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MYANMAR ENERGY CONSUMPTION SURVEYS

ASIAN DEVELOPMENT BANK

MYANMAR ENERGY CONSUMPTION SURVEYS REPORT

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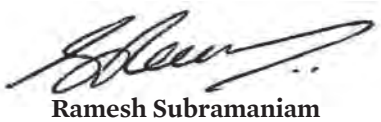
Foreword

Myanmar has one of the fastest growing economies in Asia, yet its potential is severely constrained by limited energy infrastructure. The limited availability of modern energy services and infrastructure has resulted in Myanmar having one of the lowest per capita energy consumption rates in the world.

Developing energy sector infrastructure and increasing access to modern forms of energy for Myanmar's people are therefore of paramount importance for the country's economic growth.

As one of the leading development partners in Myanmar, the Asian Development Bank (ADB) has provided sequenced technical assistance for Myanmar covering energy sector policy, planning, and legal and regulatory framework development, one result of which was the launch of an energy master plan in 2016. As part of the master planning process, ADB conducted a household survey in 2014 to better understand energy consumption trends, and to enhance the quality of the data used for energy demand forecasts that underpin the master plan. In total, 967 surveys were conducted in 11 regions across Myanmar: Ayeyarwaddy, Magway, Mandalay, Yangon, Shan State (North), Shan State (South), Kayah State, Rakhine State, Chin State, Mon State, and Kayin State. Due to the absence of historical energy consumption data in Myanmar, the surveys also helped develop a more accurate picture of historical energy consumption by fuel source, which provided a baseline for energy sector projections.

We have prepared this publication to more widely share the survey results, considering the scarcity of available energy data and statistics in Myanmar, especially at the household level. We hope the survey results will prove useful to those involved in Myanmar's energy sector, and other social sectors, in making more informed decisions in their work.



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Executive Summary

Household Energy Consumption Survey Methodology

The purpose of this report is to present the results of a household energy consumption survey and a private industry energy consumption survey for Myanmar that were conducted in 2014. The first set of results relates to the rural and urban household energy consumption survey. The second set of results relates to the outcomes of an energy consumption survey for private industrial consumers. The surveys were completed under Asian Development Bank (ADB) Technical Assistance (TA) for Myanmar on Institutional Strengthening of National Management Committee in Energy Policy and Planning and were done to enhance our understanding of energy consumption trends in Myanmar. The report is intended solely to communicate statistics on the surveys that were conducted.

Household Energy Consumption Survey

In total, 967 surveys were conducted in 11 regions across Myanmar. The basis for the total number of surveys performed was the maximum number that could be done given the time and budget constraints. Townships were selected to ensure appropriate coverage across each state and region so that geographical diversity in energy consumption trends could be captured across the entire country. The selection of households within each township was done in consultation with the township leaders and were randomly selected to avoid bias.

The report sets out statistics from the surveys for urban and rural households covering the following areas: (i) household floor space, size, and income ranges; (ii) household income, expenditure levels, and expenditure on energy; (iii) household appliance and usage of different fuel sources; (iv) energy consumption per household; (v) fuel and appliance usage for water heating; (vi) types of cooking appliances used in households; (vii) energy sources used for lighting; (viii) quantity of electricity and nonelectricity energy consumed; (ix) whether households are electrified and for how long; (x) appliances used in households; (xi) energy fuel bill per month; and (xii) statistics on household vehicle usage.

Private Industry Energy Survey

Private industry energy consumption survey was identified as another priority area as there was limited information generally available on this market segment. The goal of the private

industry survey was to understand industry outputs (production levels) and understand the corresponding amount of energy consumption to achieve the level of production. Energy consumption encompassed: electricity, natural gas, coal, gasoline, propane, wood chips, rice husks, saw dust, charcoal, and ammonia. The results of some 36 surveys are presented in this report.

Abbreviations

ADB	Asian Development Bank
EMP	energy master plan
FES	fuel-efficient stove
MK	kyat
LIFT	Livelihoods for Food Security Trust
TA	technical assistance
MT	metric ton

1

Introduction

Under the Asian Development Bank (ADB) technical assistance (TA) for Myanmar on Institutional Strengthening of National Management Committee in Energy Policy Planning, surveys on the use of energy in various sectors were conducted over the year 2014. The energy surveys were focused on end-use energy consumption, which is consistent with the perspective of the Ministry of Electricity and Energy that end-use energy consumption data has the greatest level of uncertainty.

The energy consumption surveys were intended to enhance the understanding of energy consumption trends in Myanmar, which in turn would enhance the level of confidence in the quality of the data that is used to inform the energy demand forecasts that underpin the energy master plan (EMP).[1] The surveys were used to develop more accurate historical energy balances, which become the baseline for the energy sector projections.

Following an assessment of data availability within the ministries, other previous survey work in Myanmar and a general consideration of where the energy survey work could best assist this project, the following energy consumption surveys were conducted:

- Rural and urban household energy consumption; and
- Private industry energy consumption.

The rural and urban household energy surveys were identified to be the highest priority since they correspond to the area for which the least amount of information is available. The private industry energy consumption survey was identified as the next priority area as there was also limited information generally available on the energy consumption of private industries.

1.1 Report Purpose and Structure

The purpose of this report, which was initially prepared as part of the EMP report, is to present the urban and rural household survey results and the related statistics for reference purposes. The report also presents the results of a private industry energy consumption survey. The surveys were conducted in 2014.

[1] The EMP is a comprehensive assessment of the current state of Myanmar's energy sector and identifies several options for infrastructure development over a 20-year period to match growing demand for energy services in the country. The Final EMP was launched by Myanmar vice president U Nyan Tun in January 2016.

This report has been organized as follows:

- Section 2 provides a summary of previous survey work conducted in Myanmar. The purpose is to highlight the main insights from these previous surveys for rural and urban household energy consumption trends in Myanmar.
- Section 3 sets out the methodology that we have adopted for the household energy consumption survey.
- Section 4 provides a statistical summary of the household energy data that was collected.
- Section 5 discusses the private industry energy consumption survey approach.
- Section 6 provides a statistical summary of the private industry energy data that was collected.
- Appendix A provides a copy of the household energy survey form that was used.
- Appendix B provides the detailed tables of the household energy survey results.
- Appendix C summarizes some key data from a previous survey of Myanmar.
- Appendix D provides a copy of the private industry energy survey that was used.

2

Review of Previous Household Surveys in Myanmar

A number of surveys have been recently undertaken in Myanmar that provide insight into energy consumption trends. It is important to briefly review the nature and scope of these surveys as the household survey that we have conducted can be thought to essentially complement these surveys and enhance our overall understanding of present energy consumption trends in Myanmar.

Two recent and relevant surveys that have been undertaken include (i) The Livelihoods for Food Security Trust (LIFT) baseline survey, a joint funding effort by multiple donors[2] conducted in 2012 to provide a comprehensive assessment of rural households in general,[3] and (ii) a MercyCorps Poverty Survey, which focused on the issue of fuel-efficient stoves (FES), and was conducted in 2011.[4]

2.1 The Livelihoods for Food Security Trust Baseline Survey

LIFT is a multidonor fund with a mandate of increasing food availability and incomes of the poor and vulnerable population in Myanmar and contributes resources to support Myanmar's objective of graduating from its least developed country status.

LIFT baseline survey's objective was to gain a better understanding of trends in the rural households of Myanmar. LIFT conducted a survey covering 4,000 rural households to seek information concerning fuel use for cooking and lighting by residence zone and income deciles.

Objective. The LIFT baseline survey was aimed at collating quantitative and qualitative information on livelihood and food security matters on households before and after LIFT interventions compared against control villages. In effect, it will provide insight into the effectiveness of LIFT programs deployed across representative surveyed households with respect to livelihood and food security outcomes. The survey was to cover three agro-ecological zones in the Delta II and Countrywide subprograms and Giri-affected areas of Rakhine State.[5]

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[2] The donors are Australia, Denmark, the European Union, the Netherlands, New Zealand, Sweden, Switzerland, and the United Kingdom.

[3] Livelihoods and Food Security Trust (LIFT), "Baseline Survey Results", July 2012. Accessible at: http://www.lift-fund.net/downloads/LIFT%20Baseline%20Survey%20Report%20-%20July%202012.pdf

[4] Mercy Corps. 2011. *Myanmar Energy Poverty Survey*. https://www.mercycorps.org/sites/ default/files/myanmar_energy_poverty_survey.pdf

[5] Giri-affected areas are those that were impacted by Cyclone Giri which affected the Rakhine area of Myanmar on 20 October 2010.

Methodology. The surveyed locations included the hilly, dry, and delta or coastal agro-ecological zones of Myanmar. A total of 4,000 households were chosen from 252 villages with probability proportional to their number of households. Specifically, 800 households were randomly selected from each of the three zones (coastal or delta, hilly, and dry), 800 from Rakhine (Giri-affected areas), and 800 randomly from all areas as a control.[6] By income, the respondents were grouped into deciles (10 categories), ranging from earning less than MK 25,000 to over MK 300,000 per household per month.

Key findings. The following summarizes the key findings of the survey.

- Overall, only 7% of the sample households were connected to the electricity grid, ranging from a maximum of 16% of households in the hilly zone to less than 1% of households in the Giri-affected areas. Similarly, households from the hilly zone were most likely to be connected to a village generator (15.6%) or have their own generator (3.8%). By contrast, households in Giri-affected areas were most likely to use candles for lighting (55%) and households in the delta or coastal zone most likely to use a kerosene or oil lamp (60%). Households in the dry zone were the second most connected to the grid (11%) but most likely to share a generator with other households (11%).
- As it can be expected, access to electricity either from the grid or generators (other than village generators) was correlated with the level of household average monthly income. In general, the larger the household average monthly income the more likely the household had electricity from the grid, had its own generator, or shared a generator with other households. Conversely, the poorer the household the more likely it used candles or lamps for lighting.
- Sources of cooking fuel were similar between regions with a very high reliance on fuel wood. The use of fuel wood ranged from a low of 90% of households in the delta or coastal zone to a high of 99% of households in Giri-affected areas.
- Firewood collection and sale was an important source of income for poor households. In some cases, especially the Giri-affected villages, the community had to travel long distances to collect fuel wood. These results suggest that community forestry, agroforestry, and FES may be important areas for support in some locations.

Appendix C has tabulated a number of extracts from the LIFT baseline survey.

2.2 MercyCorps Energy Poverty Survey (2011)

The MercyCorps Energy Poverty Survey objective was to conduct a survey of village households' energy consumption and obtain an understanding of the market for FES's. The survey was conducted on 396 households from 18 villages (22 households each) in 22 village tracts of Laputta Township. The main findings of the survey are summarized for cooking, firewood collection, and lighting in the subsections that follow.

[6] Footnote 5.

2.2.1 Cooking

The key findings for cooking are:

- The majority of households (88%) use wood, either with open fire or "three-stone" method (69%) or with a FES (19%) for cooking and heating water. 10% use plain rice husk (not compressed into bricks). Other fuel types used by some households are charcoal (1%) and electricity grid (1%).
- The most preferred type of fuel for cooking is wood with FES (42% of total respondent households), followed by wood with open fire (22%), electricity grid (18%), charcoal (11%), and rice husk (5%).
- The reasons, stated by the households, for preferring wood-burning FES are as follows: (i) convenient and easy to use, (ii) wood is easier to buy and more affordable than charcoal, (iii) FES are less of a fire hazard and are safer for children, and (iv) FES can reduce deforestation.

2.2.2 Firewood Collection

The key findings for firewood collection are:

- Overall, 61% of fuel wood is purchased and 38% is collected. Significantly, 43% of the respondents buy 100% of firewood because there is no longer any wood collector in the household. An average of 233 hours per year is spent by a household for collecting firewood.
- Some 49% of households get the firewood mainly from state land resources (reserve areas) and 29% from personal forest resources. Other households get it from community forest resources (12%) and privately held forest resources (4%).

2.2.3 Household Lighting

The key findings for household lighting are:

- The majority of households (56%) use diesel lamps, followed by 29% using power from the electricity grid as the main fuel sources for lighting. Other fuel types used by some households are candle (9%) and battery (6%).
- The most preferred type of fuel for lighting is electricity grid (55% of total respondent households), followed by diesel lamps (25%), and battery-powered lamps (18%). The rest prefer solar (1%) and candle (0.3%).
- The common reasons, stated by the households, for preferring the electricity grid, diesel, and battery are (i) good quality lighting power, (ii) more affordable, (iii) convenient and easy to use, (iv) can use anytime, (v) more suitable for business and income generating work, (vi) reduced fire hazard, (vii) can use for any social activities, and (viii) can use for education (studying at night).
- Households can afford an average of 3.8 hours of light per night although they would like 5 hours on average.

3 Urban and Rural Household Energy Consumption Survey Approach

3.1 Broad Design Parameters

Key constraints in undertaking the rural and urban household energy consumption surveys are time and budget. Relevant existing and available data sets were identified, collected, and compiled but it was observed that these are not necessarily complete from a holistic energy consumption perspective. For example, electricity consumption data will not include other fuel inputs, similarly, the central statistics office data does not necessarily provide the type of coverage that would be ideal.

The collection of existing data was complemented with surveys that target the gaps in knowledge and/or that can in some way confirm or enhance the quality of the data that already exists. There was an attempt to fill the gap in the rural and urban household energy consumption survey. However, it should be noted that a key practical constraint that had to be satisfied in the design was being limited to 700 household surveys. Furthermore, the level of detail in the surveys themselves needs to be carefully managed so that they can be completed quickly and practically in the field. Another important consideration is to ensure adequate coverage of different income brackets and trends within the different "fuel zones" of Myanmar.

In consultation with the national consultants who have a firmer grasp on what can be achieved and what areas can be readily accessed, we have arrived at the survey approach that is documented in Table 1. Some of the regions can be covered with minimal barriers because the local government or community leaders already have experience in having surveys conducted their regions or townships. Other regions are more problematic as the local government may oppose having the survey issued or may wish to have control over the questions asked. As such, Table 1 is essentially a "compromise" between all of the factors that have had to be taken into account in the design of household energy consumption.

3.2 Household Energy Questionnaire Design

The questionnaire for the household energy consumption survey was designed with consideration of the results of the previous surveys by LIFT and MercyCorps. The focus was to gather information on fuel end-user patterns, which could supplement the previous findings in establishing an estimate of energy consumption by rural households.

The survey questionnaire consists of 14 parts:

1. Household information: to gather information about the location and type of household including the size of the house and the number of occupants.

Table 1: Summary of Urban and Rural Household Energy Consumption Survey Approach

Region	Number of Households	General Purpose Consumption (kWh)	Electrification Rate (%)	kWh/ Household	Regional Access?	Type and Number of Surveys Planned
Ayeyarwaddy	1,335,968	116,522	9	267	Yes	Rural/60
Rakhine	527,654	29,650	6	285	Yes	Rural/60
Sagaing	862,616	154,404	18	640	No	–
Mon	340,971	92,945	27	672	Yes	Rural/60
Shan (South)	382,428	94,596	25	678	Yes	Rural/60
Bago (East)	556,540	124,615	22	705	No	–
Tanintharyi	207,153	18,659	9	709	No	–
Magway	770,123	113,214	15	716	Yes	Rural/60
Shan (North)	326,799	53,461	16	721	Yes	Rural/60
Kachin	217,309	48,094	22	757	No	–
Kayar	47,514	17,396	37	823	Yes	Rural/60
Bago (West)	448,323	80,662	18	929	No	–
Kayin	221,825	27,171	12	954	Yes	Rural/60
Shan (East)	131,549	19,637	15	1,219	No	–
Naypyitaw	116,995	60,660	52	1,247	No	–
Mandalay	1,060,762	311,876	29	1,294	Yes	Urban and Rural/80
Yangon	1,270,090	801,949	63	1,757	Yes	Urban and Rural/80
Chin	81,055	12,001	15	2,293	Yes	Rural/60
Total	**8,905,674**	**2,177,512**	**24**	**1,219**	**No**	**Total/700**

Source: ADB.

2. Household income and expenses: covers the monthly income, expenses on different energy needs, and the other household expenditure.
3. Household appliances: information about appliances by purpose and fuel used, and the respondent's preference in terms of appliances' importance.
4. Energy uses—cooking: types of cooking ovens, daily cooking duration, cooking fuel types, and quantity of fuel used in a month.
5. Energy uses—lighting: types of lighting appliances, the time and duration of use, and main fuel sources.
6. Energy uses—water heating: types of appliances, duration of use, and main fuel sources.
7. Total nonelectricity fuel consumption: information about quantities of different nonelectricity types of fuel used by the household each month.
8. Electricity supply: whether the household is connected to the power grid and (if yes) what purposes electricity is used for.
9. Past energy usage: to compare the consumption between this year and last year's.

10. Fuel source and usage: for enquiring whether the household pays for the fuel they need or gets any of it for free, purchases from market or gets the fuel delivered by someone else, what is the form of payment and how often it is made?
11. Generators: information about whether the household has a generator and the features of the generator if they own one, including the fuel type and quantity consumed.
12. Motor vehicles: whether the household has a vehicle, vehicle type and fuel type, quantity of fuel consumed, and how it is obtained.
13. Agriculture energy: types of equipment and fuel used for farming activities.
14. Solar power: whether the household has a solar panel installed.

A complete copy of the household energy consumption is provided in Appendix A.

3.2.1 Comparison to previous surveys

By comparison, the MercyCorps Energy Poverty Survey was based on a single Township of Laputta covering 70 villages in 22 village tracts. The survey was across 396 households based on quantitative data only. The survey covers similar questions on energy requirements for cooking such as fuel source and quantities and time and cost of procuring the fuel source, with the aim of informing a market strategy for the rollout of fuel-efficient stoves.

The Household Energy Consumption survey expands on the Energy Poverty Survey by including all energy use within the household from cooking to lighting and entertainment, and across all of Myanmar given significant differences in household incomes, fuel access, and proximity to city centers, etc. The Household Energy Consumption survey was performed across more than double the number of households (across Myanmar) with the objective of helping establish energy baselines and fuel-use trends for the development of the Energy Master Plan.

3.3 Approach to Survey Fieldwork

Prior to undertaking household energy consumption survey the following was undertaken:

- The Ministry of Electricity and Energy provided an endorsement letter for the survey work and to also explain how the energy consumption results will feed into a process of national energy planning.
- An advocacy process then was required for each local and/or regional authority to get their buy-in and endorsement.
- A survey team was formed and the national consultant leading the household energy survey undertook a series of workshops to explain the survey forms and concepts. This is to ensure that the energy survey team members fully understand the questions and to explain how to obtain the answers from those that are being surveyed.

The survey team comprised of a national team leader, who has had prior experience in conducting energy surveys. The team leader was trained in the household survey forms to ensure full understanding of the intent, purpose, and nature of the survey form. They subsequently recruited additional team members to assist in carrying out the survey and they

were also trained in the survey's content and in particular the means by which the survey would be conducted. The survey team then travelled to the different regions listed in Table 2 to conduct their fieldwork.

For each region, the survey team went through the following steps:

- The survey team met with the community leader and village volunteers for a consultation workshop. This involved explaining survey content and its objectives, which is extremely important to ensuring buy-in from the community leader—in general, it was explained that the survey is intended for national planning purposes and the community leader supported the initiative. An illustration of this occurring in the Ngaputaw Township, Ayeyarwaddy.
- The community leader then assisted the survey team in terms of the household selection process in order to maximize the coverage of different income levels. Furthermore, volunteers within the community would be recruited to facilitate the survey team in conducting their field work.
- A basic strategy was devised to then carry out the household survey in the village for the sample households.
- The team conducted door-to-door surveys in some instances while selected household occupants were invited to a temporary office to come and fill out the survey in others.
- Those completing the survey were provided with a small gift.

The survey team then compiled the results of the surveys into spreadsheets to enable data analysis.

3.4 Actual Numbers of Surveyed Regions and Households

In total, 967 surveys were conducted in 11 regions across Myanmar. Table 2 lists the regions and townships where the surveys took place; it also shows the number of surveyed households in each location. The basis for the total number of surveys performed was the maximum number that could be done given the time and budget constraints. Townships were selected to ensure appropriate coverage across each state and region so that geographical diversity in energy consumption trends could be captured across the entire country. The selection of households within each township was done in consultation with the township leaders and were randomly selected in order to avoid bias.

Table 2: Summary of Urban and Rural Household Energy Consumption Survey Approach

No.	Region	Township	Number of Surveyed Households
1	Ayeyarwaddy Region	Ngaputaw	85
2	Magway Region	Magway	61
3	Mandalay Region	Kyaukpadaung/Mandalay	184
4	Yangon Region	Kyauktada/Dala	101
5	Shan State (North)	Thein Ni	69
6	Shan State (South)	Pekon	72
7	Kayah State	Demoso	61
8	Rakhine State	Taunggup	75
9	Chin State	Palatwa	95
10	Mon State	Chaung Sone	78
11	Kayin State	Hlaing Bwae	86
Total			**967**

Source: ADB.

Meeting with community leader in Ngaputaw Township, Ayeyarwaddy

Source: Asian Development Bank. Photo credit: Kyi Kyi Hlaing, Consultant's Energy Survey Team.

Training and workshop with volunteers in Ngaputaw Township, Ayeyarwaddy

Source: Asian Development Bank. Photo credit: Kyi Kyi Hlaing, Consultant's Energy Survey Team.

Conducting the Survey in Ngaputaw Township, Ayeyarwaddy

Source: Asian Development Bank. Photo credit: Kyi Kyi Hlaing, Consultant's Energy Survey Team.

Conducting the Survey in Ngaputaw Township, Ayeyarwaddy

Source: Asian Development Bank. Photo credit: Kyi Kyi Hlaing, Consultant's Energy Survey Team.

4

Household Survey Results

4.1 Completed Household Surveys by Township

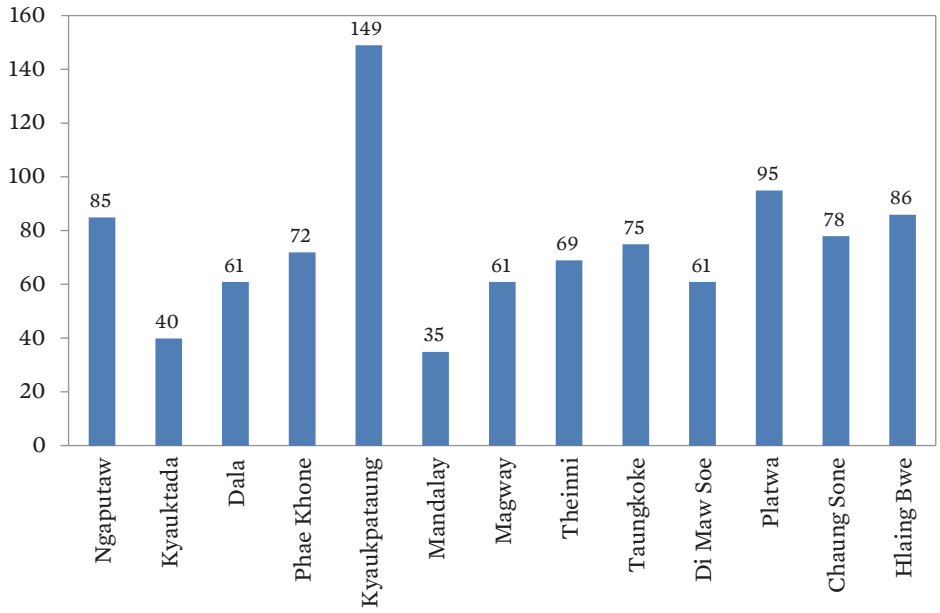
Table 3 and Figure 1 show the spread of completed surveys amongst the various townships in Myanmar. Kyaukpataung in the Mandalay region accounted for the highest share of surveys at 15%.

Table 3: Number of Completed Surveys by Township

Township	Number of Surveys	Percentage (%)
Ngaputaw	85	9
Kyauktada	40	4
Dala	61	6
Phae Khone	72	7
Kyaukpataung	149	15
Mandalay	35	4
Magway	61	6
Theinni	69	7
Taungkoke	75	8
Di Maw Soe	61	6
Platwa	95	10
Chaung Sone	78	8
Hlaing Bwe	86	9
Total	**967**	**100**

Source: ADB.

Figure 1: Number of Completed Surveys by Township



Source: ADB.

4.2 Households by Floor Space, Size, and Income

Table 4 and Figure 2 summarize the floor space data for households at the township level. Kyauktada households surveyed all owned large households greater than 500 square feet whereas Platwa and Ngaputaw has a significant share of households below 200 square feet.

Table 5 and Figure 3 show the number of households with one to five occupants. Kyaukpataung has a lot of larger households (occupant-wise), which is consistent with the floor space available (see above) with only a few surveyed households across Myanmar only containing one occupant.

