



Original research article

# Is mom energy efficient? A study of gender, household energy consumption and family decision making in Indonesia

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## ARTICLE INFO

## Article history:

Received 2 October 2014

Received in revised form

16 December 2014

Accepted 16 December 2014

## Keywords:

Gender

Control over expenditure

Energy consumption

## ABSTRACT

This study highlights gender-related factors and attempts to understand their influence in residential energy consumption. This pilot study was done in Bandung City, Indonesia. It employed a questionnaire survey and face to face interviews. Questionnaires were randomly distributed to the households in Bandung City. In this study, energy consumption included household uses of power for lighting, entertainment, thermal comfort and cooking. Energy consumption was estimated based upon electrical and liquefied petroleum gas (LPG) consumption. The results showed that when the decisions about energy expenditure and control of energy consumption in the household were solely made by a woman, energy consumption tended to be the lowest. There are three possible ways decision can be made, by the wife, husband and a joint decision. This evidence suggests several things. They are that (1) women are good household energy managers, (2) men may be careless with respect to energy consumption, (3) women may be more cautious about household expenditures, and (4) when joint decisions were made the husband and wife relied-upon-each-other in reaching agreement. This suggests useful entry points for energy efficient initiatives.

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## 1. Introduction

Energy consumption at the household level involves all householders including husbands, wives and children. They are all household's energy consumers. From a gender perspective, the roles of householders are differentiated into roles of men and women [1–3]. With their respective roles, every family member contributes differently to household energy consumption [4,5]. Generally, a wife spends more time at home than a husband. A husband as breadwinner spends more time outside the home [6,7]. Energy consumption can also be affected by household income

level, the person controlling the expenditures, levels of energy awareness among the householders, and other of their personal attributes [8,9].

The residential sector is one of the largest energy consumers in both developed and developing countries [9]. Thus, in minimizing residential energy consumption while developing low carbon cities, authorities cannot ignore household dynamics [10]. This study examines gender attributes and their effect upon family decision-making in household energy consumption. Therefore, this study hypothesizes that there is a correlation between decision makers in the households and energy consumption. We also offer a hypothesis that wife (woman) is a best energy saver in the household. The study expects to clarify gender attributes affecting household energy conservation and elucidate the roles women and men in residential energy savings.

Control over resources by a person of a particular gender at the household level does influence its patterns of consumption, including energy consumption. It also reflects the equality in access to resources [5,11,12]. Control of household expenditures influences the levels of energy consumption [13]. However, the way it happens is inconclusive. Among the variety of gender roles and responsibilities across cultures, women are generally underappreciated in many societies [14]. Women significantly affect decision-making

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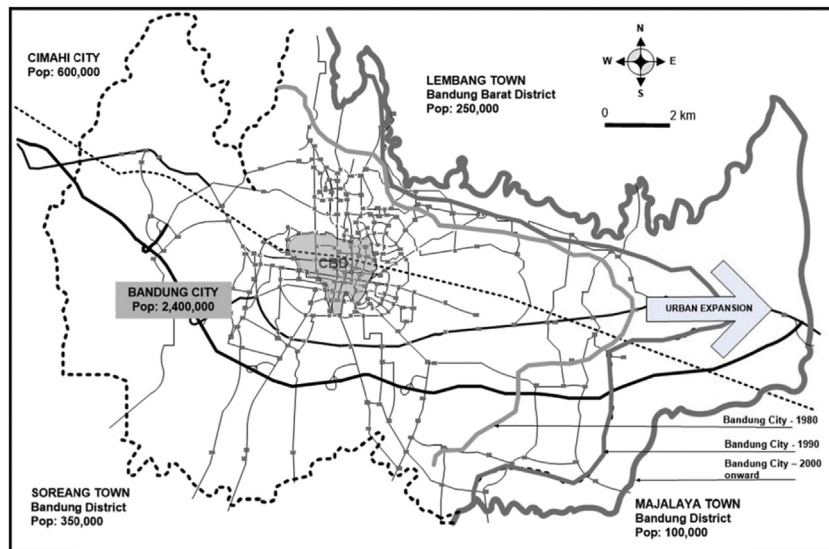


