Energy Reduction Through a Deeper Understanding of Household Consumption: Staying Cool in Metro Manila

Marlyne D. Sahakian and Julia K. Steinberger

Abstract

This article proposes a multi-disciplinary and systemic approach to sustainable consumption that combines environmental considerations of energy usage from a life-cycle perspective with a social understanding of consumption grounded in economic anthropology. The goal is to understand both consumption patterns and drivers, with a focus on household energy consumption used for cooling in Metro Manila, the Philippines. For different socio-economic groups, cooling devices also deliver social and cultural services, such as socializing or adhering to Western fashion trends. This article argues for the need to address these aspects, if reductions in household energy usage are to become possible. The limits of individual-choice consumption theories are rendered apparent, with examples of how institutional and structural conditions lock-in consumption patterns and limit household choices. The notion that emerging economies might be able to 'leapfrog' over the environmental errors of more industrialized countries is also raised and critiqued.

Keywords: sustainable consumption; household electricity; energy reduction; emerging economy: the Philippines.

<heading level 1> Introduction

Sustainable consumption research and policy-making is a central but relatively recent contribution to the area of society and environmental interactions. One of its main challenges is to understand how higher standards of living can be achieved for more people with a more equitable sharing of the global resource pie, while reducing energy and material usage and avoiding resource depletion as well as local and global pollution. Yet today, certain emerging economies are following in the resource-intensive development path of more industrialized countries, experiencing what Rostow called – in his influential and controversial United States-centric framework on economic growth – "a widespread boom in consumers' goods and services" along with "the acceptance and absorption of the age of high mass-consumption" (1960: 88).

Mass consumption is often driven by a rise in affluence. For Myers and Kent (2004), Asia is the center of gravity for this 'new consumer' phenomenon, where a rise in affluence often translates to consumers who enjoy better diets, private transport, throw-away products, and fashionable versus functional clothing. There is the hope that these emerging economies might yet choose sustainable modes of economic development that would allow them to transcend the errors of more industrialized countries and thus 'leapfrog' over environmental degradation (Chiu and Yong 2004; Tukker 2005). Opportunities for leapfrogging are not clear, however: to understand how transitions to more sustainable lifestyles could be made possible, a deeper understanding of consumption drivers in developing countries is necessary, with a consideration of socio-economic differences among consumer groups.

This article focuses on energy consumption in the context of an urban mega-polis in a Southeast Asian emerging economy – Metro Manila or the National Capital Region of the Philippines (among Myers and Kent's twenty new consumer countries). The focus is on cooling services, including fans and air-conditioning. This paper contributes to research on household

energy consumption in developing countries (Tyler 1996; Bank 1997; Mehlwana 1997; Cohen 2005; Lee 2006; Saidur, Masjuki et al. 2007) including the Philippines (Sathaye and Tyler 1991; Garcia, Madegdeg et al. 1994; Bensel and Remedios 1995). It also builds on studies that consider air-conditioning uptake and usage as socially and technically constructed, and as tied to notions of comfort and the human body that have become increasingly global in reach (Cooper 1998; Shove 2003; Chappells and Shove 2005; Parkhurst and Parnaby 2008; Wilhite 2008).

The main goal of this article is to demonstrate how a deeper understanding of household electricity consumption can contribute to insights for reducing energy consumption. Two main questions will be addressed: what energy consumption patterns are developing at the household level, with a focus on electricity usage in the home? And what are the drivers behind those patterns, drawing on insights on consumer practices? Practices – which inevitably involve the use of material resources – go beyond the structure-actor dichotomy in sociology, and are made up of a constellation of actions that become the units of analysis for understanding the social (Randles 2006; Røpke 2009; Shove, Trentmann et al. 2009).

In a first section, this paper will set the stage by presenting a brief conceptual framework. The next section is an introduction to the context of Metro Manila and the three neighborhoods of the study, and the historical, international and local context of energy use in Manila and the Philippines. The methodology is then presented, followed by the research results. The article concludes with a discussion on the research findings and policy recommendations.

