

## **POVERTY AND SOCIAL IMPACTS ANALYSIS**

---

Understanding the impact of tariffs and connection costs for the preparation of the National Electrification Plan, Myanmar

The data presented here is based on qualitative research conducted by Enlightened Myanmar Research between February and June 2014.

## Contents

|  |    |
|--|----|
| List of Acronyms .....   | 3  |
| Executive Summary.....   | 4  |
| Quality of the service in rural areas.....   | 8  |
| Monthly bill comparison and increase percentage of tariff in different groups .....  | 12 |
| Different types of businesses surveyed (Yangon and Mandalay) .....   | 13 |
| Part I - Introduction.....   | 17 |
| 1. Context .....   | 17 |
| 2. Key Research Questions.....   | 17 |
| Table 1: Key research questions for the PSIA qualitative module .....  | 18 |
| Table 2: Changes in tariffs in effect by April 2014 .....  | 19 |
| 3. Methodology .....   | 20 |
| 3.1 Qualitative Module: Selection of Research Sites and Informants .....   | 20 |
| Table 3: Rural sites for qualitative analysis (a total of 13 villages) .....   | 20 |
| Table 4: Research sites in urban areas (a total of 9 wards of which two industrial zones) .....                              | 21 |
| Table 5: Consultations conducted for institutional analysis .....  | 21 |
| Part II - Qualitative Analysis .....   | 22 |
| 1. Barriers to Access.....   | 22 |
| 1.1 In Rural Areas .....   | 22 |
| Box 1: Self-Reliant Electrification.....   | 22 |
| Box 2: The cost of connection to the grid remains the key barrier in rural areas .....                                       | 24 |
| Table 6: Villages with access to electricity grid.....   | 24 |
| Box 3: Governance Challenges in Self-Organizing.....   | 25 |
| Table 7: Access to electricity services within villages (rural areas).....   | 26 |
| Table 8: Cost of household connection for community-based initiatives and small electricity re-distribution businesses ..... | 27 |
| Box 5: Electricity Re-distributing Business in Rakhine.....  | 27 |
| Box 6: Distribution of solar panels .....  | 28 |
| 1.2 In Urban Areas.....  | 29 |
| Table 9: Coverage of “government-provided electricity” within targeted wards in three cities Yangon, Mandalay and Hakha..... | 29 |
| Figure 1: Limited access to the Government grid in YGN-3.....  | 30 |
| Table 10: Wards with access to electricity distributed by small-scale private providers in three cities....                  | 31 |
| Table 11: Cost of household/commercial connections in urban areas .....  | 32 |

|  |    |
|--|----|
| Box 7: Who supplies electricity for those without access to the Government grid in Yangon?             | 33 |
| 2. Uses of electricity and quality of the service  | 34 |
| 2.1 Rural Areas  | 34 |
| Figure 2: Household perceptions of expenditure in energy and electricity                               | 34 |
| Table 11: Uses of electricity by welfare group across rural areas                                      | 35 |
| Table 12: Rural SMEs monthly use of diesel   | 36 |
| Table 13: Quality of the service   | 37 |
| 2.2 Urban Areas  | 37 |
| Figure 3: Household Perceptions electricity and energy expenditure as a proportion of total costs      | 38 |
| Table 14: Uses and feedback on quality of the service in urban areas                                   | 38 |
| Box 8: Improvements in the quality of service in Mandalay  | 39 |
| 3. Tariff Affordability: perceptions   | 40 |
| Figure 4: Electricity Bill for Village 2 produced by the electricity committee (charging 50 Kyats kWh) | 40 |
| 3.1 Rural Areas  | 40 |
| Table 15: Rates and additional charges (Government and Private Companies in Rural areas)               | 41 |
| Table 16: Rates charged by community-based schemes and small businesses re-distributing electricity    | 41 |
| Figure 5: Doing homework in the evenings in a Ayeyarwaddy Delta Village without access to electricity  | 42 |
| Box 9: Making do without electricity   | 42 |
| Table 17: Getting an overview of cost/quality across types of service providers in rural areas         | 43 |
| 3.2 Urban Areas  | 43 |
| Figure 6: Bills for consumers in the industrial zones in Mandalay and Yangon                           | 44 |
| Table 18: Monthly bill comparison and increase percentage of tariff in different wealth groups         | 44 |
| Table 19: Different types of businesses surveyed (Yangon and Mandalay)                                 | 45 |
| Table 20: Average weekly use of diesel (gallons) by SMEs   | 46 |
| Table 21: Summary of tariff increases impact and perceptions in urban areas                            | 47 |
| Part IV – Conclusion and Recommendations   | 48 |

## List of Acronyms

|        |  |
|--------|--|
| EI     | Earth Institute  |
| FGD    | Focus Group Discussion   |
| GDP    | Gross Domestic Product   |
| KII    | Key Informant Interview  |
| kWh    | Kilowatt hour  |
| LIFT   | Livelihoods and Food Security Trust Fund                           |
| MoEP   | Ministry of Electric Power   |
| NEP    | National Electrification Plan                                      |
| PSIA   | Poverty and Social Impacts Analysis                                |
| QSEM   | Qualitative Socio-Economic Monitoring                              |
| TA     | Technical Assistance   |
| WB     | World Bank   |
| SMEs   | Small and Medium Enterprises                                       |
| ESE    | Electrical Supply Enterprise                                       |
| YESB   | Yangon Electrical Supply Board                                     |
| CSO    | Civil Society Organization   |
| UMFCCI | Union of Myanmar Federation of Chambers of Commerce and Industries |
| DEP    | Department of Electric Power                                       |
| SRE    | Self-Reliant Electrification                                       |
| YGN    | Yangon   |
| CHN    | Chin   |
| MDY    | Mandalay   |

## A. Executive Summary

### Objective and key research questions

**The Government of the Union of Myanmar is currently preparing the Myanmar National Electrification Plan (NEP). The NEP aims to electrify 100% of Myanmar's households by 2030.** According to the Earth Institute's (EI) geospatial planning results, this means connecting more than 7.2 million households over the next 16 years. Balancing financial sustainability with addressing consumers' concerns about price increases, and in particular the need to protect poor and vulnerable consumers will be key for the implementation of the NEP.

**The development of the NEP supported by the World Bank (WB) through a series of capacity building and Technical Assistance (TA) activities includes a review of electricity tariffs and subsidy mechanisms.** The Poverty and Social Impacts Analysis (PSIA) is intended to support this process by providing information on: (i) the institutional context where the development and implementation of the NEP takes place; (ii) energy and electricity consumption patterns with a focus on energy poverty; (iii) perception of affordability of electricity connections and recurrent charges - with a particular focus on the new tariffs introduced in April 2014 and how these have affected different groups of consumers; and (iv) consumers' perspectives on the quality of services and understanding of pricing. The PSIA used a mixed methods approach and included a quantitative and a qualitative module to collect information on the issues outlined above.<sup>1</sup>

**The PSIA was implemented in a context where Government announcements of tariff increases in November 2013 met with significant opposition and protests on the part of citizens. Electricity tariffs for retail customers were adjusted in April 2014<sup>2</sup>.** The new tariff system introduced three tariff blocks for residential, small and medium-sized customers: (i) less than 100 kWh at 35 kyats; (ii) from 101 to 200 kWh at 40 kyats; and (iii) more than 201 kWh at 50 kyats. For industrial and large customers, there are six tariff blocks with tariffs range of 75-150 kyats/kWh. Effectively, residential, small and medium-sized customers will be cross-subsidized by industrial and large commercial customers since their new tariffs (35-50 kyats/kWh) are below the average cost of supply (Table 2 provides an overview of the increases in tariffs for different consumer groups).

**The PSIA drew on the results of a “deep-dive” into the 2009 IHLCA data focusing on access to electricity, reliability of supply and affordability.** A background paper (forthcoming) by Kozel and Kim is currently being finalized and will include an overview of the methodology.

**The qualitative analysis undertaken drew on the ongoing research program of the Livelihoods and Food Security Trust Fund (LIFT): Qualitative Socio-Economic Monitoring (QSEM) implemented for the World Bank by the Enlightened Myanmar Research (EMR) consultancy firm.** The selection of field sites took into account the importance of understanding the different contexts, conditions of access to electricity and perceptions of consumers in **rural and in urban areas**. The Focus Group Discussion (FGD), Key Informant Interviews (KIIs) and Household Questionnaires were field tested and adjusted based on the feedback from respondents. For rural areas, a sub-set of 13 the 56 QSEM villages were targeted to collect information from areas with different types of access to electricity in different Regions/States and “agro-ecological zones” (as outlined in Table 3). Overall a total of 114 FGDs and 378

---

<sup>1</sup> The quantitative analysis based on 2009 Living Standards Survey (IHLCA) will be presented in a forthcoming paper by Kozel and Kim

<sup>2</sup> Previously tariffs had been adjusted in January 2012 following significant devaluation of the Myanmar kyat

KII were conducted across all research sites.<sup>3</sup> All names of villages, wards, informants and FGD participants have been changed to ensure the anonymity of the respondents.

### Barriers to access and main uses of electricity

**The IHLCA data indicates that overall, 28% of households in Myanmar were connected to the public grid in 2010 with marked differences between rural and urban areas: 77% of urban households were connected to the grid compared to only 10 percent of rural households.** An additional 15% reported they purchased electricity from private suppliers (9% of urban households, 18% of rural households). Another 5% indicated they used communal or had a private generator, and 7% reported using batteries for lighting. Overall, the IHLCA data indicates that there were substantial gaps in access to reliable electricity and that households, and communities and households developed innovative alternatives to secure access to electricity albeit without ensuring reliable supply.

**Overall, households with public connections were much more likely to live in urban areas and were wealthier than households with private or communal connections.** Access to electricity was highly correlated with income. Better off households were much more likely to use electricity (particularly the public grid) than poorer households.

**According to the IHLCA data, households connected to the public grid reported spending 1.4% of total expenditures on electricity, and the share of spending was fairly constant across the income distribution (for poor as well as rich households).** Households accessing electricity from private suppliers reported spending 2.2% of total consumer expenditures on electricity, which was also constant across the income distribution. Low spending is the result of modes tariffs and a generous lifeline tariff cut-off, coupled with low electricity consumption. A substantial number of (public electricity) households in Myanmar consume below the lifeline tariff (currently set at 100 KWh/month): in urban areas, 30% of households consumed 50 KWh/month or less, and 66% consumed 100 KWh/month or less. In rural areas, 53% of households consumed 50 KWh/month or less, and 88% consumed 100 KWh/month or less. Overall, current tariffs are moderate and electricity remains affordable to those who currently have access.

**Importantly not all households within electrified villages and wards were themselves connected to electricity services.** Electrification rates for urban wards/rural villages were substantially higher than electrification rates for individual households. According to the IHLCA, 41% of wards or villages were connected to the public grid, 13% reported communal electricity sources, and 50% had households that used electricity from a private supplier. Overall, 78% of urban wards and rural villages had some type of electricity supply available (viz. public, private, or communal). In 40% of electrified wards/villages, nearly all households were electrified. But private connection rates were highly variable in the remaining 60% of wards/villages.

**Very few households had electricity available 24/7. Surprisingly, there was no strong relationship between the reliability of the supply of electricity (measured in average hours available/day) and household income.** Households connected to the public grid reported an average availability of 12 hours/day, households connected to private suppliers reported an average availability of 10-11 hours/day

**IHLCA tabulations, augmented by some additional simulations, do not suggest that electricity affordability is currently a concern for households currently connected to electricity services in Myanmar.** It is important to understand this finding in a context where better off households are

---

<sup>3</sup> Village and ward names were removed for the analysis/write to guarantee respondents' anonymity particularly relevant for case studies to be developed on barriers to access to electricity, governance issues of Electricity Committee, informal charge collected.

currently much more likely than poorer households to be connected to the grid. In addition, this finding was not reflected in the qualitative analysis and warrants additional study. Qualitative analysis further indicated that in rural areas, electricity committees and private companies do charge rates significantly above those set by MoEP. Further analysis will be particularly relevant as the NEP plans a steep increase in the number of households to be covered by electricity services and an outreach to poor and marginalized households currently not connected.

#### *Barriers to Access in rural and urban areas*

**The “Self-Reliant Electrification Approach” (SRE) currently in place through which communities raise their own funds to connect to the Government’s electricity grid provides no financial support to communities. Access to electricity in rural areas is limited, therefore, by the current coverage of the grid but also by the fact that villages must cover the costs of the connection from the main “transmission” line to the village itself.** All three villages with access to the government electricity were located immediately beside the main road/transmission lines (or beside a sub-station). However, of the remaining nine villages without access to the government grid five were similarly located within 2 to 3 miles from the main roads and the transmission lines.

**Limited technical support is provided by the township departments of the electricity companies responsible for overseeing the SRE and there is little regulation of the role of electricity committees that oversee SRE at village level.** Composition and selection of electricity committee members, their functions and roles, segregation of duties, procedures for financial management and procurement, disclosure of information, community mobilization and planning procedures as well as the rates for be charged are left to the discretion of the committees themselves. This creates a number of organizational and governance challenges and often results in electricity tariffs significantly above those set by government. Given the limited external support available for SRE, social cohesion, social capital and quality of leadership at village level play a key role in determining the village’s chances to access the Government’s electricity service.

**Within villages connected to the grid (or with access to electricity through community initiatives), a significant proportion of the population (middle and lower income households) remain without access.** The fees associated with connecting the village to the grid are unaffordable for these households. In addition, the research team noted that poor households are excluded right from the planning stages – as village leaders/elites assume their inability to pay and do not invite them for discussions. While there were no instances noted (in the areas visited) of particular groups being denied access to electricity based on other social factors (ethnicity, political or religious affiliation for example) poorer villages and households are systematically being excluded due to their inability to pay for the connection.<sup>4</sup> No instances of cross-subsidization were observed (where the village itself put in place a mechanism to facilitate access to poorer households). In five of the 9 villages with a functioning electricity scheme, poor households did not use electricity at all, relying on batteries, candles and kerosene lamps.<sup>5</sup>

**Barriers to access (inability to connect to the service) were less relevant in the main urban centers but significant for smaller cities (Hakha) and for informal settlers in poorer wards (Yangon and Mandalay).** Overall access was not the key concern in the major urban centers of Yangon and Mandalay and issues of quality of service and affordability were more frequently highlighted by respondents across all

---

<sup>4</sup> In this regard it is important to note that qualitative analysis was undertaken in 13 villages only and that further work will be conducted under the PSIA Phase II to understand possible social dimensions of exclusion within villages with greater depth.

<sup>5</sup> Please refer to Section 2.1 outlining that for villages with connections to the grid household with access to the service are usually those better off.

wards visited.. There were, however, noteworthy issues of access particularly by informal settlers in Yangon (namely in the poorer ward visited, YGN-3)<sup>6</sup>. While the costs of the connection were indicated as a barrier to access by a small minority the most commonly mentioned reason for using these “better than nothing at all” services in Yangon was the inability to secure the necessary documentation (including household and land registration as well as approval of the application by the ward leader) to apply for a connection.

**Informal connections to small-scale local providers of electricity (using diesel generators) were observed across all cities and were particularly important in Hakha.** This was noted given the limitations of the coverage by government-provided electricity services (only a few hours every other day). In Mandalay, all neighborhoods visited had connections to electricity provided by similar small-scale operators. This was conveyed as a “back-up” option given the widespread black-outs experienced until recently in the city. In Yangon the research team found a different scenario where only the poorest groups (informal settlers) relied on the services of these small local private providers given their inability to access the grid as highlighted above.

**The cost of connections for households and industrial/commercial consumers varied across sites but did not constitute a barrier for the majority of respondents in urban areas as it did in rural areas.** However, as noted above, the poorest and marginalized households in low income wards could not afford the connection fee and used informal electricity providers instead. In addition, interviews conducted with households from the wealthiest quintiles and businesses in Industrial zones in Mandalay and Yangon indicated that a significant portion of the connection cost had been shouldered by the households and/or by businesses themselves at the time of establishment.