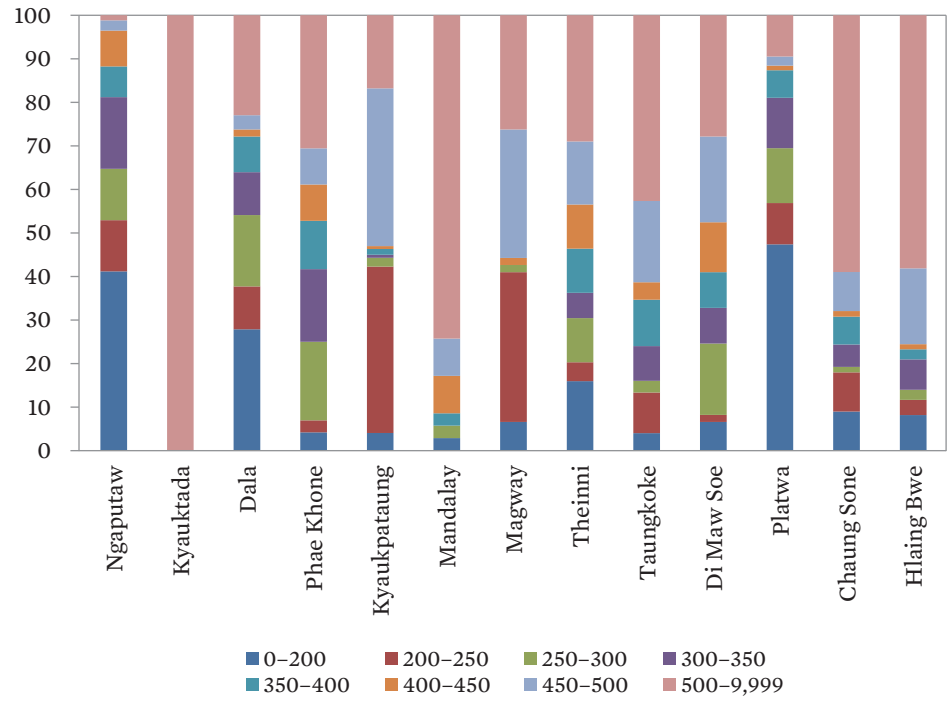
Table 6 and Figure 4 summarize the household incomes across the townships. Mandalay has the highest proportion of higher income earners (lighter colors) than all of the other townships.

Table 4: Household Floor Space by Township (square feet)

Floor space (From)	0	200	250	300	350	400	450	500
Floor space (To)	200	250	300	350	400	450	500	9999
Ngaputaw	35	10	10	14	6	7	2	1
Kyauktada	0	0	0	0	0	0	0	40
Dala	17	6	10	6	5	1	2	14
Phae Khone	3	2	13	12	8	6	6	22
Kyaukpataung	6	57	3	1	2	1	54	25
Mandalay	1	0	1	0	1	3	3	26
Magway	4	21	1	0	0	1	18	16
Theinni	11	3	7	4	7	7	10	20
Taungkoke	3	7	2	6	8	3	14	32
Di Maw Soe	4	1	10	5	5	7	12	17
Platwa	45	9	12	11	6	1	2	9
Chaung Sone	7	7	1	4	5	1	7	46
Hlaing Bwe	7	3	2	6	2	1	15	50
Total	**143**	**126**	**72**	**69**	**55**	**39**	**145**	**318**

Source: ADB.

Figure 2: Household Floor Space Distribution by township (square feet)



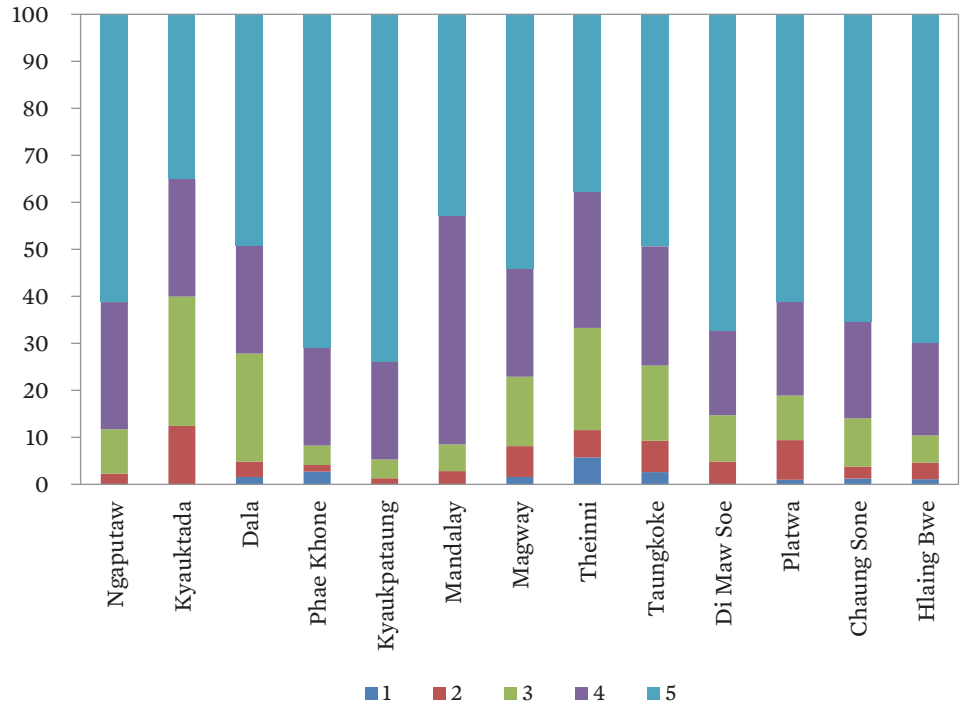
Source: ADB.

Table 5: Occupants per Household by Township

No. Occupants (From)	1	2	3	4	5
Ngaputaw	0	2	8	23	52
Kyauktada	0	5	11	10	14
Dala	1	2	14	14	30
Phae Khone	2	1	3	15	51
Kyaukpataung	0	2	6	31	110
Mandalay	0	1	2	17	15
Magway	1	4	9	14	33
Theinni	4	4	15	20	26
Taungkoke	2	5	12	19	36
Di Maw Soe	0	3	6	11	41
Platwa	1	8	9	19	58
Chaung Sone	1	2	8	16	51
Hlaing Bwe	1	3	5	17	60
Total	**13**	**42**	**108**	**226**	**577**

Source: ADB.

Figure 3: Occupants per Household by Township (%)



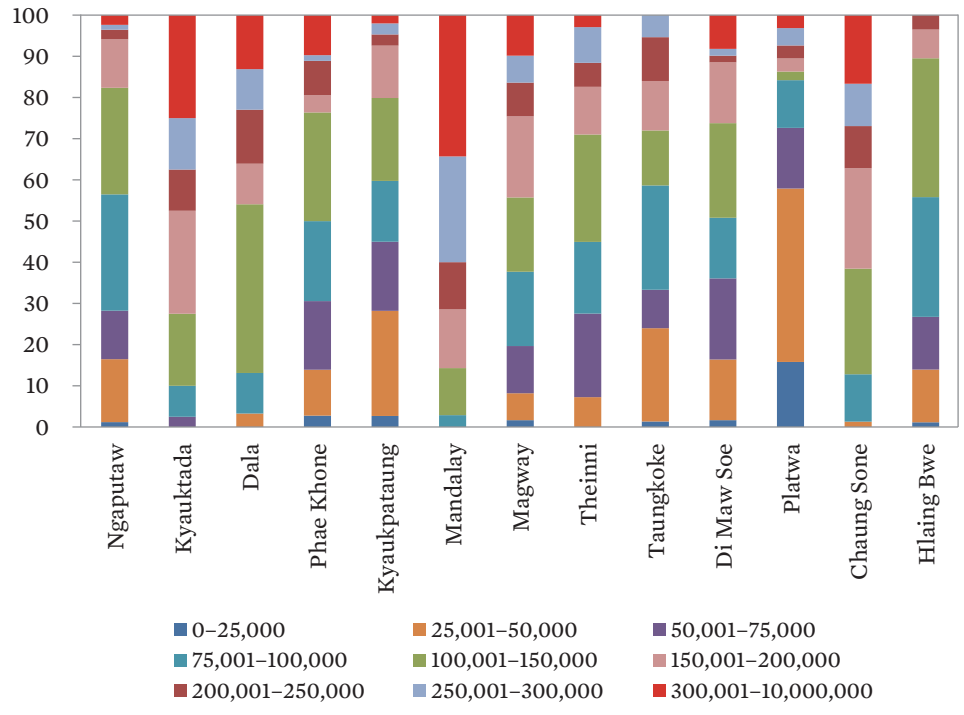
Source: ADB.

Table 6: Household Income Level by Township (kyat/month)

Income Level (From)	0	25,001	50,001	75,001	100,001	150,001	200,001	250,001	300,001
Income Level (To)	25,000	50,000	75,000	100,000	150,000	200,000	250,000	300,000	10,000,000
Ngaputaw	1	13	10	24	22	10	2	1	2
Kyauktada	0	0	1	3	7	10	4	5	10
Dala	0	2	0	6	25	6	8	6	8
Phae Khone	2	8	12	14	19	3	6	1	7
Kyaukpataung	4	38	25	22	30	19	4	4	3
Mandalay	0	0	0	1	4	5	4	9	12
Magway	1	4	7	11	11	12	5	4	6
Theinni	0	5	14	12	18	8	4	6	2
Taungkoke	1	17	7	19	10	9	8	4	0
Di Maw Soe	1	9	12	9	14	9	1	1	5
Platwa	15	40	14	11	2	3	3	4	3
Chaung Sone	0	1	0	9	20	19	8	8	13
Hlaing Bwe	1	11	11	25	29	6	3	0	0
Total	**26**	**148**	**113**	**166**	**211**	**119**	**60**	**53**	**71**

Source: ADB.

Figure 4: Household Income Distribution by Township (kyat/month)



Source: ADB.

4.3 Household Income and Energy Expenditure

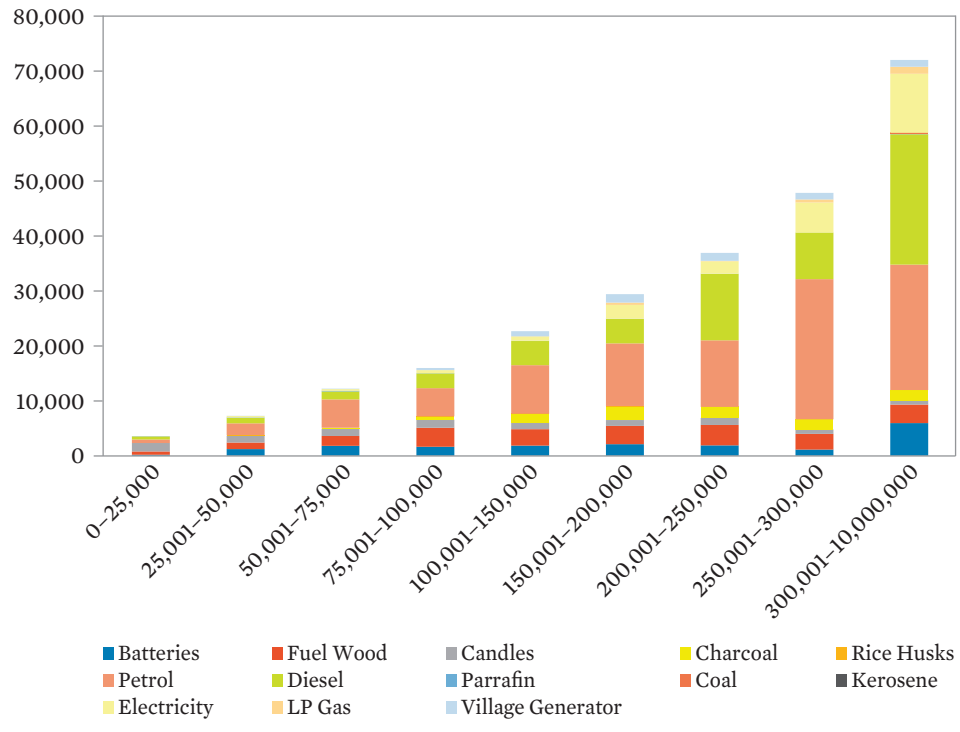
Table 7 and Figure 5 show the average energy expenditure across all surveyed households by income level. The data show, as expected, the higher the household income, the higher the expenditure indicating a positive correlation between the two.

Table 7: Household Energy Expenditure by Income Level (All Townships)

Township	Income Level (From)	Income Level (To)	Number of Households	Batteries	Fuel Wood	Candles	Charcoal	Rice Husks	Petrol	Diesel	Parrafin	Coal	Kerosene	Electricity	LP Gas	Village Generator
All	0	25,000	26	164	585	1,554	0	0	615	558	58	0	0	0	0	0
All	25,001	50,000	148	1,170	1,189	1,284	56	25	2,147	992	73	0	0	232	0	69
All	50,001	75,000	113	1,768	1,804	1,365	106	0	5,151	1,471	119	0	0	319	0	72
All	75,001	100,000	166	1,623	3,432	1,481	463	136	5,105	2,712	43	0	0	563	0	375
All	100,001	150,000	211	1,823	2,960	1,237	1,491	95	8,824	4,398	54	0	0	775	17	936
All	150,001	200,000	119	2,071	3,336	1,066	2,493	67	11,349	4,437	33	0	13	2,525	420	1,524
All	200,001	250,000	60	1,843	3,709	1,315	1,979	0	12,103	12,068	25	0	0	2,273	75	1,458
All	250,001	300,000	53	1,102	2,848	798	1,851	0	25,458	8,483	0	0	0	5,460	530	1,198
All	300,001	10,000,000	71	5,927	3,344	820	1,824	0	22,797	23,693	42	211	0	10,726	1,289	1,232

Source: ADB.

Figure 5: Household Energy Expenditure by Income Level (All Townships)



Source: ADB.

4.4 Household Income Levels and Expenditure Levels

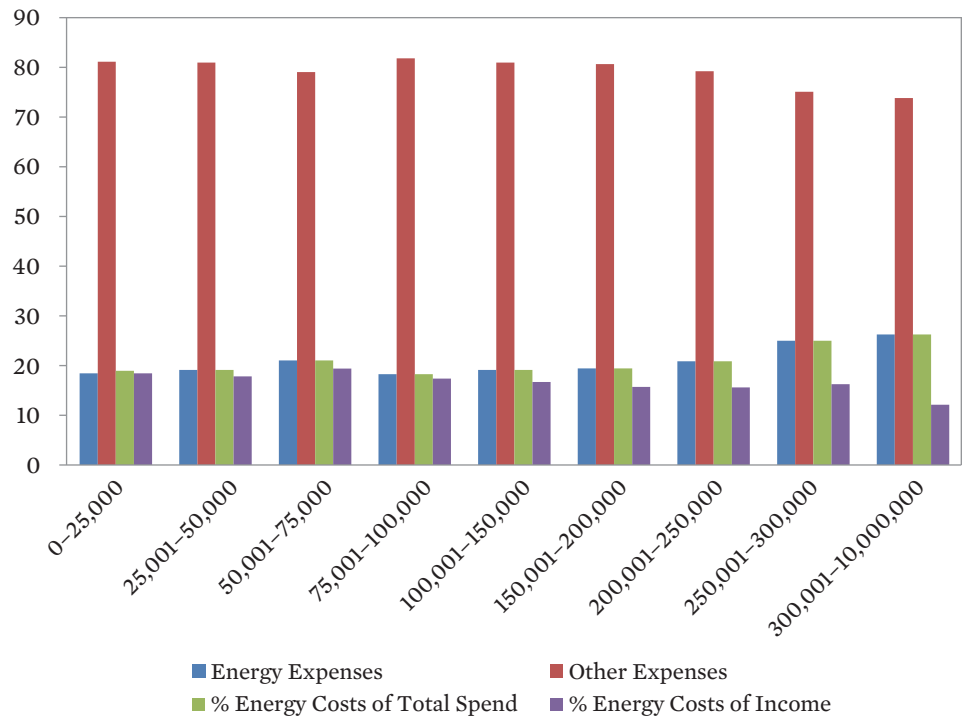
Table 8 and Figure 6 summarize the expenditure levels across energy and other categories of expenses by income level. Figure 6 shows lower income households spend a higher percentage of their incomes on energy requirements..

Table 8: Total Household Expenditure by Component
(kyat/month, All Townships)

Township	Income Level (From) (Kyat/month)	Income Level (To) (Kyat/month)	Number of Households	Energy Expenses (Kyat/month)	Other Expenses (Kyat/month)	Total Expenses (Kyat/month)	Income (Kyat/month)
All	0	25,000	26	3,534	15,126	18,660	19,192
All	25,001	50,000	148	7,237	30,652	37,889	40,652
All	50,001	75,000	113	12,176	45,743	57,920	62,806
All	75,001	100,000	166	15,934	71,312	87,246	91,743
All	100,001	150,000	211	22,610	95,732	118,342	135,452
All	150,001	200,000	119	29,333	121,723	151,056	186,933
All	200,001	250,000	60	36,849	139,833	176,683	236,333
All	250,001	300,000	53	47,728	143,396	191,125	294,142
All	300,001	10,000,000	71	71,905	202,183	274,088	593,724

Source: ADB.

Figure 6: Total Household Expenditure by Component (kyat/month, All Townships)



Source: ADB.

4.5 Household Appliance or Application Availability and Fuel Sources

Table 9 summarizes the percentage of the surveyed households that have access to various applications or appliances by township. Tables 10–13 summarize the same application and/or appliance availability fueled by a specific energy source.

Table 9: Household Appliance or Application Availability by Township

Available	Households	Cooking (%)	Lighting (%)	Space Cooling (%)	Water Heating (%)	Television (%)	Refrigeration (%)	Pumping (%)	Other (%)
Ngaputaw	85	100	100	0	100	25	0	2	0
Kyauktada	40	93	100	73	98	95	88	98	15
Dala	61	100	100	2	100	57	31	0	0
Phae Khone	72	100	100	0	0	47	0	1	0
Kyaukpataung	149	100	100	1	5	42	2	10	3
Mandalay	35	100	100	40	43	100	80	66	0
Magway	61	100	100	0	0	36	0	0	5
Theinni	69	91	100	0	0	43	0	0	0
Taungkoke	75	100	100	0	0	20	0	0	0
Di Maw Soe	61	100	100	0	10	67	2	21	2
Platwa	95	100	100	0	0	13	0	0	0
Chaung Sone	78	99	100	0	0	85	3	3	1
Hlaing Bwe	86	100	100	1	0	26	0	0	0

Source: ADB.

Cooking and lighting are very important requirements to any household, which is evidenced by close to 100% availability rates across all townships. Firewood is a major fuel source for cooking where electricity or liquefied petroleum gas is not available.

Table 10: Household Appliance or Application Availability by Township
(Electricity as Fuel Source)

Electricity	Households	Cooking (%)	Lighting (%)	Space Cooling (%)	Water Heating (%)	Television (%)	Refrigeration (%)	Pumping (%)	Other (%)
Ngaputaw	85	0	0	0	0	0	0	0	0
Kyauktada	40	85	100	73	98	95	88	98	13
Dala	61	38	38	2	36	38	28	0	0
Phae Khone	72	0	11	0	0	8	0	0	0
Kyaukpataung	149	13	26	1	5	21	2	7	1
Mandalay	35	97	100	40	43	100	80	66	0
Magway	61	0	0	0	0	0	0	0	0
Theinni	69	10	28	0	0	4	0	0	0
Taungkoke	75	0	28	0	0	12	0	0	0
Di Maw Soe	61	30	33	0	10	30	2	20	2
Platwa	95	0	11	0	0	1	0	0	0
Chaung Sone	78	0	13	0	0	4	3	1	0
Hlaing Bwe	86	0	0	0	0	0	0	0	0

Source: ADB.

Table 11: Household Appliance or Application Availability by Township
(Liquefied Petroleum Gas as Fuel Source)

Liquefied Petroleum Gas	Households	Cooking (%)	Lighting (%)	Space Cooling (%)	Water Heating (%)	Television (%)	Refrigeration (%)	Pumping (%)	Other (%)
Ngaputaw	85	0	0	0	0	0	0	0	0
Kyauktada	40	35	0	0	0	0	0	0	0
Dala	61	0	0	0	0	0	0	0	0
Phae Khone	72	0	0	0	0	0	0	0	0
Kyaukpataung	149	0	0	0	0	0	0	0	0
Mandalay	35	11	0	0	0	0	0	0	0
Magway	61	0	0	0	0	0	0	0	0
Theinni	69	12	29	0	0	9	0	0	0
Taungkoke	75	0	0	0	0	0	0	0	0
Di Maw Soe	61	0	0	0	0	0	0	0	0
Platwa	95	0	0	0	0	0	0	0	0
Chaung Sone	78	5	0	0	0	0	0	0	0
Hlaing Bwe	86	0	0	0	0	0	0	0	0

Source: ADB.

Table 12: Household Appliance or Application Availability by Township
(Generator as Fuel Source)

Generator	Households	Cooking (%)	Lighting (%)	Space Cooling (%)	Water Heating (%)	Television (%)	Refrigeration (%)	Pumping (%)	Other (%)
Ngaputaw	85	0	7	0	0	7	0	1	0
Kyauktada	40	0	3	0	0	0	0	0	0
Dala	61	2	3	0	0	3	2	0	0
Phae Khone	72	0	0	0	0	0	0	1	0
Kyaukpataung	149	0	7	0	0	3	0	3	2
Mandalay	35	0	11	0	0	6	0	3	0
Magway	61	2	10	0	0	7	0	0	5
Theinni	69	10	29	0	0	7	0	0	0
Taungkoke	75	0	8	0	0	4	0	0	0
Di Maw Soe	61	0	0	0	0	0	0	2	0
Platwa	95	0	5	0	0	3	0	0	0
Chaung Sone	78	0	13	0	0	10	0	1	0
Hlaing Bwe	86	0	15	0	0	19	0	0	0

Source: ADB.

Table 13: Household Appliance or Application Availability by Township
(Firewood as Fuel Source)

Firewood	Households	Cooking (%)	Lighting (%)	Space Cooling (%)	Water Heating (%)	Television (%)	Refrigeration (%)	Pumping (%)	Other (%)
Ngaputaw	85	96	2	0	96	0	0	0	0
Kyauktada	40	0	0	0	0	0	0	0	0
Dala	61	20	0	0	0	0	0	0	0
Phae Khone	72	100	0	0	0	0	0	0	0
Kyaukpataung	149	94	0	0	0	0	0	0	0
Mandalay	35	6	0	0	0	0	0	0	0
Magway	61	97	0	0	0	0	0	0	0
Theinni	69	0	0	0	0	0	0	0	0
Taungkoke	75	88	0	0	0	0	0	0	0
Di Maw Soe	61	100	0	0	0	0	0	0	0
Platwa	95	100	0	0	0	0	0	0	0
Chaung Sone	78	94	0	0	0	0	0	0	0
Hlaing Bwe	86	88	0	0	0	0	0	0	0

Source: ADB.

4.6 Household Energy Source and Energy Use

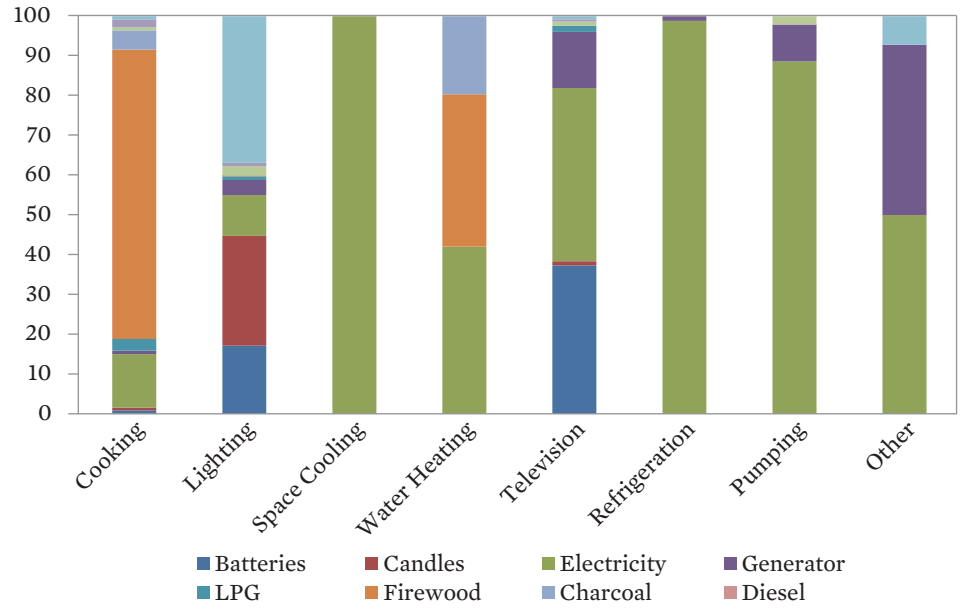
Table 14 and Figure 7 show the various fuel sources for various household appliances and shows space-heating, refrigeration, and pumping is primarily driven by electricity whereas batteries and torches are a significant fuel source for lighting. Firewood is also the most dominant fuel source for cooking.

Table 14: Number of Households Reported Using the Fuel for the Application Listed (All Townships)

Township	Energy Source	Cooking	Lighting	Space Cooling	Water Heating	Television	Refrigeration	Pumping	Other	Total
All	Batteries	9	376	0	0	143	0	0	0	528
All	Candles	7	605	0	0	4	0	0	0	616
All	Electricity	136	225	46	90	167	86	86	7	843
All	Generator	9	83	0	0	54	1	9	6	162
All	LPG	30	20	0	0	6	0	0	0	56
All	Firewood	738	2	0	82	0	0	0	0	822
All	Charcoal	49	0	0	42	0	0	0	0	91
All	Diesel	0	1	0	0	0	0	0	0	1
All	Paraffin	8	53	0	0	4	0	2	0	67
All	Rice Husk	19	18	0	0	2	0	0	0	39
All	Torches	9	808	0	0	3	0	0	1	821
All	**Total**	**1,014**	**2,191**	**46**	**214**	**383**	**87**	**97**	**14**	**4,046**

LPG = liquefied petroleum gas.
Source: ADB.