<heading level 1> Conceptual Framework of Consumption

Addressing consumption is very much akin to opening a social science Pandora's box of complexity because of all of the diverse issues and perspectives it raises. This paper takes a multi-

disciplinary and systemic approach to consumption. On the one hand, energy usage patterns and priorities for reducing household electricity consumption are determined based on a life cycle perspective to provide an environmentally relevant context. On the other hand, the drivers behind those biophysical patterns are based on a social understanding of consumption. Because no single theory can be applied to understanding all forms of consumption, we have chosen to build on Wilk's 'multigenic' conceptual framework 2002 that proposes three complementary consumption paradigms – social, cultural and individual choice – which can in turn lead to multi-stranded policy solutions.

Social forms of consumption involve collective actions and group pressure, or consumption as a form of social belonging (Bourdieu 1979; Veblen 1994 / 1899, among others). Cultural forms of consumption consider the symbolic value of products, as objects for display and communication (Baudrillard 1970; Douglas and Isherwood 1979 among others). The individual-choice approach involves consumers making decisions based on a hierarchy of needs and in a marketplace of opportunities, rationalizing purchases based on information and price. Despite the vast amount of work that has been opposed to this perspective (starting with Karl Polanyi, 1957; 2001 (1944)), it is the individual-choice approach that remains prevalent and pervasive in sustainable consumption policy-making today, as the flurry of information campaigns and eco-tax schemes worldwide might suggest. Without a social and cultural understanding of consumption, this last paradigm remains limited in its ability to understand all consumption drivers (Cohen 2001).

<heading level 1> The Context of Metro Manila

<heading level 2> Three Neighborhoods

Metro Manila is said to have two seasons: the hot season and the even hotter season, with temperatures ranging between 30°C and 37°C throughout the year. With a population of approximately 12 million, high-wealth coexists with a growing middle-class and many who live on

less than a dollar per day, with infrastructure in different phases of development across the seventeen cities and districts that make up the National Capital Region. Metro Manila also has an urban heat island, with higher temperatures relative to surrounding areas because of its high population density, built environment (asphalt, concrete, etc. that tend to store heat), and other factors including the use of motorized vehicles and air-conditioning units. Under adverse conditions such as weak winds in the summer, the city temperature can be up to 10 °C warmer than surrounding rural areas (Estoque and Maria 2000).

The first neighborhood selected for this article is in the Tondo district and is better known as Smokey Mountain, the name of an infamous landfill that was active for forty years then put out of use in the 1990s. At that time, several low-income buildings were constructed to house the squatter community. Ironically called Paradise Heights, this neighborhood includes several five-story buildings housing approximately 20,000 families in total. Within the compound, few livelihood opportunities exist and many families continue to generate revenue from the collection, sorting and resale of recyclables, facilitated by access to the Piers that serve as waste dumps and areas for exporting recyclables to China. Each building apartment unit is similar in format: the total floor surface area is of 6x3m, with a main area including kitchenette and toilet, and a narrow staircase leading to a mezzanine used mostly for sleeping at night.

The second neighborhood selected is Malate, a more middle-class area. One mark of the middle-class is to have a maid and perhaps even a driver. These domestic helpers often come from the provinces and live-in with the families. In the best-case scenario, they have their own room; in some cases, they sleep in the kitchen, under the table or on a rolled-up mattress. On the Manila Bay, this neighborhood benefits from many bars, restaurants and shopping malls. When sociologist Jean Baudrillard described commercial centers in 1970s France, he may not have imagined the scale of Manila's shopping centers today, including the Mall of Asia with its gross floor area of

410,000 m^2, not far from Malate. These are a primary weekend destination for Filipino families, who use the verb 'to go malling'. Many say they visit malls not for shopping, but for the cool and free air-conditioned spaces.