#### *Uses and quality of the service*

**The qualitative analysis indicated that uses of electricity were very consistent across research sites in rural areas. Household use was primarily for lighting and TV across all sites visited.** For lower middle income households (among those with an electricity connection) lighting was often the only use found. Diesel was the primary source of energy for livelihood activities for the vast majority of households and small businesses interviewed. Overall, the cost of diesel (and fluctuations in cost) were a significant constraint to their profitability and there was high demand among rural Small and Medium Enterprises (SMEs) for grid-based electricity services.

**While current usage of electricity was limited, households across all rural research sites (with and without access to the Government grid) highlighted the importance of an electricity connection to “be linked up to the outside world”** particularly through a TV. There was a sense in village with no electricity connections that they were left behind in terms of the “modernization” process (particularly where better-off villages in the vicinity were connected to the grid). Furthermore, there was high demand for more reliable electricity services so children could study at night and electricity could be used for livelihood activities (in the areas visited this consisted of pottery making in the evenings, lighting in small village shops and more generally agricultural activities given the very high perceived cost of diesel).

**Agricultural tasks for large/medium/small farmer were systematically carried out with diesel generators.** These were owned for large/medium farmers and rented out for small farmers. Better off households, in villages with reliable electricity supply, used electricity for water pumping and limited irrigation. In the areas surveyed, fishermen mainly relied on diesel generators for productive activities (i.e for lighting to sort fish in the evenings).

---

<sup>6</sup> Informal settlers in Yangon (YGN 3) are not included in wards records and therefore not officially “counted” in data on access to electricity (please see Table 9)

## Quality of the service in rural areas

| Types of Sources   | Villages   | Regularity   | Capacity   |
|--|--|--|--|
| Grid Connection<br>(Government or<br>Private Provider)                       | Village 1 (Magway)- Grid                           | Regular access- 24 hours<br>(black-outs very rare) | Good capacity (regular household uses –<br>lighting and TV as well as water pumps) |
|  | Village-3 (Chin) - Hydro                           | One day out of three                               | Good enough for lighting and TV  |
|  | Village-2 (Shan-N) Grid                            | Regular access- 24 hours<br>(black-outs very rare) | Good capacity (regular household uses –<br>lighting and TV as well as water pumps) |
|  | Village-5 (Shan-E) - Hydro                         | Regular access- 24 hours<br>(black-outs very rare) | Good capacity (regular household uses –<br>lighting and TV as well as water pumps) |
| Community<br>Initiatives   | Village-4 (Chin) - Hydro                           | 2 hours daily                                      | Lighting and TV only   |
|  | Village-7 (MDY) – Generator                        | 2 hours daily                                      | Limited capacity lighting only   |
| Household re-<br>distribution/small<br>businesses using<br>diesel generators | Village-6 (Magway) -Village<br>Monastery generator | 2 hours daily                                      | Lighting and TV only   |
|  | Village-8 (Rakhine)-<br>Household redistribution   | 2 hours daily                                      | Lighting and TV only   |
|  | Village-9 (Rakhine) -<br>Household re-distribution | 2 hours daily                                      | Lighting and TV only   |

**Unlike in rural areas, uses at household level in urban areas varied more markedly across wards/income groups and cities.** Urban households with generally better access to reliable electricity used significantly more appliances. Beyond lighting and TV, electricity was commonly used to run refrigerators, stoves, kettles and rice-cookers. Air-conditioning was an important use among higher income households and found exceptionally only in middle-income households. The use of electricity for cooking was observed in better-off wards but was much less prevalent in middle-income neighborhoods and non-existent in the poorer wards. Issues of quality of service were stressed in poorer wards more strongly (across all three cities) both in terms of the availability, reliability of the supply and speed/cost of repairs.

**With the exception of Hakha, which has significant limitations in the actual availability of service, respondents in Yangon were the most critical regarding the quality of the service** (particularly in the middle-income ward visited). In Mandalay the overall perception across sites was that privatization had improved the quality of service and customer relations. There were some variations, within cities in terms of quality of service with poorer wards highlighting more power fluctuations and difficulties in getting repairs done. Interestingly, better off households reported good service for repairs with no informal charges. These were more frequently mentioned in middle income wards. Poorer households tended not to call the service provider (as this would take too long) but instead to call upon private electricians (sometimes employed by the electricity companies but doing these small repair jobs “on the side” for additional income).

## Uses of electricity and perception of quality in urban areas

| Location            | Uses  | Perception of Quality   |
|---------------------|---|---|
| <b>Poorer Wards</b> |   |   |
| CHN- 3              | Mostly lighting with firewood used for cooking and heating  | Limited availability - 3 hours/day during 5 days a week   |
| MDY- 3              | Lighting and TV   | Fluctuation in capacity throughout the day, issues noted with maintenance and charges covered by the community (frequent weather related damage).   |
| YGN- 3              | Lighting and TV with charcoal used for cooking. A very limited number of respondents (2 of 25) had small appliances (kettle, rice-cooker) | 24 hours supply but limitations in terms of capacity (water pumping only possible during the day for example). For repairs, households contacted electricians privately and paid them directly. |

| <b>Middle Income Wards</b> |  |   |
|----------------------------|--|---|
| CHN- 2                     | Lighting and TV with very limited appliance use. Charcoal used for cooking and heating   | Limited availability - 3 hours/day during 5 days a week   |
| MDY- 2                     | Lighting, TV, limited use of appliance (fans rather than air-conditioning). Hot plates used for cooking  | Limited capacity for 1 or 3 hours during cooking time in the evening but overall good supply and few blackouts. Improvements in quality of service also noted with privatization. Some informal charges reportedly collected for repairs  |
| YGN- 2                     | Lighting, TV, basic appliances including stoves, kettles, rice cookers, refrigerators and simple washing machines. Electricity used for cooking with more limited use of charcoal for the households interviewed | Limited capacity during cooking hours (10 am to 12 pm). Repairs are relatively quick but informal charges collected   |
| <b>Better-off Wards</b>    |  |   |
| CHN- 1                     | Lighting, TV and limited appliance use. Cooking and heating done with charcoal. Use of private generators to complement limited government services  | Limited availability - 3 hours/day during 5 days a week.  |
| MDY- 1                     | Lighting, TV appliances air-conditioning and cooking   | Some issues with capacity and occasional black-outs (weather related damage). Noted improvements in service after privatization (particularly for maintenance and customer service). Repairs were conducted quickly and no informal charges were reported although “tips” were provided |
| YGN- 1                     | Lighting (including security lighting/garden lighting), full range of appliances including air-conditioning and cooking  | 24 hours and good capacity. Repairs were conducted quickly and no informal charges collected although “tips” were provided  |

## Affordability of the new tariffs: perceptions

### *In rural areas*

In rural areas, there was an overall lack of knowledge on the part of households about the electricity tariffs charged by Government and the increase taking effect in April<sup>7</sup> 2014. Across all 13 villages visited, only a very limited number respondents had heard about the tariff increases. These were: (i) the members of the Electricity Committees at village level and; (ii) occasionally small business owners who had heard the announcements on TV.

Standard government rates were applied only in two of the four villages where electricity services were provided either by government or a private company (per kWh/hour). In the other two sites, tariffs collected were much higher than government rates at 200 Kyats/kWh and 50 Kyats/kWh and were set by the electricity committee. As noted earlier, the functioning of the electricity committee is largely unregulated and while these committees are responsible for the maintenance of the village's system there is no guidance provided on what amounts to charge for the service. In addition, the level of detail provided in the bill does not allow households to fully understand the tariffs, additional meter rental charges or other maintenance charges that may be added. Overall, where social capital was high and there was trust between the electricity committee and the villagers the amounts charged were not questioned. Governance challenges did emerge as highlighted in the case of Village 3 (Box 3).

### Rates and additional charges (Government and Private Companies in Rural areas)

| Service Provider                | Villages           | Tariffs   | Additional Charges   | Monthly charges (kyats) |
|---------------------------------|--------------------|---|--|-------------------------|
| Government-provided Electricity | Village 1 (Magway) | Government rates for both domestic use and businesses               | Regular monthly charges: 500 kyats for meter maintenance, 300 kyats for village electricity committee, and 300-500 kyats for “units lost” between village main meter and individual household meters.<br><br>Occasional charges: 1,000 kyats for maintenance when larger repairs were required | 2,000 to 17,500         |
|                                 | Village-3 (Chin)   | Government rates for both domestic use and businesses (small hydro) | Regular monthly charges: 200 kyats contribution for collecting/paying bills at township office   | 3,000 to 8,000          |
|                                 | Village-2 (Shan)   | 50 kyats/KWh (the rate set by the village electricity committee)    | Regular monthly charges: 500 kyats for meter maintenance   | 3,000 to 25,000         |
| Private Company (Hydro)         | Village 5 (Shan)   | 200 kyats/KWh   | None   | 4,000 to 14,000         |

<sup>7</sup> It is important to note that field work in rural areas was conducted in March 2014. This was following the announcement of the increase in rates but before the tariffs were reflected in the new bills.

## Rates charged by community-based schemes and small businesses re-distributing electricity

| Service Provider   | Villages and type of service       | Rates charged   |
|--|------------------------------------|---|
| Community Initiatives  | Village-4 (Chin) - hydro           | 16 baskets of maze per household as an annual contribution (very poor quality of service noted) |
|  | Village-7 (MDY) – diesel generator | 1500 Kyat/month for lighting and 1000 kyats/month for TV  |
| Households redistribution of electricity (diesel generators) | Village-6 (Magway)                 | 1000 Kyat/month for lighting and 1500 kyat/month for TV   |
|  | Village-8 (Rakhine)                | 3000 kyats/month for Lighting and 1500 kyats/month for TV                                       |
|  | Village-9 (Rakhine)                | 3000 kyats/month for lighting and 6000 kyats for TV   |

**When assessing affordability of the rates currently practiced in rural areas it is important to consider the perspectives of three groups:**

- i. **Overall, for those with access to either Government/Private Company Services or more informal (community schemes or small businesses), payments were considered affordable.** Consumption was overall low (primarily for lighting and TV as noted above) and respondents in rural areas were: (i) not concerned about the upcoming tariff increases; (ii) were not planning to further reduce electricity consumption. In terms of coping strategies, landless/land poor households did, however, occasionally resort to late payments (no more than 1 month for grid connection or additional few days for community initiatives/household re-distribution) or to borrowing from neighbors for monthly electricity payments (for a short period of time and without incurring any interest – the rationale being that they would be able to reciprocate the favor at a later date). Value for money considerations were frequently brought up by respondents when discussing affordability of tariffs, with grid-based services usually considered reasonably priced by those with access.
- ii. **Participants in FGD, Key Informants (in villages 4, 7, 8 and 9) without access to reliable electricity supply also referred to the fact that the service received was “expensive” given the poor quality.** They expressed a keen interest in access the Government grid (should the connection to the village be affordable) as it would result in “savings” (lower rates for a better service than what they current have access to).
- iii. **Importantly, the poorer groups in the rural areas visited (as defined by the villagers themselves) considered they could not afford to pay electricity charges even for the minimum lighting in the evenings.** These groups were not currently connected to the grid (in villages 1,2 and 6) or to community initiatives/small businesses providing a few hours of electricity in the evenings (for villages 4,5,7,8 and 9). The discussion about affordability of rates currently being charged in rural areas (across the different types service providers – formal or informal), needs to be understood in a context where: (i) the poorest villages in the study sample do not have access to the government grid or electricity provided by private companies; (ii) the most vulnerable households within the communities do not have to electricity (and use candles, kerosene lamps for lighting).

Currently this group considers the connection costs to the home and the lowest rates charged by small-scale suppliers (typically 1500 kyats/month for lighting in the evening) unaffordable. As the NEP rolls-out and grid connections are extended subsidizing access by these groups in terms of connections to village and home as well as subsidizing tariffs to allow access to electricity will be key.

*In urban areas*

Analysis in urban areas was conducted in April and May 2014 once new tariffs were already in place and the first bill with the increases had been paid by households. Compared to rural areas, there was a generally good understanding of the new tariffs charged and greater clarity in terms of the different charges that make up the electricity bill.

Monthly bill comparison and increase percentage of tariff in different groups

| Wealth Quintile | Average Usage (units kWh) | Previous monthly bill (average) | Current monthly bill (average) | Estimated increase % |
|-----------------|---------------------------|---------------------------------|--------------------------------|----------------------|
| Well-off        | 1,443                     | 50,500                          | 70,000                         | 38                   |
| Medium          | 282                       | 9,800                           | 11,500                         | 17                   |
| Poorer          | 138                       | 4,900                           | 5,000                          | marginal changes     |

Given the limited supply of electricity in Hakha (number of hours/day), the city was in an exceptional situation in that the increase in rates were not considered relevant for all respondents across wards (including the poorest). There were high expectations regarding the expansion of Government electricity services. A common concern for better off/middle income households and small businesses in Hakha was the high cost of fuel for diesel generators. There was significant hope that improved access to electricity would eventually result in savings. As in rural areas, the use of solar panels as an alternative to diesel (for lighting) was frequently observed for households that were able to afford the upfront investment. Overall rates charged were considered affordable although respondents resented having to pay “maintenance fees” for meters 500 kyats/meter/month (in fact meter rental fees) as they reported receiving “no maintenance services”.

The situation was significantly different in Yangon and Mandalay where particular segments of participants in the study reported being “very affected” by the increase, namely middle-income households and some categories of SMEs. As noted earlier it is important to highlight that the findings reported here focus on households and businesses perceptions of impact. In the case of middle-income wards, where feedback on tariffs was strongly negative, there were, in fact, no negative coping strategies reported. Respondents in this case linked their dissatisfaction with the tariff increases with the lack of improvements in the quality of services.

*Feedback from poor and marginalized households*

Pre-existing difficulties to pay were noted for the most vulnerable households interviewed, although this segment of interviewees did not see their electricity tariff increase. Households considered vulnerable/marginalized within the poorer wards themselves reported challenges with making monthly electricity payments (both for grid connection and for small scale distributors). Overall, the main coping strategies noted were delays in payment and borrowing from neighbors. Borrowing was done without interest charged but with the idea that the favor will be reciprocated if needed, indicating significantly high levels of social cohesion/social capital in these wards. Payments were never more than a month late for grid connection and a few days late for small-scale providers.

As noted earlier, in a small number of cases (among on the households interviewed) the cost of the connection to the household was a barrier for the poor in urban areas. This was true in wards where the government service does not yet provide full coverage and connection to some blocks in the ward may require a significant investment. Respondents in this category in Mandalay<sup>8</sup> use the services of informal providers instead. They indicated that given the opportunity to connect they would prefer to pay government tariffs considered overall affordable and as better value for money if the cost of connection could be subsidized.

*Respondents in middle class wards*

Respondents in middle class ward had mostly moderate overall increases but had strong negative feedback on the additional cost particularly in Yangon. These participants in the study highlighted that increases in tariffs were not accompanied by improvements in the quality of the service. Given the level of consumption/types of uses, this segment of respondents reported it would be difficult for them to further reduce electricity consumption. The most frequently mentioned savings item was to reduce air-conditioning use<sup>9</sup> and switching off lights during the day. No significant delays in bill payment, instance of borrowing money or reduction of other types of expenditure were however, reported.

Significant increases were noted for the better-off households (particularly in Yangon) and savings were planned to cope with new rates. The items households indicated they would most likely cut were: (i) lighting in garden/security lights; (ii) air-conditioning; (iii) lighting during the day/unused rooms. While there was negative feedback on the increases, this was less strong than in middle-class areas with an overall sense that electricity supply was of good quality.

*Small and Medium Enterprises (SMEs) in Yangon and Mandalay*

The study covered three groups of SMEs in Yangon and Mandalay, defined in terms of their electricity consumption. Feedback on the tariff increases and coping strategies adopted varied depending on the new tariff band in which they now found themselves in.

Different types of businesses surveyed (Yangon and Mandalay)

| Cities   | Number of SMEs by consumption (Units kWh) |            |               |
|----------|---|------------|---------------|
|          | 1-500                                     | 501-10,000 | 10,001-20,000 |
| Yangon   | 8   | 17         | 0             |
| Mandalay | 13  | 10         | 2             |
| Total    | 21  | 27         | 2             |

Very small, family run businesses and business requiring unskilled labor reported not being affected by changes in tariffs. These made up a significant proportion of the businesses surveyed and included small-scale food production and packaging companies and mechanics. Overall the rates were considered affordable and no particular negative coping strategies were observed among this group.