Figure 7: Percentage of Fuels Used for the Application Listed (All Townships)



LPG = liquefied petroleum gas.
Source: ADB.

4.7 Fuel and Appliance Use for Household Water Heating

Table 15 summarizes the number of households with access to the following appliances used for water heating. For the townships that answered this section, the dominant appliance is the electric stove and coal or wood stove.

Table 15: Appliance Used for Water Heating by Township

Appliances	Ngaputaw	Kyauktada	Dala	Phae Khone	Kyaukpataung	Mandalay	Magway	Theinni	Taungkoke	Di Maw Soe	Platwa	Chaung Sone	Hlaing Bwe	All
LPG Cooker	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wick stove	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pressure stove	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric stove	0	39	22	0	0	0	0	0	0	0	0	0	0	61
Coal or wood stove	85	0	39	72	0	0	0	0	0	0	0	0	0	196
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LPG = liquefied petroleum gas.
Source: ADB.

Table 16 summarizes the fuel used for water heating which is dominated by electricity and firewood.

Table 16: Fuel Used for Water Heating by Township

Fuel Used	Ngaputaw	Kyauktada	Dala	Phae Khone	Kyaukpataung	Mandalay	Magway	Theinni	Taungkoke	Di Maw Soe	Platwa	Chaung Sone	Hlaing Bwe	All
LPG	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electricity	0	39	22	0	0	0	0	0	0	0	0	0	0	61
Fire wood	82	0	39	70	0	0	0	0	0	0	0	0	0	191
Dung	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rice husks	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	3	0	0	2	0	0	0	0	0	0	0	0	0	5

LPG = liquefied petroleum gas.
Source: ADB.

4.8 Type of Cooker Used in Households

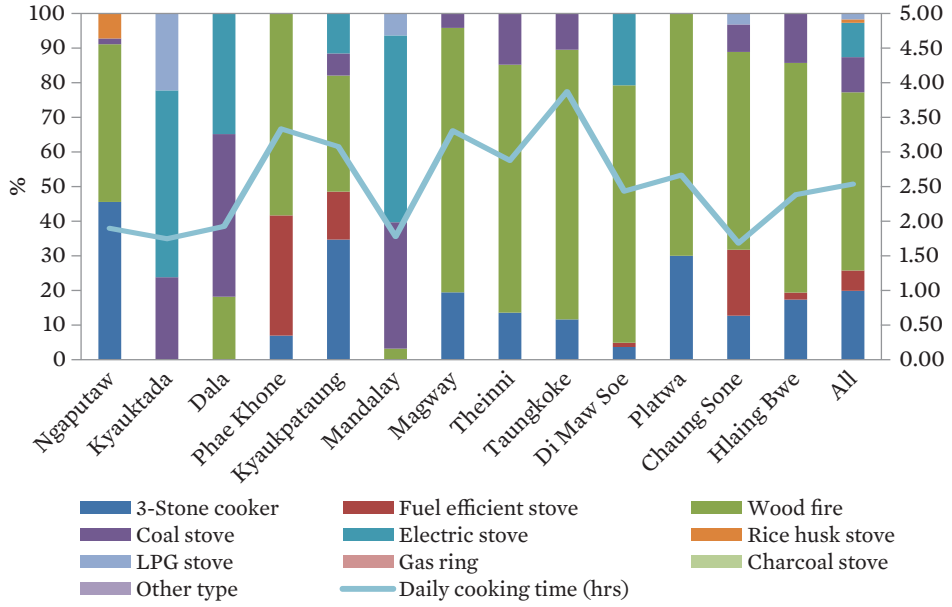
Table 17 and Figure 8 show the number of households that have a certain type of cooker by township. The most popular cooking appliances include the 3-stone cooker and wood fire.

Table 17: Type of Cooker Used in Households (by Township)

Appliances	Ngaputaw	Kyauktada	Dala	Phae Khone	Kyaukpataung	Mandalay	Magway	Theinni	Taungkoke	Di Maw Soe	Platwa	Chaung Sone	Hlaing Bwe	All
3-Stone cooker	82	0	0	5	60	0	14	11	10	3	39	16	17	257
Fuel efficient stove	0	0	0	25	24	0	0	0	0	1	0	24	2	76
Wood fire	82	0	12	42	58	2	55	58	67	61	91	72	65	665
Coal stove	3	15	31	0	11	23	3	12	9	0	0	10	14	131
Electric stove	0	34	23	0	20	34	0	0	0	17	0	0	0	128
Rice husk stove	13	0	0	0	0	0	0	0	0	0	0	0	0	13
LPG stove	0	14	0	0	0	4	0	0	0	0	0	4	0	22
Gas ring	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Charcoal stove	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other type	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LPG = liquefied petroleum gas.
Source: ADB.

Figure 8: Type of Cooker Used in Households (by Township)



LPG = liquefied petroleum gas.
Source: ADB.

4.9 Number of Cooking Fuels Available to Households

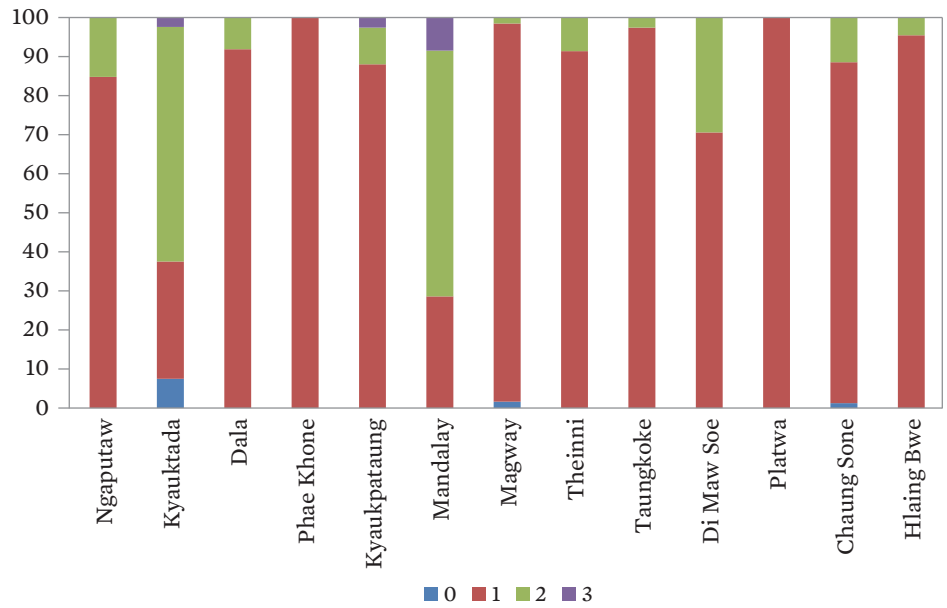
Table 18 and Figure 9 show the number of households with access to one, two, or three types of fuels for cooking. With the exception of Mandalay and Kyauktada, all households generally have one type of fuel for cooking across all townships.

Table 18: Number of Cooking Fuels Used per Household by Township

	Number of Fuel Types			
Township	0	1	2	3
Ngaputaw	0	72	13	0
Kyauktada	3	12	24	1
Dala	0	56	5	0
Phae Khone	0	72	0	0
Kyaukpataung	0	131	14	4
Mandalay	0	10	22	3
Magway	1	59	1	0
Theinni	0	63	6	0
Taungkoke	0	73	2	0
Di Maw Soe	0	43	18	0
Platwa	0	95	0	0
Chaung Sone	1	68	9	0
Hlaing Bwe	0	82	4	0

Source: ADB.

Figure 9: Distribution of the Number of Cooking Fuels Used per Household by Township (%)



Source: ADB.

4.10 Household Cooking Fuel Source Quantities (Single and Dual-Fuel Households)

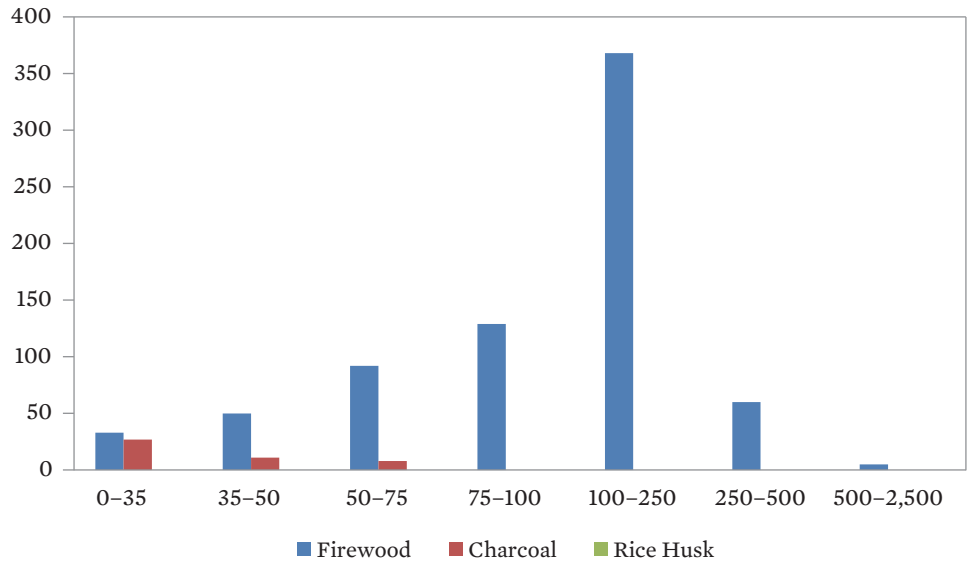
Table 19 and Figure 10 summarize the number of household and the various fuel source quantities used for cooking (single-fuel households). Most households use 100 kilograms (kg) to 250 kg of firewood each month.

Table 19: Cooking Fuel Source Quantities for Single-Fuel Households
(kg, All Townships)

Township	Single Fuels	Number of Households	Quantity per month (From and To, kg) 0 35	35 50	50 75	75 100	100 250	250 500	500 2,500
All	Firewood	737	33	50	92	129	368	60	5
All	Charcoal	56	27	11	8	0	0	0	0
All	Rice Husk	0	0	0	0	0	0	0	0
All	Electricity	42	30	0	0	0	0	0	0
All	Gas	1	1	0	0	0	0	0	0

Source: ADB.

Figure 10: Cooking Fuel Source Quantities for Single-Fuel Households
(kg, All Townships)



Source: ADB.

Table 20 summarizes the same information for dual-fuel households (for cooking).

Table 20: Cooking Fuel Source Quantities for Dual-Fuel Households
(kg, All Townships)

Township	Dual Fuel			Number of Households	Quantity per month (From and To, unit: kg)						
	Fuel #1	Fuel #2	Main Fuel		0 35	35 50	50 75	75 100	100 250	250 500	500 2500
All	firewood	rice husk	firewood	12	4	6	2	0	0	0	0
All	firewood	rice husk	rice husk	12	3	6	1	1	1	0	0
All	charcoal	electricity	charcoal	39	29	3	3	0	3	0	0
All	charcoal	electricity	electricity	39	16	0	1	0	0	0	0
All	firewood	electricity	firewood	29	2	4	4	10	7	2	0
All	firewood	electricity	electricity	29	19	0	0	0	0	0	0

Source: ADB.

4.11 Fuel Sources Used for Household Lighting

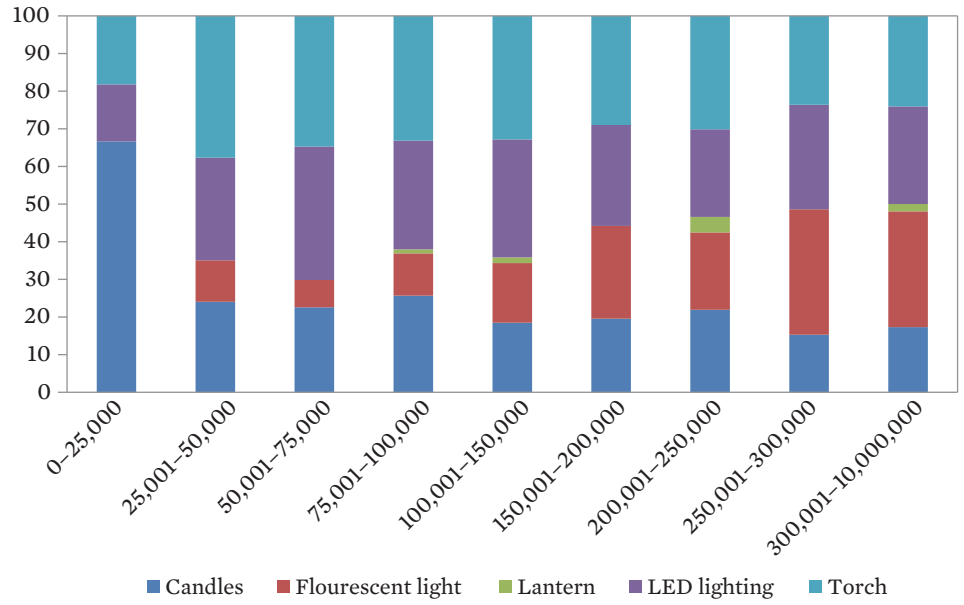
Table 21 summarizes and Figure 11 plots the number of households by income range, using a particular type of lighting. The obvious trend is with an increasing reliance on candles for lower income households and a higher percentage of fluorescent lighting for higher income households.

Table 21: Number of Households by Lighting Type and Income Range
(kyat/month, All Townships)

Township	Type	Income Range (From and To)								
		0 25,000	25,001 50,000	50,001 75,000	75,001 100,000	100,001 150,000	150,001 200,000	200,001 250,000	250,001 300,000	300,001 10,000,000
All	Candles	22	37	28	48	49	27	16	11	18
All	Fluorescent light	0	17	9	21	42	34	15	24	32
All	Lantern	0	0	0	2	4	0	3	0	2
All	LED lighting	5	42	44	54	83	37	17	20	27
All	Torch	6	58	43	62	87	40	22	17	25

LED = light emitting diode.
Source: ADB.

Figure 11: Percentage of Households by Lighting Type and Income Range (kyat/month, All Townships)



Source: ADB.

4.12 Average Hours of Lighting by Income Range

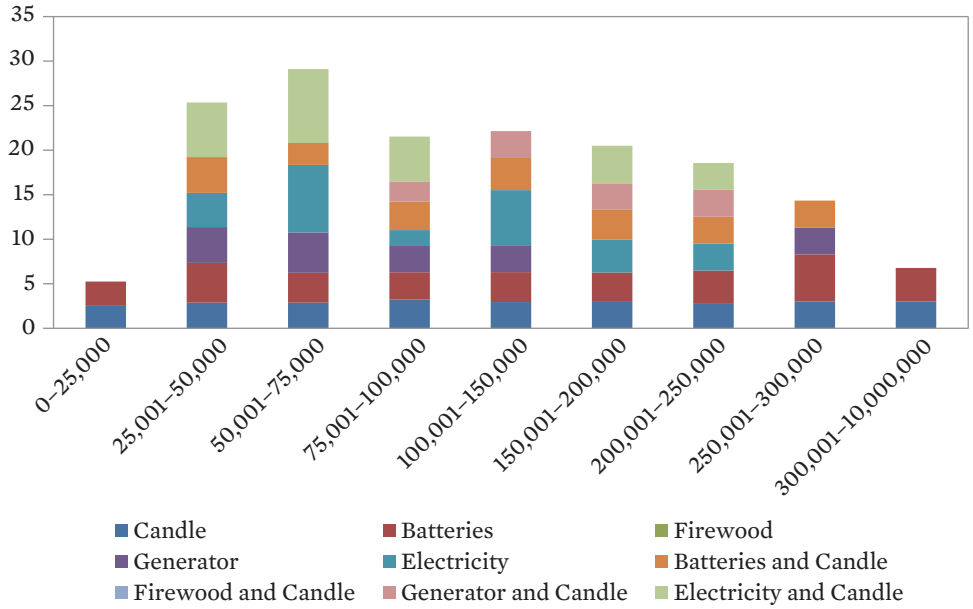
Table 22 and Figure 12 summarize the average lighting hours for all households by fuel source. Households with access to just candle have it lit from 2.5 hours in the lowest income to up to 3 hours in the highest income bracket.

Table 22: Household Light Hours by Fuel Source and Income Range (kyat/month, All Townships)

Township	Fuel source #1	Fuel source #2	Income Range (From and To) 0 25,000	25,001 50,000	50,001 75,000	75,001 100,000	100,001 150,000	150,001 200,000	200,001 250,000	250,001 300,000	300,001 10,000,000
All	Candle		2.5	2.9	2.9	3.2	2.9	2.9	2.7	3.0	3.0
All	Batteries		2.7	4.4	3.3	3.1	3.3	3.3	3.7	5.3	3.7
All	Firewood		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	Generator		0.0	4.0	4.5	2.9	3.0	0.0	0.0	3.0	0.0
All	Electricity		0.0	3.8	7.5	1.8	6.1	3.7	3.0	0.0	0.0
All	Batteries	Candle	0.0	4.0	2.4	3.2	3.6	3.4	3.0	3.0	0.0
All	Firewood	Candle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	Generator	Candle	0.0	0.0	0.0	2.3	3.0	2.9	3.0	0.0	0.0
All	Electricity	Candle	0.0	6.1	8.3	5.0	0.0	4.2	3.0	0.0	0.0

Source: ADB.

Figure 12: Household Light Hours by Fuel Source and Income Range
(kyat/month, All Townships)



Source: ADB.

4.13 Number of Light Sources (Aggregated)

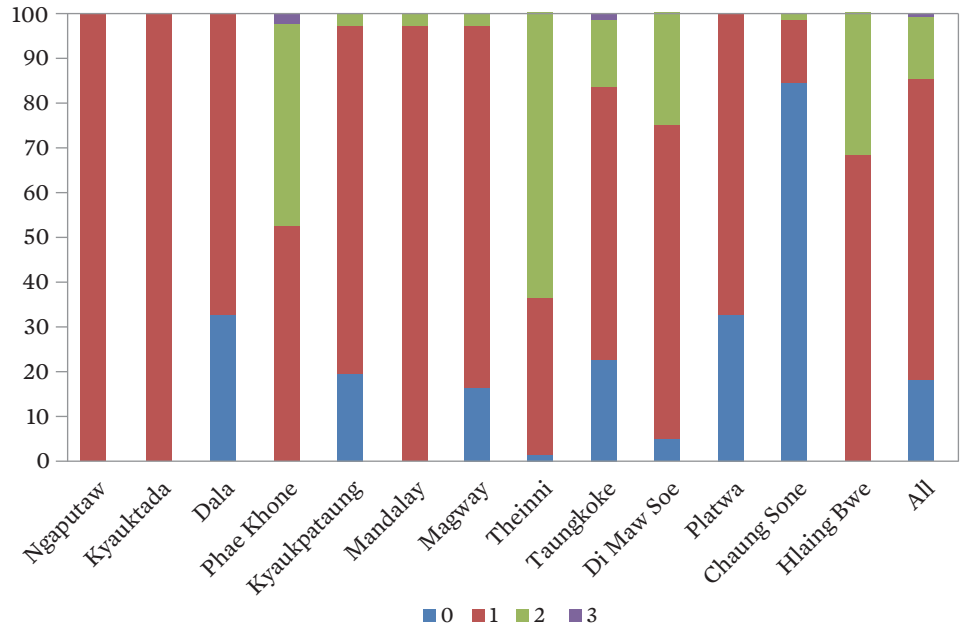
Table 23 and Figure 13 summarize the number of households with access to no, one, two, or three types of light sources. Most households in all of the townships have at least one type of light source.

Table 23: Number of Light Sources per Household by Township

	Number of Light Sources			
Township	**0**	**1**	**2**	**3**
Ngaputaw	0	85	0	0
Kyauktada	0	40	0	0
Dala	20	41	0	0
Phae Khone	0	37	33	2
Kyaukpataung	29	116	4	0
Mandalay	0	34	1	0
Magway	10	49	2	0
Theinni	1	24	44	0
Taungkoke	17	46	11	1
Di Maw Soe	3	43	15	0
Platwa	31	64	0	0
Chaung Sone	66	11	1	0
Hlaing Bwe	0	58	28	0
All	**177**	**648**	**139**	**3**

Source: ADB.

Figure 13: Number of Light Sources per Household by Township
(%, Distribution)



Source: ADB.

Table 24 summarizes the number of households with access to certain lighting sources by income range. Candles, batteries, and electricity are the main fuel sources for lighting.

Table 24: Household Lighting Fuel Sources by Income Range
(kyat/month, All Townships)

Township	Fuel source #1	Fuel source #2	Income Range (From and To) 0 25,000	25,001 50,000	50,001 75,000	75,001 100,000	100,001 150,000	150,001 200,000	200,001 250,000	250,001 300,000	300,001 10,000,000
All	Candle		1	50	24	267	54	885	643	503	588
All	Batteries		9	15	3	46	68	27	17	4	11
All	Firewood		0	0	0	0	0	0	0	0	0
All	Generator		0	1	2	13	10	0	0	1	0
All	Electricity		0	26	13	47	51	26	1	0	0
All	Batteries	Candle	0	1	17	27	18	28	2	1	3
All	Firewood	Candle	0	0	0	0	0	0	0	0	0
All	Generator	Candle	0	0	0	4	2	10	3	0	0
All	Electricity	Candle	0	6	8	2	0	5	1	0	0

Source: ADB.

4.14 Number of Lighting Sources by Income Range

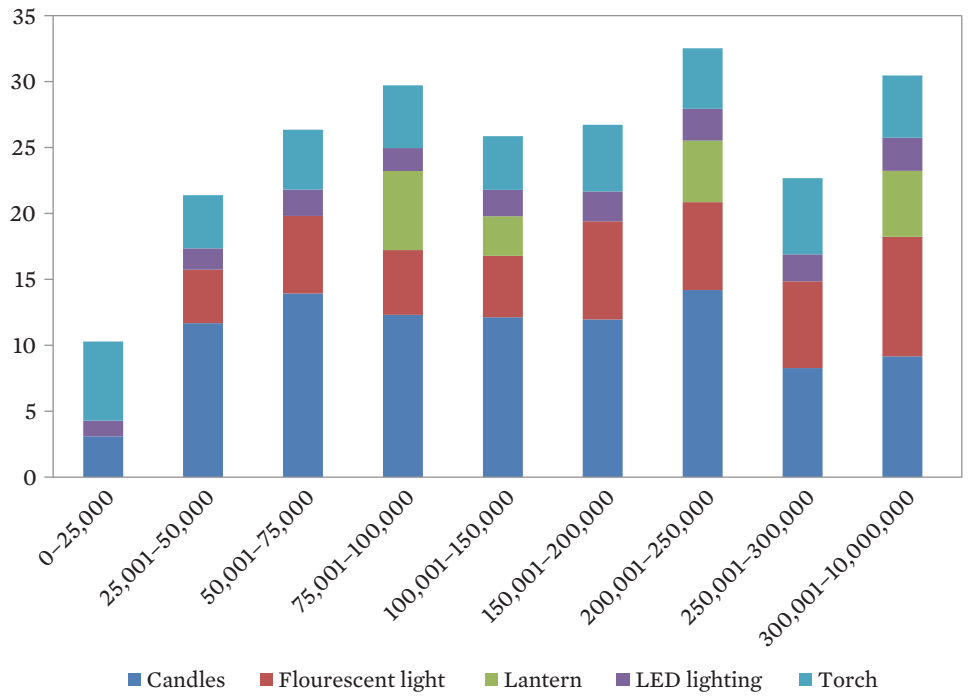
Table 25 and Figure 14 summarize the average number of lighting sources used per lighting type across income ranges. As income rises, the average number of lighting sources increases.

Table 25: Number of Lighting Sources in Use at One Time, by Income Range
(kyat/month, All Townships)

		Income Range (From and To)								
Township	Type	0 25,000	25,001 50,000	50,001 75,000	75,001 100,000	100,001 150,000	150,001 200,000	200,001 250,000	250,001 300,000	300,001 10,000,000
All	Candles	3.1	11.7	13.9	12.3	12.1	12.0	14.2	8.3	9.2
All	Fluorescent light	0.0	4.1	5.9	4.9	4.7	7.4	6.7	6.6	9.1
All	Lantern	0.0	0.0	0.0	6.0	3.0	0.0	4.7	0.0	5.0
All	LED lighting	1.2	1.6	2.0	1.7	2.0	2.3	2.4	2.1	2.5
All	Torch	6.0	4.0	4.5	4.8	4.1	5.1	4.6	5.8	4.7

LED = light emitting diode.
Source: ADB.

Figure 14: Typical Number of Lighting Source in Use at One Time, by Income Range (kyat/month, All Townships)



Source: ADB.

