

Availability and market barriers to energy efficient technologies for household in Cambodia

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Abstract:

The 2012 World Energy Outlook highlights the importance of energy efficiency (EE) in reducing greenhouse gas emissions in the coming decades. The objective of this study is to explore the available energy efficient technologies for using in households, with a focus on low income households and to assess market barriers to EE products. The study is conducted with household appliance retail shops in Phnom Penh City and Siem Reap province. The information on availability and market barriers to EE products is collected using questionnaire. 100 retailers in Phnom Penh City and 65 retailers in Siem Reap province are randomly selected for face to face interviews. Results of the study show that EE products for households are available in market in Cambodia with more than 80% of sampled retail shops selling EE products such as air conditioner, refrigerator, washing machine, iron, water boiler and water pumping. The study also indicates that the key barrier indicated by retail shop is that customers don't care about environment, they care about the price of EE technology. Other key barriers are that customers and shop staff are lack of awareness and the information on EE products. Regarding to policy barrier, financial incentives to EE products and environmental policies and regulations are also key barrier.

Keywords: Energy Efficient Technology; Market Barrier; Availability

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1. Introduction

The 2012 World Energy Outlook highlights the importance of energy efficiency (EE) in reducing greenhouse gas emissions in the coming decades: energy efficiency is responsible for 75% of emissions reductions by 2020 in a 2°C temperature rise scenario (IEA 2012). In Cambodia, only 14% of Cambodia's rural population has access to electricity and almost 100% of people in urban areas are electrified (World Bank, 2009). In 2009, CO₂ emissions from energy consumption amounted to 3.93 million tons of CO₂. Both Figs. primary energy consumption as well as CO₂ emission at least doubled over the past ten years (U.S. Energy Information Administration, 2012). EE products are available in the market. Despite this, non-technical barriers, such as high up-front capital costs and energy illiteracy, mean that many of these potential EE gains remain untapped. Many of the non-technical barriers to EE deployment will be more prevalent in low-energy households. While there have been some regional studies looking into non-technical barriers, most studies focus on industry and there are few studies focusing on household EE in the developing world; none have focused on Cambodia. The objective of this study is to explore the available energy efficient technologies for using in households, with a focus on low income households and to assess market barriers to EE products.

2. Material and methods

2.1 Study site

The study is conducted with household appliance retail shops in Phnom Penh City and Siem Reap province. Phnom Penh is the capital and largest city of Cambodia and located in the south-central region of Cambodia, at the confluence of the Tonlé Sap, Mekong, and Bassac rivers. Situated on the banks of the Tonlé Sap, Mekong and Bassac rivers, the Phnom Penh metropolitan area is home to about 1.5 million of Cambodia's population of over 14.8 million (Phnom Penh Municipality, 2014). Siem Reap is the 10th largest province in Cambodia. With a population of 896,309, it ranks as the 6th largest in the nation (Wikipedia, 2014).

2.2 Data collection

The information on availability and market barriers to EE products is collected using questionnaire. A review of secondary data was used in the preparation of the instruments for the study. The questionnaire for barriers to selling energy efficient products in retail shops was designed based on literature reviewed especially UNEP (2006). The questionnaire comprised 7 broad headings: background information, energy efficient products, knowledge and skill in maintenance and installation of EE products, barrier, main reason for selling EE products, activity needed to improve selling EE products, and effective energy efficiency. Under the barrier heading, many options related to the subject of the question were designed for respondents to score based on their level of agreement or disagreement. A five-point Likert¹ scale was used as the scoring system to make respondents easier to rate the many options. The average score to each option by all respondents was calculating to find out which option obtained the higher score and thus, is more important or likely to happen. The questionnaire contains a mix of open-ended and confined questions which were administered in face-to-face interviews in March 2014. 100 retailers in Phnom Penh City and 65 retailers in Siem Reap province are randomly selected for face to face interviews. To verify the results of the study, consultation workshop has been organized to discuss with national experts from relevant government institutes and civil societies.