<sup>8</sup> As in Chin respondents saw little value in getting a connection to the grid given the limited supply

<sup>9</sup> For a minority of households in the middle-income wards covered

**Medium-sized businesses (in the second and third group) were the most affected among those surveyed<sup>10</sup>.** The second group of businesses includes mold making, printing and purified water companies, now required to pay 25 additional kyats per unit (or 30% increase in relation to the previous tariff structure). These businesses consider themselves hard hit by the increases particularly as they have to shoulder the additional electricity costs together with diesel costs. Generators are still needed to address gaps in electricity supply (fluctuations in capacity and brief black-outs). The third group of businesses was found only in the Mandalay industrial zone surveyed. These were two smelting businesses (iron rods and construction materials), which fell under the second tariff block with an additional 50 kyats to be paid per unit (i.e two-thirds increase in their bill compared to the previous tariff). Using generators for these businesses is extremely expensive and they rely heavily on the grid connection having invested significantly in setting up the necessary infrastructure in the Industrial Zone.

**The most common coping strategy reported was to increase prices for the consumer when this was possible** (in some instances pre-existing contract commitments meant that businesses incurred losses). Medium businesses in the second group coped by laying off some staff, reducing production and no longer holding stocks (i.e producing only when they had a specific order). Larger businesses in the third group reported that they had some time to prepare (around three months) and find cheaper suppliers and renegotiate prices and in spite of a higher increase were in a comparatively better situation.

**However, even among the second group of businesses (most affected) feedback focused on improvement in quality of service rather than in reduction of the tariffs.** The main recommendation made by all the three groups was to reduce power fluctuations, increase voltage capacity and ensure a 24-hour steady supply. With these conditions met, business owners would be able to drastically reduce their expenditures with diesel, which were considered more burdensome than electricity prices. Overall 85% of businesses interviewed regularly use generators (100% of those in Chin).

## Conclusions and Recommendations

### *In rural areas*

**The SRE approach currently in place allocates no funding to subsidize feasibility studies and technical assistance or hardware at community level meaning that currently only the better off villages and better off households within those villages are able to access government electricity services<sup>11</sup>.** The limited guidance provided on the community mobilization and planning process for SRE seems to have resulted in a systematic exclusion of poor households within communities with access to government electricity. The research team did not find instance of the participation on the part of these households in planning or discussions on cost and access. Community planning is led by the electricity committee whose members are nominated among formal and traditional leaders. Information is not widely shared with the community and no instances of community-level subsidizing of access by poor households were observed across research sites. No instances were observed of community members being excluded on the basis of ethnic or religious identity. However, this area of enquiry may warrant further analysis in a subsequent phase of the PSIA requiring different sampling/site selection than that currently used by QSEM.

**Similarly, the lack of regulation of electricity committee functions (including rate setting) resulted in some instances in the application of tariffs well above those set by MoEP (50 kyats/kWh and 200 kyats kWh).** Consumers of government services in rural areas also pay additional maintenance charges to do with the upkeep of the connections and collection of payments. In addition, it is important to

---

<sup>10</sup> It's important to note that the analysis did not cover individual discussions with large-scale companies although the Myanmar Chamber of Commerce and the Management Committee of Industrial Zones in Mandalay and Yangon were consulted on the overall quality of the electricity supply and on their perspectives regarding tariff increases.

<sup>11</sup> Among villages within reach of the grid.

note that rural households have a limited understanding of the bills (which are frequently not itemized). Payments tend to be made regularly where there is strong social capital and trust in village leadership and the electricity committee. No negative feedback was received by the research team on these higher rates charged.

**Given the profile of households with access to government electricity services in rural areas (overall the better off groups in the sites covered) and the limited uses of electricity, no negative feedback was received from current users on the updated tariffs** (where these were practiced). The majority of these households use electricity for lighting and TV in the evenings and would not be affected by tariff increases. Overall, government services are considered good value for money when compared to informal providers or community-based initiatives using small-scale hydro or diesel generators.

**Subsidizing the cost of connections to the villages and to individual households within these villages would be an important element of the NEP roll-out to ensure more equitable access to the service in rural areas.** Beyond the cost of connection to the village, once the latter is established, the additional costs of connecting individual households acted as a second barrier for low income households.

**Further regulation of the functioning of the electricity committees and the provision of technical assistance including a focus on community participation, good governance and social accountability would be an equally important element.** Beyond the regulation of tariff setting in rural areas, the functioning of the electricity committees and their oversight would benefit from strengthening under NEP (if these committees are expected to play an ongoing role in rural areas for the implementation of interim mini-grid solutions). Challenges with governance and instances of lack of transparency in financial management were observed by the research team. Overall, the quality of leadership and social cohesion at village level currently play the determining role in the absence of external regulation and support. The same SRE process can lead to very different outcomes as noted by the research team fully depending on the local context (i.e currently regulations are not adding much additional value in terms of quality of the process).

**Across all sites visited <sup>12</sup> a significant proportion of poor and marginalized households, not connected to the grid at the time of the study, could not afford the cost of the basic services of informal providers** (Kyats 1000 to 1500/month for lighting in the evenings). Extending access to electricity to this group under NEP would require not only subsidizing the cost of overall connections, connections to the households but also the introduction of further subsidized tariffs. Additional analysis to be carried out in the new Living Standards Survey (2014) will be key to understanding energy consumption among this group as an input to the design appropriate life-line tariffs.

#### *In urban areas*

As noted above, the cost of access was not the key concern in urban areas, where the option of SRE is of course not viable. **There was high demand for electricity services in Hakha and an overall sense that access to electricity using the new tariffs would significantly reduce households' expenditure on energy.** Currently, the purchase of fuel is considered a heavy burden on households and small businesses in Hakha.

**For the urban centers of Yangon and Mandalay the cost of household connections in poorer wards where the government service does not yet have full coverage was a significant barrier to access for low income households.** In additional informal settlers in Yangon (1,000 households in YGN 3) could not access the grid as they were unable to obtain the necessary documentation to apply for the connection. There was strong demand for the service among these household who considered government service better value for money when compared to informal providers. A small number of households interviewed in Yangon (4 of 25 in the poorer ward, YGN 3) also indicated that they could not afford the payment of regular charges and therefore relied on informal service providers opting for daily payments.

---

<sup>12</sup> With the exception of the villages in Shan state which were exceptionally well off

**Overall there was strong negative feedback among middle-income households and small businesses in Yangon and Mandalay regarding the new tariffs.** Households in urban areas were well informed about the new rates and had a good understanding of the different charges in their electricity bill. For middle-income households feedback was related to the lack of improvements noted in service rather than with overall inability to pay. Respondents indicated they would implement some saving measures but no negative coping strategies or delays with payments were observed. Adverse impacts were noted among SMEs in both of these urban areas with medium businesses laying off staff and reducing production. Importantly, lack of quality of the electricity service and the need to rely on diesel generators with associated costs was the main complaint of this particular group.

**As with rural areas, subsidizing connections to the home in poor wards would seem important for a more equitable NEP roll-out.** Regularizing and simplifying requirements for applications/connections in informal settlements would equally be key. As with the rural poor and marginalized households a closer analysis of the energy consumption among this group would be important for the design of life-line tariffs. With current tariffs already being unaffordable there is a risk that this vulnerable group will be left out of the electrification process.

**Improvement in quality, reliability and repair services will be essential particularly if further increases in rates are expected to be put in place.** Communication with consumers, feedback and grievance redress mechanisms are virtually non-existent and information tends to flow based on personal connections.

## Part I - Introduction

### 1. Context

**Myanmar is one of the poorest countries in East Asia with a GDP per capita of US\$900 and poverty incidence estimated at 26 percent.** While reliable poverty data is scarce in Myanmar, all indicators point to poverty being concentrated in rural areas. Two rounds of household surveys in 2005 and 2009) carried out by the Myanmar Central Statistical Office highlight significant differences in poverty across geographical areas, with rural poverty considerably higher than urban poverty.

**Myanmar is also one of the most diverse countries in East Asia.** There are 135 officially recognized languages and ethnic groups, with ethnic minorities making up approximately 30 percent of the population. This diversity creates variation in local norms and power structures, ranging from a system of small principalities in Shan and Kayah States to the tribal systems of the Kachin. The country is undergoing a process of profound transformation with significant implications also in terms of local governance structures at township and village level.

**Lack of access to and the poor state of existing infrastructure are major impediments to the provision of basic health and education services, and for economic development.** About 75 percent of the population has no access to electricity, and the consumption of electricity (about 160 kWh per capita) is one of the lowest in the world – twenty times less than the world average. Furthermore, the existing power infrastructure can meet only about half of current demand, resulting in frequent blackouts and rationing of electricity supply<sup>13</sup>. Rural areas remain mostly un-electrified, with only 16% of rural households with access to grid based-electricity. Access to modern fuel for cooking is limited to urban areas where only one third of the population lives. Traditional biomass (fuel wood and animal dung) accounts for two-thirds of Myanmar's primary energy consumption.<sup>14</sup>

**In this context, the Government of the Union of Myanmar is currently preparing the Myanmar National Electrification Plan (NEP). The NEP aims to electrify 100% of Myanmar's households by 2030.** According to the Earth Institute's (EI) geospatial planning results, this means connecting more than 7.2 million households over the next 16 years. The EI estimates that over 98% of the new total connections will be grid-based, 0.15% will be permanent mini-grids, and only 0.06% will be off-grid solar home systems. Additionally, EI estimates there will be approximately 250,000 temporary ("pre-electrification") connections made through mini-grid and household solutions that will be viable for households who can expect to be connected to the grid at the very end of the roll-out program.<sup>15</sup>

### 2. Key Research Questions

**Balancing financial sustainability with addressing consumers' concerns about price increases, and in particular the need to protect poor and vulnerable consumers will be key for the implementation of the NEP.** The development of the NEP supported by the World Bank (WB) through a series of capacity building and Technical Assistance (TA) activities includes a review of electricity tariffs and subsidy mechanisms. The Poverty and Social Impacts Analysis (PSIA) undertaken between February and June 2014 is intended to support this process by providing information on: (i) the institutional context where the development and implementation of the NEP takes place; (ii) energy and electricity consumption patterns

---

<sup>13</sup> Myanmar, Project Appraisal Document (PAD) Community Driven Development Project (2012)

<sup>14</sup> Myanmar, PAD, Electric Power Project (2013)

<sup>15</sup> Castalia (June 2104), Draft Myanmar NE Road Map and Investment Prospectus p i.

with a focus on energy poverty; (iii) perception of affordability of electricity connections and recurrent charges - with a particular focus on the new tariffs introduced in April 2014 and how these have affected different groups of consumers; and (iv) consumers' perspectives on the quality of services and understanding of pricing.

**The PSIA has two complementary modules and uses a mixed methods approach to provide information on the issues outlined above as follows:**

- **Qualitative module consisting of primary data collection in selected rural and urban areas** (through a series of focus group discussions, key informant interviews and a short household questionnaire) to collect information on: (i) access and barriers to access to electricity; (ii) uses of energy, uses of electricity as well as demand for electricity in areas where access is limited; (iii) perception of affordability of tariffs in use; (iv) perceptions of quality of the electricity service received; (v) coping strategies with a particular focus on vulnerable households. (Additional details on the key questions for the qualitative module are included in Table 1 below).
- **Quantitative analysis on overall energy/electricity consumption patterns and distributional impacts of the new tariffs** (with a particular focus on the lowest socio-economic quintiles) using the 2009/10 Living Standards Survey undertaken by the Myanmar Central Statistical.

Table 1: Key research questions for the PSIA qualitative module

| Themes  | Key questions  |
|---|--|
| Energy and Electricity Consumption                              | Sources of energy (what is consumed - portion of electricity, role of other sources)<br><br>Uses (household use versus livelihood use – including agricultural activities) and demand  |
| Payment and coping strategies                                   | Ability to pay: affordability of electricity connections and tariffs and barriers to access for poor and marginalized groups<br><br>Coping with high expenditure on energy (focus on electricity) : (i) shifting to other sources?; (ii) reduction in energy consumption; (iii) approaches used to reduce energy consumption – if this is an option; (iv) other coping strategies (including borrowing or reducing consumption in other areas – negative coping strategies)<br><br>Support available: (i) social assistance – particularly through informal networks and community institutions and local leaders vs state programs that may provide support)  |
| Quality of the service and communication with service providers | Reliability of energy services (hours of service, interruptions) and variations by energy provider ( <i>Particular attention will be paid to understanding the quality and reliability of the national electricity supply vs that of private suppliers</i> )<br><br>Feedback on service providers performance: access to the service, (including understanding any “informal fees” that may be charged), handling of complaints, responsiveness to consumer needs and gaps<br><br>Understanding of pricing on the part of consumers, discussion of recent changes in prices and feedback on potential increases. ( <i>Particular attention will be paid to understanding the quality and reliability of the national electricity supply vs that of private suppliers</i> ) |

**The PSIA was implemented in a context where Government announcements of tariff increases in November 2013 met with significant opposition and protests on the part of citizens in main urban centers of Yangon and Mandalay.** The analysis undertaken focused, therefore, on understanding how possible changes in tariffs could impact the welfare of consumers (with a focus on the

poorest<sup>16</sup>) through quantitative analysis has been coupled with the collection of information on citizens' perspectives on current tariffs and quality of service that can inform the design of adequate/effective subsidies as well as communication/feedback mechanisms between MoEP, utility companies and consumers.

**Electricity tariffs for retail customers were adjusted in April 2014<sup>17</sup>. The new tariff system introduced three tariff blocks for residential, small and medium-sized customers:** (i) less than 100 kWh at 35 kyats; (ii) from 101 to 200 kWh at 40 kyats; and (iii) more than 201 kWh at 50 kyats. For industrial and large customers, there are six tariff blocks with tariffs range of 75-150 kyats/kWh. Effectively, residential, small and medium-sized customers will be cross-subsidized by industrial and large commercial customers since their new tariffs (35-50 kyats/kWh) are below the average cost of supply (**Table 2 below** provides an overview of the increases in tariffs for different consumer groups).

Table 2: Changes in tariffs in effect by April 2014

**Residential, small-medium commercial, public buildings, street lightings:**

| Consumption (kWh) | Kyats / kWh    |            |
|-------------------|----------------|------------|
|                   | Previous rates | April 2014 |
| 0-100             | 35             | 35         |
| 101-200           |                | 40         |
| 201++             |                | 50         |

**Industrial, large commercial**

| Consumption (kWh) | Kyats / kWh    |            |
|-------------------|----------------|------------|
|                   | Previous rates | April 2014 |
| 0-500             | 75             | 75         |
| 501-10,000        |                | 100        |
| 10,001-50,000     |                | 125        |
| 50,001-200,000    |                | 150        |
| 200,001-300,000   |                | 125        |
| 300,001 ++        |                | 100        |

**Overall, tariffs remain below the cost of supply.** Government subsidies for overhead and operating costs of the sector would substantially increase until electricity tariffs are brought to the cost recovery level. Preliminary budget estimates indicate the level of Government subsidies would be 555 billion kyats (1.1 percent of GDP) in FY 13/14. A key challenge facing the energy sector in the near term (2013-2015) is, therefore, to ensure the financial viability of sector enterprises.

<sup>16</sup> For purposes of the qualitative analysis: (i) a social mapping exercise was undertaken in rural areas to identify poor and marginalized households as defined by the communities themselves.; and (ii) in urban areas the research team purposefully selected a low income ward per city to collect the perspectives of poor households(four wards were covered for each city). A similar social mapping exercise was conducted for urban areas to identify poor and marginalized groups.