4.15 Quantity of Nonelectricity Energy Fuel Sources

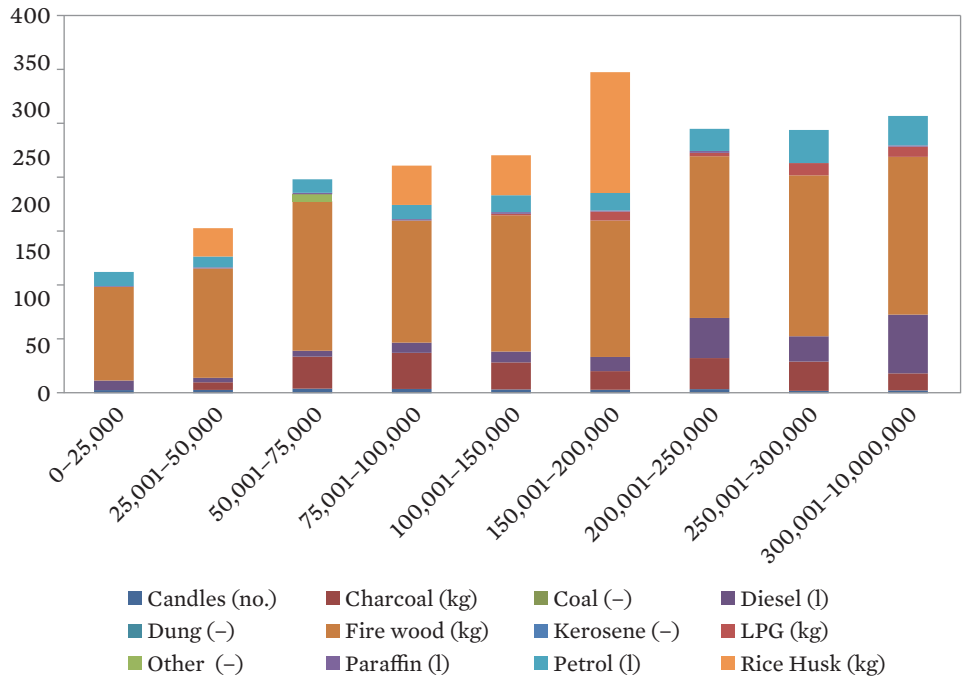
Table 26 and Figures 15–17 summarize the quantity of nonelectricity fuel that is used on average across all townships. Similar to the above, petrol and diesel increase in use with income.

Table 26: Quantity of Nonelectricity Fuel Being Used (All Townships)

			Income Range (From and To)								
Township	Type	Units	0 25,000	25,001 50,000	50,001 75,000	75,001 100,000	100,001 150,000	150,001 200,000	200,001 250,000	250,001 300,000	300,001 10,000,000
All	Candles	number	3.5	3.6	4.9	4.5	4.1	3.7	4.5	2.6	3.1
All	Charcoal	kg	0.0	8.0	34.0	38.3	28.6	19.7	32.7	31.0	18.1
All	Coal	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	Diesel	l	10.0	4.8	6.3	10.8	11.5	15.1	42.6	26.8	62.2
All	Dung	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	Fire wood	kg	99.1	115.7	158.2	129.2	144.3	144.6	171.1	170.4	167.1
All	Kerosene	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	LPG	kg	0.0	0.0	0.0	0.0	1.6	9.4	3.6	13.0	10.6
All	Other	–	0.0	0.0	7.5	0.0	0.0	0.0	0.0	0.0	0.0
All	Paraffin	l	1.0	1.2	1.4	1.6	1.8	1.2	2.0	0.0	1.5
All	Petrol	l	15.0	11.5	14.4	15.1	17.8	18.5	23.4	35.1	31.1
All	Rice Husk	kg	0.0	30.0	0.0	41.6	42.3	128.0	0.0	0.0	0.0

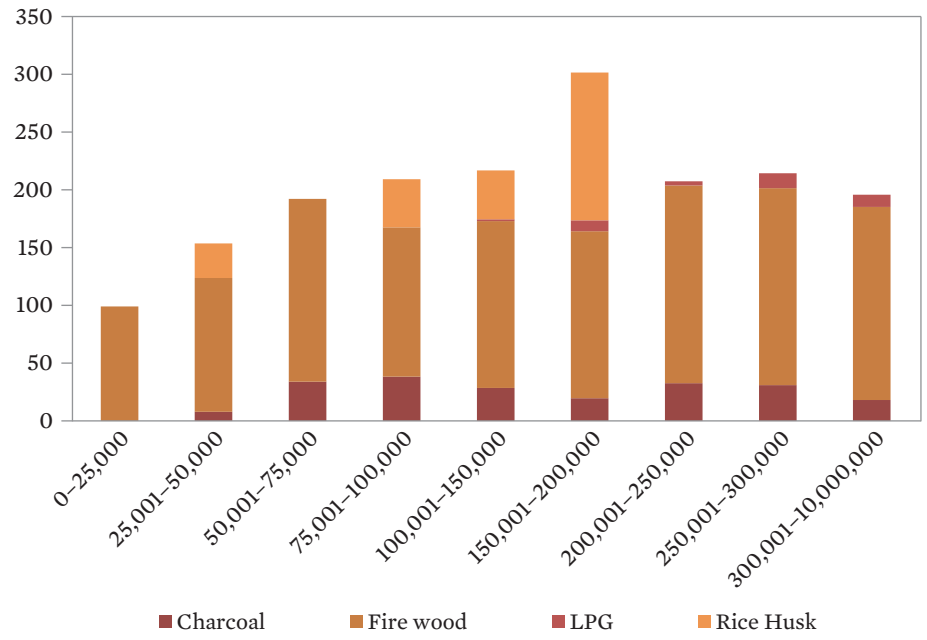
kg = kilogram, l = liter, LPG = liquefied petroleum gas.
Source: ADB

Figure 15: Quantity of Nonelectricity Fuel Being Used (All Townships)



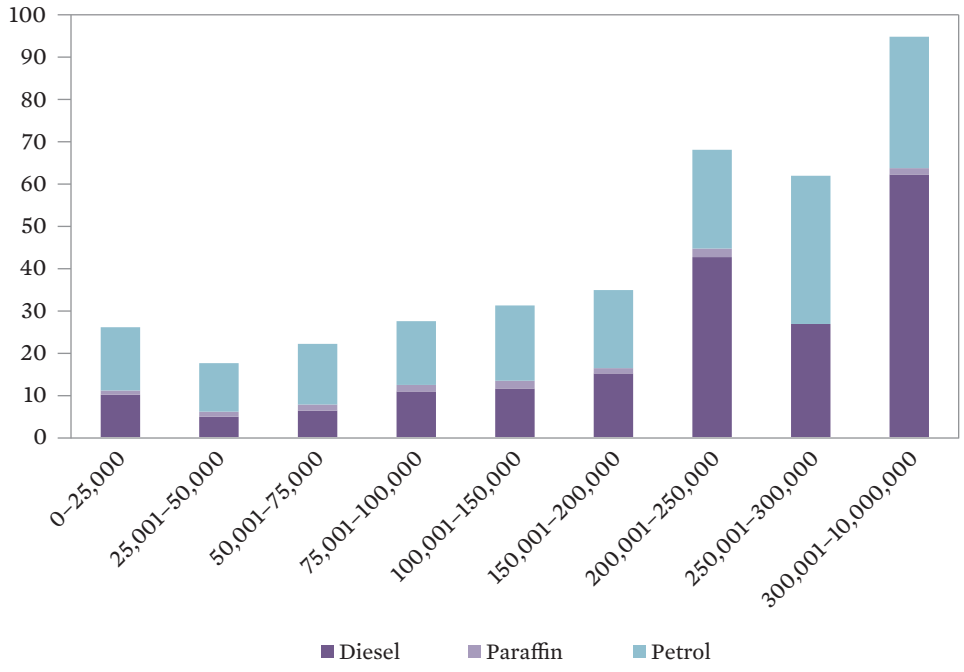
kg = kilogram, l = liter, LPG = liquefied petroleum gas, no. = number.
Source: ADB.

Figure 16: Quantity of Nonelectricity Fuel Being Used (kg, All Townships)



kg = kilogram, LPG = liquefied petroleum gas.
Source: ADB.

Figure 17: Quantity of Nonelectricity Fuel Being Used (liter, All Townships)



Source: ADB.

4.16 Household Nonelectricity Energy Consumption

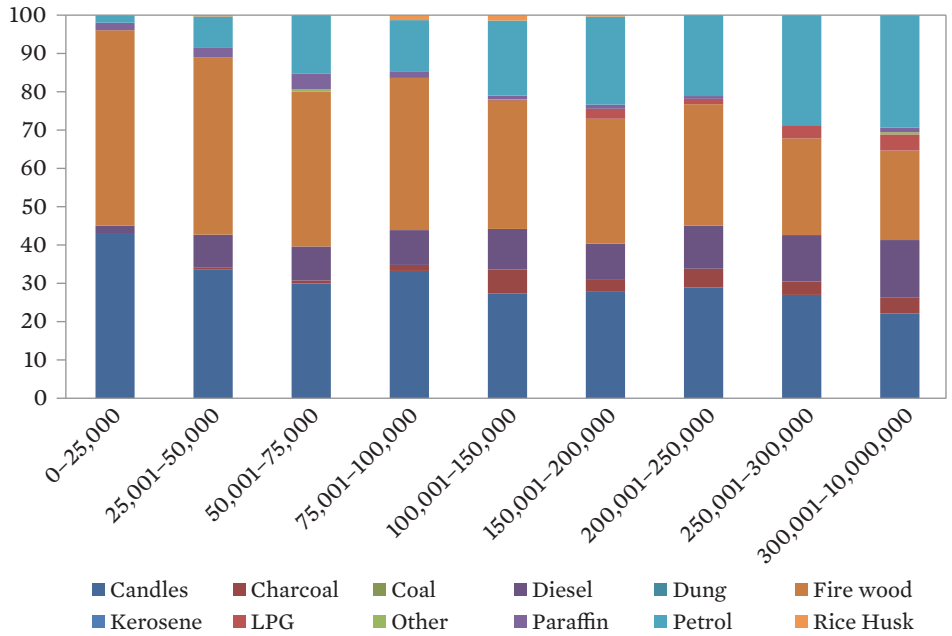
Table 27 and Figure 18 summarize the number of households with access to various nonelectricity energy consumption by income range. As incomes increase, the usage of firewood declines and petrol increases.

Table 27: Number of Households and Nonelectricity Energy Consumption

		Income Range (From and To)								
Township	Type	0 25,000	25,001 50,000	50,001 75,000	75,001 100,000	100,001 150,000	150,001 200,000	200,001 250,000	250,001 300,000	300,001 10,000,000
All	Candles	22	106	81	128	137	75	41	31	37
All	Charcoal	0	2	2	6	31	9	7	4	7
All	Coal	0	0	0	0	0	0	0	0	0
All	Diesel	1	27	24	35	53	25	16	14	25
All	Dung	0	0	0	0	0	0	0	0	0
All	Fire wood	26	146	109	153	166	88	45	29	39
All	Kerosene	0	0	0	0	0	0	0	0	0
All	LPG	0	0	0	0	2	7	2	4	7
All	Other	0	0	2	0	1	0	0	0	1
All	Paraffin	1	8	11	6	5	3	1	0	2
All	Petrol	1	26	41	52	98	62	30	33	49
All	Rice Husk	0	1	0	5	7	1	0	0	0

LPG = liquefied petroleum gas.
Source: ADB.

Figure 18: Number of Households and Nonelectricity Energy Consumption (%, Distribution)



LPG = liquefied petroleum gas.
Source: ADB.

4.17 Number of Households Electrified and Period of Time since Electrification

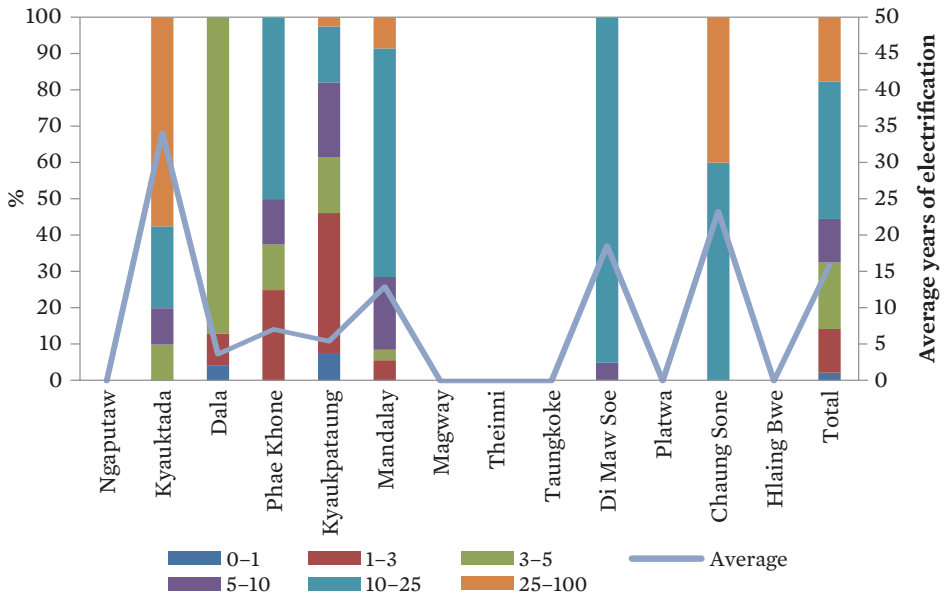
Table 28 and Figure 19 summarize the number of households electrified and the length of electrification (including average) by township. Quite a few townships are still without access to electricity whereas townships like Di Maw Soe have been electrified for longer than 10 years.

Table 28: Electrified Households and Length of Electrification by Township

		Length of Electrification (Years From and To)						
Township	# Electrified	0 1	1 3	3 5	5 10	10 25	25 100	Average
Ngaputaw	0	0	0	0	0	0	0	0
Kyauktada	40	0	0	4	4	9	23	34
Dala	23	1	2	20	0	0	0	4
Phae Khone	8	0	2	1	1	4	0	7
Kyaukpataung	39	3	15	6	8	6	1	5
Mandalay	35	0	2	1	7	22	3	13
Magway	0	0	0	0	0	0	0	0
Theinni	0	0	0	0	0	0	0	0
Taungkoke	0	0	0	0	0	0	0	0
Di Maw Soe	20	0	0	0	1	19	0	19
Platwa	0	0	0	0	0	0	0	0
Chaung Sone	10	0	0	0	0	6	4	23
Hlaing Bwe	0	0	0	0	0	0	0	0
Total	**175**	**4**	**21**	**32**	**21**	**66**	**31**	**16**

Source: ADB.

Figure 19: Electrified Households and Length of Electrification by Township



Source: ADB.

4.18 Appliance Numbers and Ranking Preference

Table 29 summarizes the number of households that have access to the various appliances.

Table 29: Appliances Available by Township

Appliance	Ngaputaw	Kyauktada	Dala	Phae Khone	Kyaukpataung	Mandalay	Magway	Theinni	Taungkoke	Di Maw Soe	Platwa	Chaung Sone
Lighting	85	40	61	73	149	35	51	69	75	61	95	78
Water heating	0	22	2	0	8	16	0	0	0	1	0	2
Rice cooker	0	34	20	0	18	34	0	0	0	11	0	3
Microwave oven	0	2	1	0	3	19	0	0	0	5	0	0
Toaster	0	3	0	0	0	0	0	0	0	0	0	0
Refrigeration	0	34	19	0	3	28	0	0	0	1	0	2
Freezer	0	0	0	0	0	4	0	0	0	0	0	0
Radio	48	3	8	21	96	15	36	29	40	25	27	58
Air conditioner	0	26	1	0	2	14	0	0	0	0	0	0
Pump	5	39	0	1	15	23	1	2	2	13	0	2
Television	21	38	35	34	64	35	22	32	14	41	12	67
Others	0	33	20	0	0	0	0	2	0	9	0	8

Source: ADB.

Table 30 summarizes the appliance preference (ranking where 1 is the most important) by township. Lighting is unanimously the most important across all townships.

Table 30: Appliance Ranking Preference by Township

Preference	Ngaputaw	Kyauktada	Dala	Phae Khone	Kyaukpataung	Mandalay	Magway	Theinni	Taungkoke	Di Maw Soe	Platwa	Chaung Sone
Lighting	1.0	1.0	1.0	1.0	1.0	1.4	1.0	1.0	1.0	1.0	1.0	1.0
Water heating		6.2	3.5		3.8	4.6				5.0		4.5
Rice cooker		2.2	2.1		2.5	2.1				2.4		6.0
Microwave oven		9.0	3.0		2.7	3.8				2.8		
Toaster		6.7										
Refrigeration		3.1	2.9		4.3	4.6				5.0		6.5
Freezer						6.5						
Radio	2.2	7.7	3.6	2.3	2.3	6.7	1.9	2.2	2.2	2.7	2.2	2.5
Air conditioner		4.2	6.0		5.5	4.8						
Pump	2.6	4.1		2.0	3.5	4.7	4.0	3.0	2.5	3.2		2.5
Television	2.4	5.5	3.3	2.1	3.1	5.0	2.1	2.3	2.1	2.8	2.1	2.4
Others		7.1	4.8					4.0		4.6		3.9

Source: ADB.

4.19 Appliance Used in Households

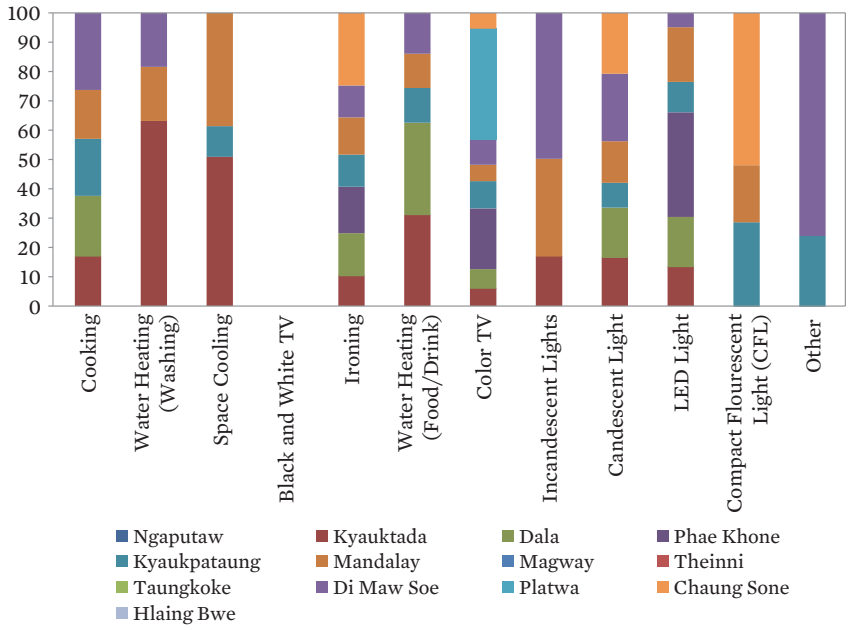
Table 31 and Figure 20 summarize the appliances used across the households in each township.

Table 31: Appliances Used in Households by Township

Township	Appliance											
	Cooking	Water Heating (Washing)	Space Cooling	Black and White TV	Ironing	Water Heating (Food And Drink)	Color TV	Incandescent Lights	Candescent Light	LED Light	Compact Fluorescent Light (CFL)	Other
Ngaputaw	0	0	0	0	0	0	0	0	0	0	0	0
Kyauktada	34	10	18	0	28	39	38	1	40	24	0	0
Dala	23	0	0	0	22	22	23	0	23	17	0	0
Phae Khone	0	0	0	0	2	0	6	0	0	3	0	0
Kyaukpataung	21	0	2	0	16	8	31	0	11	10	25	2
Mandalay	34	3	14	0	35	15	35	2	35	34	32	0
Magway	0	0	0	0	0	0	0	0	0	0	0	0
Theinni	0	0	0	0	0	0	0	0	0	0	0	0
Taungkoke	0	0	0	0	0	0	0	0	0	0	0	0
Di Maw Soe	18	1	0	0	10	6	18	1	19	3	0	4
Platwa	0	0	0	0	0	0	9	0	0	0	0	0
Chaung Sone	0	0	0	0	4	0	2	0	3	0	5	0
Hlaing Bwe	0	0	0	0	0	0	0	0	0	0	0	0

LED = light emitting diode.
Source: ADB.

Figure 20: Appliances Used in Households by Township (%)



Source: ADB.

4.20 Energy Fuel Bill per Month

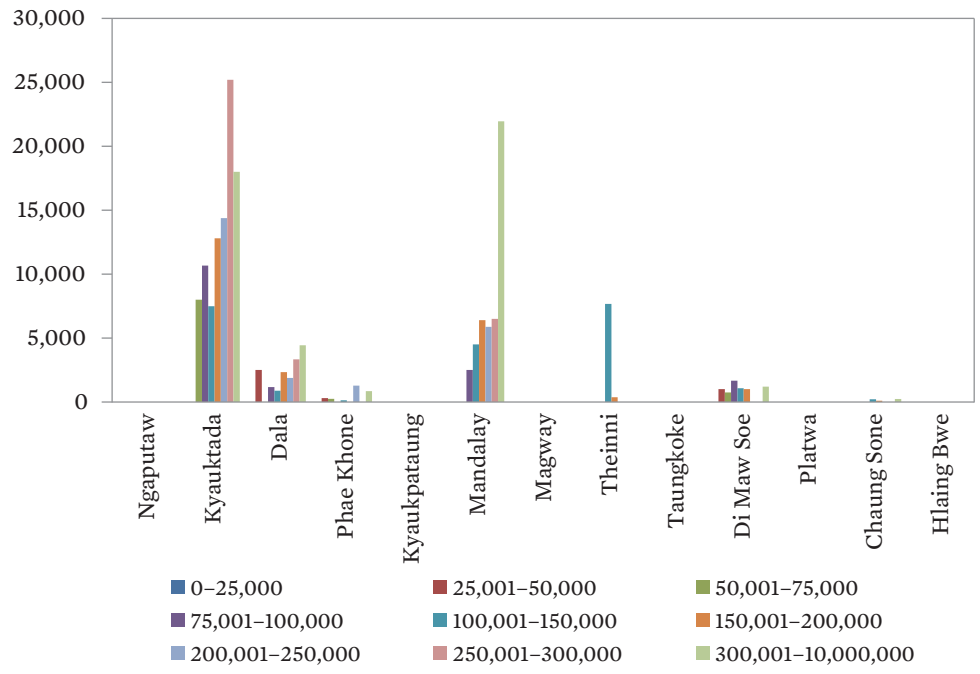
Table 32 and Figure 21 summarize the energy fuel bill by income range and township. The findings are similar to previous results where the higher the income the higher the energy fuel bill.

Table 32: Energy Fuel Bill per Month (kyat)

Township	Income Range (From and To) 0 25,000	25,001 50,000	50,001 75,000	75,001 100,000	100,001 150,000	150,001 200,000	200,001 250,000	250,001 300,000	300,001 10,000,000
Ngaputaw	0	0	0	0	0	0	0	0	0
Kyauktada	0	0	8,000	10,667	7,486	12,800	14,375	25,200	18,000
Dala	0	2,500	0	1,167	880	2,333	1,875	3,333	4,438
Phae Khone	0	300	250	0	132	0	1,283	0	851
Kyaukpataung	0	0	0	0	0	0	0	0	0
Mandalay	0	0	0	2,500	4,500	6,400	5,875	6,500	21,958
Magway	0	0	0	0	0	0	0	0	0
Theinni	0	0	0	0	7,667	375	0	0	0
Taungkoke	0	0	0	0	0	0	0	0	0
Di Maw Soe	0	1,000	750	1,667	1,071	1,000	0	0	1,200
Platwa	0	0	0	0	0	0	0	0	0
Chaung Sone	0	0	0	0	208	95	0	0	238
Hlaing Bwe	0	0	0	0	0	0	0	0	0

Source: ADB.

Figure 21: Energy Fuel Bill per Month (kyat)



Source: ADB.

4.21 Household Vehicle Usage

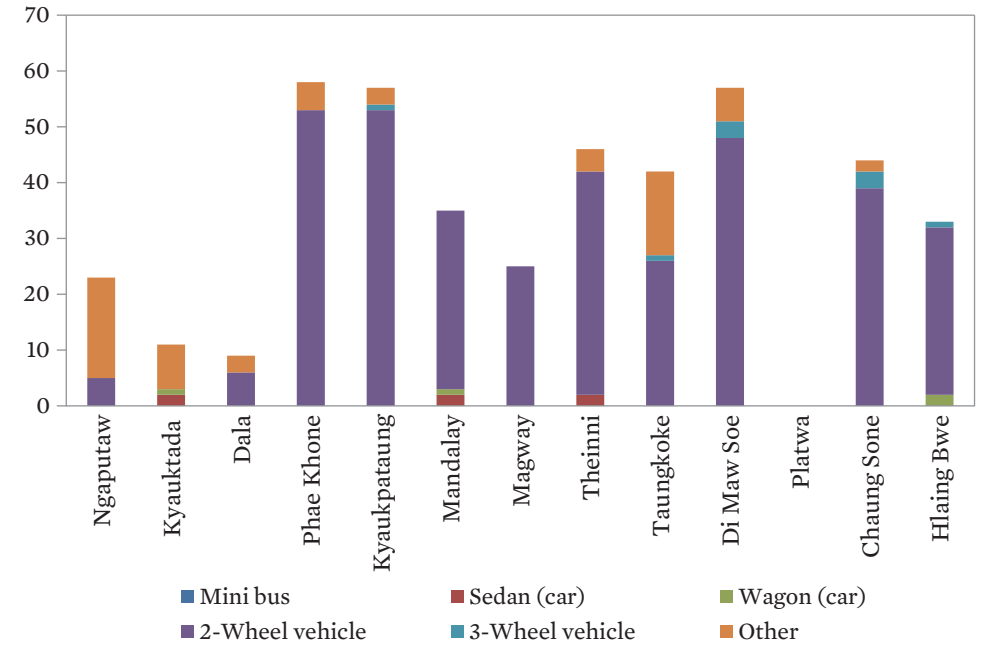
Table 33 and Figure 22 summarize the vehicle type amongst the townships. The most common type of vehicle is 2-wheeled.