The third area studied is the City of Makati, representing the higher socio-economic groups. Makati resembles any other financial district in the world with its skyscrapers, bustling streets and five-star hotels. What makes Makati different from city centers in the West is not only its size: in the heart of the city, several gated communities encompass the guarded villas, apartments and gardens of Manila's wealthiest inhabitants. Domestic helpers and air-conditioning usage is the norm rather than a luxury in these housing developments, which have followed a similar pattern of new technology adoption as in the United States where air-conditioning was successfully integrated into building design, construction and financing in the post-war period (Cooper 1998). The housing structures of Makati's Dasmariñas Village, for example, included built-in air-conditioning when designed in the 1960s.

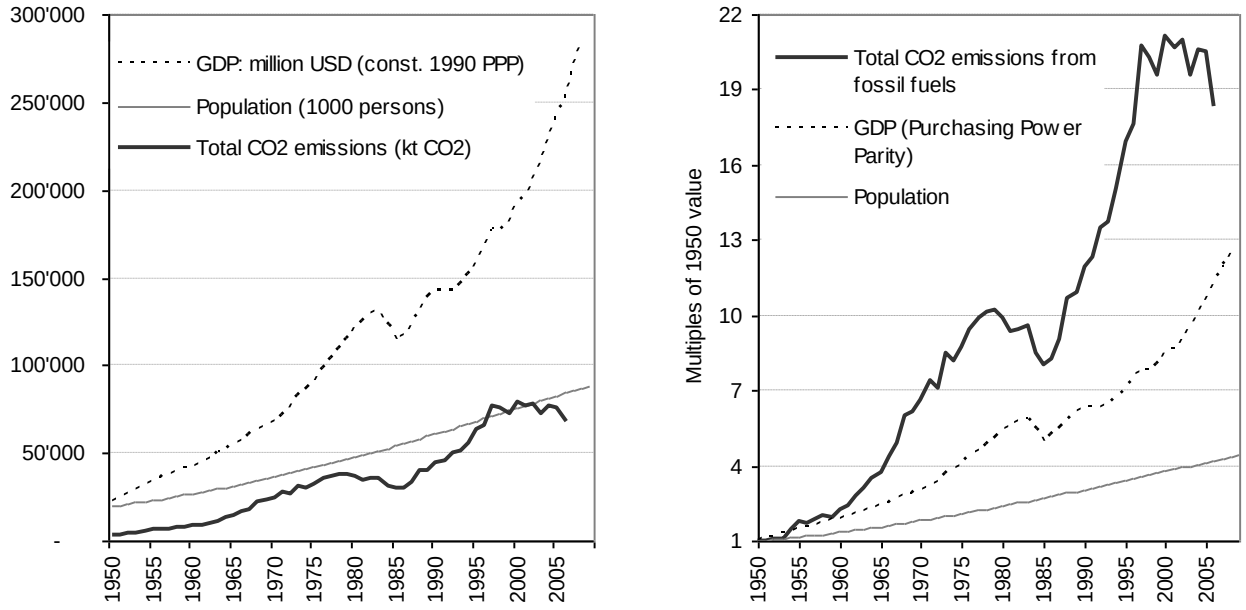
This analysis also considers a group of people known in the Philippines as OFWs (Overseas Filipino Workers) and who best fit the description of 'new consumers'. Over two million Filipinos work overseas at any given time, often leaving behind their family to seek livelihood opportunities abroad (approximately one third of OFWs were laborers and unskilled workers in 2008, including domestic helpers and cleaners, NSO 2008). Migration is an important livelihood strategy in the Philippines, and one that is visibly encouraged by the government (Quisumbing and McNiven 2010). OFWs are seen as a particularly important for the local economy, contributing to over 10 % of GDP and sending remittances to cover the expenses of their extended families in areas ranging from housing construction to education (IBON 2008).

<heading level 2> Environmental Context: Energy, electricity and CO_2 in the Philippines

In this section, energy use and CO_2 emissions of the Philippines is described, with an emphasis on electricity and household use. We include data from the last few decades, and put the results in an international context, including recent results on trade-linked emissions. Since the Republic of the Philippines is an archipelago, we pay special attention to the electricity production of the local grid.