3. Results and discussion

3.1 Availability of energy efficient products

Fig. 1 shows main products of interviewed retail shops and percentage of energy efficient products sold in sampled retail shops. Since there are hundreds of retailers in Phnom Penh city and Siem Reap province, different types of retailers had to be chosen to conduct face to face interview. Retail shops are classified into 11 types as shown in Fig. 1(a). More than 40% of total sampled retailers are selling fan, lighting and cooking devices as their main products. To identify energy efficient products selling in retail shops, several energy efficient labels are printed to show retail shop owners during interview since we realize that most of shop owners lack of knowledge in identifying energy efficient products. Based on Fig. 1(b), more than 80% of six types of retail shop such air conditioner, refrigerator, washing machine, iron, water boiler and water pumping are selling energy efficient products, while less than 40% of electric water heater retail shops are selling the device with energy saving label. Energy efficient electric rice cookers are also available in market in Cambodia. Fig. 1(d) shows that inefficient light bulbs are dominant in Cambodian market. However, efficient light bulbs such CFL and LED are also available in Cambodia.

3.2 Key barriers to selling energy efficient products in market

In attempt to understand key barriers in selling EE products in Cambodia, this study shows that the most important barriers indicated by retail shops in the study areas are that customers don't care about environment, they care about the price of EE technology. Lack of awareness of the importance of energy efficiency and the price of EE technology are also the key barriers in selling EE products. Because of lack of financial resources, customers are careful about spending in energy efficient products and usually, the price of EE technology is higher than non-efficient products, which is also a key barrier. During interview, most of respondents express that customers care about energy saving when they want to buy refrigerator or air conditioner because these devices highly contribute to monthly electricity consumption.

¹ A Likert scale is a type of psychometric response scale often used in questionnaires, and is one of the most widely used scales in survey research. When responding to a Likert questionnaire item, respondents specify their level of agreement to a statement.