Table 33: Household Vehicle Usage by Type and Township

Township	No vehicle	Has a vehicle?	Type					
			Mini Bus	Sedan (Car)	Wagon (Car)	2-Wheel Vehicle	3-Wheel Vehicle	Other
Ngaputaw	65	20	0	0	0	5	0	18
Kyauktada	29	11	0	2	1	0	0	8
Dala	54	7	0	0	0	6	0	3
Phae Khone	19	53	0	0	0	53	0	5
Kyaukpataung	95	54	0	0	0	53	1	3
Mandalay	1	34	0	2	1	32	0	0
Magway	33	28	0	0	0	25	0	0
Theinni	28	41	0	2	0	40	0	4
Taungkoke	49	26	0	0	0	26	1	15
Di Maw Soe	9	52	0	0	0	48	3	6
Platwa	95	0	0	0	0	0	0	0
Chaung Sone	39	39	0	0	0	39	3	2
Hlaing Bwe	55	31	0	0	2	30	1	0
All	**571**	**396**	**0**	**6**	**4**	**357**	**9**	**64**

Source: ADB.

Figure 22: Household Vehicle Usage by Type and Township



Source: ADB.

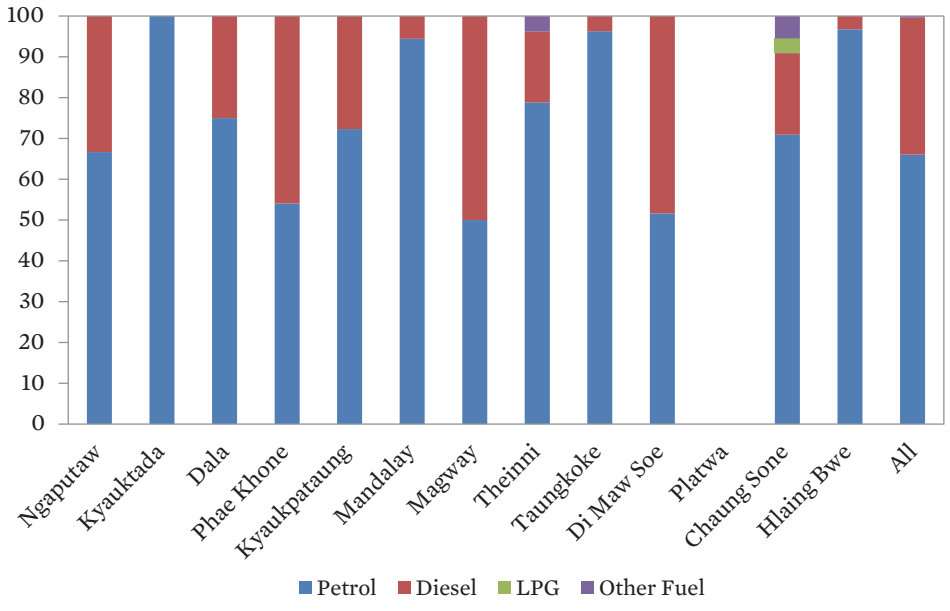
Table 34 and Figure 23 summarize the fuel source for the vehicles discussed in Table 33 and Figure 26. The most common fuel is petrol followed by diesel.

Table 34: Household Vehicle Fuel Source by Township

	Vehicle Uses			
Township	Petrol	Diesel	LPG	Other Fuel
Ngaputaw	20	10	0	0
Kyauktada	11	0	0	0
Dala	6	2	0	0
Phae Khone	53	45	0	0
Kyaukpataung	47	18	0	0
Mandalay	34	2	0	0
Magway	28	28	0	0
Theinni	41	9	0	2
Taungkoke	26	1	0	0
Di Maw Soe	47	44	0	0
Platwa	0	0	0	0
Chaung Sone	39	11	2	3
Hlaing Bwe	30	1	0	0
All	**313**	**159**	**0**	**2**

LPG = liquefied petroleum gas.
Source: ADB.

Figure 23: Distribution of Household Vehicle Fuel Source by Township (%)



LPG = liquefied petroleum gas.
Source: ADB.

4.22 Household Generator Availability

Table 35 summarizes the household generator availability and its associated average income levels. With the exception of Kyauktada, all other households from the other townships with access to generators have higher average incomes but account for a small percentage of the total number of households.

Table 35: Household Generator Availability and Average Income Levels (kyat/month)

	Without generators		With generators					
Township	No.	Average income	No.	Average income	Hours of use	Diesel	LPG	Other
Ngaputaw	79	109,430	6	119,167	2.3	5	0	0
Kyauktada	38	278,289	2	200,000	0.8	1	0	0
Dala	59	235,593	2	311,500	3.5	2	0	0
Phae Khone	71	142,911	1	520,000	10.0	1	0	0
Kyaukpataung	131	107,671	18	120,254	0.6	13	0	0
Mandalay	30	349,333	5	870,000	2.4	1	0	0
Magway	54	137,363	7	545,214	2.6	7	0	0
Theinni	67	131,216	2	300,000	2.0	1	0	0
Taungkoke	68	117,296	7	176,429	2.3	1	0	2
Di Maw Soe	60	136,631	1	150,000	0.0	1	0	0
Platwa	90	75,795	5	630,000	2.4	3	0	0
Chaung Sone	65	207,431	13	289,462	0.0	2	0	0
Hlaing Bwe	67	102,612	19	141,579	0.0	1	0	0
All	**879**	**144,954**	**88**	**274,739**	**1.2**	**39**	**0**	**2**

LPG = liquefied petroleum gas, No. = number.
Source: ADB.

4.23 Households with Solar Photovoltaic

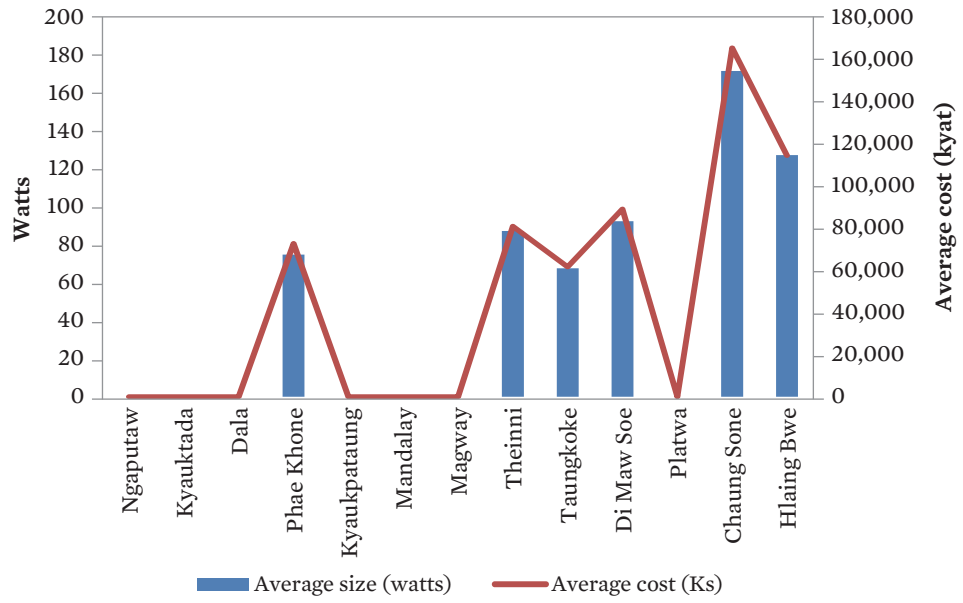
Table 36 and Figure 24 summarize the number of households with access to solar panels.

Table 36: Household Solar Photovoltaic Installations by Township

Township	Household with PV	No. of panels	Average size (watts)	Average cost (MK)
Ngaputaw	0	0.00	0	0
Kyauktada	0	0.00	0	0
Dala	0	0.00	0	0
Phae Khone	34	1.00	75	72,765
Kyaukpataung	0	0.00	0	0
Mandalay	0	0.00	0	0
Magway	0	0.00	0	0
Theinni	39	1.18	87	80,974
Taungkoke	9	1.00	68	61,667
Di Maw Soe	25	1.08	93	89,120
Platwa	0	0.00	0	0
Chaung Sone	8	2.13	172	165,625
Hlaing Bwe	12	1.00	128	114,583
All	**127**	**1.14**	**93**	**87,520**

MK = kyat, No. = number, PV = photovoltaic.
Source: ADB.

Figure 24: Household Solar Photovoltaic Installations by Township



Source: ADB.

4.24 Household Agriculture Survey Results

Table 37 summarizes the household agricultural survey results.

Table 37: Household Agricultural Survey Results by Township

Township	Agriculture area	Average income	Farm area	HEAVY EQUIPMENT USED ON FARM?	HAVE ENGINE FOR PUMPING WATER?
Ngaputaw	28	113,107	7.82	3	7
Kyauktada	0	0	0.00	0	0
Dala	5	634,600	19.60	2	0
Phae Khone	65	155,795	6.59	46	2
Kyaukpataung	69	100,456	54.73	1	11
Mandalay	0	0	0.00	0	0
Magway	46	213,654	7.75	2	2
Theinni	39	116,872	5.10	11	15
Taungkoke	34	104,915	2.32	2	0
Di Maw Soe	60	138,531	8.96	43	0
Platwa	60	109,643	2.48	0	0
Chaung Sone	31	250,419	6.74	3	0
Hlaing Bwe	38	122,368	5.00	13	0
All	**475**	**144,536**	**13.14**	**126**	**37**

Source: ADB.

4.25 Fuel-Powered Equipment

Table 38 summarizes the number of households by income range having access to the various fuel-powered equipment per township. Most townships have access to vehicles with farm equipment, the second most common of fuel-powered equipment.

Table 38: Fuel-Powered Equipment Availability per Township and Income Range (kyat/month)

		Income Range (From and To)								
Township	Equipment	0 25,000	25,001 50,000	50,001 75,000	75,001 100,000	100,001 150,000	150,001 200,000	200,001 250,000	250,001 300,000	300,001 10,000,000
Ngaputaw	Generators	0	1	0	1	2	2	0	0	0
Ngaputaw	Vehicles	0	0	0	6	9	2	0	1	2
Ngaputaw	Farm equipment	0	0	0	0	1	0	0	1	1
Ngaputaw	Fuel-powered equipment									
Kyauktada	Generators	0	0	0	0	0	2	0	0	0
Kyauktada	Vehicles	0	0	0	0	1	3	2	1	4
Kyauktada	Farm equipment	0	0	0	0	0	0	0	0	0
Kyauktada	Fuel-powered equipment									
Dala	Generators	0	0	0	0	0	0	0	1	1
Dala	Vehicles	0	0	0	1	1	2	0	0	3
Dala	Farm equipment	0	0	0	0	0	0	0	0	2
Dala	Fuel-powered equipment									
Phae Khone	Generators	0	0	0	0	0	0	0	0	1
Phae Khone	Vehicles	0	4	9	7	17	2	6	1	7
Phae Khone	Farm equipment	0	5	5	11	14	1	5	1	4
Phae Khone	Fuel-powered equipment									
Kyaukpataung	Generators	0	4	3	2	4	2	3	0	0
Kyaukpataung	Vehicles	1	7	11	5	13	11	3	2	1
Kyaukpataung	Farm equipment	0	0	0	0	1	0	0	0	0
Kyaukpataung	Fuel-powered equipment									
Mandalay	Generators	0	0	0	0	0	0	1	0	4
Mandalay	Vehicles	0	0	0	1	3	5	4	9	12
Mandalay	Farm equipment	0	0	0	0	0	0	0	0	0
Mandalay	Fuel-powered equipment									

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Table 38 *continued*

Township	Equipment	Income Range (From and To) 0 25,000	25,001 50,000	50,001 75,000	75,001 100,000	100,001 150,000	150,001 200,000	200,001 250,000	250,001 300,000	300,001 10,000,000
Magway	Generators	0	0	0	0	0	0	1	2	4
Magway	Vehicles	0	0	2	2	5	7	3	4	5
Magway	Farm equipment	0	0	0	0	0	0	0	0	2
Magway	Fuel-powered equipment									
Theinni	Generators	0	0	0	0	0	0	0	2	0
Theinni	Vehicles	0	1	8	7	10	5	3	5	2
Theinni	Farm equipment	0	0	3	2	4	0	1	1	0
Theinni	Fuel-powered equipment									
Taungkoke	Generators	0	1	1	1	0	1	1	2	0
Taungkoke	Vehicles	0	6	3	4	5	5	2	1	0
Taungkoke	Farm equipment	0	0	0	1	0	1	0	0	0
Taungkoke	Fuel-powered equipment									
Di Maw Soe	Generators	0	0	0	0	1	0	0	0	0
Di Maw Soe	Vehicles	0	5	8	9	14	9	1	1	5
Di Maw Soe	Farm equipment	0	4	6	9	10	8	1	0	5
Di Maw Soe	Fuel-powered equipment									
Platwa	Generators	1	2	0	0	0	0	1	0	1
Platwa	Vehicles	0	0	0	0	0	0	0	0	0
Platwa	Farm equipment	0	0	0	0	0	0	0	0	0
Platwa	Fuel-powered equipment									
Chaung Sone	Generators	0	0	0	0	1	3	2	4	3
Chaung Sone	Vehicles	0	0	0	1	8	8	5	7	10
Chaung Sone	Farm equipment	0	0	0	0	0	1	0	2	0
Chaung Sone	Fuel-powered equipment									
Hlaing Bwe	Generators	0	0	1	6	7	3	2	0	0
Hlaing Bwe	Vehicles	0	0	0	0	0	0	0	0	0
Hlaing Bwe	Farm equipment	0	0	0	2	7	2	2	0	0
Hlaing Bwe	Fuel-powered equipment									

Source: ADB.

5 Private Industry Survey Approach

5.1 Broad Design Parameters

The project team undertook a survey of private industry since information available on the private sector energy consumption was not readily available. The surveys were designed to obtain information on the historical energy consumption for a number of energy carriers.

5.2 Industry Energy Questionnaire Design

Figure 25 enumerates the questions asked of the businesses to gauge their energy requirements. It is important to note that the operations of the businesses surveyed can vary widely from labor-intensive garment production to more energy-intensive industrial processes. The questionnaire is designed to be flexible to account for the variations in the business operations of the industrial energy consumer.

A number of key features of the survey:

- **Plant location** is important to determine or analyze the underlying fuel/energy source availability to a particular region.
- **Process description** provides a better understanding of what the energy is used for and how to group businesses into general categories.
- **Production and plant capacity** is important to gauge the size of the operation and the total potential energy usage if the plant is at full capacity.
- **Fuel consumption** covers all the major fuel types applicable to a wide range of businesses. It is expected each business would rely on only several fuel types.
- **Generation capability** is useful to determine whether the facility is grid-connected, and/or has backup.

The survey was also designed for the respondents to provide production and energy requirements over several years. This smooths out any outliers and potentially allows for trend analysis if particular businesses or industries are growing or in decline. It also enables benchmarking of the efficiency of the industrial customer.

Figure 25: Industrial Survey Questions and Sample Results

Plant name	Location
Golden Lion Wire	Hlaing Thar Yar Zone-3

Process description

1. Melting, 2. Drawing, 3. PVC Coating, 4. Packing

Plant outputs

Copper cable
PVC wire

Production	Plant output	Unit	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013
	Copper cable	lbs								35,200	23,430	101,200	169,400	301,224
	PVC wire	no. coils (100m/coil)								69,530	68,304	96,780	157,117	194,047

Plant capacity	Plant output	Unit	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013
	Copper cable	tons												500
	PVC wire	no. coils (100m/coil)												25,000

Fuel consumption	Year	Unit	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013
	Electricity	kWh								724,020	948,090	1,945,020	2,409,660	2,291,850
	Natural gas	cubic meters												
	Diesel	liters								9,594	72,270	27,990	106,000	66,946
	Coal	tons												
	Fuel oil	liters												
	Gasoline	liters												
	Propane	tons												
	Biomass	liters												
	Wood Chip	tons												
	Rice husk	tons												
	Sawdust	tons												
	Charcoal	tons												
	Ammonia	tons												

Diesel gensets

Set #1	3 x 500 kVa
Set #2	1 x 1,00 kVa

Diesel genset generation	Aspect	Unit	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013
	Electricity generation	kWh									329,872	129,313	453,453	286,882

Source: ADB.

5.3 Approach to Survey Fieldwork

The survey forms were issued to the national consultants in the project team along with the list of industrial customers. The national consultants visited each of the facilities in the index and worked with the facility managers to complete the surveys. Not all private industry surveys could be completed.

5.4 Actual Numbers of Surveyed Businesses

Table 39 is a list of surveyed businesses. The survey spans multiple business types and therefore provides an understanding of the end-product. Out of the 52 businesses surveyed, 36 survey results were completed. Follow ups with the noncompleted surveys were initiated but were not completed.

Table 39: Surveyed Businesses

Name	Business	Production
Elan	Soap, toothpaste, shampoo	Soap [38,210 boxes], toothpaste [22,782 boxes], shampoo [57,239 boxes]
J'Donuts	Bakery products	Bakery products [250,000 lbs]
Yadana Bon (Oxygen)	Oxygen cylinders	12.5 Mpa cylinder [142,000 units]
Arkar Moe (Oxygen)	Oxygen cylinders	Oxygen cylinders [2,400,000 liters]
Diamond Dragon	Pp bags	PP bags [511,195 lbs]
Toyo Battery	Battery (assorted)	Battery [1.2 number (millions)]
Dagon Kyaw Cube Ice	Cube ice	Cube ice [4,500 tons]
Loi Hein Co (Drinking Water)	Drinking water	Drinking water [16,023,513 liters]
A1 Garment	Garment products	Garment products [24,650 dozens]
Deco-Land	Boxes and cartons	Carton box [3,376,164 units], cardboard sheet [1,729,529 units]
Ice Mountain	Cube ice	Cube ice [16,869 tons]
Golden Sea Cold Storage	Marine products	Marine products [1,200 tons]
SEM (Transformers)	Transformers	Transformer [1,053 number]
Anawar Hlwam	Marine products	Marine products [4515 tons]
Silver Sea	Boxes and cartons	Boxes and cartons [5,052,377 dozens]
Ngwe Yi Palè	Sugar products	Sugar products [42,043 tons]
Lucky Drinking Water	Drinking water	Drinking water [120.31 million liters]
U Kyu Family (Flour)	Wheat and flour	Flour [38,518 tons]
Opal International	Garment products	Garment products [1.4 number (millions)]
Panda	Printed fabric products	Printed fabric [3,993,799 meters]

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Table 39 *continued*

Name	Business	Production
Ngwe Pinlae Cold Storage	Cold storage of marine products	Marine products [1,205 tons]
Yangon Metal Industry	Lead	Lead [693.83 tons]
Hmwe Plastic	Plastic bags	Plastic bags [60,000 lbs]
Asia Star (Plastic Bottle)	Plastic bottles	Plastic bottle [1,574,000 units]
Cho Cho (Noodle)	Shin shin instant noodle	Instance vermicelli [559,445 boxes]
Asia World (Penang Bag)	Penang bag	Penang bag [1,342 MT]
Ayeyar Hinthar	Rice	Rice [22,000 tons]
Gold Delta	Rice	Rice [5,039 tons]
Golden Lace	Rice	Rice [8,975 tons]
Hlaing Nady Chan Myae	Rice	Rice [17,000 tons]
Myanmar Dairy	Dairy products	Dairy products [2,283 tons]
Wood Products	Wood products	Wood products [1,548 cubic ton]
SEM (Capacitors)	Capacitor banks	Capacitor bank [166 number]
OK Rice Mill	Rice	Rice [20,000 tons]
Golden Lion Wire	Copper cable/PVC wire	Copper cable [301,224 lbs], PVC wire [194,047 number of coils (100m/coil)]
Loi Hein Co (Soft Drink)	Soft drink	Soft drink [362,880 dozens], cordial [5,601 dozens]

lbs = pounds, Mpa = mega pascal, MT = metric ton.

Source: ADB.

6

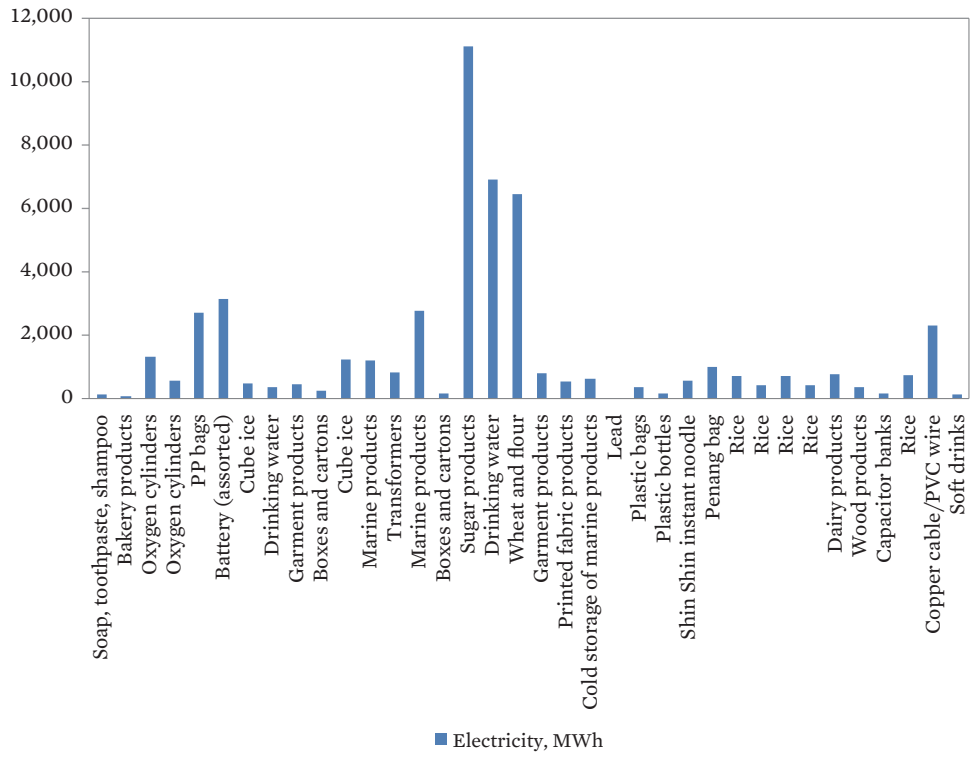
Private Industry Survey Results

Given the varied nature of operations, only electricity and diesel use is reported in this section. Other surveyed fuels were not as common as electricity and diesel but the full set of summarized results is reported in the Appendixes. Only the 2013 survey results are presented here as production figures prior to 2013 were not reported which makes comparisons across time difficult.

6.1 Annual Electricity Use

Figure 26 plots the 2013 annual electricity consumption at each of the surveyed facilities. Comparisons across businesses are hard due to variations in operation, factory size, and use of other energy sources.

Figure 26: Private Industry Electricity Consumption (2013, MWh)

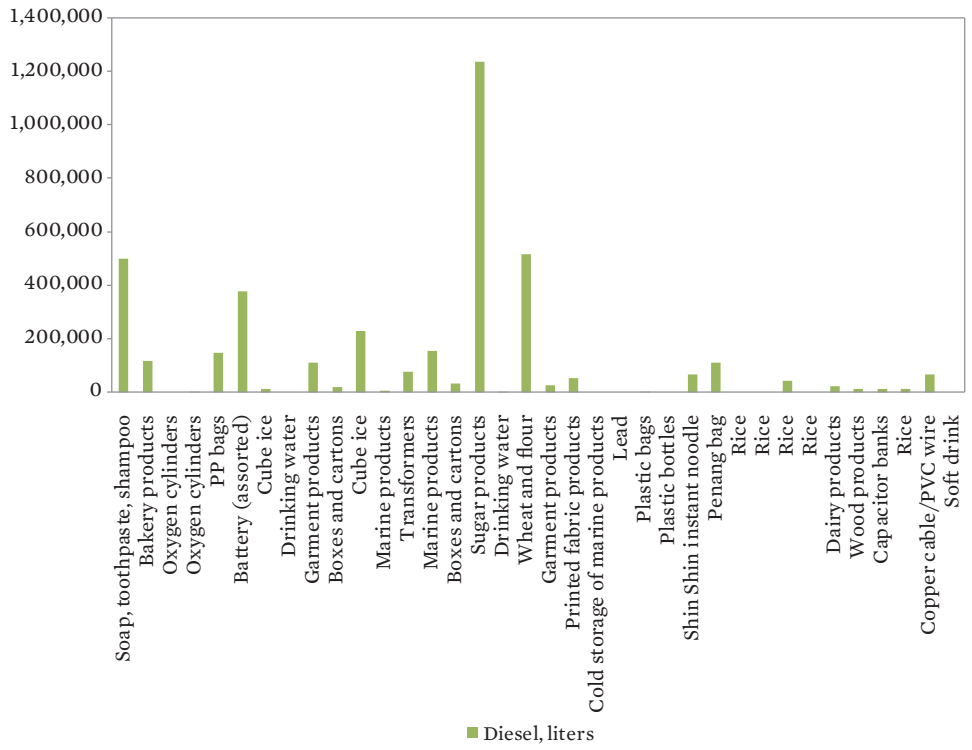


MWh = megawatt hour.
Source: ADB.

6.2 Annual Diesel Use

Figure 27 shows the 2013 annual diesel consumption at each of the surveyed facilities. The production of sugar products (combined with electricity use above) at that particular facility (42,000-ton production) requires considerably more electricity and diesel than any of the other surveyed participants.

Figure 27: Private Industry Diesel Consumption (2013, Liters)



Source: ADB.