Since 1950, the Republic of the Philippines has experienced growth in every possible dimension: their population has increased almost 5-fold, their economy over 12-fold, and their CO_2 emissions from fossil sources by a factor of 20 (**Fig. 1**). This growth corresponds to increases in affluence, industrialization, and development, which are still ongoing.

Figure 1: Population, Gross Domestic Product and CO_2 emissions of the Philippines, total and indexed to their 1950 values (sources: UN 2007; Boden and Marland 2009; The Conference Board 2009; UNDP 2007) .



One sign of development is a slowing in population growth rates: these have fallen from 3% a year in TBD to 1.9% in 2005. The Filipino Human Development Index grew from 0.66 to 0.77 between 1975 and 2005, and is now just below the threshold of 0.8 for 'high human development' according the United Nations Development Programme (International Energy Agency 2007). Since 1950, the GDP per capita has grown a factor of almost 3, to 2'895 USD per capita.

CO_2 emissions increased even faster than population and income. This increase is typical of a phase of fast industrialization, when a country's economy uses resources to build up its infrastructure, and should be put in an international context: per capita, the Philippines was still at only 0.9 tonnes of CO_2 in 2005 – a factor of 10 below most European countries, and a factor of 20 below the United Sates and Australia. Emissions accounting can be done from a production (territorial) perspective, or a consumption (economic) perspective. The consumption perspective includes emissions caused by imports, and subtracts those tied to exports, using Multi-Regional Input-Output. Peters and Hertwich (2008) conducted the first global analysis of trade emissions, and found that the Philippines is a net importer of emissions. In 2001, the consumption perspective emissions per capita were 1.2 tons per capita: a 20% increase compared to the 1 ton per capita production level.

As can be seen in **figure 2**, since 1975, there has been a moderate increase in primary energy per capita (34%) and fossil CO_2 emissions per capita (19%), while GDP per capita grew by 35%. The energy demand of the commercial sector is also growing, according to the International Energy Agency 2007, which can be attributed to an increase in the number of call centers and small-scale businesses. In terms of energy types, electricity grew at more than twice the rate of overall energy, and experienced a per capita increase of 85% since 1975. The CO_2 emissions associated with electricity were not commensurate, since they only increased by 43%. Indeed, in the short span between 1998 and 2005 the Philippines reduced the CO_2 intensity of their electricity

from 0.75 to 0.52 kg CO_2 / kWh by reducing the contribution of petroleum and adding natural gas to their electricity production (**Fig. 3**).

Figure 2: Energy use, CO_2 emissions and GDP per capita, indexed to their 1975 value. (sources: same as fig 1, and the International Energy Agency 2007).