<sup>17</sup> Previously tariffs had been adjusted in January 2012 following significant devaluation of the Myanmar kyat

### 3. Methodology

#### 3.1 Qualitative Module: Selection of Research Sites and Informants<sup>18</sup>

The qualitative analysis undertaken drew on the ongoing research program of the Livelihoods and Food Security Trust Fund (LIFT): Qualitative Socio-Economic Monitoring (QSEM) implemented for the WB by the Enlightened Myanmar Research (EMR) consultancy firm. The selection of field sites took into account the importance of understanding the different contexts, conditions of access to electricity and perceptions of consumers in **rural and in urban areas**. The Focus Group Discussion (FGD), Key Informant Interviews (KIIs) and household questionnaires were field tested and adjusted based on the feedback from respondents. For rural areas, a sub-set of 13 the 56 QSEM villages were targeted to collect information from areas with different types of access to electricity in different Regions/States and “agro-ecological zones” (as outlined in Table 3).

Overall a total of 114 FGDs and 378 KII were conducted across all research sites.<sup>19</sup> All names of villages, wards, informants and FGD participants have been changed to ensure the anonymity of the respondents.

A total of 108 FGD and 78 KII (and short questionnaires on energy consumption) were undertaken in rural areas. Eight FGDs conducted per site with: (i) village leaders (1 FGD), (ii) different livelihood groups (FGD 2 to 6); (iii) electricity committee (FGD 7); and (iv) women (FGD 8 to assess whether there were any relevant difference in terms of perception of quality of services or barriers to access and affordability by gender). In addition, six KIIs were conducted per site, two with each of the main socio-economic categories as defined by the villagers (better off, middle quintile and vulnerable households).

Table 3: Rural sites for qualitative analysis (a total of 13 villages)

| Region/State | Access to Electricity |                     |   |  |
|--------------|-----------------------|---------------------|---|--|
|              | Government Service    | Private Company     | Community initiative or SMEs(hh. selling electricity) | Individual connections only (solar panels or generators) |
| Chin         | Village 1 - Hydro)    |                     | Village 4 - (Hydro)                                   |  |
| Mandalay     |                       |                     | Village 7 - (Generator)                               | Villages 10 and 11                                       |
| Ayeyarwa     |                       |                     |   | Villages 12 and 13                                       |
| Magway       | Village 3 - (Grid)    |                     | Village 5 - (Generator)                               |  |
| Shan         | Village 2 - (Grid)    | Village 6 - (Hydro) |   |  |
| Rakhine      |                       |                     | Villages 8 & 9 – (Generator)                          |  |

<sup>18</sup> An overview of the methodology used for the IHLCA 2009 analysis will be outlined in the forthcoming paper by Koziel and Kim

<sup>19</sup> Village and ward names were removed for the analysis/write to guarantee respondents’ anonymity particularly relevant for case studies to be developed on barriers to access to electricity, governance issues of Electricity Committee, informal charge collected.

In addition, 300 KIIs and 6 FGDs<sup>20</sup> were conducted in the main urban centers of Yangon and Mandalay as well as in the capital of Chin State (Hakha). Key Informant Interviews (KIIs) were the preferred means of data collection with 25 KIIs conducted per site (five in each of the four wards selected to exemplify different socio-economic conditions as outlined in Table 4 below). In addition, FGDs were conducted with Electricity Committees in Industrial Zones and Township Electricity Departments where relevant. Urban areas were purposefully selected to collect information from: (i) areas where negative feedback to the announcement of new electricity tariffs in November 2013 had been the strongest (Yangon and Mandalay); and (ii) smaller urban areas where access to electricity remains limited and challenges with the quality of supply are an important issue (Hakha was selected as it exemplifies some of the challenges common in a number of state capitals). The field guide used by the research team and the data collection tools are included in Annex I.

Table 4: Research sites in urban areas (a total of 9 wards of which two industrial zones)

| City     | Poorer Ward | Middle-Income Ward | Better-off Ward | Industrial Zone                                     |
|----------|-------------|--------------------|-----------------|---|
| Hakha    | CHN-1       | CHN-2              | CHN-3           | SMEs spread across the cities to conduct interviews |
| Mandalay | MDY-1       | MDY-2              | MDY-3           | MDY-4   |
| Yangon   | YGN-1       | YGN-2              | YGN-3           | YGN-4   |

Finally, a series of interviews and consultations were held with key Government agencies, private sector stakeholders and civil society organizations. These were particularly important to provide the research team with an understanding of the overall institutional context for NEP implementation and to collect private sector and civil society perspectives on the introduction of the new tariffs and the quality of the electricity service. A total of 12 KIIs and 10 FGDs were held in Nay Pyi Taw, Mandalay and Yangon with a diverse group of stakeholders. The detailed information on consultations is presented in Table 5 below.

Table 5: Consultations conducted for institutional analysis <sup>21</sup>

| City       | Government Agencies  | Private Sector Organizations  | Civil Society Groups   |
|------------|--|---|--|
| Mandalay   | ESE and Township/District Engineering Staff  | Myanmar Business Coalition for Aid; Mandalay Industrial Zone Management Committee   | Youth CSO, Religiously Affiliated CSO, Grass-roots organizations             |
| Nay Py Taw | MoEP – Department of Electric Power (DEP) and Electrical Supply Enterprise (ESE)               |   |  |
| Yangon     | YESB (Chair and Vice-Chair); Township Office/Chair of Industrial Zone 2 Electricity Department | Union of Myanmar Federation of Chambers of Commerce and Industries (UMFCCI)<br>South Dagon Industrial Zone Management Committee and Dagon Sei-Kan Industrial Zone Management Committee<br>Zaya and Associates, Pacific Electric Company , Parami Energy Group (Private Electricity Providers); Technical Advisors to Govt/Media (3 resources persons) | Renewable Energy Association Myanmar (REAM) CSO focusing on renewable energy |

<sup>20</sup> KII were the preferred means of data collection in urban areas.

<sup>21</sup> Annex II includes a full list of people met

## Part II - Qualitative Analysis

### 1. Barriers to Access

#### 1.1 In Rural Areas

Access to electricity in rural areas is limited by the current coverage of the grid but also by the fact that villages must cover the costs of the connection from the main “transmission” line to the village itself following the Self-Reliant approach to electrification (Box 1). All three villages with access to the government electricity grid were located immediately beside the main road, transmission lines, or beside a sub-station. However, of the remaining nine villages without access, five were similarly located within 2 to 3 miles from the main roads and the transmission lines. While proximity to the grid plays an obviously important role in determining access to electricity, the affordability of the connection to the village (for which villages are required to raise their own funds) plays an equally determining part.

Of the 13 villages targeted in the study those with access to electricity provided by Government services/private company were: (i) provided with access/village connection free of charge by government or by the private company supplying electricity; or (ii) in the case of Village 6 in Shan were exceptionally well-off<sup>22</sup> and able to raise the necessary funds from households. Respondents in the remaining villages systematically highlighted the cost to the households of establishing this initial connection as the key obstacle for their lack of access. The perception that government subsidies for these connections were not available (or were granted only in very exceptional circumstances) was reported systematically across research sites.

#### Box 1: Self-Reliant Electrification

**The Self-Reliant Electrification (SRE) approach, put in place in 2000,<sup>23</sup> consists of granting access to the Government’s electricity grid to village(s) and ward(s) who self-organize to raise the necessary funding from community contributions.** The technical requirements for the infrastructure is laid out in the “12-point Document”<sup>24</sup> issued by MoEP (Please refer to Annex III for additional details). The document requires that an Electricity Committee be established at village level to oversee fundraising and construction efforts. It acts as contract with between the utility companies and the Village Electricity Committee certifying that construction standards have been adhered to and that the committee will be responsible for the maintenance of the connection.

**There is a great deal of flexibility in the way in which the communities organize themselves and the in the specific steps to process their application.** It is important to note that while the Electricity Committee is responsible for raising the funds, overseeing construction and maintenance, little is mandated by MoEP in terms of: (i) selection of committee members; (ii) Terms of Reference or roles of different members (including segregation of duties for financial management and procurement); (iii) community planning and mobilization process; (iv) basis for calculating tariffs and maintenance charges to be collected. In addition, communities are not required to mobilize the full amount needed for construction before the start of the works and some conduct construction in phases over a number of years. Decisions about these key issues are left to the communities themselves which introduces a lot of variation in the approach followed and results in use of the tariffs that are often well above those set by Government.

<sup>22</sup> Research team observation highlighted the quality of housing construction, infrastructure and related it to the source of income of the village/migration.

<sup>23</sup> Interestingly, respondents at township level gave different start dates for the initiative between 2000 and 2005

<sup>24</sup> Source: ESE Department, office 53, Nay Pyi Taw

**Overall, village leaders (formal such as village administrators or traditional and religious leaders) approach the township or regional level department of Electric Supply Enterprise or Yangon Electric Supply Board (YESB) for information.** Among respondents, well connected individuals in the community often used personal relationships to obtain information directly from regional offices (considered a more reliable source of information than the township offices) to learn about key steps and general cost estimates. This is followed by a discussion of the information received and next steps among community leaders only. It is important to note that the lack of a requirement for information sharing with the broader community in the 12 point document means that decisions about electrification are usually made by a small group of village leaders and tend to exclude the poorer households in the village from the onset. This was the case across all sites visited with the exception of Village 6 in Shan, which as noted earlier was exceptionally well off.

**Depending on the degree of interest (and social capital) of the village or ward, the formal Electricity Committee will be set up. It is usually made up for two members per village, which are nominated among village leaders.** Electrification Plans in the areas visited tended to cover clusters of villages so as to divide the cost. The committee does sometimes include the Village Administrator but not necessarily so<sup>25</sup>. There is no established limit to the number of committee members and or mandated functions (for example in one of villages visited the committee was made up of 15 members).

**Technical support provided by the township offices of electricity companies is focused on the review and approval of proposals and technical designs developed independently by the villages. No financial support is provided to the Electricity Committee for either the planning or construction steps. The committee is responsible for sourcing the technical support needed for construction.** Township staff will, however, provide initial cost estimates and assessment of the feasibility of the electrification plan. The township office will also certify the compliance of the works with the construction standards before the access to the grid is finally granted. The committee will therefore prepare and submit the electrification plan to the township office, who reviews it and endorses it for approval at Regional level. This approval gives the community the green light to proceed with construction. A similar process is followed for the certification of “readiness to connect” at the end of construction. An inspection is conducted by the township office and approval granted by the Regional Office to initiate the connection.

**According to the ESE, self-reliant electrification has been more encouraged in recent years and the procedure for application simplified.** The technical requirements laid out in the 12 Point Document have been streamlined (from 72, to 24 and finally to 12 required tasks). Approval of community applications and certification of compliance is now reviewed at Regional rather than Central/Ministerial level. In spite of the simplification of procedures, based on feedback from the respondents, establishing connections can take a number of years (three on average in the areas visited including construction of infrastructure by the community).

---

<sup>25</sup> It is common that clusters of village apply for the connection together.

Box 2: The cost of connection to the grid remains the key barrier in rural areas

Cost of connection to the grid remains the main barrier even in accessible villages

Village 10 is a village with 73 households located in the dry zone of Mandalay region. The village is located three miles away from main road and within easy reach of the national electricity grid. A new village administrator was elected in early 2013 keenly interested in connecting the village to the Government electricity grid. In early 2014, he was informed (together with other administrators from nearby areas) by the head monk in the adjacent village about the procedures under the “Self-Reliant Electrification Plan”. The monk shared the first-hand information he obtained from the Mandalay Regional Department of Electricity Supply Enterprise (ESE). According to the information received, the village could set up its connection to the grid, in collaboration with neighboring communities, if they had at least 1500 potentially interested households. While there was no minimum requirement set in terms of interested households, this number of households was recommended based on cost-effectiveness considerations. This minimum number of households was considered to make the scheme affordable for the village.

The total cost estimated by the ESE Department was around 500 million kyats for the connection of all seven villages in the area. Thus, the monk suggested a collective effort by neighboring villages (including Village 10), with each contributing an equal amount of 60 million kyats. Each village would pay the same overall amount, which was considered more equitable although wealthier households within villages would contribute more if needed. The discussion about the potential cost of electrification took place among a relatively small number of community leaders. Given this initial budget, each household in Village 10 would need to contribute around 800,000 Kyats. Village leaders did not include poorer households in the planning and discussions as it was assumed they would not be able to afford the connection charges.

However, only 10 of the 73 households in the village could afford to buy into the connection scheme. The information about the Village Self-reliant Electrification Plan put village leaders, both traditional and formal, in a difficult situation by raising community expectations about the possibility of access to electricity. In spite of high demand for electricity in their village and the nearby area, village leaders will be unable to implement the scheme without additional government support. Currently, there is no access to electricity in Village 10 (including through community initiatives using diesel generators).

Table 6: Villages with access to electricity grid

| Village Name       | Access to Electricity      | Year | Cost of Connection to the village (to the households)  | Cost of connection to home (kyat) |
|--------------------|----------------------------|------|--|-----------------------------------|
| Village 1 (Chin)   | Government Service (Hydro) | 2003 | None – Connection provided by Government with additional support from private donor  | 3,500                             |
| Village 3 (Magway) | Government Grid            | 1990 | None - The original cost of the connection in 1990 was covered by Government. Households paid 20 Lakh/household for maintenance ( in 2013) | 4,500                             |
| Village 2 (Shan)   | Government Grid            | 2012 | 10.6 Lakh/household  | No additional amount collected    |
| Village 6 (Shan)   | Private Company (Hydro)    | 2012 | Financed by the Private Company  | 350,000                           |

**Social capital at village level also plays a key role in determining access to electricity given the importance of ‘self-organizing’ in rural areas.** The Self-Reliant approach to electrification outlined above means that in addition to village wealth, the quality of leadership and the village’s overall connections with township and regional ESE offices play a determining part. Accessing information about the procedures was very reliant on personal connections across all sites visited. The ability of the village electricity committee to mobilize the community (or more precisely the better-off sections of the community) is a determining factor for success. The experience of Village 3 in Magway illustrates some of the challenges in self-organizing that may pose a further barrier to access.

### Box 3: Governance Challenges in Self-Organizing

In 2011, through its three retail distributors of fertilizer in Village 3, the Agro Products company provided the village with all necessary materials for basic access to electricity through a community-managed diesel generator. The company has good “business relations” with villagers who all purchased their fertilizers through these three retailers. This was indicated as their main motivation for providing support according to respondents.

To oversee the implementation of the initiative and operation and maintenance of the scheme, an Electricity Committee with 15 members was formed. The committee was made responsible for the collection of electricity payments, purchasing diesel, and the regular maintenance of the generator. Committee members included the retailers who initiated the process and a number of the beneficiary households. The division of labor among committee members was unclear. Respondents could not provide a clear picture of the breakdown in roles indicating rather that all members “helped with the setting up of the generator”. The committee’s organization efforts focused on collecting the necessary contribution to connect individual households (5,000 to 20,000 kyats depending on their location). Initially 50 of the 328 households in the village were covered by the scheme.

Within 3 months of setting up the initial connection further households were interested in joining the scheme (bringing the number of connected households to 128 in total). Households who were initially skeptical saw the advantages of the electricity connection as the scheme became functional and were interested in joining. Monthly electricity charges were set at 1500 Kyats per household (covering lighting with a 2-foot fluorescent lamp) and another 1000 kyats charged for TV/household. The generator functioned in the evenings between 6 and 10 pm. The tariffs were considered relatively cheaper than the rates set by other private distributors in near-by villages where 2500 kyats were charged for the lighting and another 2000 kyats for TV.

Challenges began with the maintenance and operation as initial materials used seemed to be of poor quality, according to the villagers, and the wiring required frequent repairing. The committee faced difficulties in managing income and expenditures and increased the tariff by 500 kyats each for lighting and TV. Dissatisfaction also grew among community members with the financial management by the committee. The overall budget for maintenance, and fuel was unclear and there was a great deal of resentment over the fact that the 15 members of the committee were exempt from paying electricity charges. Only 80 households remained part of the community scheme in 2012 while others quit due to the poor quality of the service and lack of transparency in financial management. Finally, the committee stopped the service after one year of distribution with a loss of 400,000 Kyats in uncollected electricity bills in 2013.