6.3 Survey Results

The full set of private industry survey results are provided in Table 40.

Table 40: Summarized Private Industry Energy Consumption Survey Results

Business	Production	Electricity (MWh)	Natural gas (cubic metres)	Diesel (litres)	Coal (tons)	Fuel Oil (litres)	Gasoline (liters)	Propane (tons)	Biomass (litres)	Wood Chip (tons)	Rice husk (tons)	Saw dust (tons)	Charcoal (tons)	Ammonia (tons)
Soap, Toothpaste, Shampoo	Soap [38,210 boxes], Toothpaste [22,782 boxes], Shampoo [57,239 boxes]	106	0	500,000	0	0	0	0	0	0	0	0	0	0
Bakery Products	Bakery products [250,000 lbs]	72	0	115,200	0	0	0	16,200	0	0	0	0	0	0
Oxygen Cylinders	12.5 Mpa cylinder [142,000 number]	1,307	0	0	0	0	0	0	0	0	0	0	0	0
Oxygen Cylinders	Oxygen Cylinders [2,400,000 liters]	560	0	3,000	0	0	0	0	0	0	0	0	0	0
PP Bags	PP Bags [511,195 lbs]	2,688	0	148,468	0	0	0	0	0	0	0	0	0	0
Battery (Assorted)	Battery [1.2 number (millions)]	3,120	996	375,674	0	0	0	48	0	0	0	0	0	0
Cube Ice	Cube ice [4,500 tons]	480	0	13,500	0	0	0	0	0	0	0	0	0	0
Drinking Water	Drinking water [16,023,513 liters]	355	0	0	0	0	0	0	0	0	0	0	0	0
Garment Products	Garment products [24,650 dozens]	429	0	110,889	0	0	0	0	0	838	0	0	108	0
Boxes and Cartons	Carton box [3,376,164 number], Cardboard Sheet [1,729,529 number]	240	0	17,896	0	0	0	0	0	1,102	0	0	0	0
Cube Ice	Cube ice [16,869 tons]	1,210	0	230,036	0	0	0	0	0	0	0	0	0	0
Marine Products	Marine products [1,200 tons]	1,201	0	4,500	0	0	0	0	0	0	0	0	0	15
Transformers	Transformer [1,053 number]	813	0	75,739	0	0	0	0	0	0	0	0	0	0
Marine Products	Marine products [4,515 tons]	2,751	0	153,241	0	0	0	0	0	0	0	0	0	0
Boxes and Cartons	Boxes and cartons [5,052,377 dozens]	156	478	32,400	0	0	0	0	0	0	0	0	0	0
Sugar Products	Sugar products [42,043 tons]	11,100	0	1,235,940	1,718	0	0	0	0	237	0	0	0	0

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Table 40 *continued*

Business	Production	Electricity (MWh)	Natural gas (cubic metres)	Diesel (litres)	Coal (tons)	Fuel Oil (litres)	Gasoline (liters)	Propane (tons)	Biomass (litres)	Wood Chip (tons)	Rice husk (tons)	Saw dust (tons)	Charcoal (tons)	Ammonia (tons)
Drinking Water	Drinking water [120.31 million liters]	6,912	0	1,000	0	0	0	0	0	0	0	0	0	0
Wheat and Flour	Flour [38,518 tons]	6,433	0	516,221	0	0	0	0	0	0	0	0	0	0
Garment Products	Garment products [1.4 number (millions)]	798	0	24,000	0	0	0	0	0	0	0	0	0	0
Printed Fabric Products	Printed fabric [3,993,799 m]	530	0	52,806	0	0	6,541	0	0	0	0	0	1,765	0
Cold Storage of Marine Products	Marine Products [1,205 tons]	625	0	0	0	0	0	0	0	0	0	0	0	0
Lead	Lead [693.83 tons]	0	799,773	0	629	0	0	0	0	0	0	0	0	0
Plastic Bags	Plastic bags [60,000 lbs]	360	0	3,000	0	0	0	0	0	0	0	0	0	0
Plastic Bottles	Plastic bottle [1,574,000 number]	138	0	0	0	0	0	0	0	0	0	0	0	0
Shin Shin Instant Noodle	Instance vermicelli [559,445 box]	548	0	67,558	0	0	0	0	0	0	565	0	0	0
Penang Bag	Penang Bag [1,342 MT]	976	0	111,148	0	0	0	0	0	0	0	0	0	0
Rice	Rice [22,000 tons]	704	0	0	0	0	0	0	0	0	0	0	0	0
Rice	Rice [5,039 tons]	417	0	–	0	0	0	0	0	0	0	0	0	0
Rice	Rice [8,975 tons]	708	0	42,390	0	0	0	0	0	0	0	0	0	0
Rice	Rice [17,000 tons]	420	0	0	0	0	0	0	0	0	0	0	0	0
Dairy Products	Dairy products [2,283 tons]	770	0	23,739	1,147	19,423	24,738	26	0	0	0	0	0	0

continued on next page

Table 40 *continued*

Business	Production	Electricity (MWh)	Natural gas (cubic metres)	Diesel (litres)	Coal (tons)	Fuel Oil (litres)	Gasoline (liters)	Propane (tons)	Biomass (litres)	Wood Chip (tons)	Rice husk (tons)	Saw dust (tons)	Charcoal (tons)	Ammonia (tons)
Wood Products	Wood products [1,548 cubic ton]	349	0	11,350	0	0	0	0	0	0	0	0	0	0
Capacitor Banks	Capacitor bank [166 number]	135	0	12,572	0	0	0	0	0	0	0	0	0	0
Rice	Rice [20,000 tons]	720	0	10,800	0	0	0	0	0	0	0	0	0	0
Copper Cable/ PVC Wire	Copper cable [301,224 lbs], PVC wire [194,047 no. coils (100 m/coil)]	2,292	0	66,946	0	0	0	0	0	0	0	0	0	0
Soft Drink	Soft drink [362,880 dozens], Cordial [5,601 dozens]	120	0	0	0	36,181	0	0	0	0	0	0	0	0

lbs = pounds, m = meter, Mpa = mega pascal, MT = metric ton.

Source: ADB.

APPENDIX A

Household Energy Consumption Survey Forms

ADB TA-8356 Energy Master Plan

Household Energy Consumption Survey

Purpose of this survey

The Ministry of Energy (MOE) is conducting a household energy survey in order to gain a better understanding of energy consumption patterns in Myanmar households. This survey is intended to collect data on the types and quantities of energy consumed in households in Myanmar. This information will be used by the MOE for the purpose of enhancing energy planning, with the longer-term objective being to enhance energy access in the country.

Your participation is important

This survey is conducted under the authority of the Ministry of Energy. However, completion of the survey is voluntary. The use of this survey will enhance the Ministry of Energy's understanding of household energy consumption and will assist in planning Myanmar's future energy needs, which is in the national interest.

Completion of the survey

Please complete this survey and return it to the person that issued it.

Details of person completing this survey

	Township
	Address / location of household
	Phone no.

Details of person issuing this survey

	Person issuing survey form
	Phone no.

Cover Page

A) Household Information

A1) Location of House:

A2) Type of house location (tick one):

- ☐ City
- ☐ Town
- ☐ Village
- ☐ Farm
- ☐ Other, please specify:

A3) Number of occupants: ☐ Number of people

A4) Number of rooms in house: ☐ Number of rooms

A5) Type of home (tick one):

- ☐ Single family detached house (a free standing house)
- ☐ Single family attached house (attached to one or more houses)
- ☐ An apartment building with a total of 2 to 4 units
- ☐ An apartment building with 5 or more units
- ☐ Other, please specify:

A6) Area of property (floor space): ☐ ☐ Units of measure (Example: meters squared)

B) Household Income and Expenses

B1) Total Monthly Income: _____ Kyat

B2) Monthly Expenses: (please tick those that are relevant and give the monthly spend)

Tick Item		Monthly Spend	
	Electricity		Kyat
	LPG		Kyat
	Batteries		Kyat
	Fuel Wood		Kyat
	Candles		Kyat
	Coal		Kyat
	Charcoal		Kyat
	Kerosene		Kyat
	Paraffin		Kyat
	Rice Husk		Kyat
	Petrol		Kyat
	Diesel		Kyat
	All other monthly expenditure		Kyat
	Total monthly household expenditure		Kyat

(C) Household Income and Expenses

C1) What are the main types of household appliances that you have and what are they used for?

	Cooking	Lighting	Space Cooling	Water Heating	Television	Refrigeration	Pumping	Other (please specify)
Electricity	☐	☐	☐	☐	☐	☐	☐	☐
LPG	☐	☐	☐	☐	☐	☐	☐	☐
Paraffin	☐	☐	☐	☐	☐	☐	☐	☐
Candles	☐	☐	☐	☐	☐	☐	☐	☐
Torches	☐	☐	☐	☐	☐	☐	☐	☐
Batteries	☐	☐	☐	☐	☐	☐	☐	☐
Rice Husk	☐	☐	☐	☐	☐	☐	☐	☐
Generator	☐	☐	☐	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐	☐	☐	☐

C) Household Income and Expenses (cont.)

C2) Rank the appliances listed below in order of importance to you.

	Tick if you have the appliance	Rank the appliance in order from 1 (most important) to 9 (least important)
Lighting		
Water Heating (example: kettle)		
Rice Cooker		
Microwave Oven		
Toaster		
Refrigerator		
Freezer		
Radio		
Air Conditioner		
Pump		
Television		

D) Energy Uses: Cooking

D1) What type of oven is used for cooking?

☐ 3 stone stove ☐ Fuel-efficient stove ☐ Wood fire ☐ Coal stove

☐ Electric stove ☐ Rice husk stove ☐ LPG stove ☐ Charcoal stove

☐ Other, specify: _____

D2) How many hours per day do you use your stove/ fire? _____ Hours

D3) What fuel do you use for cooking? _____

D4) How much of this fuel is used per month? _____ Quantity of fuel/month

E) Energy Uses: Lighting

E1) List the type of appliances used for lighting and their number

Tick Item:		Approx. Number:	Tick Item:		Approx. Number:
☐	Lantern		☐	LPG Light	
☐	Incandescent light		☐	Candles	
☐	Fluorescent light		☐	Torch	
☐	LED lighting		☐	Other (please explain):	
☐	Compact Fluorescent Lamp (CFL)				

E2) How many hours a day are your lights turned on?

E3) What is the main fuel used for lighting?

☐ LPG ☐ Electricity ☐ Fire Wood ☐ Batteries

☐ Dung ☐ Kerosene ☐ Paraffin ☐ Candles

☐ Other – please explain:

E4) Reason for using this fuel?

E5) What hours of the day are the lights usually turned on?

☐ hours

☐ am to ☐ am

☐ pm to ☐ pm

F) Energy Uses: Water Heating (for washing)

F1) Type of appliance used for water heating?

☐ LPG cooker ☐ Wick stove ☐ Pressure stove ☐ Electric stove

☐ Coal/wood stove ☐ Other – please specify ☐

F2) What is the main fuel used for water heating?

☐ LPG ☐ Electricity ☐ Fire Wood ☐ Dung ☐ Rice husk

☐ Other – please specify: ☐

F3) How many hours a day do you use appliances for water heating? ☐ Hours

G) Total Fuel (Nonelectricity) Consumption

G1) Provide information on how much fuel is used each month by specifying the type of fuel and what quantities of those fuels you use.

Type of Fuel	Tick if used	Quantity used	Unit	Specify, if other
LPG				
Fire wood				
Dung				
Kerosene				
Paraffin				
Candles				
Coal				
Charcoal				
Rice Husk				
Petrol				
Diesel				
Other				

G2) Compare consumption between winter and summer

Energy consumption is

- ☐ More in winter (or cold days) than in summer (or hot days)
- ☐ The same in winter (cold days) compared to summer (hot days)

H) Electricity Supply

H1) Is the house electrified? ☐ Yes ☐ No

H2) If yes, for how long? _____ Years

H3) What is the electricity used for?

☐ Cooking	☐ Water heating for washing	☐ Space cooling	☐ Black and White TV
☐ Ironing	☐ Water heating (kettle)	☐ Color TV	☐ Incandescent lights
☐ Candescent lights	☐ LED lighting	☐ Compact Fluorescent Lights (CFLs)	
☐ Other – specify:	_____		

I) Past Energy Usage

I1) This time last year, what was the household income? _____ Kyat per month

I2) This time last year, what was your monthly fuel bill? _____ Kyat per month

I3) Did you spend about the same amount on fuel last year as you do now? ☐ Yes ☐ No

I4) Do you use the same fuels now as you did last year? ☐ ☐

I5) If not, which fuels did you use this time last year?

☐ Paraffin	☐ Dung	☐ Fuel wood	☐ LPG	☐ Kerosene
☐ Candles	☐ Coal	☐ Rice husk	☐ Charcoal	☐
☐ Other - specify	_____			

J) Fuel Source and Usage

J1) I buy all the fuel I use ☐ Yes ☐ No

J2) Where do you buy your fuel?

☐ Someone delivers to home ☐ Purchase from market

☐ Other – please specify: _____

J3) From how many suppliers do you buy your fuel?

☐ Always the same supplier

☐ I purchase from: ☐ Suppliers (enter number)

J4) I get some of the fuel for free ☐ Yes ☐ No

J5) If you get some fuel for free please specify what and how much:

	Tick	Quantity	Unit	Specify (if other)
LPG	☐			
Fire Wood	☐			
Dung	☐			
Kerosene	☐			
Paraffin	☐			
Candles	☐			
Rice Husk	☐			
Other	☐			

J6) How do you pay for the fuel?

☐ In cash each time I buy ☐ In cash at the end of the week

☐ In cash at the end of the month ☐ In cash advance at the start of the month

☐ By cheque, credit card in advance ☐ By cheque, credit card at the end of the month

☐ In kind (in exchange for something else) ☐ Other, specify: _____

J7) What happens if you can't pay for your fuel?

☐	Supplier gives credit	☐	Supplier gives loan
☐	Obtain fuel from another supplier	☐	Borrow money from friends/relatives
☐	Borrow fuel from friends/relatives	☐	Avoid use of fuel
☐	Other, specify:		

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K) Generators

K1) Does the household have one or more generators? ☐ Yes ☐ No

IF "NO" THEN PLEASE SKIP THE REMAINING QUESTIONS ON THIS PAGE

K2) How many hours a day does the generator operate? ☐ pm/am to ☐ pm/am

If operating also in other hours, specify: ☐ pm/am to ☐ pm/am

☐ pm/am to ☐ pm/am

K3) What is the generator capacity? ☐ HP OR ☐ kVA

K4) What fuel does the generator use?

☐ Petrol ☐ Diesel ☐ LPG ☐ Other

K5) How many liters of fuel does the generator use each month?

☐ Petrol ☐ Diesel ☐ LPG ☐ Other

K6) How much does the fuel cost per liter? ☐ Kyat

L) Motor Vehicles

L1) Does the household have a vehicle? ☐ Yes ☐ No

IF "NO" THEN PLEASE SKIP THE REMAINING QUESTIONS ON THIS PAGE

L2) Vehicle type(s)	Tick Items:	Number:
	☐ Mini Bus	☐
	☐ Car - Sedan	☐
	☐ Car - Wagon	☐
	☐ 2-wheel	☐
	☐ 3-wheel	☐
	☐ Other Details:	☐

L3) What is the main fuel used in your vehicle? ☐ Petrol ☐ Diesel ☐ LPG

Other – please explain: ☐

L4) I buy all the fuel I use ☐ Yes ☐ No

L5) Where do you buy your fuel? ☐ Someone delivers to home ☐ Purchase from market

☐ Other – please specify: ☐

L6) From how many suppliers do you buy your fuel? ☐ Always the same supplier

☐ I purchase from: ☐ Suppliers (enter number)

L) Motor Vehicles (cont.)

L7) I get some of the fuel for free ☐ Yes ☐ No

L8) If you get some fuel for free, please specify what and how much:

	Tick	Quantity	Unit	Specify (if other)
Petrol				
Diesel				
LPG				
CNG				
Biodiesel				
Bioethanol				
Other				

L9) How do you pay for the fuel?

☐ In cash each time I buy
☐ In cash at the end of the week
☐ In cash at the end of the month
☐ In cash advance at the start of the month
☐ By cheque, credit card in advance
☐ By cheque, credit card at the end of the month
☐ In kind (in exchange for something else)
☐ Other, specify: ☐

L10) What happens if you can't pay for your fuel?

☐ Supplier gives credit
☐ Supplier gives loan
☐ Obtain fuel from another supplier
☐ Borrow money from friends/relatives
☐ Borrow fuel from friends/relatives
☐ Avoid use of fuel
☐ Other, specify: ☐

M) Agricultural Energy

M1) Is the property part of an agricultural area or farm? ☐ Yes ☐ No

IF "NO" THEN PLEASE SKIP THE REMAINING QUESTIONS ON THIS PAGE

M2) Area of farm _____ _____ Unit (example: square meter)

M3) What crops do you grow?

Crop type	Area used

M4) What livestock do you keep?

Livestock Type	Number of Animals

M5) Is there heavy equipment used on the farm? ☐ Yes ☐ No

M6) Specify equipment:

Equipment Type	Powered by? (e.g. petrol, diesel, wind)

M7) Irrigation

a) Do you own a portable diesel or petrol engine for pumping water? ☐ Yes ☐ No

b) What is its horsepower? _____

c) On average how many hour in the engine used each day? _____

M) Agricultural Energy (cont.)

M8) Provide information on how much fuel is used on your farm each month by specifying the types of fuels and what quantities of those fuels you use:

Type of Fuel	Tick if used	Enter quantity that is used	Unit (Kg, liter, number, etc.)	Specify, if other
LPG				
Petrol				
Diesel				
Other #1				
Other #2				

M9) What was your monthly fuel bill for farm equipment this time last year? _____ Kyat per month

M10) Did you spend about the same amount of fuel last year as you do now? ☐ Yes ☐ No

M11) If not, what is your fuel bill for farm equipment this year? _____ Kyat per month

M12) If not, which fuel did you use this time last year?

☐ Paraffin ☐ Dung ☐ Fuel wood ☐ LPG ☐ Kerosene

☐ Candles ☐ Coal ☐ Rice husk ☐ Charcoal ☐ Petrol

☐ Diesel ☐ Other, specify: _____

N) Solar Power

N1) Does the household have a solar panel for electricity? ☐ Yes ☐ No

IF "NO" THEN PLEASE SKIP THE REMAINING QUESTIONS ON THIS PAGE

N2) How many solar panels? _____

N3) If you know the size (in Watts) of the solar panel please specify: _____

N4) Approximate cost per solar panel _____ Kyat

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APPENDIX B

Survey Results: Detailed Township Tables

This section contains township level detail for the various tables discussed in Section 4.

Table B1: Household Energy Expenditure by Income Level (Individual Townships)

Township	Income Level (From)	Income Level (To)	Number of Households	Batteries	Fuel Wood	Candles	Charcoal	Rice Husks	Petrol	Diesel	Parrafin	Coal	Kerosene	Electricity	LP Gas	Village Generator
Ngaputaw	0	25,000	1	0	5,000	3,000	0	0	0	0	0	0	0	0	0	0
Ngaputaw	25,001	50,000	13	1,346	1,615	1,138	0	288	0	1,900	0	0	0	0	0	0
Ngaputaw	50,001	75,000	10	1,500	4,300	960	0	0	0	1,270	0	0	0	0	0	0
Ngaputaw	75,001	100,000	24	2,750	6,458	1,067	750	938	3,000	4,396	0	0	0	0	0	0
Ngaputaw	100,001	150,000	22	2,968	8,227	1,514	114	909	5,455	14,314	0	0	0	0	0	0
Ngaputaw	150,001	200,000	10	1,440	12,100	1,020	200	800	1,500	15,550	0	0	0	0	0	0
Ngaputaw	200,001	250,000	2	3,000	16,000	1,500	0	0	0	0	0	0	0	0	0	0
Ngaputaw	250,001	300,000	1	3,000	8,000	1,000	0	0	0	52,500	0	0	0	0	0	0
Ngaputaw	300,001	10,000,000	2	1,900	14,000	2,000	250	0	22,500	27,500	0	0	0	0	0	0
Kyauktada	0	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kyauktada	25,001	50,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kyauktada	50,001	75,000	1	0	0	0	3,000	0	0	0	0	0	0	8,000	0	0
Kyauktada	75,001	100,000	3	0	0	0	0	0	0	0	0	0	0	12,000	0	0
Kyauktada	100,001	150,000	7	0	0	143	2,000	0	3,143	0	0	0	0	7,486	500	0
Kyauktada	150,001	200,000	10	100	0	500	1,500	0	8,200	0	0	0	150	14,400	3,800	0
Kyauktada	200,001	250,000	4	0	0	338	1,500	0	5,500	0	0	0	0	17,925	125	0
Kyauktada	250,001	300,000	5	0	0	320	1,800	0	4,400	0	0	0	0	33,200	3,400	0
Kyauktada	300,001	10,000,000	10	0	0	450	1,000	0	10,000	0	0	0	0	21,000	2,700	0
Dala	0	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dala	25,001	50,000	2	0	3,000	1,200	0	0	0	0	0	0	0	2,500	0	1,500
Dala	50,001	75,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dala	75,001	100,000	6	0	1,000	600	5,000	0	0	0	0	0	0	1,167	0	2,000
Dala	100,001	150,000	25	2,160	2,760	516	6,612	0	3,840	0	0	0	0	880	0	1,680
Dala	150,001	200,000	6	500	2,000	183	5,000	0	5,500	0	0	0	0	2,333	0	3,000
Dala	200,001	250,000	8	375	3,375	1,538	9,531	0	0	0	0	0	0	1,875	0	4,125
Dala	250,001	300,000	6	500	0	1,167	5,000	0	11,000	0	0	0	0	3,333	0	500
Dala	300,001	10,000,000	8	1,038	0	188	4,688	0	3,750	0	0	0	0	4,438	0	0
Phae Khone	0	25,000	2	1,000	0	1,500	0	0	0	0	0	0	0	0	0	0

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Table B1 *continued*

Township	Income Level (From)	Income Level (To)	Number of Households	Batteries	Fuel Wood	Candles	Charcoal	Rice Husks	Petrol	Diesel	Parrafin	Coal	Kerosene	Electricity	LP Gas	Village Generator
Phae Khone	25,001	50,000	8	1,125	0	1,688	0	0	5,563	4,713	0	0	0	300	0	0
Phae Khone	50,001	75,000	12	2,190	0	1,067	0	0	9,250	4,574	42	0	0	250	0	0
Phae Khone	75,001	100,000	14	3,231	0	1,943	0	0	6,700	9,224	0	0	0	0	0	0
Phae Khone	100,001	150,000	19	3,347	0	1,158	0	0	11,947	11,994	0	0	0	132	0	0
Phae Khone	150,001	200,000	3	1,833	0	667	0	0	5,000	6,000	150	0	0	0	0	0
Phae Khone	200,001	250,000	6	2,271	833	1,917	0	0	18,500	18,267	0	0	0	1,283	0	0
Phae Khone	250,001	300,000	1	2,000	0	0	0	0	10,000	22,500	0	0	0	0	0	0
Phae Khone	300,001	10,000,000	7	4,957	0	1,557	0	0	13,086	47,857	286	0	0	851	0	0
Kyaukpataung	0	25,000	4	344	2,250	1,875	0	0	4,000	0	0	0	0	0	0	0
Kyaukpataung	25,001	50,000	38	1,514	750	799	79	0	2,053	753	0	0	0	79	0	111
Kyaukpataung	50,001	75,000	25	1,412	1,680	680	200	0	4,200	2,192	0	0	0	480	0	84
Kyaukpataung	75,001	100,000	22	807	5,273	573	36	0	3,636	1,745	0	0	0	636	0	82
Kyaukpataung	100,001	150,000	30	1,694	3,042	575	175	0	7,233	1,577	0	0	0	840	0	267
Kyaukpataung	150,001	200,000	19	2,132	789	784	1,684	0	9,316	868	0	0	0	1,847	0	95
Kyaukpataung	200,001	250,000	4	1,438	0	500	0	0	45,000	67,500	0	0	0	250	0	0
Kyaukpataung	250,001	300,000	4	0	11,250	1,225	0	0	15,000	0	0	0	0	2,100	0	0
Kyaukpataung	300,001	10,000,000	3	1,667	34,000	0	2,000	0	40,000	0	0	0	0	4,333	0	1,333
Mandalay	0	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mandalay	25,001	50,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mandalay	50,001	75,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mandalay	75,001	100,000	1	0	0	1,000	4,000	0	20,000	0	0	0	0	4,500	0	0
Mandalay	100,001	150,000	4	0	1,250	0	1,875	0	14,500	0	0	0	0	6,125	0	0
Mandalay	150,001	200,000	5	0	5,000	0	2,400	0	23,400	0	0	0	0	17,200	0	0
Mandalay	200,001	250,000	4	0	0	0	2,625	0	27,500	0	0	0	0	7,500	1,000	0
Mandalay	250,001	300,000	9	0	0	389	2,722	0	45,556	0	0	0	0	10,222	400	0
Mandalay	300,001	10,000,000	12	16,875	0	192	4,875	0	36,000	19,167	0	1,250	0	40,542	2,708	0
Magway	0	25,000	1	900	0	0	0	0	0	0	0	0	0	0	0	0
Magway	25,001	50,000	4	481	0	0	0	0	0	0	0	0	0	0	0	750
Magway	50,001	75,000	7	2,007	0	0	571	0	2,714	0	0	0	0	0	0	857
Magway	75,001	100,000	11	2,791	0	0	0	0	2,727	0	0	0	0	0	0	227
Magway	100,001	150,000	11	1,309	0	136	0	0	8,864	0	0	0	0	0	0	1,409
Magway	150,001	200,000	12	3,450	0	500	0	0	9,583	0	0	0	0	0	0	708
Magway	200,001	250,000	5	2,780	0	0	0	0	8,000	26,400	0	0	0	0	0	500
Magway	250,001	300,000	4	500	1,500	0	0	0	25,250	21,500	0	0	0	0	0	2,875
Magway	300,001	10,000,000	6	10,267	0	0	0	0	15,667	118,133	0	0	0	0	0	917
Theinni	0	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Theinni	25,001	50,000	5	620	1,200	2,600	0	0	3,000	0	0	0	0	0	0	0
Theinni	50,001	75,000	14	4,157	950	3,286	0	0	11,643	929	0	0	0	0	0	0