Fig. 1. Bandung City and vicinity areas.

on household expenditures [10,11,15]. In the US, women are responsible for making about 80% of all household expenditures [16]. Van der Werff [17] argued that household energy use is an important contributor to the emission of greenhouse gases. Hence, to reduce environmental problems it is important that households reduce their energy consumption. In addition, social sciences can provide important insights into ways to increase the effects and acceptability of policies that aim to promote energy savings. They also asserted that higher problem awareness in turn strengthens the extent to which one thinks one can successfully contribute to the solutions of these environmental problems. Such outcome efficacy in turn activates one's personal norms to reduce energy use.

This study is one of many attempts to correlate social science and energy studies. A study did by Sovacool [18] has argued that social science related disciplines, methods, concepts, and topics remain underutilized, and perhaps underappreciated, in contemporary energy studies research. Energy studies need social science [19]. By these Sovacool's strong messages, we tried to understand the correlation between family decision making and household energy consumption. Ryan [20] also argued that it is important for the policy makers to appropriately mainstream the gender aspect into energy policy at national level toward energy saving, by looking at strong correlation between these two aspects. In more generic way, Stern [21] suggested that for the value of developing an integrated and trans-disciplinary science of human-energy interactions, the *Energy Research & Social Science* can provide a space for further development of this science.

We did this study in Bandung City, Indonesia. Bandung is a tropical city that is suitable to reduce its residential electrical energy consumption by use of passive building, since the average annual temperature is close to thermal comfort. i.e., 28–29°C, and sunlight is abundant all year-long [22]. The use of electric power or other purchased energy sources for residential lighting, cooling, heating, cooking, entertainment, and other purposes, is the basis of residential energy consumption. Transport energy consumption viz. for working, shopping and leisure was excluded from this study. It offers slim opportunities for energy saving as working and shopping trips are the must-do activities, and there are also limited transport modes in Bandung City.

The selection of Bandung City, Indonesia as particular national focus of the study of family decision making in household energy

consumption was because of several reasons. These reasons were, among others, (1) Bandung City reflects a developing city with considerably significant economic growth that perfectly representing Indonesia as a whole, (2) the uniqueness of Bandung City where culture of communities strongly dictates family decision making system, which may also reflect the similar situation in its Southeast Asian counterparts like Nakhon Ratchashima (Thailand), Siem Reap (Cambodia), Vientiane (Lao PDR), Johor Bahru (Malaysia) and Manila (the Philippines) (see, for example, studies by Nitivatnanon [23], Yusuf and Permana [24], and in China by Fu [25]) (3) Bandung city has typical household energy consumption similar to developing cities in Southeast Asia [12,26].

## 2. Methods

Bandung urban area also known as Bandung Greater Area consists of four different administrative regions. They include Bandung City, Cimahi City, District of Bandung and District of Bandung Barat with a total population of about 7,650,000 [27], within which the conurbation exists. The conurbation of Bandung Metropolis composes of Bandung City as the core, Cimahi City, Soreang Town and Majalaya Town (in Bandung District) and Lembang Town (in Bandung Barat District). The total population within this conurbation accounts for about 3,700,000 (Schematically shown in Fig. 1). However, we limit the study only within the administrative area of Bandung City (total population is about 2,400,000 and population census of 2010 showed 2,394,873) for the reason of manageability and administrative coherence, i.e. different administrative areas have sets of different administrative systems and policies. Thus, excluding Bandung Metropolis and focusing only on Bandung City, in this study, may avoid bias of the data.

The study was carried out in 2013 by using a questionnaire survey of randomly selected respondents that was proportionately distributed throughout the city. There are 30 townships within Bandung City. The numbers of distributed questionnaires were approximately in proportion to the number of population in the townships. With the total eligible population in Bandung City of 2,400,000, confidence level of 95% and with 5% margin errors, the expected sample size was 384 (<http://surveysystem.com/sscalc.htm>). By this figure, we distributed 600 questionnaires but we received 352 responses. However, there were only 330 fully completed questionnaires returned meeting

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