Table 7: Access to electricity services within villages (rural areas)

| Villages   | Total HH | HH with Access | Coverage % |
|--|----------|----------------|------------|
| Coverage in villages with access to Government Services  |          |                |            |
| Village-1 (Chin – Hydro)   | 17       | 17             | 100        |
| Village-2 (Shan)   | 55       | 35             | 64         |
| Village 3 (Magway)   | 400      | 169            | 42         |
| Coverage in villages with access to Private Sector Providers                                       |          |                |            |
| Village-6 (Shan- Hydro)  | 115      | 109            | 95         |
| Coverage in villages with access through community initiatives                                     |          |                |            |
| Village-4 (Chin) - Hydro   | 65       | 25             | 38         |
| Village-5 (Magway) - generator   | 298      | 200            | 67         |
| Coverage in villages access provided by SMEs (households in the village through diesel generators) |          |                |            |
| Village-7 (MDY)  | 328      | 127            | 39         |
| Village-8 (Rakhine)  | 126      | 55             | 44         |
| Village-9 (Rakhine)  | 105      | 53             | 50         |

A significant proportion of households in nearly all villages visited remain without access to electricity (irrespective of the source of the electricity service). Affordability of connection charges for individual households is an important barrier for the extremely poor/vulnerable. For villages with access to government services this is related, as noted above, to the fact that villages have to finance the cost of connection. Not only poorer villages but also poorer households within those villages are at a disadvantage – with vulnerable groups not being able to contribute to the cost of the initial connection and being left out (please refer to Table 7 and 8 for additional details). Interviews with vulnerable households across research sites consistently support this conclusion. Those who cannot afford to buy into village schemes for grid connections, small hydro or community-managed diesel generators usually rely on candles and kerosene as well as small rechargeable batteries for lighting.

Across the research sites visited there were no instances noted where particular sections of the village/community were excluded from access based on other social factors (ethnicity, political or religious affiliation for example)<sup>26</sup>. A limited number of households in villages visited in Shan State (Village 6) did not access the electricity service at village level since they were located at a distance from the village center. This was however, exceptional with affordability being the key determining factor.

**Box 4: In villages connected to the grid often only the better-off were given access**

In 2009, Village 2 in Shan State, located just beside the main Mandalay-Lashio road, started its “self-reliant village electrification plan” in cooperation with other five villages. The village electricity committee was formed in 2009 with two representatives from each village in this case the village administrator and an

<sup>26</sup> As noted earlier the sample for the qualitative analysis was small with a focus on 13 villages to understand issues of affordability more broadly. Phase II of the analysis will focus on these dimensions of potential social exclusion in mixed communities to inform NEP roll-out.

influential businessman. The latter took the initiative to contact the regional ESE Department for information on the application process and overall cost. 800 households across all six villages indicated their interest in participating in the scheme. It is important to note that as in the case of other villages the poorest households did not participate in these discussions, it was assumed that they would not be able to afford the connection and they were, therefore, excluded from planning discussions from the onset. Once the information on potentially interested households was available, the electricity committee approached the township office of ESE and learned of the estimated cost. The amount required to participate in the scheme meant that around 570 households (across all villages) had to quit as they could not afford the individual household contribution. This in turn represented an additional financial burden for those who remained interested in implementing the “Self-Reliant Electrification Plan” with the household contribution amounting to 1.06 million kyats. The committee collected the agreed upon contributions as the works progressed with the total amount collected from each household totaling up to 1.06 million kyats. In 2014, only 35 of 55 households in Village 2 were covered by the connection. The rest of the households in the village could not afford the cost of the connection. This means that currently low-middle income as well as poor and marginalized groups in the village (land-less farmers and daily laborers) remain excluded from access to the electricity grid.

**For those areas where electricity is provided through community initiatives or by households “selling electricity” from their home generators two groups tend not to be covered by the schemes: (a) well-off households** who can afford their own generators or solar panels and therefore access a more reliable electricity supply; **and (b) the extremely poor and vulnerable households** who cannot afford the cost of the individual connections to the household (usually covering the cost of cable extensions/posts – please see Table 6 for an overview) and/or who are reluctant to commit to paying to regular monthly or weekly charges. Overall connection to these services is considered affordable by lower-middle income households and considered a “better than nothing” alternative in areas where the possibility of a more stable connection to the grid is considered unlikely in the near future.

Table 8: Cost of household connection for community-based initiatives and small electricity re-distribution businesses

| Type of access   | Villages-types of services  | Cost of connection to the home (Kyats) |
|--|-----------------------------|--|
| Community Managed Schemes                                | Village-7 (MDY) - Generator | 5,000                                  |
|  | Village-4 (Chin) Hydro      | 5,500                                  |
| Redistribution by village households (Diesel generators) | Village-5 (Magway)          | 3,600                                  |
|  | Village-8 (Rakhine)         | 3,000-3,500                            |
|  | Village-9 (Rakhine)         | 3,000-3,500                            |

#### Box 5: Electricity Re-distributing Business in Rakhine

Lin Lin has been running a small business selling electricity to his neighbors. His village is located only three miles away from one of the main transportation road in the township, but there is no easy access to the national grid and the likelihood that the village will get access to electricity is still remote.

. When Lin Lin first bought 7-HP generator in 2013, he intended to use for his own home. Private distribution of electricity (small-scale) had started in the village 20 years ago and there were active providers at

the time. However, he could not afford to use the generator every day given the high cost of diesel. He therefore negotiated with two or three household nearby to share the electricity supply and the diesel costs. Later, more households became interested in connecting to his generator and he finally set up his small business. Currently, 14 households are connected.

The current charges are 100 kyats per day for a 2-foot fluorescent light, 200 kyats for using a portable DVD player, and 450 kyats for using TV. But, he allows small light offerings for Buddha free of charge. His service includes the cost of connection from the generator to the home and covers 3 hours of electricity/day from 6:30 pm to 9:30 pm. He collects the payment every day as a monthly plan is not suitable for most households who are daily wage earners and whose income can be unpredictable. His profit margin is small as he earns 2,800 Kyats per day and the cost of diesel every day is about 1,800 kyats and spends a further 1,500 kyats per month for maintenance. He sees his business more as a *“merit-making undertaking”*.

**Solar panels play an important role in villages with no access to the grid/no community initiatives for energy provision.** They are often perceived by villagers as very advantageous given the high cost of diesel, although a significant upfront investment is required. In addition, the availability of solar panels in the local markets in different locations of Myanmar (especially in dry Zone) is a significant factors making solar an option being considered across all sites without access to the government grid for individual access to electricity. A preference for solar power was noted across all such sites by middle income and better off households (mainly for home lighting and entertainment purposes). Smaller size solar panels were considered an attractive option for lower income households as suppliers expanded into rural markets and provided flexible purchase options (including payments in installments and loans).

#### Box 6: Distribution of solar panels

**Distribution of home solar electrification packages by the Department of Rural Development (DRD) was also observed in research sites as part of the government recent poverty reduction policy.** In one of the study sites (Village 12 in dry zone), solar panels were recently distributed to every households in the village .Village 12 has no access to the national grid, though it is located 3 miles away from the main transportation road and grid. In February 2013, the Minister of Transport visited the district and organized a meeting with village administrators to inform them about village electrification plans in line with the national poverty reduction policy. He suggested that local authorities seek to obtain the connection to the national grid through the “Self-reliant Village Electrification Plan”. Local authorities clarified that the estimated cost for the village would be around 60 million kyats. Consequently, the Village 12 administrator openly let the minister know that his village would not be able to afford this amount.

It is understood at the township level that the issue was brought to the attention of the Department of Rural Development (DRD) following the Transport Minister’s visit. One month later, through the township Department of Rural Development, all 96 households in the village received sets of home solar panels.<sup>27</sup>

Currently (approximately a year after distribution) two of the households reported that their panels were not functioning. Overall there have been no complaints about the quality of the panels but households need additional guidance on how to use the inverters as the system is occasionally overloaded.

---

<sup>27</sup> each consisting of a 60-watt solar panel, a 65-Volt battery, a 300-watt inverter (as well as light bulbs).

## 1.2 In Urban Areas

Barriers to access in urban barriers are primarily determined by the current grid coverage. While access in the major urban centers of Yangon and Mandalay was overall good, barriers to accessing electricity services in Hakha in Chin State were significant. The situation in Hakha can to some extent provide insights into conditions in smaller cities/other State capitals with limited supply of electricity (hydro) and overall reliance on own generators or small-scale businesses re-distributing electricity. Limited information was currently available on the timing and expansion of the service but high expectations were observed in all wards visited as construction work takes place. In all the neighborhoods visited in Chi there was strong demand for improved electricity services and high expectations regarding the establishment of new connections in Chin State- Phalam, Hakah and Htunzan.

In Yangon and Mandalay, the key concerns expressed by respondents were around issues of quality of service and affordability rather than access. The exception were respondents in the poorer wards, particularly informal settlers in Yangon (YGN-3)<sup>28</sup>. Cost did not seem to be the determining factor but rather the ability to fulfill the administrative requirements to apply for a connection.

Table 9: Coverage of “government-provided electricity” within targeted wards in three cities Yangon, Mandalay and Hakha

| Region/State | Welfare Group | Ward Code        | Year (Access to electricity)  | No. of HHs (Ward) | No. of HHs (Access to electricity) | %    |
|--------------|---------------|------------------|---|-------------------|------------------------------------|------|
| Yangon       | Well-Off      | YGN-1            | 1950  | 675               | 675                                | 100% |
|              | Middle        | YGN-2            | 1959  | 2173              | 2173                               | 100% |
|              | Poorer        | YGN-3            | 1998  | 2185              | 2185                               | 100% |
|              | SMEs          | YGN-4            | 1993  | 573               | 573                                | 100% |
| Mandalay     | Well-Off      | MDY-1            | 1970  | 1427              | 1427                               | 100% |
|              | Middle        | MDY-2            | 1960  | 1436              | 1236                               | 86%  |
|              | Poorer        | MDY-3            | 1994  | 3956              | 2739                               | 69%  |
|              | SMEs          | MDY-4            | 1990  | 4778              | 3853                               | 81%  |
| Chin         | Well-Off      | CHN-1            | 1985  | 1766              | 1766                               | 100% |
|              | Middle        | CHN-2            | 1985  | 908               | 900                                | 99%  |
|              | Poorer        | CHN-3            | 2012  | 350               | 86                                 | 25%  |
|              | SMEs          | no specific ward | Access to government-provided electricity, but relied only on Diesel Generators |                   |                                    |      |

<sup>28</sup> Informal settlers in Yangon (YGN 3) are not included in wards records and therefore not officially “counted” in data on access to electricity (please see Table 9)



Figure 1: Limited access to the Government grid in YGN-3 <sup>29</sup>

**Informal connections to small-scale providers of electricity (using diesel generators) were observed across all cities and were particularly important in Chin State given the limited availability of government services.** Respondents systematically reported relying on their own generators for the better off or small-scale providers for middle and some of the low income households as the primary source of electricity. The government provided service was considered extremely unreliable and given the limited number of hours (every other day) during which it ran respondents remarked they often “did not notice whether it was running or not”.

**In Mandalay, all neighborhoods visited had connections to electricity provided by similar small-scale operators although all were also connected to the Government grid.** Local providers were mostly used as a “back-up” option given the widespread black-outs experienced until recently in the city. In addition, it is important to note that some wards in Mandalay did not have access to the electricity grid (some until the beginning of 2013) and therefore relied until recently on informal service providers. All respondents in Mandalay highlighted the significant improvements in the quality of the service by the electricity company but retained this fall back option as these improvements were fairly recent. (additional details on the quality of the service are provided in Section 3.2 below). In poorer neighborhoods, such as MDY-3 ward, there are small-private providers supplying 30 to 50 households (for a limited number of hours in the evening).<sup>30</sup> In this ward, most of the settlers are daily wage earners, and thus cannot afford the connection fees charged. In addition, some of these households do not have proof of residence that would allow them to apply for a connection.

**In Yangon the research team found a different scenario where only poor households relied on the services of these small local private providers.** While the costs of the connection were indicated as a barrier to access by a small minority (4 of 25 interviewed households in YGN 3) the most commonly mentioned reason for using these “better than nothing at all” services in Yangon was the inability to apply for a connection on the part of informal settlers. Box 7 provides an overview of the type of service access by the urban poor in Yangon. This situation affected a group of approximately 1,000 households in YGN 3 made up of farmers who had lost their land and agricultural jobs as the city expanded into what were previously peri-urban areas and farmland (i.e have resided in the area for a considerable period of time) as well as more recent migrants from the Delta. These informal settlers were unable to secure the necessary documentation to apply for an electricity connection (including household and land registration as well as approval of the application by the ward leader). Overall, the primary occupation among this group is daily labor/informal work with incomes of between 4,000 and 5,000/daily. According to respondents, earnings can reach a

<sup>29</sup> Strong reliance on small-scale providers (diesel generators): Informal settlers with no connection to the grid (left), other homes in the same ward currently with grid connection (right)

<sup>30</sup> There were three such providers in MDY3

maximum of 60,000 monthly but are irregular with little or no income reported during certain times of the year.

Table 10: Wards with access to electricity distributed by small-scale private providers in three cities

| Region/State | Wealth Quintile | Ward Code | Year (Access to electricity) | No. of HHs (Ward) | No. of HHs (Access to electricity) | %  |
|--------------|-----------------|-----------|------------------------------|-------------------|------------------------------------|--|
| Yangon       | Poorer          | YGN-3     | 2001                         |                   | 1000 (est.)                        | 100 % (informal settlers)                |
| Mandalay     | Well-Off        | MDY-1     | 2004-2005                    | 1427              | 285                                | 20% (own generators)                     |
|              | Middle          | MDY-2     | 2004                         | 1236              | 71                                 | 5% (using the service as back-up option) |
|              | Poorer          | MDY-3     | 2005                         | 2739              | 790                                | 20%                                      |
| Chin         | Well-Off        | CHN-1     | 2010                         | 1766              | 1272                               | 72%                                      |
|              | Middle          | CHN-2     | 2011                         | 908               | 506                                | 56%                                      |
|              | Poorer          | CHN-3     | 2009                         | 350               | 116                                | 33%                                      |

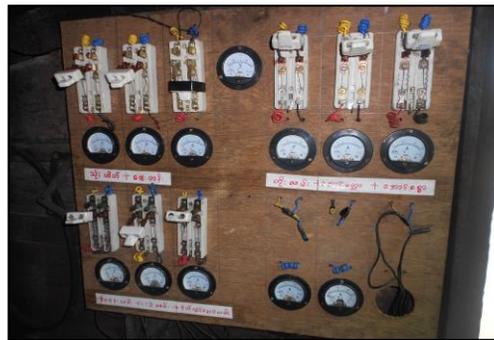
**The cost of connections for households and industrial/commercial consumers varied across sites but did not constitute a barrier for the majority of respondents.** As noted above, a minority of poor and marginalized households across sites in Yangon and Mandalay could not afford the connection fee and used informal electricity providers instead. In addition, interviews conducted with households from the wealthiest quintiles and businesses in Industrial zones in Mandalay and Yangon indicated that a significant portion of the connection cost had been shouldered by the households and/or businesses themselves when the connection was first established.

Table 11: Cost of household/commercial connections in urban areas

| Region/State | Wealth Quintile | Ward Code  | Year (Access to electricity) | Cost of Connection (kyats)                    |   |
|--------------|-----------------|--|------------------------------|---|---|
|              |                 |  |                              | Gov. Grid                                     | Private Providers                                   |
| Yangon       | Well-Off        | YGN -1   | 1950                         | 200,000 for connections after 2000            | None  |
|              | Middle          | YGN-2  | 1959                         | 200,000 for connections after 2000            | None  |
|              | Poorer          | YGN-3  | 2001                         | 200,000 to 300,000 for connections after 2000 | N/A (included in monthly/daily payments)            |
|              | SME             | YGN -4   | 1993                         | 2 million                                     | 1 to 7.5 million for own generator <sup>31</sup>    |
| Mandalay     | Well-Off        | MDY-1  | 2004-2005                    | 300,00 to 500,000                             | 10,000 to 100,000 or 2.6 million for own generators |
|              | Middle          | MDY-2  | 2004                         | 300,00 to 500,000                             | 10,000 to 30,000                                    |
|              | Poorer          | MDY-3  | 2005                         | 300,00 to 500,000                             | n/a (included in monthly/daily fees)                |
|              | SME             | MDY-4  | 1990                         | 5 to 10 million                               | 1 to 7.5 million for own generator                  |
| Chin         | Well-Off        | CHN-1  | 2010                         | 100,000                                       | 3,000 to 20,000                                     |
|              | Middle          | CHN-2  | 2011                         | 100,000                                       | 3,000 to 20,000                                     |
|              | Poorer          | CHN-3  | 2009                         | 100,000                                       | 3,000 to 20,000                                     |
|              |                 | SME: no specific ward, distributed across research sites. Connection to the grid of limited use and reliance on own generators |                              |   | 2.6 million (generator average cost)                |

<sup>31</sup> Among businesses interviewed

Box 7: Who supplies electricity for those without access to the Government grid in Yangon?