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Table B1 *continued*

Township	Income Level (From)	Income Level (To)	Number of Households	Batteries	Fuel Wood	Candles	Charcoal	Rice Husks	Petrol	Diesel	Parrafin	Coal	Kerosene	Electricity	LP Gas	Village Generator
Theinni	75,001	100,000	12	3,788	417	3,292	375	0	15,417	3,283	0	0	0	0	0	0
Theinni	100,001	150,000	18	2,239	2,147	2,694	2,111	0	12,611	4,533	0	0	0	378	0	0
Theinni	150,001	200,000	8	6,075	4,650	2,500	14,875	0	12,375	5,500	0	0	0	0	0	0
Theinni	200,001	250,000	4	6,275	4,358	2,000	6,500	0	13,500	8,500	0	0	0	0	0	0
Theinni	250,001	300,000	6	4,467	7,293	1,417	1,167	0	37,500	16,333	0	0	0	0	0	0
Theinni	300,001	10,000,000	2	22,800	6,250	2,500	1,500	0	90,000	0	0	0	0	0	0	0
Taungkoke	0	25,000	1	0	0	3,000	0	0	0	0	0	0	0	0	0	0
Taungkoke	25,001	50,000	17	294	2,868	2,147	0	0	7,729	0	76	0	0	353	0	0
Taungkoke	50,001	75,000	7	1,143	6,286	1,479	0	0	10,571	714	0	0	0	429	0	0
Taungkoke	75,001	100,000	19	362	2,811	2,450	789	0	7,382	2,474	0	0	0	789	0	0
Taungkoke	100,001	150,000	10	0	3,300	1,375	4,000	0	10,725	200	0	0	0	1,200	0	0
Taungkoke	150,001	200,000	9	1,556	1,806	1,361	4,500	0	28,611	5,556	0	0	0	667	0	0
Taungkoke	200,001	250,000	8	4,500	3,763	2,156	0	0	5,000	0	0	0	0	1,125	0	0
Taungkoke	250,001	300,000	4	0	0	325	4,625	0	45,313	23,000	0	0	0	750	0	0
Taungkoke	300,001	10,000,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Di Maw Soe	0	25,000	1	0	0	2,000	0	0	0	0	0	0	0	0	0	0
Di Maw Soe	25,001	50,000	9	761	0	833	0	0	2,111	4,867	89	0	0	1,000	0	0
Di Maw Soe	50,001	75,000	12	875	0	1,333	0	0	7,167	2,154	467	0	0	500	0	0
Di Maw Soe	75,001	100,000	9	2,546	2,222	944	0	0	10,222	8,867	0	0	0	1,667	0	0
Di Maw Soe	100,001	150,000	14	4,000	571	714	0	0	25,321	12,284	0	0	0	1,071	0	0
Di Maw Soe	150,001	200,000	9	3,548	2,833	861	0	0	13,444	17,664	0	0	0	1,000	0	0
Di Maw Soe	200,001	250,000	1	2,200	0	1,000	0	0	18,000	22,500	0	0	0	0	0	0
Di Maw Soe	250,001	300,000	1	3,000	0	500	0	0	20,000	5,600	0	0	0	0	0	0
Di Maw Soe	300,001	10,000,000	5	3,400	83	700	0	0	31,400	22,275	200	0	0	1,200	0	0
Platwa	0	25,000	15	0	0	1,393	0	0	0	967	0	0	0	0	0	0
Platwa	25,001	50,000	40	1,648	730	1,213	8	0	445	300	196	0	0	225	0	0
Platwa	50,001	75,000	14	536	1,186	1,107	0	0	0	0	193	0	0	286	0	0
Platwa	75,001	100,000	11	1,636	5,182	1,391	0	0	0	0	0	0	0	182	0	0
Platwa	100,001	150,000	2	6,500	0	1,200	0	0	0	0	0	0	0	0	0	0
Platwa	150,001	200,000	3	2,667	4,000	1,067	0	0	0	0	0	0	0	1,000	0	0
Platwa	200,001	250,000	3	0	4,667	1,000	0	0	0	25,667	0	0	0	667	0	0
Platwa	250,001	300,000	4	3,400	6,500	1,000	0	0	0	0	0	0	0	0	0	0
Platwa	300,001	10,000,000	3	4,167	6,667	1,500	0	0	10,000	32,000	0	0	0	1,000	0	0
Chaung Sone	0	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chaung Sone	25,001	50,000	1	3,800	0	500	0	0	0	0	0	0	0	0	0	0
Chaung Sone	50,001	75,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chaung Sone	75,001	100,000	9	0	5,056	1,222	0	0	3,333	0	333	0	0	0	0	5,111
Chaung Sone	100,001	150,000	20	75	5,100	1,260	50	0	8,425	0	0	0	0	158	0	6,600

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Table B1 *continued*

Township	Income Level (From)	Income Level (To)	Number of Households	Batteries	Fuel Wood	Candles	Charcoal	Rice Husks	Petrol	Diesel	Parrafin	Coal	Kerosene	Electricity	LP Gas	Village Generator
Chaung Sone	150,001	200,000	19	995	6,039	1,763	2,263	0	13,053	2,105	0	0	0	179	632	8,053
Chaung Sone	200,001	250,000	8	625	10,250	1,563	0	0	12,650	3,000	0	0	0	0	0	6,500
Chaung Sone	250,001	300,000	8	625	2,775	1,250	1,138	0	31,750	11,625	0	0	0	0	938	6,125
Chaung Sone	300,001	10,000,000	13	2,292	5,731	1,692	1,077	0	26,077	11,231	0	0	0	123	2,462	6,000
Hlaing Bwe	0	25,000	1	0	1,200	1,000	0	0	0	0	1,500	0	0	0	0	0
Hlaing Bwe	25,001	50,000	11	227	3,318	2,091	455	0	1,091	0	73	0	0	0	0	0
Hlaing Bwe	50,001	75,000	11	2,273	4,091	2,455	0	0	2,191	0	427	0	0	0	0	0
Hlaing Bwe	75,001	100,000	25	660	4,472	2,200	180	0	4,176	440	168	0	0	0	0	0
Hlaing Bwe	100,001	150,000	29	888	3,334	2,526	1,414	0	5,766	2,836	393	0	0	0	0	0
Hlaing Bwe	150,001	200,000	6	3,208	3,042	1,833	521	0	11,833	7,500	583	0	0	0	0	0
Hlaing Bwe	200,001	250,000	3	0	5,000	2,333	0	0	16,667	18,333	500	0	0	0	0	0
Hlaing Bwe	250,001	300,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hlaing Bwe	300,001	10,000,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: ADB.

Table B2: Total Household Expenditure by Component (Individual Townships)

Township	Income Level (From)	Income Level (To)	Number of Households	Energy Expenses	Other Expenses	Total Expenses	Income
Ngaputaw	0	25,000	1	8,000	13,000	21,000	25,000
Ngaputaw	25,001	50,000	13	6,288	34,269	40,558	41,385
Ngaputaw	50,001	75,000	10	8,030	43,500	51,530	57,000
Ngaputaw	75,001	100,000	24	19,358	66,167	85,525	88,208
Ngaputaw	100,001	150,000	22	33,500	92,818	126,318	128,227
Ngaputaw	150,001	200,000	10	32,610	123,500	156,110	170,600
Ngaputaw	200,001	250,000	2	20,500	160,000	180,500	241,500
Ngaputaw	250,001	300,000	1	64,500	250,000	314,500	300,000
Ngaputaw	300,001	10,000,000	2	68,150	250,000	318,150	400,000
Kyauktada	0	25,000	0	0	0	0	0
Kyauktada	25,001	50,000	0	0	0	0	0
Kyauktada	50,001	75,000	1	11,000	55,000	66,000	70,000
Kyauktada	75,001	100,000	3	12,000	70,000	82,000	95,000
Kyauktada	100,001	150,000	7	13,271	117,857	131,129	150,000
Kyauktada	150,001	200,000	10	28,650	146,000	174,650	198,000
Kyauktada	200,001	250,000	4	25,388	190,000	215,388	247,500
Kyauktada	250,001	300,000	5	43,120	182,000	225,120	300,000
Kyauktada	300,001	10,000,000	10	35,150	283,000	318,150	510,000
Dala	0	25,000	0	0	0	0	0

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Table B2 *continued*

Township	Income Level (From)	Income Level (To)	Number of Households	Energy Expenses	Other Expenses	Total Expenses	Income
Dala	25,001	50,000	2	8,200	22,500	30,700	35,000
Dala	50,001	75,000	0	0	0	0	0
Dala	75,001	100,000	6	9,767	63,333	73,100	90,000
Dala	100,001	150,000	25	18,448	97,800	116,248	148,800
Dala	150,001	200,000	6	18,517	115,000	133,517	190,000
Dala	200,001	250,000	8	20,819	160,625	181,444	241,250
Dala	250,001	300,000	6	21,500	156,667	178,167	300,000
Dala	300,001	10,000,000	8	14,100	171,250	185,350	665,375
Phae Khone	0	25,000	2	2,500	15,000	17,500	20,000
Phae Khone	25,001	50,000	8	13,388	26,625	40,013	43,938
Phae Khone	50,001	75,000	12	17,372	43,750	61,122	63,958
Phae Khone	75,001	100,000	14	21,097	64,286	85,383	90,704
Phae Khone	100,001	150,000	19	28,578	85,158	113,736	123,937
Phae Khone	150,001	200,000	3	13,650	121,667	135,317	188,333
Phae Khone	200,001	250,000	6	43,071	130,000	173,071	224,667
Phae Khone	250,001	300,000	1	34,500	120,000	154,500	300,000
Phae Khone	300,001	10,000,000	7	68,594	198,571	267,166	524,286
Kyaukpataung	0	25,000	4	8,469	13,569	22,038	18,750
Kyaukpataung	25,001	50,000	38	6,136	30,632	36,768	39,947
Kyaukpataung	50,001	75,000	25	10,928	48,160	59,088	63,034
Kyaukpataung	75,001	100,000	22	12,789	64,091	76,880	92,528
Kyaukpataung	100,001	150,000	30	15,403	93,300	108,703	133,533
Kyaukpataung	150,001	200,000	19	17,516	118,158	135,674	188,368
Kyaukpataung	200,001	250,000	4	114,688	92,500	207,188	245,000
Kyaukpataung	250,001	300,000	4	29,575	165,000	194,575	282,500
Kyaukpataung	300,001	10,000,000	3	83,333	110,000	193,333	456,667
Mandalay	0	25,000	0	0	0	0	0
Mandalay	25,001	50,000	0	0	0	0	0
Mandalay	50,001	75,000	0	0	0	0	0
Mandalay	75,001	100,000	1	29,500	70,000	99,500	100,000
Mandalay	100,001	150,000	4	23,750	100,000	123,750	150,000
Mandalay	150,001	200,000	5	48,000	108,000	156,000	196,000
Mandalay	200,001	250,000	4	38,625	140,000	178,625	250,000
Mandalay	250,001	300,000	9	59,289	128,889	188,178	300,000
Mandalay	300,001	10,000,000	12	121,608	243,333	364,942	787,500
Magway	0	25,000	1	900	15,000	15,900	15,000
Magway	25,001	50,000	4	1,231	31,250	32,481	35,000
Magway	50,001	75,000	7	6,150	55,000	61,150	64,643
Magway	75,001	100,000	11	5,745	136,364	142,109	89,145

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Table B2 *continued*

Township	Income Level (From)	Income Level (To)	Number of Households	Energy Expenses	Other Expenses	Total Expenses	Income
Magway	100,001	150,000	11	11,718	105,455	117,173	133,227
Magway	150,001	200,000	12	14,242	130,000	144,242	175,667
Magway	200,001	250,000	5	37,680	136,000	173,680	233,600
Magway	250,001	300,000	4	51,625	150,000	201,625	275,250
Magway	300,001	10,000,000	6	144,983	175,000	319,983	633,917
Theinni	0	25,000	0	0	0	0	0
Theinni	25,001	50,000	5	7,420	30,000	37,420	42,300
Theinni	50,001	75,000	14	20,964	35,000	55,964	65,929
Theinni	75,001	100,000	12	26,571	60,233	86,804	91,833
Theinni	100,001	150,000	18	26,714	75,833	102,547	124,278
Theinni	150,001	200,000	8	45,975	87,500	133,475	182,313
Theinni	200,001	250,000	4	41,133	85,000	126,133	229,750
Theinni	250,001	300,000	6	68,177	96,667	164,843	292,083
Theinni	300,001	10,000,000	2	123,050	160,000	283,050	394,000
Taungkoke	0	25,000	1	3,000	22,000	25,000	25,000
Taungkoke	25,001	50,000	17	13,468	27,882	41,350	44,065
Taungkoke	50,001	75,000	7	20,621	44,286	64,907	62,286
Taungkoke	75,001	100,000	19	17,057	69,474	86,530	94,000
Taungkoke	100,001	150,000	10	20,800	103,000	123,800	142,500
Taungkoke	150,001	200,000	9	44,056	131,111	175,167	192,778
Taungkoke	200,001	250,000	8	16,544	138,750	155,294	231,875
Taungkoke	250,001	300,000	4	74,013	112,500	186,513	300,000
Taungkoke	300,001	10,000,000	0	0	0	0	0
Di Maw Soe	0	25,000	1	2,000	20,000	22,000	25,000
Di Maw Soe	25,001	50,000	9	9,661	27,778	37,439	38,733
Di Maw Soe	50,001	75,000	12	12,496	44,167	56,663	61,851
Di Maw Soe	75,001	100,000	9	26,468	58,333	84,802	89,722
Di Maw Soe	100,001	150,000	14	43,962	78,571	122,533	128,441
Di Maw Soe	150,001	200,000	9	39,351	102,222	141,573	180,389
Di Maw Soe	200,001	250,000	1	43,700	100,000	143,700	219,000
Di Maw Soe	250,001	300,000	1	29,100	120,000	149,100	254,000
Di Maw Soe	300,001	10,000,000	5	59,258	98,000	157,258	505,975
Platwa	0	25,000	15	2,360	14,933	17,293	18,267
Platwa	25,001	50,000	40	4,764	31,000	35,764	38,369
Platwa	50,001	75,000	14	3,307	50,357	53,664	59,643
Platwa	75,001	100,000	11	8,391	63,818	72,209	89,618
Platwa	100,001	150,000	2	7,700	80,000	87,700	135,000
Platwa	150,001	200,000	3	8,733	150,000	158,733	186,667
Platwa	200,001	250,000	3	32,000	126,667	158,667	246,667

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Table B2 *continued*

Township	Income Level (From)	Income Level (To)	Number of Households	Energy Expenses	Other Expenses	Total Expenses	Income
Platwa	250,001	300,000	4	10,900	125,000	135,900	288,000
Platwa	300,001	10,000,000	3	55,333	166,667	222,000	1,206,667
Chaung Sone	0	25,000	0	0	0	0	0
Chaung Sone	25,001	50,000	1	4,300	40,000	44,300	45,000
Chaung Sone	50,001	75,000	0	0	0	0	0
Chaung Sone	75,001	100,000	9	15,056	73,333	88,389	92,222
Chaung Sone	100,001	150,000	20	21,668	98,275	119,943	136,650
Chaung Sone	150,001	200,000	19	35,082	127,368	162,450	194,211
Chaung Sone	200,001	250,000	8	34,588	145,000	179,588	231,000
Chaung Sone	250,001	300,000	8	56,225	163,750	219,975	300,000
Chaung Sone	300,001	10,000,000	13	56,685	204,231	260,915	438,462
Hlaing Bwe	0	25,000	1	3,700	15,000	18,700	20,000
Hlaing Bwe	25,001	50,000	11	7,255	35,455	42,709	46,364
Hlaing Bwe	50,001	75,000	11	11,436	48,182	59,618	65,909
Hlaing Bwe	75,001	100,000	25	12,296	74,000	86,296	95,600
Hlaing Bwe	100,001	150,000	29	17,157	113,448	130,605	141,379
Hlaing Bwe	150,001	200,000	6	28,521	120,000	148,521	186,667
Hlaing Bwe	200,001	250,000	3	42,833	181,667	224,500	233,333
Hlaing Bwe	250,001	300,000	0	0	0	0	0
Hlaing Bwe	300,001	10,000,000	0	0	0	0	0

Source: ADB.

Table B3: Number of Households Reported Using the Fuel for the Application Listed
(Individual Townships)

Township	Energy Source	Cooking	Lighting	Space Cooling	Water Heating	Television	Refrigeration	Pumping	Other	Total
Ngaputaw	Batteries	0	65	0	0	21	0	0	0	86
Ngaputaw	Candles	0	83	0	0	0	0	0	0	83
Ngaputaw	Electricity	0	0	0	0	0	0	0	0	0
Ngaputaw	Generator	0	6	0	0	6	0	1	0	13
Ngaputaw	LPG	0	0	0	0	0	0	0	0	0
Ngaputaw	Firewood	82	2	0	82	0	0	0	0	166
Ngaputaw	Charcoal	3	0	0	3	0	0	0	0	6
Ngaputaw	Diesel	0	1	0	0	0	0	0	0	1
Ngaputaw	Paraffin	0	1	0	0	0	0	1	0	2
Ngaputaw	Rice Husk	13	0	0	0	0	0	0	0	13
Ngaputaw	Torches	0	85	0	0	0	0	0	0	85
Kyauktada	Batteries	0	1	0	0	0	0	0	0	1

Table B3 *continued*

Township	Energy Source	Cooking	Lighting	Space Cooling	Water Heating	Television	Refrigeration	Pumping	Other	Total
Kyauktada	Candles	0	13	0	0	0	0	0	0	13
Kyauktada	Electricity	34	40	29	39	38	35	39	5	259
Kyauktada	Generator	0	1	0	0	0	0	0	0	1
Kyauktada	LPG	14	0	0	0	0	0	0	0	14
Kyauktada	Firewood	0	0	0	0	0	0	0	0	0
Kyauktada	Charcoal	15	0	0	0	0	0	0	0	15
Kyauktada	Diesel	0	0	0	0	0	0	0	0	0
Kyauktada	Paraffin	0	0	0	0	0	0	0	0	0
Kyauktada	Rice Husk	0	0	0	0	0	0	0	0	0
Kyauktada	Torches	0	10	0	0	0	0	0	1	11
Dala	Batteries	0	19	0	0	2	0	0	0	21
Dala	Candles	0	24	0	0	0	0	0	0	24
Dala	Electricity	23	23	1	22	23	17	0	0	109
Dala	Generator	1	2	0	0	2	1	0	0	6
Dala	LPG	0	0	0	0	0	0	0	0	0
Dala	Firewood	12	0	0	0	0	0	0	0	12
Dala	Charcoal	31	0	0	39	0	0	0	0	70
Dala	Diesel	0	0	0	0	0	0	0	0	0
Dala	Paraffin	0	0	0	0	0	0	0	0	0
Dala	Rice Husk	0	0	0	0	0	0	0	0	0
Dala	Torches	0	41	0	0	0	0	0	0	41
Phae Khone	Batteries	0	51	0	0	28	0	0	0	79
Phae Khone	Candles	0	51	0	0	0	0	0	0	51
Phae Khone	Electricity	0	8	0	0	6	0	0	0	14
Phae Khone	Generator	0	0	0	0	0	0	1	0	1
Phae Khone	LPG	0	0	0	0	0	0	0	0	0
Phae Khone	Firewood	72	0	0	0	0	0	0	0	72
Phae Khone	Charcoal	0	0	0	0	0	0	0	0	0
Phae Khone	Diesel	0	0	0	0	0	0	0	0	0
Phae Khone	Paraffin	0	2	0	0	0	0	0	0	2
Phae Khone	Rice Husk	0	0	0	0	0	0	0	0	0
Phae Khone	Torches	0	65	0	0	0	0	0	0	65
Kyaukpataung	Batteries	0	86	0	0	29	0	0	0	115
Kyaukpataung	Candles	0	62	0	0	0	0	0	0	62
Kyaukpataung	Electricity	20	39	2	8	31	3	11	1	115
Kyaukpataung	Generator	0	10	0	0	5	0	4	3	22
Kyaukpataung	LPG	0	0	0	0	0	0	0	0	0
Kyaukpataung	Firewood	140	0	0	0	0	0	0	0	140
Kyaukpataung	Charcoal	0	0	0	0	0	0	0	0	0

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Table B3 *continued*

Township	Energy Source	Cooking	Lighting	Space Cooling	Water Heating	Television	Refrigeration	Pumping	Other	Total
Kyaukpataung	Diesel	0	0	0	0	0	0	0	0	0
Kyaukpataung	Paraffin	0	0	0	0	0	0	1	0	1
Kyaukpataung	Rice Husk	0	0	0	0	0	0	0	0	0
Kyaukpataung	Torches	1	135	0	0	0	0	0	0	136
Mandalay	Batteries	0	2	0	0	0	0	0	0	2
Mandalay	Candles	0	6	0	0	0	0	0	0	6
Mandalay	Electricity	34	35	14	15	35	28	23	0	184
Mandalay	Generator	0	4	0	0	2	0	1	0	7
Mandalay	LPG	4	0	0	0	0	0	0	0	4
Mandalay	Firewood	2	0	0	0	0	0	0	0	2
Mandalay	Charcoal	0	0	0	0	0	0	0	0	0
Mandalay	Diesel	0	0	0	0	0	0	0	0	0
Mandalay	Paraffin	0	0	0	0	0	0	0	0	0
Mandalay	Rice Husk	0	0	0	0	0	0	0	0	0
Mandalay	Torches	0	17	0	0	0	0	0	0	17
Magway	Batteries	0	44	0	0	13	0	0	0	57
Magway	Candles	0	2	0	0	0	0	0	0	2
Magway	Electricity	0	0	0	0	0	0	0	0	0
Magway	Generator	1	6	0	0	4	0	0	3	14
Magway	LPG	0	0	0	0	0	0	0	0	0
Magway	Firewood	59	0	0	0	0	0	0	0	59
Magway	Charcoal	0	0	0	0	0	0	0	0	0
Magway	Diesel	0	0	0	0	0	0	0	0	0
Magway	Paraffin	0	0	0	0	0	0	0	0	0
Magway	Rice Husk	0	0	0	0	0	0	0	0	0
Magway	Torches	0	57	0	0	0	0	0	0	57
Theinni	Batteries	9	16	0	0	1	0	0	0	26
Theinni	Candles	7	18	0	0	4	0	0	0	29
Theinni	Electricity	7	19	0	0	3	0	0	0	29
Theinni	Generator	7	20	0	0	5	0	0	0	32
Theinni	LPG	8	20	0	0	6	0	0	0	34
Theinni	Firewood	0	0	0	0	0	0	0	0	0
Theinni	Charcoal	0	0	0	0	0	0	0	0	0
Theinni	Diesel	0	0	0	0	0	0	0	0	0
Theinni	Paraffin	8	17	0	0	4	0	0	0	29
Theinni	Rice Husk	6	18	0	0	2	0	0	0	26
Theinni	Torches	8	19	0	0	3	0	0	0	30
Taungkoke	Batteries	0	10	0	0	3	0	0	0	13
Taungkoke	Candles	0	73	0	0	0	0	0	0	73

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Table B3 *continued*

Township	Energy Source	Cooking	Lighting	Space Cooling	Water Heating	Television	Refrigeration	Pumping	Other	Total
Taungkoke	Electricity	0	21	0	0	9	0	0	0	30
Taungkoke	Generator	0	6	0	0	3	0	0	0	9
Taungkoke	LPG	0	0	0	0	0	0	0	0	0
Taungkoke	Firewood	66	0	0	0	0	0	0	0	66
Taungkoke	Charcoal	0	0	0	0	0	0	0	0	0
Taungkoke	Diesel	0	0	0	0	0	0	0	0	0
Taungkoke	Paraffin	0	2	0	0	0	0	0	0	2
Taungkoke	Rice Husk	0	0	0	0	0	0	0	0	0
Taungkoke	Torches	0	74	0	0	0	0	0	0	74
Di Maw Soe	Batteries	0	27	0	0	23	0	0	0	50
Di Maw Soe	Candles	0	52	0	0	0	0	0	0	52
Di Maw Soe	Electricity	18	20	0	6	18	1	12	1	76
Di Maw Soe	Generator	0	0	0	0	0	0	1	0	1
Di Maw Soe	LPG	0	0	0	0	0	0	0	0	0
Di Maw Soe	Firewood	61	0	0	0	0	0	0	0	61
Di Maw Soe	Charcoal	0	0	0	0	0	0	0	0	0
Di Maw Soe	Diesel	0	0	0	0	0	0	0	0	0
Di Maw Soe	Paraffin	0	7	0	0	0	0	0	0	7
Di Maw Soe	Rice Husk	0	0	0	0	0	0	0	0	0
Di Maw Soe	Torches	0	58	0	0	0	0	0	0	58
Platwa	Batteries	0	28	0	0	8	0	0	0	36
Platwa	Candles	0	66	0	0	0	0	0	0	66
Platwa	Electricity	0	10	0	0	1	0	0	0	11
Platwa	Generator	0	5	0	0	3	0	0	0	8
Platwa	LPG	0	0	0	0	0	0	0	0	0
Platwa	Firewood	95	0	0	0	0	0	0	0	95
Platwa	Charcoal	0	0	0	0	0	0	0	0	0
Platwa	Diesel	0	0	0	0	0	0	0	0	0
Platwa	Paraffin	0	6	0	0	0	0	0	0	6
Platwa	Rice Husk	0	0	0	0	0	0	0	0	0
Platwa	Torches	0	94	0	0	0	0	0	0	94
Chaung Sone	Batteries	0	13	0	0	8	0	0	0	21
Chaung Sone	Candles	0	69	0	0	0	0	0	0	69
Chaung Sone	Electricity	0	10	0	0	3	2	1	0	16
Chaung Sone	Generator	0	10	0	0	8	0	1	0	19
Chaung Sone	LPG	4	0	0	0	0	0	0	0	4
Chaung Sone	Firewood	73	0	0	0	0	0	0	0	73
Chaung Sone	Charcoal	0	0	0	0	0	0	0	0	0
Chaung Sone	Diesel	0	0	0	0	0	0	0	0	0

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Table B3 *continued*

Township	Energy Source	Cooking	Lighting	Space Cooling	Water Heating	Television	Refrigeration	Pumping	Other	Total
Chaung Sone	Paraffin	0	1	0	0	0	0	0	0	1
Chaung Sone	Rice Husk	0	0	0	0	0	0	0	0	0
Chaung Sone	Torches	0	72	0	0	0	0	0	0	72
Hlaing Bwe	Batteries	0	14	0	0	7	0	0	0	21
Hlaing Bwe	Candles	0	86	0	0	0	0	0	0	86
Hlaing Bwe	Electricity	0	0	0	0	0	0	0	0	0
Hlaing Bwe	Generator	0	13	0	0	16	0	0	0	29
Hlaing Bwe	LPG	0	0	0	0	0	0	0	0	0
Hlaing Bwe	Firewood	76	0	0	0	0	0	0	0	76
Hlaing Bwe	Charcoal	0	0	0	0	0	0	0	0	0
Hlaing Bwe	Diesel	0	0	0	0	0	0	0	0	0
Hlaing Bwe	Paraffin	0	17	0	0	0	0	0	0	17
Hlaing Bwe	Rice Husk	0	0	0	0	0	0	0	0	0
Hlaing Bwe	Torches	0	81	0	0	0	0	0	0	81

LPG = liquefied petroleum gas
Source: ADB.

