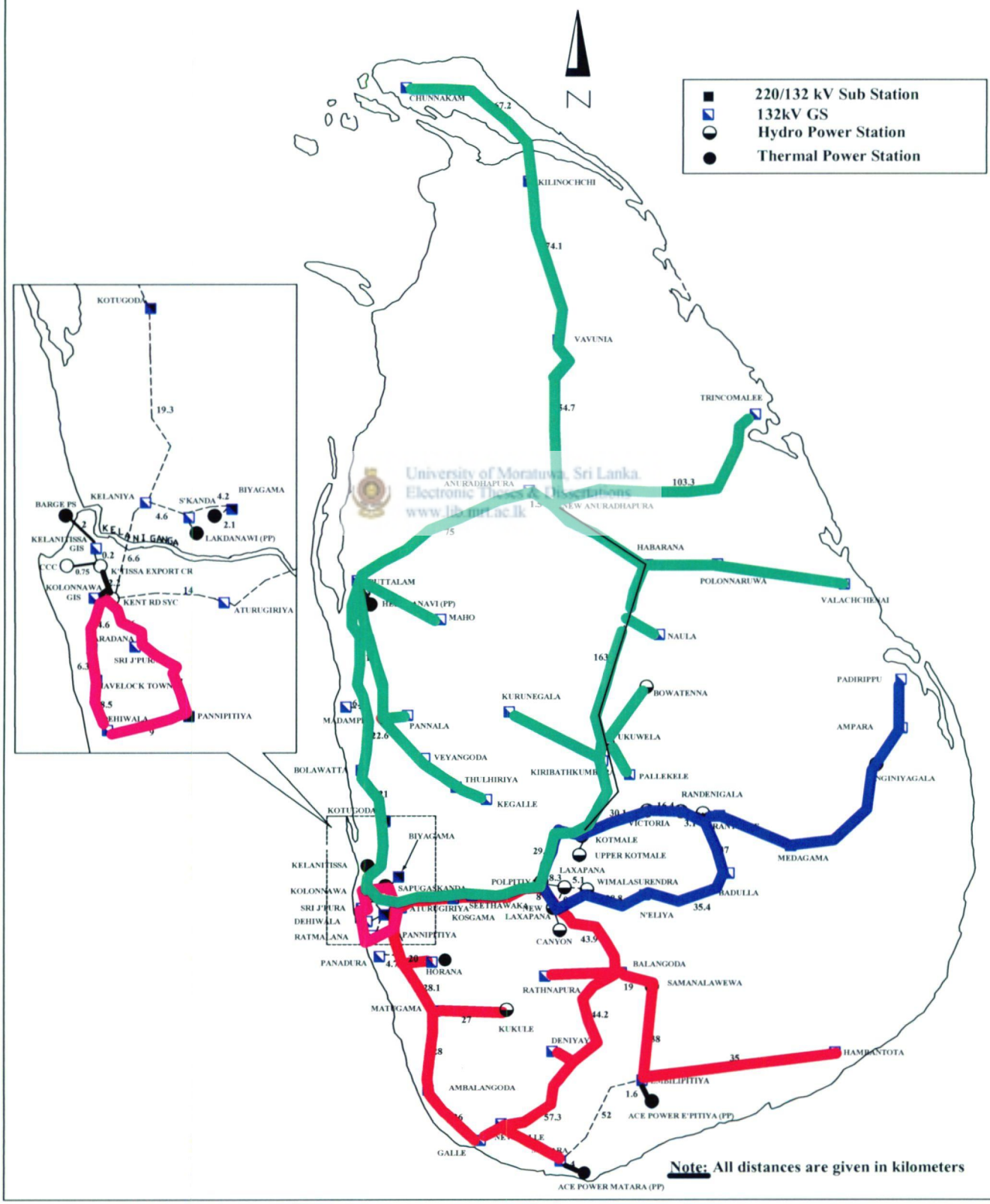
Discounts Offered

06 months Advance payment on monthly rental - 10%
12 months Advance payment on monthly rental - 15%
*All prices quoted are subjected to 15% VAT & 1% BSC

Eureka Plus	
Off Peak	Mon - Fri 1.00 am - 7.a.m
	Saturday & Sundays
	Mercantile Holidays
Peak	All other times

Epromo	
Off Peak	10 Hours
	9 PM- 12 AM
Peak	50 Hours 12 AM - 9 PM

ANNEX 10 4
Proposed & Existing Communication by using Fiber Optic Lines-2010



Annex 10.5
Existing Telephone System Numbering Plan Sri Lanka (Administration)