

## New modern energy consumers in the Greater Mekong subregion

Pan Piyasil<sup>1,2,\*</sup>, and Milou Beerepoot<sup>3</sup>

<sup>1</sup>The Joint Graduate School of Energy and Environment, King Mongkut's University of Technology Thonburi, Bangkok, Thailand

<sup>2</sup>Center of Energy Technology and Environment, Ministry of Education, Thailand

<sup>3</sup>German International Cooperation, 3<sup>rd</sup> Fl. 121/1-2 Petchburi Rd. Ratchathewi Bangkok 10400, Thailand

### **Abstract:**

*This study aims to examine a particular income group of energy consumer in the Greater Mekong Sub-region (GMS), which includes Cambodia, Lao PDR, Myanmar, Thailand, and Vietnam. This income group, referred as MECON, is defined as those who are those who connect to electricity grid with daily income of \$2-5 (2005 PPP). This target group is important for the future energy demand in this region as they are likely to earn higher incomes, own more household appliances, and consume more energy in the near future. This paper discusses on the definition of MECON, and its application. The study, then, uses the method reviewed from literatures, and PovcalNet, World Bank's poverty analysis tool to test if the income range is usable to capture the target group. The result shows the percentage headcount of MECON to national populations in this region, and its trend. The finding suggests that this target group tends to decline in Thailand which is opposite to other GMS countries. Also, MECON group will become more important to residential energy consumption in this region in the future.*

**Keywords:** energy efficiency; residential sector; low income household; socio-economic data; poverty line

\*Corresponding author. Tel.: +668-2022-0699, Fax: +662-872-6978

E-mail address: panpiyasil@gmail.com

### **1. Introduction**

A continuous rising in average income and the amount of middle class in the Greater Mekong Sub-region (GMS), i.e. Cambodia, Lao PDR, Myanmar, Thailand and Vietnam, have elevated the importance of energy efficiency in residential sector. According to Pezzini (2012), the size of global middle class will raise from 1.8 billion in 2009 to 4.9 billion in 2030, and Asia will hold the largest share by 66% of global middle-class population in 2030, an incredible growth in comparison to less than 20% in 2000 (ibid.). Significant contribution will come from the GMS as well, and developing countries in this region like Vietnam and Thailand could have their significant economic mass larger than France today (Kharas, 2010).

Evidently, an emerging middle class is a critical factor to economic and social development, but it also leads to an increase in sales of household appliances as well as domestic energy consumption. Since many of household appliances have long lifespans and are often relatively expensive to low-income households, they tend to choose low-price-low-efficient appliances, and then stuck with those appliances for a long time. This path dependency is the main factors why we should be proactive, and policy interventions are needed to assist these low-income households to improve energy efficiency before they start consuming more and more inefficiently.

The target group in this study is the low-income households which are on the verge to become middle income, referred as "New Modern Energy Consumer" or MECON. Studies with similar target group have been conducted extensively in global and regional scales. However, we know so little about the identity and energy consumption behavior of this particular group in the GMS. In order to be able to conduct more researches on the MECON group in different countries, it is important to come to a good definition of the MECON target group. Therefore this paper identifies and develops the definition for MECON group definition to be used in the GMS region, which will offer a crucial stepping stone for conducting household surveys, and designing energy efficiency policies with socio-economic data.

## **2. Method**

The method used in this study is mostly desk research and literature review on main two discussions which are the definition of MECON and how to identify them in the GMS. MECON are defined as those who connect to electricity grid with daily income of \$2-5/person/day. The rationale behind this income band comes from UN and World Bank definition of international poverty line used since 2005. International poverty line, \$1.25/person/day (2005 PPP), is derived from the minimum value of consumption needed to be considered 'not poor' in the world's poorest countries (The World Bank, 2008).

International poverty line has many values, which are \$1.25, \$2, \$4, and \$5 a day, and this offers different standards of what poverty meant by different countries (The World Bank, n.d.). The \$1.25 a day poverty line (in 2005 PPP \$) is not appropriate in this study because it represents the extreme poverty line typically for the world's poorest countries. People who live around this line are likely to still struggle fulfilling basic physical needs rather than to concern on convenient household goods that consume high energy. Therefore, they are not the target group in this study.

On the other hand, the \$2 a day poverty line (in 2005 PPP \$), representing the median (average) poverty line for all developing countries, are more appropriate because it implies a slightly higher standard of living. Moreover, higher international poverty lines are more comparable in more developed regions, such as the \$4 a day for countries in the Latin American and the Caribbean (LAC) region, and the \$5 a day in the Eastern Europe and Central Asia (ECA) region (ibid.).