Table B4: Number of Households by Lighting Type and Income Range
(Individual Townships, kyat/month)

Township	Type	Income Range (From and To)								
		0 25,000	25,001 50,000	50,001 75,000	75,001 100,000	100,001 150,000	150,001 200,000	200,001 250,000	250,001 300,000	300,001 10,000,000
Ngaputaw	Candles	1	12	10	24	22	9	2	1	2
Ngaputaw	Fluorescent light	0	1	0	1	2	2	0	0	0
Ngaputaw	Lantern	0	0	0	0	1	0	0	0	0
Ngaputaw	LED lighting	0	6	5	22	21	4	2	1	2
Ngaputaw	Torch	1	13	10	24	22	10	2	1	2
Kyauktada	Candles	0	0	0	0	1	5	2	1	4
Kyauktada	Fluorescent light	0	0	1	3	7	10	4	5	10
Kyauktada	Lantern	0	0	0	0	0	0	0	0	0
Kyauktada	LED lighting	0	0	1	2	5	6	2	2	6
Kyauktada	Torch	0	0	0	0	1	3	2	2	2
Dala	Candles	0	2	0	4	4	2	6	2	4
Dala	Fluorescent light	0	2	0	6	17	5	7	6	7
Dala	Lantern	0	0	0	0	0	0	0	0	0
Dala	LED lighting	0	0	0	1	11	3	3	4	6

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Table B4 *continued*

Township	Type	Income Range (From and To) 0 25,000	25,001 50,000	50,001 75,000	75,001 100,000	100,001 150,000	150,001 200,000	200,001 250,000	250,001 300,000	300,001 10,000,000
Dala	Torch	0	1	0	5	14	4	7	3	7
Phae Khone	Candles	1	6	8	10	13	2	5	0	6
Phae Khone	Fluorescent light	0	0	1	1	2	1	0	0	3
Phae Khone	Lantern	0	0	0	0	0	0	0	0	0
Phae Khone	LED lighting	1	2	6	5	6	0	2	1	1
Phae Khone	Torch	2	8	11	14	19	3	6	1	7
Kyaukpataung	Candles	3	17	10	9	9	9	1	4	0
Kyaukpataung	Fluorescent light	0	14	7	10	10	11	1	4	1
Kyaukpataung	Lantern	0	0	0	1	2	0	0	0	0
Kyaukpataung	LED lighting	4	34	32	24	36	22	6	4	6
Kyaukpataung	Torch	3	36	22	18	29	17	4	4	3
Mandalay	Candles	0	0	0	1	0	0	0	3	2
Mandalay	Fluorescent light	0	0	0	0	4	5	3	9	11
Mandalay	Lantern	0	0	0	1	1	0	3	0	2
Mandalay	LED lighting	0	0	0	0	4	2	2	8	6
Mandalay	Torch	0	0	0	1	2	3	1	6	4
Magway	Candles	0	0	0	0	1	1	0	0	0
Magway	Fluorescent light	0	1	4	5	10	7	4	4	4
Magway	Lantern	0	0	0	0	1	1	0	1	0
Magway	LED lighting	0	1	1	2	7	4	1	2	4
Magway	Torch	1	3	7	10	10	12	4	4	6
Theinni	Candles	0	5	14	12	18	7	4	5	2
Theinni	Fluorescent light	0	0	4	2	3	1	2	2	0
Theinni	Lantern	0	0	0	0	0	0	0	0	0
Theinni	LED lighting	0	0	2	2	1	1	1	0	0
Theinni	Torch	0	5	14	11	15	8	3	6	2
Taungkoke	Candles	1	16	7	19	10	9	7	4	0
Taungkoke	Fluorescent light	0	3	2	10	5	6	7	3	0
Taungkoke	Lantern	0	0	0	0	1	1	0	0	0
Taungkoke	LED lighting	1	1	0	2	0	1	0	0	0
Taungkoke	Torch	1	17	7	19	10	9	7	4	0
Di Maw Soe	Candles	1	8	11	7	12	7	1	1	4
Di Maw Soe	Fluorescent light	0	3	2	4	7	5	0	1	3
Di Maw Soe	Lantern	0	0	3	0	0	0	0	0	1

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Table B4 *continued*

Township	Type	Income Range (From and To) 0 25,000	25,001 50,000	50,001 75,000	75,001 100,000	100,001 150,000	150,001 200,000	200,001 250,000	250,001 300,000	300,001 10,000,000
Di Maw Soe	LED lighting	0	0	1	1	3	1	0	0	1
Di Maw Soe	Torch	1	8	11	9	14	9	1	1	4
Platwa	Candles	14	28	10	7	1	2	2	2	2
Platwa	Fluorescent light	1	12	5	4	1	2	1	2	3
Platwa	Lantern	0	0	1	0	0	0	0	0	0
Platwa	LED lighting	0	4	1	2	1	0	2	0	1
Platwa	Torch	15	40	13	11	2	3	3	4	3
Chaung Sone	Candles	0	1	0	9	17	16	8	8	11
Chaung Sone	Fluorescent light	0	1	0	7	19	19	8	7	13
Chaung Sone	Lantern	0	0	0	1	1	0	0	0	2
Chaung Sone	LED lighting	0	0	0	0	6	3	2	3	3
Chaung Sone	Torch	0	1	0	8	16	18	8	8	13
Hlaing Bwe	Candles	1	11	11	25	29	6	3	0	0
Hlaing Bwe	Fluorescent light	0	1	2	3	6	1	1	0	0
Hlaing Bwe	Lantern	1	0	3	3	3	1	1	0	0
Hlaing Bwe	LED lighting	0	0	0	0	0	0	0	0	0
Hlaing Bwe	Torch	1	9	10	23	29	6	3	0	0

LED = light emitting diode.
Source: ADB.

Table B5: Typical Number of Lighting Source in Use at One Time, by Income Range
(Individual Townships, kyat/month)

Township	Type	Income Range (From and To) 0 215,000	215,001 150,000	150,001 150,000	150,001 200,000	200,001 1,500,000	1,500,001 1,500,000	1,500,001 15,000,001
Ngaputaw	Candles	6.00	2.25	1.90	2.25	2.23	2.44	2.50
Ngaputaw	Fluorescent light	0.00	1.00	0.00	1.00	1.00	2.50	0.00
Ngaputaw	Lantern	0.00	0.00	0.00	0.00	2.00	0.00	0.00
Ngaputaw	LED lighting	0.00	1.00	1.40	1.09	1.00	1.25	1.00
Ngaputaw	Torch	1.00	1.15	1.50	1.46	1.45	1.80	2.50
Kyauktada	Candles	0.00	0.00	0.00	0.00	12.00	11.20	22.00
Kyauktada	Fluorescent light	0.00	0.00	6.00	3.67	5.29	6.80	4.50
Kyauktada	Lantern	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kyauktada	LED lighting	0.00	0.00	2.00	1.00	1.00	1.17	1.00
Kyauktada	Torch	0.00	0.00	0.00	0.00	1.00	1.33	1.00
Dala	Candles	0.00	2.00	0.00	2.00	13.75	1.00	2.83

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Table B5 *continued*

Township	Type	Income Range (From and To) 0 215,000	215,001 150,000	150,001 150,000	150,001 200,000	200,001 1,500,000	1,500,001 1,500,000	1,500,001 15,000,001
Dala	Fluorescent light	0.00	2.50	0.00	1.50	2.00	1.80	2.14
Dala	Lantern	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dala	LED lighting	0.00	0.00	0.00	1.00	1.00	1.67	1.00
Dala	Torch	0.00	1.00	0.00	1.20	1.07	1.00	1.29
Phae Khone	Candles	6.00	4.50	3.50	5.50	3.77	2.00	4.60
Phae Khone	Fluorescent light	0.00	0.00	2.00	1.00	2.00	1.00	0.00
Phae Khone	Lantern	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phae Khone	LED lighting	1.00	2.50	1.17	1.60	2.33	0.00	2.50
Phae Khone	Torch	1.00	1.88	1.73	2.36	2.11	2.00	2.33
Kyaukpataung	Candles	3.67	2.94	5.30	2.67	4.33	3.56	3.00
Kyaukpataung	Fluorescent light	0.00	2.29	2.00	1.60	2.10	2.18	2.00
Kyaukpataung	Lantern	0.00	0.00	0.00	2.00	1.00	0.00	0.00
Kyaukpataung	LED lighting	1.00	1.47	2.06	2.00	2.06	1.82	2.33
Kyaukpataung	Torch	1.33	1.61	1.68	1.72	1.93	2.06	2.50
Mandalay	Candles	0.00	0.00	0.00	2.00	0.00	0.00	0.00
Mandalay	Fluorescent light	0.00	0.00	0.00	0.00	4.00	7.20	6.67
Mandalay	Lantern	0.00	0.00	0.00	6.00	1.00	0.00	4.00
Mandalay	LED lighting	0.00	0.00	0.00	0.00	2.00	4.00	2.00
Mandalay	Torch	0.00	0.00	0.00	2.00	1.00	2.00	4.00
Magway	Candles	0.00	0.00	0.00	0.00	3.00	10.00	0.00
Magway	Fluorescent light	0.00	1.00	1.25	1.60	1.20	2.00	1.25
Magway	Lantern	0.00	0.00	0.00	0.00	1.00	1.00	0.00
Magway	LED lighting	0.00	1.00	1.00	1.00	1.29	1.00	1.00
Magway	Torch	1.00	1.33	1.57	1.60	1.30	1.83	2.25
Theinni	Candles	0.00	10.60	7.21	6.58	5.78	5.71	4.00
Theinni	Fluorescent light	0.00	0.00	1.50	2.00	1.33	1.00	1.50
Theinni	Lantern	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Theinni	LED lighting	0.00	0.00	1.00	1.00	1.00	6.00	4.00
Theinni	Torch	0.00	1.80	2.07	2.55	2.33	1.75	1.67
Taungkoke	Candles	1.00	6.56	6.14	7.74	3.40	5.22	10.29
Taungkoke	Fluorescent light	0.00	2.00	1.00	1.50	1.60	1.67	1.71
Taungkoke	Lantern	0.00	0.00	0.00	0.00	2.00	1.00	0.00
Taungkoke	LED lighting	1.00	1.00	0.00	1.50	0.00	3.00	0.00
Taungkoke	Torch	1.00	1.82	1.86	2.58	2.10	2.89	2.00
Di Maw Soe	Candles	5.00	2.13	3.27	1.86	1.75	2.43	2.00
Di Maw Soe	Fluorescent light	0.00	1.33	2.50	3.75	2.57	4.20	0.00
Di Maw Soe	Lantern	0.00	0.00	2.00	0.00	0.00	0.00	0.00
Di Maw Soe	LED lighting	0.00	0.00	1.00	2.00	3.00	3.00	0.00

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Table B5 *continued*

Township	Type	Income Range (From and To) 0 215,000	215,001 150,000	150,001 150,000	150,001 200,000	200,001 1,500,000	1,500,001 1,500,000	1,500,001 15,000,001
Di Maw Soe	Torch	3.00	1.50	2.18	2.22	2.21	2.00	2.00
Platwa	Candles	2.57	3.04	3.40	5.57	3.00	3.00	3.00
Platwa	Fluorescent light	3.00	1.42	1.20	1.75	3.00	1.50	4.00
Platwa	Lantern	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Platwa	LED lighting	0.00	1.25	2.00	1.00	7.00	0.00	1.00
Platwa	Torch	1.47	1.83	2.15	2.09	3.00	1.33	2.33
Chaung Sone	Candles	0.00	1.00	0.00	2.33	2.65	3.81	3.00
Chaung Sone	Fluorescent light	0.00	1.00	0.00	1.43	1.11	2.95	1.88
Chaung Sone	Lantern	0.00	0.00	0.00	1.00	2.00	0.00	0.00
Chaung Sone	LED lighting	0.00	0.00	0.00	0.00	1.17	1.00	2.00
Chaung Sone	Torch	0.00	1.00	0.00	1.75	1.50	1.72	1.63
Hlaing Bwe	Candles	3.00	5.73	6.91	5.96	6.21	4.33	5.00
Hlaing Bwe	Fluorescent light	0.00	2.00	3.50	2.00	2.67	5.00	6.00
Hlaing Bwe	Lantern	1.00	0.00	1.33	1.00	0.67	1.00	2.00
Hlaing Bwe	LED lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hlaing Bwe	Torch	2.00	1.67	1.90	1.65	2.69	2.33	2.33

LED = light emitting diode.
Source: ADB.

APPENDIX C

Livelihood of Food Security Trust Baseline Survey Extracts

This appendix provides summary of some useful extracts as they relate to household energy consumption, from the Livelihood of Food Security Trust (LIFT) baseline survey work that was conducted in 2012.

The key tables and figures are as follows:

- Table C1 and Figure C1 show the frequency of household energy sources for lighting, by region;
- Table C2 and Figure C2 set out the frequency of household sources of energy for lighting, by income level; and
- Table C3 and Figure C3 set out statistics on rural household cooking.

Table C1: Frequency of Household Energy Sources for Lighting, by Region (%)

Source	Hilly	Dry	Delta/coastal
Electricity from the grid	16	11	4
Village generator	16	9	1
Own generator	4	1	3
Shared generator[a]	6	11	6
Lamp (kerosene/oil)	16	2	60
Candle	24	18	16
Other	19	48	10

[a] Shared generator with other households

Source: Extracted from LIFT Baseline Survey 2012—Table 121, p. 71.

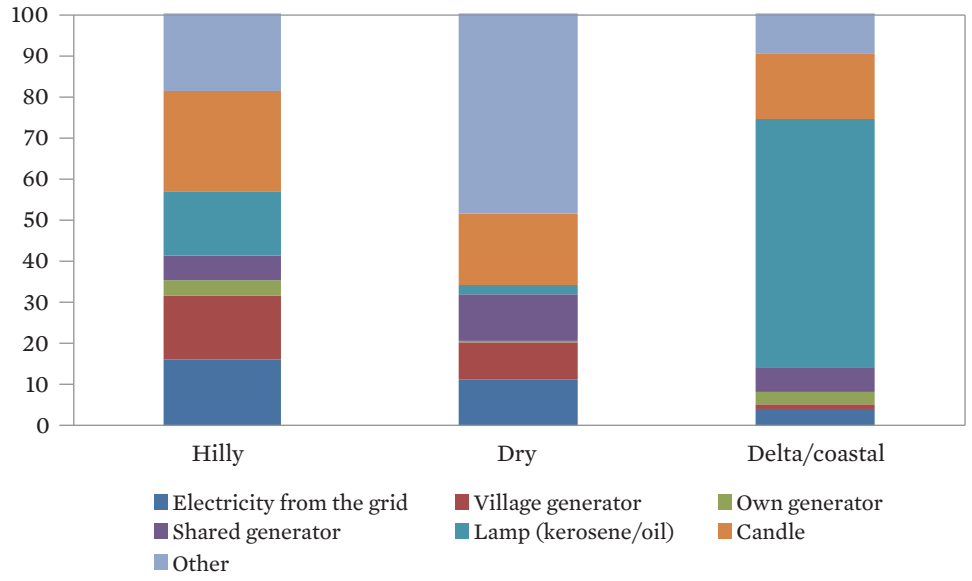
Table C2: Frequency of Household Sources of Energy for Lighting, by Income Level (%)

Monthly household income range (MK)	Electricity from grid	Village generator	Own generator	Shared generator	Lamp (kerosene/ oil)	Candle	Other
Less than 25,000	4	7	0	2	31	33	23
25,001–50,000	5	7	1	4	34	27	23
50,001–75,000	6	8	1	8	24	27	26
75,001–100,000	10	8	3	13	18	26	22
100,001–150,000	15	3	3	15	15	26	24
150,001–200,000	17	8	10	15	14	11	26
200,001–250,000	24	20	5	12	17	10	12
250,001–300,000	23	9	9	6	11	11	31
Over 300,000	29	7	19	16	9	10	10
Don't know/ nil response	10	0	0	5	14	43	29

MK = kyat.

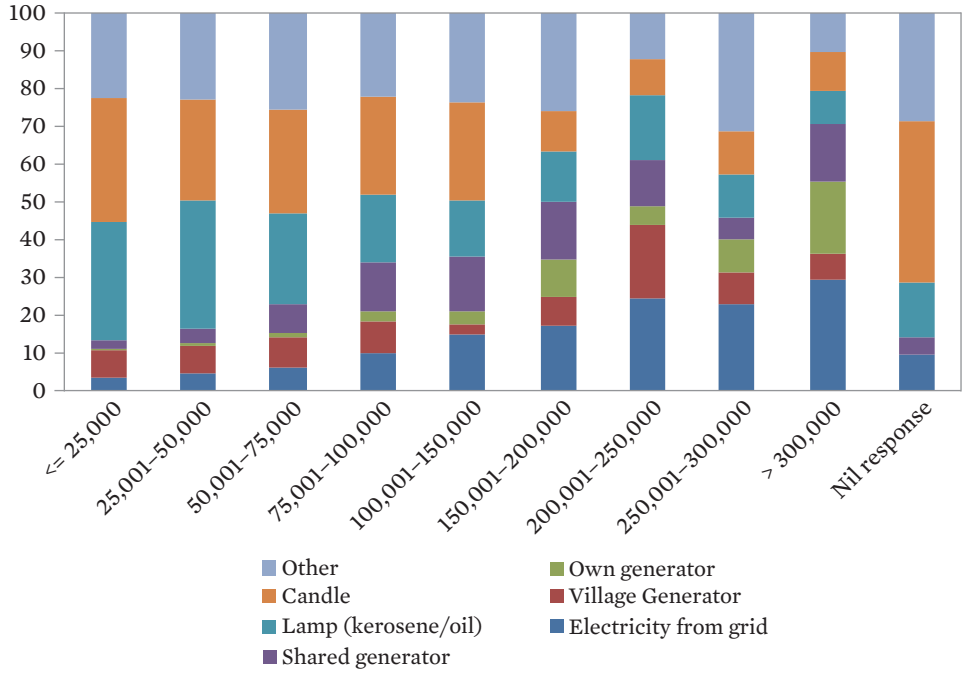
Source: Extracted from LIFT Baseline Survey 2012 – Table 123a and Table 123b, p. 72.

Figure C1: Plot of Household Energy Sources for Lighting, by Region



Source: LIFT Baseline Survey report.

Figure C2: Plot of Household Sources of Energy for Lighting, by Income Level (%)



Source: LIFT Baseline Survey Report, July 2012. Livelihood and Food Security Trust Fund (LIFT). Myanmar.

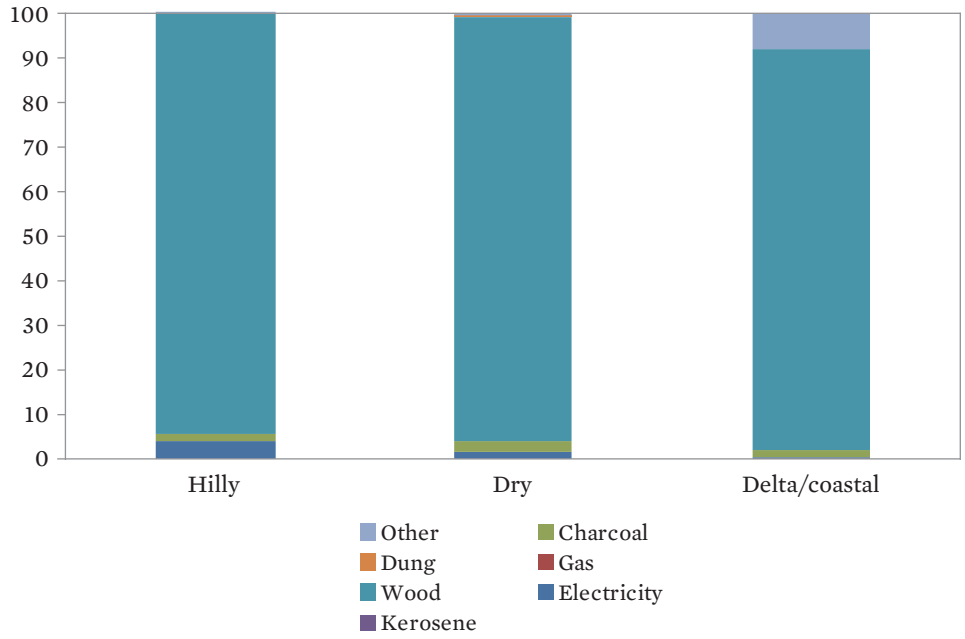
Table C3: Statistics on Rural Household Cooking, by Region (%)

Source	Hilly	Dry	Delta/coastal
Frequency of Energy Source for Cooking			
Electricity from the grid	4	1	0
Village generator	0	0	0
Own generator	1	2	2
Shared generator[a]	0	0	0
Lamp (kerosene/oil)	95	96	90
Candle	0	1	0
Other	0	0	8
Frequency of Rural Households using Fuel Efficient Wood Stoves			
Percentage of households using Fuel Efficient Wood Stoves	9	13	14

[a] Shared generator with other households.

Source: Extracted from LIFT Baseline Survey 2012 – Table 123a and Table 123b, p. 72.

Figure C3: Plot of Household Sources of Energy for Lighting, by Income Level *(%)*



Source: LIFT Baseline Survey Report, July 2012. Livelihood and Food Security Trust Fund (LIFT). Myanmar.

APPENDIX D

Private Industry Energy Consumption Survey

Figure D1: Private Industry Energy Consumption Survey Template

Plant name | Location

Process description

Plant outputs

Production	Plant output	Unit	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013
		0 tons												

Plant capacity	Plant output	Unit	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013
		0 tons												

Fuel consumption	Year	Unit	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013
	Electricity	kWh												
	Natural gas	cubic meters												
	Diesel	liters												
	Coal	tons												
	Fuel oil	liters												
	Gasolene	liters												
	Propane	tons												
	Biomass	liters												
	Wood Chip	tons												
	Rice husk	tons												
	Sawdust	tons												
	Charcoal	tons												
	Ammonia	tons												

Diesel gensets
Installed capacity (kW)

Diesel genset generation	Aspect	Unit	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013
	Electricity generation	kWh												

Source: ADB..

Myanmar Energy Consumption Surveys

A household energy consumption survey in 11 regions across Myanmar shows that firewood is mainly used for cooking (73%) and candles and torches for lighting (65%), followed by electricity for cooking (13%) and battery for lighting (17%) while the demand for modern energy sources is rapidly increasing. This report presents the results of 2014 household energy consumption surveys that helped develop a more accurate picture of historical energy consumption by fuel source. This publication shares the survey results, considering the scarcity of available energy data and statistics in Myanmar especially at the household level. The data herein may prove useful in making more informed decisions by those involved in Myanmar's energy and social sectors.

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