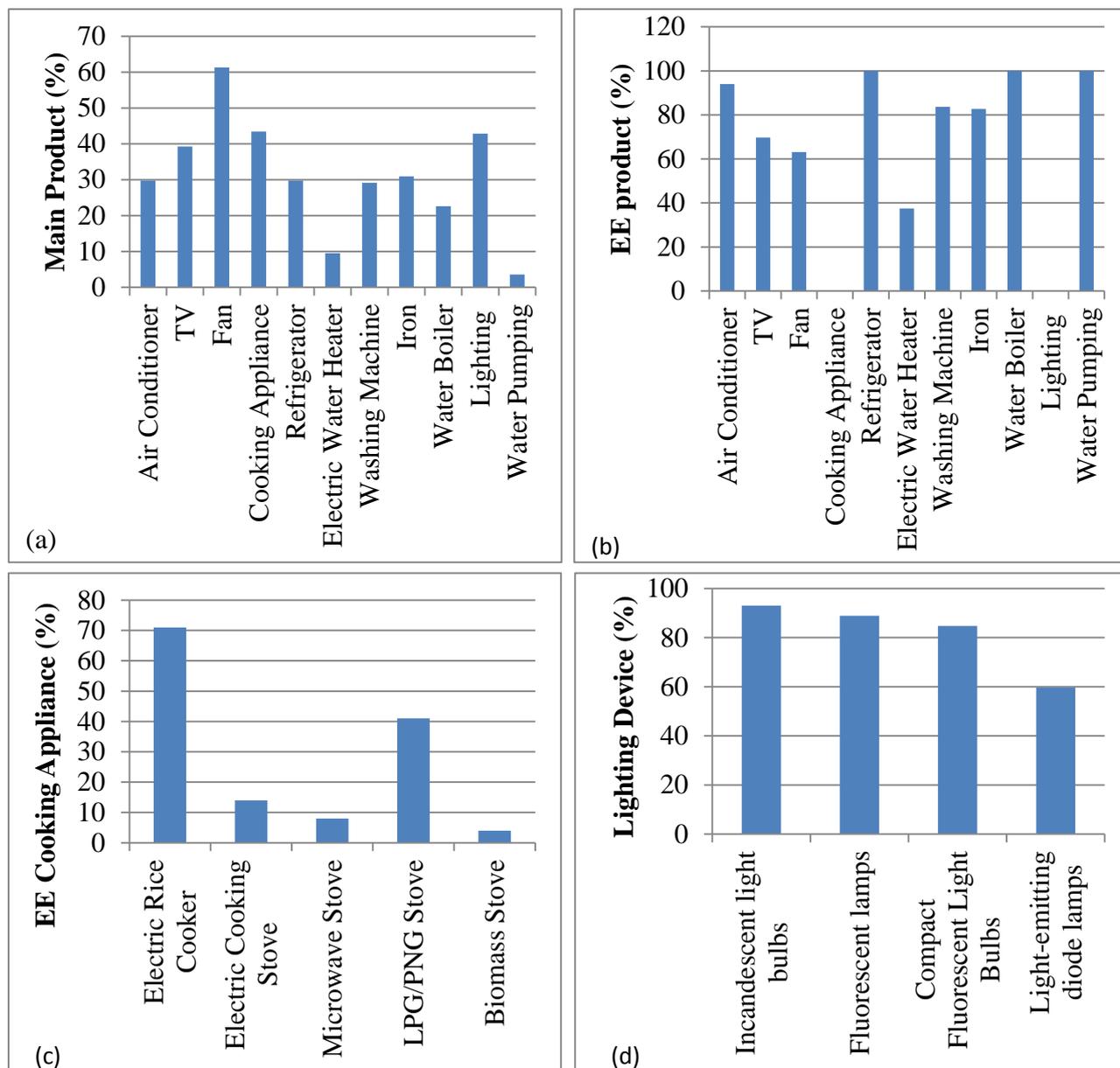


Fig. 1 (a) main products of sampled retailers; (b) percentage of energy efficient products; (c) percentage of energy efficient cooking appliance; (d) percentage of lighting devices.

Apart from customers' knowledge and the price of EE products, knowledge of shop owners and staff about EE products is low. Most respondents could not understand the meaning of energy efficient label on the products in their shop. It is because their education related to energy efficient is low and they are not properly trained. As a result, the information on EE may not be presented in a manner that is easily understandable even though the information is available. In Cambodia, EE product wholesalers usually provide direct technical support to customers. However, EE products and technical service are mobilized in Phnom Penh City and three populous provinces, which transport to the nearest purchase facility may pose a considerable burden to low income households and thereby add to the transaction costs. According to IEA 2011, the information and distribution market barriers to the purchase of energy efficient appliances often exist (IEA, 2011). Regarding to policy barrier, key barrier are that Cambodian government does not provide financial incentives to production/importation/utilization of energy efficient technology and environmental policies and legislation relating to EE are weak.

Table 1 Main barriers to selling energy efficient products

Barriers	Strongly disagree (%)					Strongly agree (%)	Average Score
	1	2	3	4	5		
Customers don't care about environment, they care about the price of EE technology	4.3	13.0	16.7	26.1	39.9	3.78	
There is a lack of awareness of the importance of energy efficiency	6.9	7.6	22.9	21.5	41.0	3.76	
Limited labor availability for maintaining and installing EE products	11.7	9.5	21.2	21.9	35.8	3.59	
The price is higher compared to non-efficient technologies	9.3	12.1	21.4	25.7	31.4	3.50	
It is difficult to access to external technical information and expertise	5.9	26.7	11.1	19.3	37.0	3.48	
Customers are not familiar with EE technologies	10.1	21.6	13.5	18.9	35.8	3.42	

4. Conclusion

This paper illustrates the availability and the barriers to selling energy efficient products in Cambodia. The results from retail shop interview show that energy efficient products are available in Cambodia. However, energy efficient products and technical service are mobilized in Phnom Penh City and three populous provinces which is a key barrier to the purchase of energy efficient products. Lack of knowledge on and price of energy efficient products are also key barriers for customers. In addition, knowledge of retail shop owners about energy efficiency is low. Therefore, although the information on EE products is available, the way to present the information may not be understandable. Regarding to policy barrier, financial incentives to EE products and environmental policies and regulations are also key barrier.

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