In the GMS, \$2-5 income range is more suitable as they are the group that start to rise above the international poverty line, but are not considered as middle class in developed countries' standards just yet. This target group is expected to start diverting their household consumption toward other goods besides foods or shelters, presumably toward more convenient household appliances, such as washing machine, rice cooker, and electric fan. Moreover, we choose the range of \$2-5 a day instead of \$2-4 a day because there are wide gap on development level in Thailand and the rest of the GMS countries. According to a survey by Thailand's National Statistical Office in 2006, the average income of low income population in Bangkok was above \$10 a day (nominal) already (Kulmar, Abdul Salam, and Shrestha, 2012). Moreover, GDP per capita in Thailand is higher than other countries in this region. Therefore, a slightly wider range of income is applied to MECON in order to be more comparable between the GMS countries.

However, this income range should be tested if it represents the target group in this study. One of the most interesting criterion comes from Easterly (2001) who defining those lying between the 20<sup>th</sup> and 80<sup>th</sup> percentile on the consumption distribution as the "middle class". This method is tested by Banerjee and Duflo (2007) using household surveys from 13 countries to see if the shares of the "middle class" population in these countries could fit into Easterly's definition. The data from the World Bank "Povcalnet" was used to find the population headcount and percentile.

Banerjee and Duflo found that the population shares in those countries were between 23 and 40 percent of the national populations, considered as majority groups of these countries. However, the shares in some countries, for example, India and Pakistan, were primarily composed of those above 80<sup>th</sup> percentile as opposed to Easterly's definition. Banerjee and Duflo argued that those shares could be considered as middle class anyway as it was not likely that those would be considered rich given their circumstances. We will also use these criteria for testing the income range of MECON, \$2-5/person/day by converting this income range to nominal local currencies in the GMS countries, and then, we also use Povcalnet to find the share of MECON to the populations.

### 3. Results

Further analysis can be drawn from the income range of \$2-5 per person per day (PPP), which could be crucial for conducting more comprehensive studies on the characteristics and energy consumptions of our target group. For example, to carry out a household survey of this target group in Vietnam, we would have to convert this income range to nominal value in dong. This unit conversion can be done in quite simple fashion as shown in the Table 1.

**Table 1** Unit conversion for income range of \$2-5

Unit	Min	Max	Note
\$ (PPP)/person/day	2	5	Original income range from MECON definition
\$ (PPP)/person/year	60	150	Times the income range by 30 days
\$ (PPP)/household/year	192	480	Times by average household size which is 3.2 members per household in Thailand in 2010
Thai baht (nominal) /household/year	2,508	6,269	Times by 13.06 baht/USD (PPP), which is the PPP conversion rate for Thailand in 2013

Using the same calculation for other countries, we have new income ranges in local currencies as presented in the Table 2.

**Table 2** Income ranges in nominal currencies of the GMS countries

	Average household size (person /household)	PPP conversion factor (local currency/USD) in 2013 <sup>1</sup>	Lower bound	Upper bound	Unit
Original income range			2	5	USD (PPP)/person/month
Thailand	3.2	13.1	2,508	6,269	baht/household/month
Vietnam	3.8	8561.6	1,952,045	4,880,112	dong/household/month
Lao PDR	5.9	3121.1	1,104,869	2,762,174	kip/household/month
Cambodia	4.7	1562.9	440,743	1,101,859	riel/household/month
Myanmar	4.4	285.2	75,285	188,212	kyat/household/month

**Table 3** share of population within the MECON income range in 2008

	Headcount of those living below \$2 a day (% of national population)	Headcount of those living below \$5 a day (% of national population)	Headcount of MECON \$2-5 a day (% of national population)
Thailand	4.7	50.0	45.4
Vietnam	42.5	89.6	47.1
Lao PDR	64.6	95.4	30.8
Cambodia	52.4	92.1	39.7
Myanmar <sup>2</sup>	N/A	N/A	N/A

<sup>1</sup>PovcalNet: the on-line tool for poverty measurement developed by the Development Research Group of the World Bank. available at <http://data.worldbank.org/indicator/PA.NUS.PRVT.PP> (retrieved 15 August 2014)

<sup>2</sup> PovcalNet does not have data for Myanmar.

This study determines the exact size of this target group in the GMS countries using PovcalNet, World Bank's poverty analysis tool<sup>3</sup>. PovcalNet contains the World Bank's official global, regional and internationally comparable country-level poverty estimates published in the World Development Indicator reports. The table below shows the share of MECON group in the GMS.