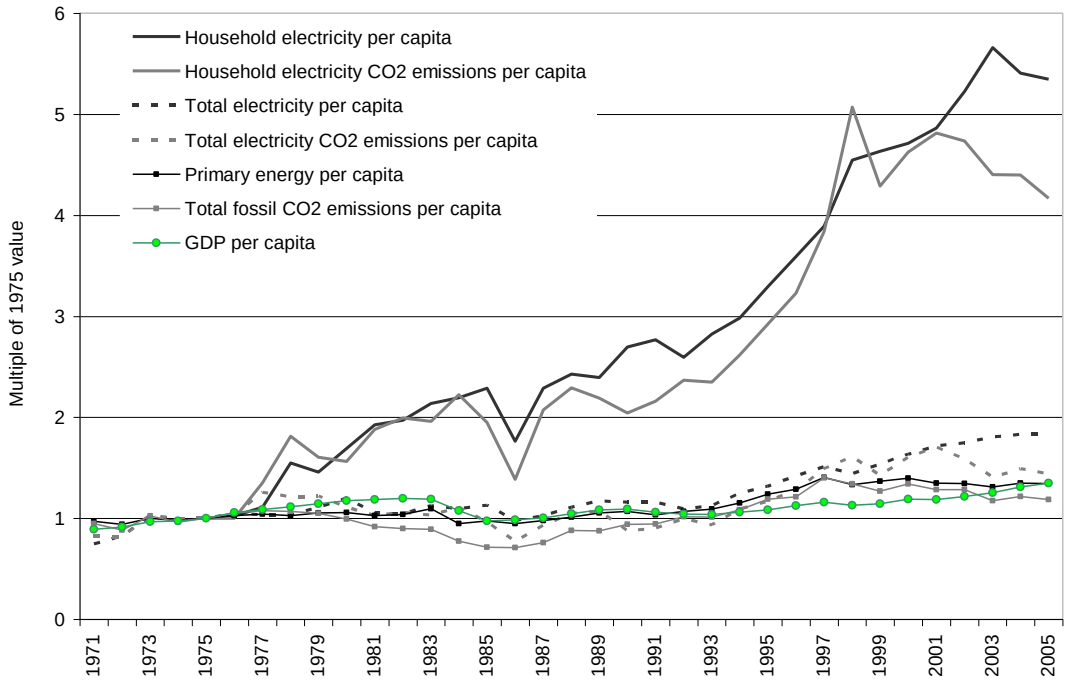
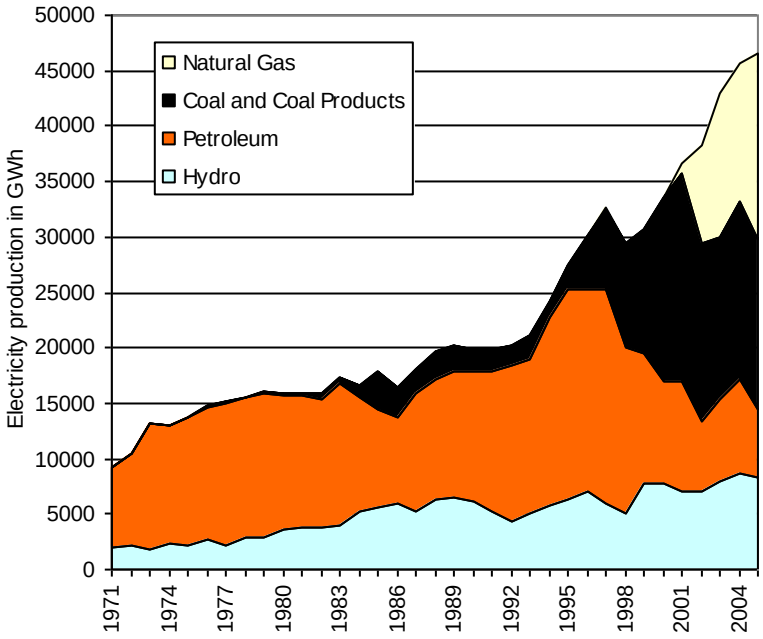


Figure 3: Electricity production mix in the Philippines (source: NSO/DOE 2004).



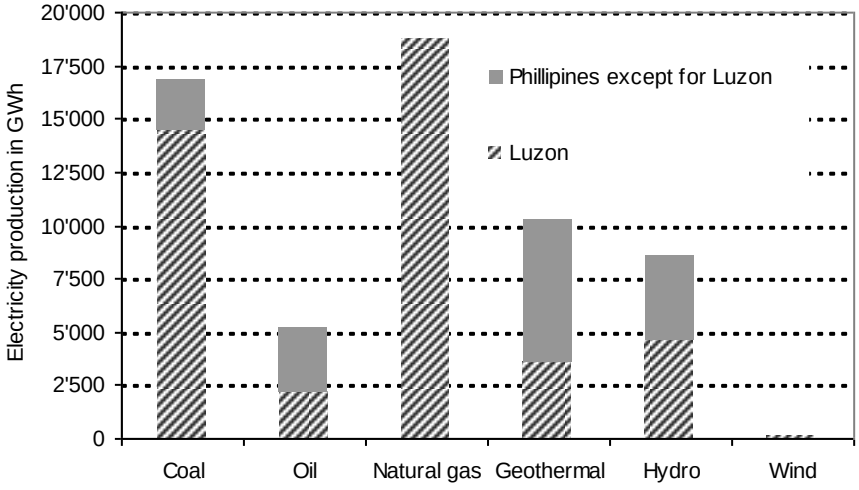
The most striking feature in **figure 2** is the fabulous increase in household electricity use, and associated CO_2 emissions. They have both increased several-fold: by a factor of more than 4 for CO_2 emissions, and more than 5 for electricity. In 2005, household electricity accounted for a third of the total electricity consumption, and for 14% of the total primary energy supply – up from 12% of total electricity and 2% of the total energy supply in 1975. In 1975, household electricity consumption was responsible for a mere 3% of total CO_2 emissions: 30 years later, this had increased to 11%. Clearly, household electricity is one of the most dynamic energy consumption components in the Philippines – and, most likely, in other industrializing (and many industrialized) countries.

