Rationale for studying encouragement of energy efficiency amongst New Modern Energy Consumers in the Mekong region

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Abstract:
Energy efficiency improvements offer multiple benefits, such as reduced household energy expenditure and improved productivity, thus contributing to economic growth. Energy efficiency (EE) also results in reduction in greenhouse gas (GHG) emissions and enhanced energy security. For developing countries, EE could make modern energy services available at a faster pace and at lower costs to those who currently lack access to electricity. New modern energy consumers, i.e. those who are connected to the electricity grid with daily incomes of US$ 2 to 5, are expected to account for a large share of the expected increase in energy demand and thus GHG emissions in the Greater Mekong Sub-region (also known as GMS: Cambodia, Laos, Myanmar, Thailand, and Vietnam). However, this target group does not exist in OECD countries and for that reason there are few examples of EE policies that can be replicated and/ or adapted to the GMS. Furthermore, effective implementation of energy policies remains a key challenge in GMS and other countries of the developing world. This paper describes the rationale for research that will investigate EE amongst "New Modern Energy Consumers" in the Greater Mekong Sub-region in order to improve policy design and implementation of EE measures.

Keywords: *low income, energy efficiency, Greater Mekong Sub-region*

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1. Introduction

One of the energy challenges that the world faces in the next decades is the combination of two interrelated developments: the increase of the middle class in developing countries and the increase in energy demand. The fall in levels of absolute poverty suggests that a new middle class is emerging, consisting of the part of population that is neither rich nor poor by national standards. The size of the "global middle class" will increase from 1.8 billion in 2009 to 3.2 billion by 2020 and 4.9 billion by 2030. The bulk of this growth will come from Asia: by 2030 Asia will represent 66% of the global middle-class population and 59% of middle-class consumption, compared to 28% and 23%, respectively in 2009, according to Figure 1 (OECD, 2012).

The developing world's "emerging middle class" is a critical economic and social actor because of its potential as an engine of growth, but it will also be responsible for a large share of increasing energy demand. According to the World Energy Outlook 2012, global energy demand grows by more than one-third over the period to 2035 with emerging economies responsible for some 60% of the increase (IEA, 2012). Despite the growth in low carbon sources of energy, fossil fuels remain dominant in the global energy mix and emissions will lead to a long-term average global temperature increase of 3.6°C (ibid.). According to the World Energy Outlook 2012, with substantially more efforts in realizing energy efficiency, it would be possible to half the growth in global primary energy demand by 2035, leading to substantial GDP gains and facilitate universal access to modern energy as well as improve air quality.

At the same time, with the definition of Banerjee and Duflo defining the middle class by an income of 2 to 10$ a day (Banerjee and Duflo, 2008), energy efficiency will result in more income generation for these people that just escaped absolute poverty. A very important factor in realising energy efficiency is that investment often has to come from end-users such as industries or households. It is well known that realising energy efficiency is obstructed by a number of

challenges related to the visibility of energy efficiency and the higher upfront capital investment. Although many scholars looked into barriers to energy efficiency deployment in developed countries, far less research looked into barriers to energy efficiency deployment in developing countries. More specifically, the emerging middle class, that will be responsible for a large share of the increase in energy demand, will have to be convinced that they will have to invest in energy efficient buildings, appliances and consumer goods, even though this may be the first time that they are able to make such investments.

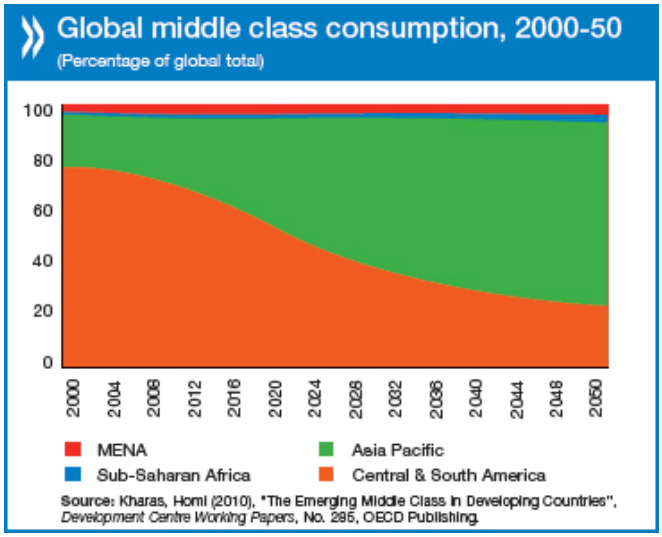

Fig. 1 Global middle class consumption, 2000 – 2050 (OECD, 2012)

From practical experience in energy efficiency policy implementation in South East Asia it becomes clear that lacking energy consumption data on household level make it difficult to assess efficiency potential and focus of policy. Also, lacking information about the "energy literacy" of middle class households and the availability of energy efficiency technology hinders effective policy development. It is clear that this creates a huge challenge and that research into technical, socio-economic and institutional barriers to energy efficiency investment by the emerging middle class in developing countries will have to be aligned with policy design questions, enabling policy making institutions to design solutions that are implementable.