With this data, we can also plot the trend of headcount of our target group in the last decade. The data in PovcalNET are not complete in all GMS countries; Thailand is the country that has the most continuous set of data since 1981, while Vietnam, Cambodia, and Lao PDR only have data for a few years in the same period, and Myanmar does not have any data at all. The Fig. 1 shows the headcount between years 2002-2010. It is not perfectly clear what the trends of the headcounts in each country are. However, it seems that while the share of this target group tends to decline in Thailand, the headcounts show upward trend in Vietnam, Lao PDR, and Cambodia. To be more precise, we recommend more studies using regression model or mathematical techniques to analyze the trend of the MECON headcount.

#### 4. Discussion

From the headcounts of the MECON population in the last Fig., it is interesting to examine why the trends are different between Thailand and the rest of the GMS countries. The trend in Thailand suggests that this group may have started to decline, or in other words, they are shifting to higher income group. Therefore, our target group is likely to have more purchasing power, own more household appliances, and consume more energy eventually.

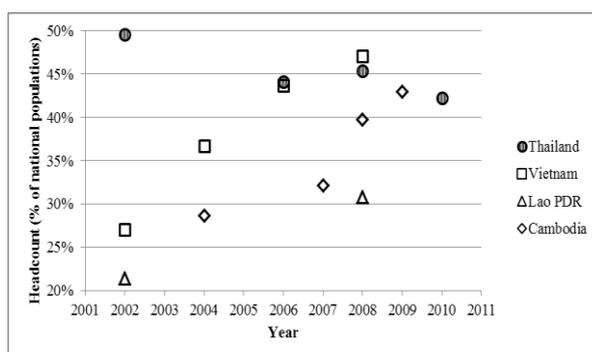


Fig. 1 Headcount of MECON population in GMS countries.

One possible explanation for different trends between Thailand and other GMS countries is the percentile of MECON in Thailand. While in other GMS countries, the percentiles of MECON are between 40<sup>th</sup> and 95<sup>th</sup>, the percentile in Thailand is between 5<sup>th</sup> and 50<sup>th</sup>. This indicates that this group may be referred as lower middle class in Thailand, but upper middle class in other countries.

Consider from the objective of this study, the result can still be relevant as they represent large shares of low income group of the countries. The shares of MECON population are quite large in comparison to national populations in the GMS countries, 30-50% of national populations. Therefore, this is a substantial amount of energy consumers that may become the main cause of energy demand in the near future.

This MECON group may be considered by many studies as low income, and presumed to consume little energy. However, these target groups may just on the verge of increasing energy consumption to another level as discussed at the beginning for some GMS countries, such as Lao, Cambodia and Myanmar where the electrification rate is still low.

<sup>3</sup> Available on <http://iresearch.worldbank.org/PovcalNet/index.htm?0#>

Identifying MECON target group paves the way to further researches in the future. The concept of international poverty line and PPP assist us when conducting household or market survey to study their behaviors and energy consumption. Moreover, identifying this important target group is necessary for developing an energy model using Long-range Energy Alternative Planning system (LEAP) to estimate the impact of proposed energy efficiency policies.

## **5. Reference**

- Banerjee, A.V., and Duflo, E. 2008. What is Middle Class about the Middle Classes around the World? *Journal of Economic Perspectives* 22(2): 2-28.
- Easterly, W. 2001. The Middle Class Consensus and Economic Development, *Journal of Economic Growth* 6 (4): 317-335.
- Kharas, H. 2010. The Emerging Middle Class in Developing Countries [Online]. OECD Development Centre: Working paper No. 285. Available at: <http://www.oecd.org/development/pgd/44457738.pdf> [Accessed on 30 June 2014].
- Kulmar, S., Abdul Salam, P., and Shrestha, P. 2012. The UPEA III Technical Report from the Thailand Member Centre AIT. Submitted to Global Network on Energy for Sustainable Development (GNESD). Pathumthani: Asian Institute of Technology.
- Pezzini, M. 2012. An Emerging Middle Class [Online]. Available at: [http://www.oecdobserver.org/news/fullstory.php/aid/3681/An\\_emerging\\_middle\\_class.html](http://www.oecdobserver.org/news/fullstory.php/aid/3681/An_emerging_middle_class.html) [Accessed on 30 June 2014].
- Ravallion, M. 2008. Poverty Lines. In L. Blume, & S. Durlauf, *The New Palgrave Dictionary of Economics* (2nd edition). London: Palgrave Macmillan.
- The World Bank. (n.d.). There are multiple international poverty lines. Which one should I use? [Online]. Available at: <https://datahelpdesk.worldbank.org/knowledgebase/articles/193308-there-are-multiple-international-poverty-lines-wh> [Accessed on 15 September 2014].
- The World Bank. 2008. A Poverty data: A supplement to World Development Indicators 2008. [Online]. Available at: <http://siteresources.worldbank.org/DATASTATISTICS/Resources/WDI08supplement1216.pdf> [Accessed on 21 June 2014].