At the national level, based on a 2004 *Household Energy Consumption Survey* with data collected among seventeen million households nationwide, 88% of all households rely on electricity as a major source of energy, an increase of 3.7% between 1995 and 2004 (SSC-CDM-PDD 2009). At a local level, Manila is based in Luzon, the northernmost group of islands in the Philippines. For Luzon and in 2007, electricity sales went up 3.0 %, despite high electricity tariffs, while the commercial sector gained 6.0 % and the industrial sector 4.0 % (Republic of the Philippines 2007). Electricity consumption continues to rise despite rising electricity costs since the 1970s (Garcia, Madegdeg et al. 1994). The cost of electricity in the Philippines remains among the highest in Asia, after Japan (IBON Facts and Figures Special Release 2008).

Manila draws from the Luzon energy grid, more dependent on coal and natural gas than other parts of the country (**Fig. 4**). In 2007, coal-fired plants accounted for the largest share of installed capacity, contributing 4,213 MW or 26.44% of the total national mix. In Luzon for 2007, coal-powered energy represented 33% of power generation (Republic of the Philippines 2007). All of the coal used in electricity generation is imported (Sathaye and Tyler 1991). Wind represents the largest potential for development in terms of renewable energy, with wind farms in Northern Luzon

generating 57,842 MWh, or 97.8% of the national wind energy total. Wind farms currently meet only 0.13% of Luzon demand. In terms of understanding the rate of carbon emissions in Metro Manila, recent reports developed under the Kyoto Protocol's Clean Development Mechanism for waste-to-energy projects in Metro Manila refer to an emission factor of 0.557 kg CO_2e / kWh for the Manila grid (NSO/DOE 2004), a bit higher than the Filipino average of 0.523 kg CO_2 / kWh.

Figure 4: Power Generation by Grid and Source in MWh: Luzon and rest of the Philippines (source: Republic of the Philippines 2007).



As can be seen in **table 1**, the use of cooling is of interest because of its high rate of electricity consumption, particularly for air-conditioning. Among households, electric fan usage is pervasive but uses less energy than air-conditioning (fans, radios and irons were found to be the most widely owned appliances in an earlier study of household energy patterns in Cebu City, the second city of the Philippines, see Bensel and Remedios 1995). No statistics are available for the breakdown of consumption by appliance for Metro Manila households, but higher incomes in Manila most likely lead to a higher diffusion of cooling devices, and other household appliances, than the nationwide average.

Table 1: National Household Energy Consumption for Cooling (source: NSO/DOE 2004).

Cooling total annual consumption: 66.6% of all households nationwide		
Electric fan	99.4%	296 Kwh
Air-conditioning	8.8%	3,914 Kwh

<heading level 1> Methodology

This research relies principally on qualitative social science methods, with quantitative information on energy consumption and CO_2 trends in the Philippines providing an environmentally relevant context.