2. Focus on the New Modern Energy Consumer in the Greater Mekong Subregion

In the greater Mekong region[1], it will be the ones with access to modern energy services, i.e. with electricity access, who will be responsible for the expected increase in energy demand in the next decades. Especially the consumers that will see their income levels rise, will be tempted to increase their use of energy services e.g. because of living in larger and air-conditioned houses and buying more appliances. This category of consumers is especially expected to be the ones that already escaped poverty but are currently still living at the lower end of the "non-poor". This target group, i.e. households with electricity access but still with low incomes, e.g. 2 to 5 USD p.p./per day (PPP exchange rates) is what we define as the "New Modern Energy Consumers". In this terminology, "modern" refers to the fact that this target group has access to electricity, wherreas "new" refers to the fact that this target group is only about to start using more of these modern energy services as their income levels are expected to rise in the near future. It is expected these "new modern energy consumers", will be responsible for a large share of expected increase in energy demand and thus CO_2 emissions (OECD, 2012). In order to realise the energy efficiency scenario in the World

1 The greater Mekong region is defined as Myanmar, Thailand, Laos, Cambodia and Vietnam

Energy Outlook 2012, those "new modern energy consumers" will have to be convinced to start consuming energy efficient products (appliances, heating and cooling systems, consumer goods and vehicles) right from the start of their first purchases.

In a number of countries in Asia, experience with energy efficiency policy exists for some time already. In Thailand, first energy efficiency policies have been introduced some two decades ago. Often energy efficiency policies are directly copied from experiences in OECD countries. However, it is not always clear to what extent these policies have been effective and/or efficient as it is not very common to perform this kind of impact assessment analysis.

In order to encourage energy efficiency by new modern energy consumers in the greater Mekong region, there is a need for academic literature that addresses the challenge of increasing energy efficiency in coherence with the "energy literacy" level of new modern energy consumers, while taking into account the accessibility and quality of energy efficient technology and addressing institutional challenges related to implementation and enforcement of energy efficiency policy as well as monitoring and evaluating results.

3. Importance of non-technical barriers to increased uptake of energy efficiency

Realising energy efficiency has no technical challenges: numerous energy efficient technologies with pay-back times between 2 to 8 years exist (IEA, 2012). Still, huge potential for energy efficiency remains untapped because of numerous non-technical barriers that have to be addressed by energy efficiency policy. Overcoming non-technical barriers to energy efficiency deployment has been studied by numerous scholars over the past decades. Discussions are thereby often based on innovation systems theory where Rogers (2003) stressed that the potential adopter's perception of the compatibility, complexity, divisibility, and communicability affect the rate of adoption of an innovation. The innovative systems theory approach is not entirely based on a belief in the blessings or basically advantageous functioning of the market economy. Many studies emphasize that the government (or policy-making bodies) should play the role of *agent d'animation* or cross-firm organizer in encouraging diffusion of innovation and that government regulation should provide such incentive (Maskell and Kebir, 2006).

Apart from the general discussion, there are a few regional studies looking into non-technological barriers to energy efficiency, such as the work by Thiruchelvam et al. (2003). This work shows the obstacles faced in adaptation of energy-efficient and environmentally sound technologies in small- and medium-sized industries in five Asian countries: China, India, Sri Lanka, Philippines, and Vietnam. UNEP looked into barriers to energy efficiency in industry in Asia and developed policy guidance (UNEP, 2006). Also a number of studies looking into barriers to energy efficiency in specific industry sectors for a given country (Hasanbeigi et al, 2009).

Analysis of non-technological barriers and policy solutions to energy efficiency in developing countries seems to have concentrated on the industry sector. Only few studies are available focusing on household energy efficiency in a developing context, e.g. (Spalding-Fecher, R., et al., 2002) and (Dianshu et al., 2010). None of the studies that look into non-technical barriers for realising energy efficiency in households have studied the Greater Mekong Sub-region. Moreover, there is no studies available looking specifically into low income households and energy efficiency in this region.

4. Conclusion

In order to be able to develop effective energy efficiency policy for new modern energy consumers in the GMS region, the target group that is expected to be responsible for a large share of expected increase in energy demand and thus CO_2 emissions, there is a need for academic literature that

addresses the challenge of increasing energy efficiency for this target group. The MECON research project[2] aims to improve understanding of the opportunities and barriers to increasing EE amongst new modern energy consumers in the GMS region. The two year multi partner research project will establish a robust evidence base on energy use, EE technologies and policies in the region and will focus on the energy resources and technologies that are used by new modern energy consumers, including household electricity use for lighting, heating, cooling, and appliances, as well as fuels for cooking. The research will contribute to knowledge on the design and implementation of EE policy by looking at the opportunities and barriers from technological, socio-economic and institutional perspectives. In so doing, MECON will contribute to higher income levels for new modern energy consumers, since reduced household expenditures on energy through enhanced EE will enable these consumers to focus on other needs.

The research is timely since energy demand is expected to increase rapidly over the coming decades, particularly in Asia and in large part as a result of energy consumption from new modern energy consumers. Targeting this important consumer group will have positive development outcomes on household economies, national energy demand and on GHG emissions. This research will also assist the countries of the GMS – Cambodia, Laos, Myanmar, Thailand and Vietnam – to realise sustainable energy access for all rapidly and cost effectively, whilst reducing the environmental impacts of this increased demand.

Acknowledgement
The authors would like to thank UK Research Councils' Energy Programme, the Department for International Development (DFID) and the Department for Energy and Climate Change (DECC) and managed by the Engineering and Physical Sciences Research Council (EPSRC) for providing research fund for this study.

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[2] Effective energy efficiency policy implementation targeting "new **M**odern **E**nergy **CON**sumers" in the Greater Mekong Sub-region (**MECON**)