In January 16, 2000, Ngwe started an electricity distribution business as the service provided by the Government was not regular in the area where he lived (was only provided during a certain number of hours a day and had limited capacity). His initial investment was 800,000 kyats. As he started off, he provided electricity to 100 households using 2-foot fluorescent lamps for lighting. At that time his service ran twice a day (from 4 am to 6 am and from 6 pm to 10:30 pm). He charged each household 35 kyats/daily. In 2008, he raised prices to 50 kyats and reduced the period of distribution partly to cover the cost of diesel. Households had greater need for his service in the evenings as the voltage of the grid connection was always low from 6 to 11pm. Since then he has been distributing electricity once a day from 6pm to 10:30 pm.

In 2010, he replaced his generator and dynamo for a total cost of 1.5 million kyats. His current daily investment cost is 3,800 kyats for two and a half gallons of diesel. In addition, he needs to change lubricant every three months at a cost of 6,000 kyats. His business has expanded and he now supplies 150 households. The service includes the cost of connection from the distribution point to the customer's home and 2 fluorescent lamps. His service can only be used for two purposes: lighting and TV. The use of rice cookers and ironing have been prohibited given the limited "supply capacity". Currently, he charges 100 kyats for 2 fluorescent lights (and customers can add further lamps, which they can buy themselves without additional daily charges) and 200 kyats for television. His challenge is that some households do use electricity for "prohibited purposes" which can lead to break downs and maintenance problems. Thus, he always needs to monitor usage.

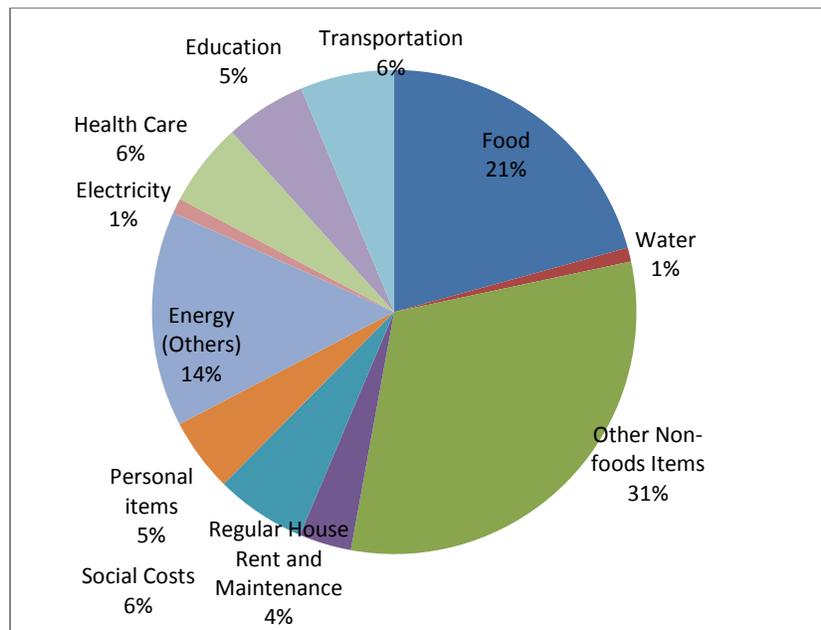
He has set up two different payment schemes- daily and monthly billing. Daily payments provide more flexibility to the poorer households in the ward who do not want to accumulate a large monthly bill but the overall price is the same (i.e no reductions in price are made for monthly payments). He collects the payments himself directly from the households and indicated that while some can be late by a day or two there are no systematic delays or issues with outstanding payments. He provides free electricity to the nearby monastery and the pilgrim hall, and he never charges for the community's social occasions such as monkhood ceremonies and funerals. He does not plan to expand his business. There are three other electricity distributors in his ward. Among them, a larger-scale one, distributing electricity to 300 households.

## 2. Uses of electricity and quality of the service

### 2.1 Rural Areas

A small questionnaire on household expenditures and uses of electricity was administered to all households interviewed in rural (as well as in urban sites). This allowed the research team to get: (i) an overview of overall use of energy and electricity; and (ii) a sense of household perceptions of how much they spend on energy and electricity respectively. It's important to review the findings below with the caveat that they reflect perceptions – as a counterpoint/complement to the quantitative analysis of consumption presented in Section 2.1. Overall, qualitative findings in rural areas were consistent with the IHLCA analysis of expenditure on electricity. In terms of overall expenditure, households estimated that electricity made up approximately 1.5% of their budget <sup>32</sup>(please see Figure 2 below).

Figure 2: Household perceptions of expenditure in energy and electricity<sup>33</sup>



Uses of electricity were very consistent across research sites in rural areas and considerably more homogeneous than in urban areas. Household use was primarily for lighting and TV across all a (Please see Table 11 for additional details). For middle income households it was often the only use made of electricity. In addition in five of the nine villages with a connection to an electricity service, poor households did not use electricity at all, relying on batteries, candles and kerosene lamps.<sup>34</sup> Only a small proportion of better off households in villages with access to grid/private sector provider had a few more

<sup>32</sup> Compared to 1.4% real share of electricity expenditure as per IHLCA data

<sup>33</sup> Social costs include expenses with weddings, funeral and other religious ceremonies for example; Personal items refer to clothing and hygiene expenses

<sup>34</sup> Please refer to Section 2.1 outlining that for villages with connections to the grid household with access to the service are usually those better off.

appliances (consistently kettle, iron, electric stove and/or rice-cooker). The villages in Shan State which were an exception since, as noted earlier, they were significantly better off than others in the sample. I

Table 11: Uses of electricity by welfare group across rural areas

| Electricity Sources  | Village   | Poorer households | Middle Income  | Better off   |
|--|---|-------------------|--|--|
| <b>Use of electricity</b>  |   |                   |  |  |
| Grid Connection (Government or Private Provider)                   | Village 1 (Magway)- Grid                        | Lighting          | Lighting and TV  | Lighting, TV, Cooking, Ironing and livelihood activities (water pumping/threshing) |
|  | Village-2 (Shan-N) Grid                         | Lighting          | Lighting and TV  | Lighting, TV, Cooking, Ironing and livelihood activities (water pumping/threshing) |
|  | Village-3 (Chin) - Hydro                        | Lighting          | Lighting   | Lighting, TV, Ironing  |
|  | Village-5 (Shan-E) - Hydro                      | Lighting          | Lighting, TV, Cooking, Ironing and livelihood activities (water pumping/threshing) | Lighting, TV, Cooking, Ironing and livelihood activities (water pumping/threshing) |
| Community Initiatives  | Village-4 (Chin) - Hydro                        | None              | Lighting   | Lighting and TV  |
|  | Village-7 (MDY) – Generator                     | None              | Lighting and TV  | Lighting and TV  |
| Household re-distribution/small businesses using diesel generators | Village-6 (Magway) -Village Monastery generator | None              | Lighting and TV  | Lighting and TV  |
|  | Village-8 (Rakhine)- Household redistribution   | None              | Lighting and TV  | Lighting and TV  |
|  | Village-9 (Rakhine) - Household re-distribution | None              | Lighting and TV  | Lighting and TV  |

**While current usage of electricity was limited, households across all research sites (with and without access to the Government grid) highlighted the importance of an electricity connection to “be linked up to the outside world”** particularly through a TV. There was a sense in village with no electricity connections that they were left behind in terms of the “modernization” process, particularly where better-off villages in the vicinity were connected to the grid. Furthermore, there was high demand for more reliable electricity services so children could study at night and electricity could be used for livelihood activities (in the villages visited this included pottery making in the evenings, for lighting in small village shops and more generally for agricultural activities given the very high perceived cost of diesel). Table 12 below provides a summary of main uses of electricity and an overview of the quality of service by type of connection, according to the respondents. It is important to note that the service provided by the Government grid was generally considered of good quality in the surveyed sites, with the services of small-scale providers or community initiatives using diesel generators were usually rated “moderately satisfactory”.

**Overall, households estimated that their overall expenditure on other sources of energy (primarily diesel, firewood and charcoal) made up around 14% of their household budget as indicated in Figure 2.** While these findings need to be analyzed together with the data from the quantitative module there are important reasons for these perceptions as outlined below.

**Firewood was used for cooking across all sites and income quintiles in rural areas.** This reflected a cultural preference for cooking with fire wood and the fact that it allows household to cook larger quantities (rather than relying on small rice cookers or stoves with limited capacity). The research team

observed that appliances were often bought as indications of the household’s “well-off” status and for display rather for actual use.

**Firewood constitutes a significant expenditure across all wards in Hakha.** Weather conditions in Chin State require the use of fire wood for both cooking and heating. Better off and middle income households usually keep a stock of firewood for the whole year. It costs 170,000 kyats per ton and at least two tons are needed for the whole year (340,000 kyats/year or 28,333 kyats/month). Poorer households cannot afford to purchase firewood and therefore collect wood from the forest. Community leaders in the poorer ward visited highlighted that the surrounding forest has been quickly depleting, with households having to go further and further way to get firewood. This is a task usually carried out by women with implications in terms of time/effort spend on household chores. Concerns about de-forestation have been raised by local authorities as well.

**Agricultural tasks for large/medium/small farmer were systematically carried out with diesel generators.** These were owned for large/medium farmers and rented out for small farmers. Better off households in villages with reliable electricity supply used electricity for water pumping and limited irrigation. In the areas surveyed fishermen mainly relied on diesel generators for productive activities (i.e for lighting to sort fish in the evenings<sup>35</sup>).

**Off-farm Small and Medium Enterprises (SMEs) in rural areas relied heavily on diesel generators.** With the exception of villages connected to the grid, generators were the main power source for business across rural sites. Of 20 business owners interviewed 14 relied on generators as their main power source (4 were connected to the grid and 2 other used solar power or bio-fuel). The fluctuations in the price of diesel were an important concern for these businesses. Sudden increases in price reduced profits significantly and limited SMEs their ability to expand and increase production. There was high demand among this group for grid-based electricity services that were expected to reduce cost and particular bring more stability to running costs (as fuel price hikes can be unpredictable). Price of fuel was found to vary across research sites with more remote sites paying considerable more. Overall, prices ranged from 3400 kyats/gallon in Magway to 5400 kyats/gallon in Rakhine. During the research period, the price tended to average out at 4,000 kyats/gallon. Table 12 below provides an overview of the fuel consumption by type of business and the estimated costs using the 4,000 kyats/gallon average.

Table 12: Rural SMEs monthly use of diesel

| Usage (per month) | Cost (kyats)         | Types of business   |
|-------------------|----------------------|---|
| 10-15 gallons     | 4,000 to 4,500       | Small movie theater, small general store and billiards        |
| 15-35 gallons     | 52,000 to 140,000    | Private power distributor, mini-store and cow-feed production |
| 35-55 gallons     | 140,000 to 220,000   | Rice mill, battery recharging business                        |
| 100-300 gallons   | 400,000 to 1,200,000 | Fisheries ( storing fish on ice and fish processing)          |

<sup>35</sup> No refrigeration was observed

Table 13: Quality of the service

| Types of Sources  | Villages   | Regularity   | Capacity   |
|---|--|--|--|
| Grid Connection<br>(Government or<br>Private Provider)                        | Village 1 (Magway)- Grid                           | Regular access- 24 hours<br>(black-outs very rare) | Good capacity (regular household uses –<br>lighting and TV as well as water pumps) |
|   | Village-3 (Chin) - Hydro                           | One day out of three                               | Good enough for lighting and TV  |
|   | Village-2 (Shan-N) Grid                            | Regular access- 24 hours<br>(black-outs very rare) | Good capacity (regular household uses –<br>lighting and TV as well as water pumps) |
|   | Village-5 (Shan-E) - Hydro                         | Regular access- 24 hours<br>(black-outs very rare) | Good capacity (regular household uses –<br>lighting and TV as well as water pumps) |
| Community<br>Initiatives  | Village-4 (Chin) - Hydro                           | 2 hours daily                                      | Lighting and TV only   |
|   | Village-7 (MDY) – Generator                        | 2 hours daily                                      | Limited capacity lighting only   |
| Household re-<br>distribution/ small<br>businesses using<br>diesel generators | Village-6 (Magway) -Village<br>Monastery generator | 2 hours daily                                      | Lighting and TV only   |
|   | Village-8 (Rakhine)-<br>Household redistribution   | 2 hours daily                                      | Lighting and TV only   |
|   | Village-9 (Rakhine) -<br>Household re-distribution | 2 hours daily                                      | Lighting and TV only   |

## 2.2 Urban Areas

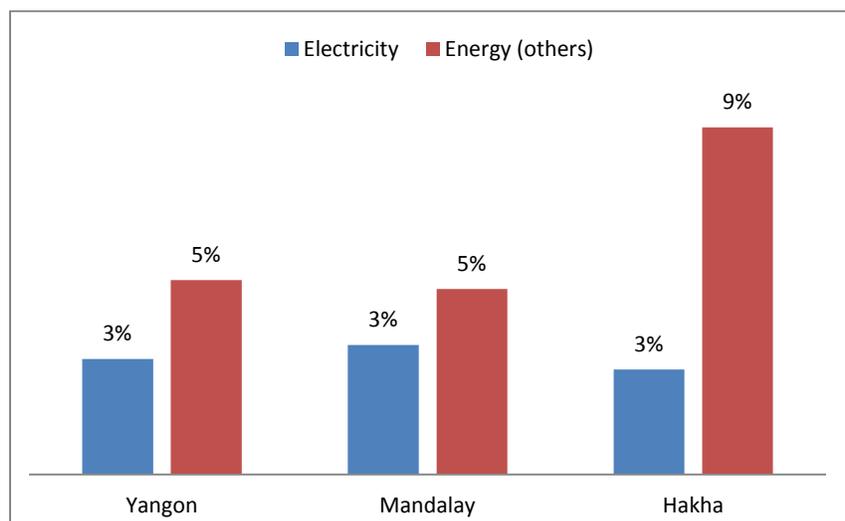
**Unlike in rural areas, uses at household level varied more markedly across wards/income groups and cities in urban areas.** Urban households with generally better access to reliable electricity used a significantly higher number of appliances. Beyond lighting and TV, electricity was commonly used to run household appliances. Refrigerators, stoves, kettles and rice-cookers were commonly observed in middle and higher income wards. Air-conditioning was an important use among higher income households and only exceptionally among middle-income households. The use of electricity for cooking was observed in better-off wards but was much less prevalent in middle-income neighborhoods and non-existent in the poorer wards. Issues of quality of service were stressed more strongly in poorer wards (across all three cities) in terms of the availability as well as reliability of the supply and speed/cost of repairs.

**A short survey of household expenditures was also carried out with urban households<sup>36</sup> to get a similar understanding of their perceptions regarding usage of electricity and other sources of energy as well as the weight of both electricity and other energy sources in the household budget.** Overall, the proportion households estimated spending on electricity across all sites was higher than in rural areas at approximately 3%<sup>37</sup>. Urban households also estimate approximately that between 5 and 9% of their income was allocated to cover other energy expenditures (diesel and/or charcoal firewood). These findings need to be interpreted with caution as they represent household perceptions only. Significantly, the estimated weight of electricity expenses was higher than in rural areas, while that of other energy sources was relatively lower.

<sup>36</sup> 200 domestic consumers (both female and male members of the household participated in the interview)

<sup>37</sup> Compared to 1.4% real share of electricity expenditure as per IHLCA data

Figure 3: Household Perceptions electricity and energy expenditure as a proportion of total costs



With the exception of Hakha, which has important limitations in the overall availability of service, respondents in Yangon were significantly more critical of the quality of the service (particularly in the middle-income wards). In Mandalay the overall perception across sites was that privatization had improved the quality of service and customer relations.

As outlined in Table 13 below there were some variations, within cities in terms of quality of service with poorer wards highlighting more power fluctuations and difficulties in getting repairs done. Interestingly, better off households reported good service for repairs with no informal charges. These were more frequently mentioned in middle income wards. Poorer households tended not to call the service provider (as this would take too long) but instead to call upon private electricians (sometimes employed by the electricity companies but doing these small repair jobs “on the side” for additional income).

Table 14: Uses and feedback on quality of the service in urban areas

| Location                   | Uses   | Perception of Quality   |
|----------------------------|--|---|
| <b>Poorer Wards</b>        |  |   |
| CHN- 3                     | Mostly lighting with firewood used for cooking and heating   | Limited availability - 3 hours/day during 5 days a week   |
| MDY- 3                     | Lighting and TV  | Fluctuation in capacity throughout the day, issues noted with maintenance and charges covered by the community (frequent weather related damage).   |
| YGN- 3                     | Lighting and TV with charcoal used for cooking. A very limited number of respondents (2 of 25) had small appliances (kettle, rice-cooker | 24 hours supply but limitations in terms of capacity (water pumping only possible during the day for example). For repairs households using contact electricians privately and pay them directly. |
| <b>Middle Income Wards</b> |  |   |
| CHN- 2                     | Lighting and TV with very limited appliance use. Charcoal used for cooking and heating   | Limited availability - 3 hours/day during 5 days a week   |
| MDY- 2                     | Lighting, TV, limited use of appliance (fans rather than air-conditioning). Hot  | Limited capacity for 1 or 3 hours during cooking time in the evening but overall good supply and few  |

|                         |   |   |
|-------------------------|---|---|
|                         | plates used for cooking.  | blackouts. Improvements in quality of service also noted with privatization. Some informal charges collected for repairs  |
| YGN- 2                  | Lighting, TV, basic appliances including stove, kettle, rice cooker, refrigerator and simple washing machine. Electricity mostly used for cooking and charcoal but to a less extent | Limited capacity during cooking hours (10 am to 12 pm). Repairs are relatively quick but informal charges collected   |
| <b>Better-off Wards</b> |   |   |
| CHN- 1                  | Lighting, TV and limited appliance use. Cooking and heating done with charcoal. Use of private generators to complement limited government services                                 | Limited availability - 3 hours/day during 5 days a week.  |
| MDY- 1                  | Lighting, TV appliances air-conditioning and cooking  | Some issues with capacity and occasional black-outs (weather related damage). Noted improvements in service after privatization (particularly for maintenance and customer service). Repairs are conducted quickly and no informal charges although “tips” are provided |
| YGN- 1                  | Lighting (including security lighting/garden lighting), full range of appliances including air-conditioning and cooking   | 24 hours and good capacity. Repairs are conducted quickly and no informal charges although “tips” are provided  |

#### Box 8: Improvements in the quality of service in Mandalay

In Mandalay, respondents in all three wards reported improvements in the quality of services. These improvements were of two kinds: (i) improvements in capacity (voltage); (ii) greater responsiveness of the repair services.

The Mandalay region Electricity Supply Enterprise (ESE) has been working in partnership with private companies since mid- 2012. Most of the respondents learned about the private companies’ involvement in electricity supply when old analog meters were replaced with digital meters in their wards. Most of the respondents in the communities stated they started noticing the improvements in the late 2013, observing the regularity of electricity supply

Mandalay CSOs and respondents at ward level indicated that overall capacity of the supply had improved at the end 2013/ early 2014. They noted blackouts are less frequent; there is less power fluctuation during the day and; greater capacity (“voltage”) in the evenings. Some respondents perceived the current increase in tariff as a positive move expected to contribute to further improvements in the quality of the service and help reduce overconsumption by “motivating” larger consumers to save.

**No system was in place, in the areas covered by the research team, to collect feedback on the quality of the service or to receive inquiries complaints regarding billing or other aspects of the service.** Overall, across the sites visited in both urban and rural areas, the contact with service providers was limited to bill issuance and payments (mediated by the village electricity committee in rural areas) and repairs. As noted in section 1 above, requests for information tended to be handled face-to-face (consumers going directly to township or city offices of the utility companies) and to rely heavily on personal connections.

### 3. Tariff Affordability: perceptions

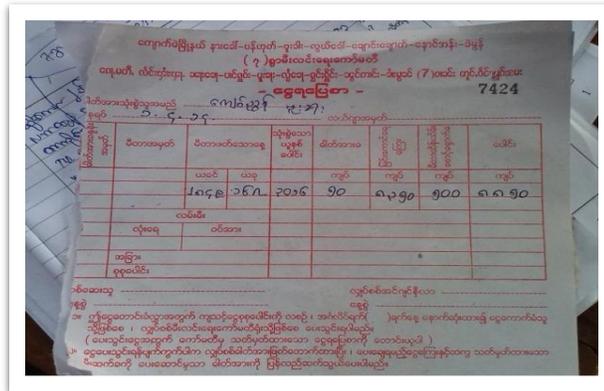


Figure 4: Electricity Bill for Village 2 produced by the electricity committee (charging 50 Kyats kWh)

#### 3.1 Rural Areas

In rural areas, there was an overall lack of knowledge on the part of households about the electricity tariffs charged by Government and the increase to take effect in April.<sup>38</sup> Across all 13 villages visited, only a limited number respondents had heard about the tariff increases. These were: (i) the members of the Electricity Committees at village level and; (ii) occasionally small business owners who had heard the announcement on TV.

Standard government rates were applied only in two of the four villages where electricity services were provided either by government or a private company (per kWh/hour):

1. Private Company rates in Shan (Village 5) were set at 200 Kyats/kWh;
2. Rates in Shan (Village 2 - connected to the Government Grid) were set at 50 Kyats/kWh by the electricity committee;
3. Rates in Village 1 (Magway) and Village 3 (Chin) were charged in line with prices set by Government.

For these same villages, additional charges were frequently collected/set by the electricity committee to cover maintenance fees, collection fees and to cover consumption for public lighting for example (an overview of the different charges are provided in Tables 14 and 15 below). These were set at the discretion of the committee and were not regulated by the ESE township office. Importantly, as shown above in Figure 4, the level of detail provided in the bill does not allow households to fully understand the tariffs, additional meter rental charges or other maintenance charges that may be added. Overall, where social capital is high and there is trust between the Electricity Committee and the Villagers amounts charged were not questioned. The only exception found by the research team was in Village 3 (detailed example provided in Box 3).

<sup>38</sup> It is important to note that field work in rural areas was conducted in March 2014. This was following the announcement of the increase in rates but before the tariffs were reflected in the new bills

Table 15: Rates and additional charges (Government and Private Companies in Rural areas)

| Service Provider                | Villages           | Tariffs   | Additional Charges   | Monthly charges (kyats) |
|---------------------------------|--------------------|---|--|-------------------------|
| Government-provided Electricity | Village 1 (Magway) | Government rates for both domestic use and businesses               | Regular monthly charges: 500 kyats for meter maintenance, 300 kyats for village electricity committee, and 300-500 kyats for “units lost” between village main meter and individual household meters.<br>Occasional charges: 1,000 kyats for maintenance | 2,000 to 17,500         |
|                                 | Village-3 (Chin)   | Government rates for both domestic use and businesses (small hydro) | Regular monthly charges: 200 kyats contribution for collecting/paying bills at township office   | 3,000 to 8,000          |
|                                 | Village-2 (Shan)   | 50 kyats/KWh (the rate set by the village electricity committee)    | Regular monthly charges: 500 kyats for meter maintenance   | 3,000 to 25,000         |
| Private Company (Hydro)         | Village 5 (Shan)   | 200 kyats/KWh   | None   | 4,000 to 14,000         |

Table 16: Rates charged by community-based schemes and small businesses re-distributing electricity

| Service Provider   | Villages and type of service       | Rates charged  |
|--|------------------------------------|--|
| Community Initiatives  | Village-4 (Chin) - hydro           | 16 baskets of maze per HH as an annual contribution (very poor quality of service noted) |
|  | Village-7 (MDY) – diesel generator | 1500 Kyat/month for lighting and 1000 kyats/month for TV fixed rate                      |
| Households redistribution of electricity (diesel generators) | Village-6 (Magway)                 | 1000 Kyat/month for lighting and 1500 kyat/month for TV                                  |
|  | Village-8 (Rakhine)                | 3000 kyats/month for Lighting and 1500 kyats/month for TV                                |
|  | Village-9 (Rakhine)                | 3000 kyats/month for lighting and 6000 kyats for TV                                      |

**Value for money considerations were frequently brought up by respondents when discussing affordability of tariffs. Overall, for those with access to either Government/Private Company Services or more informal (community schemes or small businesses), payments were considered affordable.** Consumption was overall low and respondents in rural areas were: (i) not concerned about the upcoming tariff increases; (ii) were not planning to further reduce electricity consumption. In terms of coping strategies, landless/land poor households did, however, occasionally resort to late payments (no more than 1 month for grid connection or additional few days for community initiatives/household re-distribution). In addition, households borrowed from neighbors for monthly electricity payments for a short period of time and without incurring any interest. The rationale being that they would be able to reciprocate the favor at a later date.

**Participants in FGD, Key Informants (in villages 4, 7, 8 and 9) without access to reliable electricity supply also referred to the fact that the service received was “expensive” given the poor quality when compared to the Government service.** They expressed a keen interest in access the

Government grid (should the connection to the village be affordable) as it would result in “savings” (lower rates for a better service than what they current have access to).

**Importantly, the poorer groups in the rural areas visited (as defined by the villagers themselves) considered they could not afford to pay electricity charges even for the minimum lighting in the evenings.** These groups were not currently connected to the grid (in villages 1,2 and 6) or to community initiatives/small businesses providing a few hours of electricity in the evenings (for villages 4,5,7,8 and 9). The discussion about affordability of rates currently being charged in rural areas (across the different types service providers – formal or informal), needs to be understood in a context where: (i) the poorest villages in the study sample do not have access to the government grid or electricity provided by private companies; (ii) the most vulnerable households within the communities do not have to electricity (and use candles, kerosene lamps for lighting).

**Currently this group considers the connection costs to the home and the lowest rates charged by small-scale suppliers (typically 1500 kyats/month for lighting in the evening) unaffordable.** As the NEP rolls-out and grid connections are extended subsidizing access by these groups in terms of connections to village and home as well as subsidizing tariffs to allow access to electricity will be key.



Figure 5: Doing homework in the evenings in a Ayeyarwaddy Delta Village without access to electricity

#### Box 9: Making do without electricity

Ma Mar Kyi who lives in Village 6 Village is a mother of two daughters. She earns money by making and selling pots. She also sells food in raining season when pottery making is difficult. She was happy when she first learned that the village monastery was going to distribute electricity to the households as she works on making pots mostly at night time and needs lights. But in practice, it would cost her 20,000 kyats at least to connect to the Monastery generator as her home located quite far. So, she asked her neighbor if she link up to her home electricity connection instead. This worked well for a while but the poor quality wiring damaged the connection and her neighbor refused to continue with their earlier arrangement. Since then, she has had no access to electricity and uses candles to make pots in the evening and for her daughters to study at night (one of them got into middle school in this year).

Table 17: Getting an overview of cost/quality across types of service providers in rural areas

| Types of Sources   | Villages-types of services             | Coverage (%) | Regularity     | Utility         | Cost of Connection (hh) | Estimated Rate (Cost for using 2 fluorescent light bulbs) – KWh |
|--|--|--------------|----------------|-----------------|-------------------------|---|
| Government-provided Electricity                                    | Village 1 (Magway)- Grid               | 42           | Satisfactory   | All Purposes    | 4,500                   | 0.70 Kyats  |
|  | Village-2 (Shan-N) - Grid              | 64           | Satisfactory   | All Purposes    | 10,6000                 | 1.00 Kyats  |
|  | Village-3 (Chin) - Hydro               | 100          | Unsatisfactory | Lighting and TV | 3,500                   | 0.70 Kyats  |
| Private Company  | Village-5 (Shan-E) - Hydro             | 95           | Satisfactory   | All Purposes    | 350,000                 | 4.00 Kyats  |
| Community Initiatives  | Village-4 (Chin) - Hydro               | 38           | Unsatisfactory | Lighting        | 5, 500                  | 8.50 Kyats  |
|  | Village-7 (MDY) - Generator            | 39           | Satisfactory   | Lighting and TV | 5,000                   | 16.5 Kyats  |
| Household re-distribution/small businesses using diesel generators | Village-6 (Magway) - Village Monastery | 67           | Satisfactory   | Lighting and TV | 3,600                   | 16.5 Kyats  |
|  | Village-8 (Rakhine) - Households       | 44           | Satisfactory   | Lighting and TV | 3,500                   | 33 Kyats  |
|  | Village-9 (Rakhine) - Households       | 50           | Satisfactory   | Lighting and TV | 3,500                   | 33 Kyats  |

### 3.2 Urban Areas

**Analysis in urban areas was conducted in April and May 2014 once new tariffs were already in place and the first bill with the increased rates had been paid by households.** Compared to rural areas there was a generally good understanding of the new tariffs charged and greater clarity in terms of the different charges that make up the electricity bill (including meter maintenance). Table 21 provides an overview of respondents' perceptions of the new tariffs (and linkages made with the quality of the service received).

**Given the limited supply of electricity in Hakha (number of hours/day), the city was in an exceptional situation. There, the increase in rates were not considered relevant for all respondents across wards (including the poorest).** As noted earlier, there were high expectations regarding the expansion of Government electricity services. A common concern for better off/middle income households and small businesses in Hakha was the high cost of fuel for diesel generators. Respondents expressed their hope that improved access to electricity would eventually result in savings for the households. As in rural areas, the use of solar as an alternative to diesel (for lighting) was frequent for households that were able to afford the upfront investment. Overall, government rates charged were considered affordable although

respondents resented having to pay “maintenance fees” for meters 500 kyats/meter/month (in fact meter rental fees) as they reported receiving no maintenance services and “could not rely on the electricity service”.



Figure 6: Bills for consumers in the industrial zones in Mandalay and Yangon

The situation was significantly different in Yangon and Mandalay where particular segments of participants in the study reported being “very affected” by the increase, namely middle-income households and some categories of SMEs. As noted earlier it is important to highlight that the findings reported here focus on households and businesses perceptions of impact. In the case of middle-income wards, where feedback on tariffs was strongly negative there were no negative coping strategies reported. Respondents in this case linked their dissatisfaction with the tariff increases with the lack of improvements in the quality of services.

Table 18: Monthly bill comparison and increase percentage of tariff in different wealth groups

| Wealth Quintile | Average Usage (units kWh) | Previous monthly bill (average) | Current monthly bill (average) | Estimated increase % |
|-----------------|---------------------------|---------------------------------|--------------------------------|----------------------|
| Well-off        | 1443                      | 50,500                          | 70,00                          | 38                   |
| Medium          | 282                       | 9,800                           | 11,500                         | 17                   |
| Poorer          | 138                       | 4,900                           | 5,000                          | marginal changes     |

a. Feedback from poor and marginalized households

Some pre-existing difficulties to pay were noted for the most vulnerable. Households considered vulnerable/marginalized within the poorer wards reported challenges with making monthly electricity payments (both for grid connection and for small scale distributors) although they were not affected by new rates. Overall, the main coping strategies noted were delays in payment and borrowing from neighbors. Borrowing was done without interest charged but with the idea that the favor would be reciprocated if needed, indicating significantly high levels of social cohesion/social capital in these wards. Payments were never more than a month late for grid connection and a few days late for small-scale providers. There were no instances noted of reducing consumption of other basic items or of negative coping strategies to be able to afford electricity changes among this group.

As noted earlier in Section 1, it is the cost of the connection to the household can be a barrier for the poor in urban areas. This was observed for a minority of respondents in Mandalay in poorer wards where the government service does not yet provide full coverage and connection to some blocks in the ward may require a significant investment. Respondents in this category indicated that given the opportunity to

connect they would prefer to pay government tariff. For this group tariffs were considered overall affordable and the service was seen as better value for money than that of informal providers using diesel generators.

*b. Respondents in middle class and better off wards*

**Respondents in middle class ward had mostly moderate overall increases in their bills (as indicated in Table 18 above) but, particularly in Yangon, had strong negative feedback on the additional cost.** These participants in the study highlighted that increases in tariffs were not accompanied by improvements in the quality of the service. Given the level of consumption/types of uses, this segment of respondents reported it would be difficult for them to further reduce electricity consumption. The most frequently mentioned savings item was to reduce air-conditioning use (rare in middle-income households) and switching off lights during the day. No significant delays in bill payment, instance of borrowing money or reduction of other types of expenditure were however, reported.

**Significant increases were noted for the better-off households (particularly in Yangon) and savings were planned to cope with new rates.** The items households indicated they would most likely cut were: (i) lighting in garden/security lights; (ii) air-conditioning; (iii) lighting during the day/unused rooms. While there was negative feedback on the increases, this was less strong than in middle-class areas with an overall sense that electricity supply was of good quality.

*c. Small and Medium Enterprises in Yangon and Mandalay*

**The study covered three groups of SMEs in Yangon and Mandalay, defined in terms of their electricity consumption<sup>39</sup>.** Feedback on the tariff increases and coping strategies adopted varied depending on the new tariff band in which they now found themselves in.

Table 19: Different types of businesses surveyed (Yangon and Mandalay)

| Cities   | Number of SMEs by consumption (Units kWh) |            |               |
|----------|---|------------|---------------|
|          | 1-500                                     | 501-10,000 | 10,001-20,000 |
| Yangon   | 8   | 17         | 0             |
| Mandalay | 13  | 10         | 2             |
| Total    | 21  | 27         | 2             |

**Very small, family run businesses and business requiring unskilled labor indicated they were not affected by changes in tariffs.** These made up a significant proportion of the businesses surveyed and included small-scale food production and packaging companies and mechanics. Overall the rates were considered affordable and no particular negative coping strategies were observed among this group.

**Medium-sized businesses (in the second and third group) were the most affected among those surveyed<sup>40</sup>.** The second group of businesses included mold making, printing and purified water companies, now paid an additional 25 kyats per unit (or 30% increase in relation to the previous tariff structure). These businesses considered themselves hard hit by the increases particularly as they had to shoulder the additional electricity costs while still having to purchase diesel. Generators were still needed to address gaps in electricity supply (fluctuations in capacity and brief black-outs). The third group of businesses was found only in the Mandalay industrial zone surveyed. These were two smelting businesses (iron rods and construction materials), which fell under the second tariff block with an additional 50 kyats to be paid per unit (i.e two-thirds increase in their bill compared to the previous tariff). Using generators for these

<sup>39</sup> All businesses interviewed in Hakha relied solely on diesel generators

<sup>40</sup> It's important to note that the analysis did not cover individual discussions with large-scale companies although the Myanmar Chamber of Commerce and the Management Committee of Industrial Zones in Mandalay and Yangon were consulted on the overall quality of the electricity supply and on their perspectives regarding tariff increases.

businesses was extremely expensive and they relied heavily on the grid connection having invested significantly in setting up the necessary infrastructure in the Industrial Zone.

Table 20: Average weekly use of diesel (gallons) by SMEs

| Average diesel usage (gallons) and cost (kyats) per week by SMEs |          |         |
|--|----------|---------|
| Yangon   | Mandalay | Chin    |
| 9  | 13       | 25      |
| 36,000   | 52,000   | 100,000 |

**The most common coping strategy reported was to increase prices for the consumer of the goods produced when this was possible** (in some instances pre-existing contract commitments meant that businesses incurred losses). Medium businesses in the second group coped by laying off some staff, reducing production and no longer holding stocks (i.e producing only when they had a specific order). Larger businesses in the third group reported they had had some time to prepare (around three months). Having been able to find cheaper suppliers and re-negotiate prices, they were in a comparatively better situation.

**There was a general sense that recent increases in tariffs were “non-negotiable” and none of the businesses interviewed reported having participated in protests when new rates were announced.** SME respondents and private sector organizations who participated in the study (including the Myanmar Chamber of Commerce) indicated that the process leading up to the tariff increase would have greatly benefitted from additional consultations. Greater time for businesses to adequately prepare would have been particularly welcome by this segment of consumers.

**However, even among the second group of businesses (most affected) feedback focused on the need for improvement in quality of service rather than in reduction of the tariffs.** The main recommendation made by all the three groups was to reduce power fluctuations, increase voltage capacity and ensure a 24-hour steady supply. With these conditions met, business owners would be able to reduce drastically their expenditures with diesel, which were considered more burdensome than electricity prices. Overall 85% of businesses interviewed regularly use generators. The common problems reported by SMEs in Yangon and Mandalay were frequent blackouts, especially in summer. Businesses in Mandalay did report an improvement in quality of service over the past year. As with residential consumers more complaints with quality were reported among SMEs in Yangon (voltage fluctuations and the electricity “shocks” at connection points). In Yangon, most of the businesses reported using diesel generators 5 to 7 days a week and in Mandalay most of SMEs reported using them 2 to 3 days a week. The current price of diesel is around 4,000 kyats per gallon in all three cities.

Table 21: Summary of tariff increases impact and perceptions in urban areas

| By welfare group                 | Increase in payments  | Perception  |
|----------------------------------|---|---|
| <b>Poorer Wards</b>              |   |   |
| CHN- 3                           | No increase noted. Limited service (as well as limited access among households) | Meter maintenance charges considered “unfair” given the limited service available. Noted across all wards.  |
| MDY- 3                           | Increase with no impact   | Concerns are around ability to make payments (irrespective of the increase) for a small number of study participants. High demand for Government electricity services for those hh with access to informal services only.   |
| YGN- 3                           | Increase with no impact   | Concerns are around ability to make payments (irrespective of the increase) for a small number of study participants. Limited consumption but connection charges a concern and often access only to informal services – particularly for informal settlers.   |
| <b>Middle Income Wards</b>       |   |   |
| CHN- 2                           | No increase noted. Limited service  | Meter maintenance charges considered “unfair” given the limited service available. Noted across all wards.  |
| MDY- 2                           | Increases by 1 third  | While increase was noted perception was not as negative as in Yangon given the improvements in service (linked to privatization) noted. Savings planned for only a small number of households targeted.   |
| YGN- 2                           | Increases by 1 third reported   | Negative perception linked to the lack of improvements in quality. Savings planned – reducing lights/air-conditioning and fan use and exceptionally time spent watching TV in the evenings. No consumer or home owners associations present to channel complaints   |
| <b>Better-off Wards</b>          |   |   |
| CHN- 1                           | No increase noted. Limited service  | Meter maintenance charges considered “unfair” given the limited service available. Noted across all wards.  |
| MDY- 1                           | Significant increase (doubling of bills)  | Feedback not as negative as in Yangon and improvement in quality of the service often mentioned. Difficulties to pay for some households with some potential delays in payment (not more than 1 month) and significant savings planned.   |
| YGN- 1                           | Significant increases with bills doubling in some cases                         | Negative feedback on “fairness” of the amount charged. New bill was “surprising” and main response was a drastic reduction in consumption. Four of the households reported they would have difficulty making the payment of the latest bill in terms of their household budgets (although no delays/borrowing was reported) |
| <b>SMEs and Industrial Zones</b> |   |   |
| Businesses across Hakha          | No increase noted. Limited service  | Meter maintenance charges considered “unfair” given the limited service available. Noted across all wards.  |
| YGN- 4                           | 2/3 increase in bills for most of the businesses interviews                     | Very negative perception of increases. No ongoing dialogue with Government through associations. No ability to switch services or source (diesel would be much more costly). Increase in prices of finished products for most middle/larger businesses. Reduction in production/stock/lay-offs for smaller businesses       |
| MDY- 4                           | 2/3 increase in bills for most of the businesses interviews                     | Similar feedback in terms of coping strategies. Key difference in perception in MDY was the extent to which respondents mentioned the improvements in service and the comparisons made with the much higher cost of diesel.   |

## Part IV – Conclusion and Recommendations

The IHLCA data indicates that overall, 28% of households in Myanmar were connected to the public grid in 2010 with marked differences between rural and urban areas: 77% of urban households were connected to the grid compared to only 10 percent of rural households. An additional 15% reported they purchased electricity from private suppliers (9% of urban households, 18% of rural households). Another 5% indicated they used communal or had a private generator, and 7% reported using batteries for lighting. Overall, the IHLCA data indicates that there were substantial gaps in access to reliable electricity and that households, and communities and households developed innovative alternatives to secure access to electricity albeit without ensuring reliable supply.

Overall, households with public connections were much more likely to live in urban areas and were wealthier than households with private or communal connections. Access to electricity was highly correlated with income. Better off households were much more likely to use electricity (particularly the public grid) than poorer households.

According to the IHLCA data, households connected to the public grid reported spending 1.4% of total expenditures on electricity, and the share of spending was fairly constant across the income distribution (for poor as well as rich households). Households accessing electricity from private suppliers reported spending 2.2% of total consumer expenditures on electricity, which was also constant across the income distribution. Low spending is the result of modes tariffs and a generous lifeline tariff cut-off, coupled with low electricity consumption. A substantial number of (public electricity) households in Myanmar consume below the lifeline tariff (currently set at 100 KWh/month): in urban areas, 30% of households consumed 50 KWh/month or less, and 66% consumed 100 KWh/month or less. In rural areas, 53% of households consumed 50 KWh/month or less, and 88% consumed 100 KWh/month or less. Overall, current tariffs are moderate and electricity remains affordable to those who currently have access.

Importantly not all households within electrified villages and wards were themselves connected to electricity services. Electrification rates for urban wards/rural villages were substantially higher than electrification rates for individual households. According to the IHLCA, 41% of wards or villages were connected to the public grid, 13% reported communal electricity sources, and 50% had households that used electricity from a private supplier. Overall, 78% of urban wards and rural villages had some type of electricity supply available (viz. public, private, or communal). In 40% of electrified wards/villages, nearly all households were electrified. But private connection rates were highly variable in the remaining 60% of wards/villages.

Very few households had electricity available 24/7. Surprisingly, there was no strong relationship between the reliability of the supply of electricity (measured in average hours available/day) and household income. Households connected to the public grid reported an average availability of 12 hours/day, households connected to private suppliers reported an average availability of 10-11 hours/day.

IHLCA tabulations, augmented by some additional simulations, do not suggest that electricity affordability is currently a concern for households currently connected to electricity services in Myanmar. It is important to understand this finding in a context where better off households are currently much more likely than poorer households to be connected to the grid. In addition, this finding was not reflected in the qualitative analysis and warrants additional study. Qualitative analysis further indicated that in rural areas, electricity committees and private companies do charge rates significantly above those set by MoEP. Further analysis will be particularly relevant as the NEP plans a steep increase in the number of households to be covered by electricity services and an outreach to poor and marginalized households currently not connected.

## *Rural areas*

**The SRE approach currently in place allocates no funding to subsidize feasibility studies and technical assistance or hardware at community level meaning that currently only the better off villages and better off households within those villages are able to access government electricity services<sup>41</sup>.** The limited guidance provided on the community mobilization and planning process for SRE seems to have resulted in a systematic exclusion of poor households within communities with access to government electricity. The research team did not find instance of the participation on the part of these households in planning or discussions on cost and access. Community planning is led by the electricity committee whose members are nominated among formal and traditional leaders. Information is not widely shared with the community and no instances of community-level subsidizing of access by poor households were observed across research sites. No instances were observed of community members being excluded on the basis of ethnic or religious identity. However, this area of enquiry may warrant further analysis in a subsequent phase of the PSIA requiring different sampling/site selection than that currently used by QSEM.

**Similarly, the lack of regulation of electricity committee functions (including rate setting) resulted in some instances in the application of tariffs well above those set by MoEP (50 kyats/kWh and 200 kyats kWh).** Consumers of government services in rural areas also pay additional maintenance charges to do with the upkeep of the connections and collection of payments. In addition, it is important to note that rural households have a limited understanding of the bills (which are frequently not itemized). Payments tend to be made regularly where there is strong social capital and trust in village leadership and the electricity committee. No negative feedback was received by the research team on these higher rates charged.

**Given the profile of households with access to government electricity services in rural areas (overall the better off groups in the sites covered) and the limited uses of electricity, no negative feedback was received from current users on the updated tariffs (where these were practiced).** The majority of these households use electricity for lighting and TV in the evenings and would not be affected by tariff increases. Overall, government services are considered good value for money when compared to informal providers or community-based initiatives using small-scale hydro or diesel generators.

**Subsidizing the cost of connections to the villages and to individual households within these villages would be an important element of the NEP roll-out to ensure more equitable access to the service in rural areas.** Beyond the cost of connection to the village, once the latter is established, the additional costs of connecting individual households acted as a second barrier for low income households.

**Further regulation of the functioning of the electricity committees and the provision of technical assistance including a focus on community participation, good governance and social accountability would be an equally important element.** Beyond the regulation of tariff setting in rural areas, the functioning of the electricity committees and their oversight would benefit from strengthening under NEP (if these committees are expected to play an ongoing role in rural areas for the implementation of interim mini-grid solutions). Challenges with governance and instances of lack of transparency in financial management were observed by the research team. Overall, the quality of leadership and social cohesion at village level currently play the determining role in the absence of external regulation and support. The same SRE process can lead to very different outcomes as noted by the research team fully depending on the local context (i.e currently regulations are not adding much additional value in terms of quality of the process).

**Across all sites visited <sup>42</sup> a significant proportion of poor and marginalized households, not connected to the grid at the time of the study, could not afford the cost of the basic services of**

---

<sup>41</sup> Among villages within reach of the grid.

<sup>42</sup> With the exception of the villages in Shan state which were exceptionally well off

**informal providers** (Kyats 1000 to 1500/month for lighting in the evenings). Extending access to electricity to this group under NEP would require not only subsidizing the cost of overall connections, connections to the households but also the introduction of further subsidized tariffs. Additional analysis to be carried out in the new Living Standards Survey (2014) will be key to understanding energy consumption among this group as an input to the design appropriate life-line tariffs.

#### *Urban areas*

As noted above, the cost of access was not the key concern in urban areas, where the option of SRE is of course not viable. **There was high demand for electricity services in Hakha and an overall sense that access to electricity using the new tariffs would significantly reduce households' expenditure on energy.** Currently, the purchase of fuel is considered a heavy burden on households and small businesses in Hakha.

**For the urban centers of Yangon and Mandalay the cost of household connections in poorer wards where the government service does not yet have full coverage was a significant barrier to access for low income households.** In additional informal settlers in Yangon (1,000 households in YGN 3) could not access the grid as they were unable to obtain the necessary documentation to apply for the connection. There was strong demand for the service among these household who considered government service better value for money when compared to informal providers. A small number of households interviewed in Yangon (4 of 25 in the poorer ward, YGN 3) also indicated that they could not afford the payment of regular charges and therefore relied on informal service providers opting for daily payments.

**Overall there was strong negative feedback among middle-income households and small businesses in Yangon and Mandalay regarding the new tariffs.** Households in urban areas where well informed about the new rates and had a good understanding of the different charges in their electricity bill. For middle-income households feedback was related to the lack of improvements noted in service rather than with overall inability to pay. Respondents indicated they would implement some saving measures but no negative coping strategies or delays with payments were observed. Adverse impacts were noted among SMEs in both of these urban areas with medium businesses laying off staff and reducing production. Importantly, lack of quality of the electricity service and the need to rely on diesel generators with associated costs was the main complaint of this particular group.

**As with rural areas, subsidizing connections to the home in poor wards would seem important for a more equitable NEP roll-out.** Regularizing and simplifying requirements for applications/connections in informal settlements would equally be key. As with the rural poor and marginalized households a closer analysis of the energy consumption among this group would be important for the design of life-line tariffs. With current tariffs already being unaffordable there is a risk that this vulnerable group will be left out of the electrification process.

**Improvement in quality, reliability and repair services will be essential particularly if further increases in rates are expected to be put in place.** Communication with consumers, feedback and grievance redress mechanisms are virtually non-existent and information tends to flow based on personal connections.