The qualitative research is used to identify consumption drivers, with insights into their relative importance depending on socio-economic group. The research material was gathered through approximately thirty semi-structured interviews, conducted primarily in 2008. Previous stays in 2005-2007 guided the research design. The focus was placed on understanding consumer practices and perceptions in relation to energy consumption in general, and electricity usage and cooling more specifically. Observations – in both public and private spaces, during the day and at night – were a key part of the research, as observations help distinguish between what people say they do, and what they actually do.

Observations were combined with semi-structured interviews that took place in the households of the three distinct socio-economic neighborhoods described above. Efforts were made to interview men and women from varying age groups, education levels, income, as well as different housing types and size (considering the presence of domestic workers). In the Tondo district, the sample was skewed towards women who were more responsive to being approached by a female interviewee. In the neighborhood of Malate, one apartment building and three single-

family homes were selected for interviews and observations. In Makati, five single-unit homes, and two apartment units were selected. In apartment buildings, the interview sample was gathered by knocking on every third door. Observations took place during social events in homes, in all three areas.

The field interviews were also used to derive quantitative data on electricity consumption among selected households, in order to illustrate the stark difference in consumption patterns across socio-economic groups. The assessment of electricity at the individual household level involved several challenges. The data gathered includes the type and number of appliances, along with self-reports of usage patterns: enough information to make a rough estimate of electricity consumption, but certainly not an accurate one, given the variation in individual appliance consumption and usage. In higher-income households, household numbers encompasses family members, but also maids, drivers, and other domestic helpers, raising the issue of how to calculate electricity usage per household member, as domestic helpers don't benefit from the many appliances used by family members. For example, air-conditioning in bedrooms is often limited to family members only.

The focused nature of the fieldwork and interviews enables a deeper understanding of the multiplicity of issues surrounding household electricity use. This method is necessary to move beyond an often-superficial statistical analysis (such as that resulting from general surveys), which can only produce correlations without causation. Although the in depth nature of the interviews and fieldwork are of necessity at the expense of statistical breadth, the insights they reveal could not be discovered any other way.

<heading level 1> Research Results: Case studies on cooling in three different socio-economic neighborhoods in Metro Manila

Household electricity consumption and cooling in particular are environmentally relevant in Manila, as we have seen above. In this section, qualitative methods are used to understand

consumer practices and perceptions in regards to cooling, thus shedding light on the main drivers of consumption. The results are presented by socio-economic neighborhood.

<heading level 2> Fan usage among select Tondo households

In Paradise Heights, lifestyles differ greatly among apartments: most units benefit from electricity, very few use air-conditioning systems, and some have no electricity at all, using candles at night and purchasing cooked food at nearby outdoor markets. The average income per household in this neighborhood is under 5,000 PHP per month (100 USD). Households can range anywhere from one family of seven to three families living together. Over twenty units were visited in Paradise Heights during fieldwork and each unit had a fan and at least one light fixture; many also included a television and shared cell phone. In most of the households, at least one fan ran continuously day and night, while other fans were turned on at night in the mezzanine sleeping area. Respondents described a feeling of general comfort associated with fan usage, particularly for sleeping at night.

Unlike other interviewees in Malate and Makati, all research participants in Tondo were concerned about electricity prices and were able to give a very precise breakdown of household expenses. To cite the example of a woman and her family of seven, their monthly electricity bill was approximately 1,000 PHP, or 20% of their monthly expenses. At an average usage rate of 175 KWh/month, each household member consumers 25 KWh/month individually for three fans, three light bulbs, an iron and a television set. In her unit, a non-functioning stereo system and two wall clocks were also on display (**Fig. 6**) along with toys. Electricity costs were reduced for another family once they removed their refrigerator. Most

Figure 6: Electrical items on display, 2/10/08, Tondo

families buy food from outdoor market stalls directly below the buildings, storing almost no food items in the home (moving fuel usage from the household to the commercial sector, as noted in Sathaye and Tyler 1991). For another family, loans were acquired to pay off a particularly high month of electricity usage following the death of a family member: Christmas lights had been used to decorate a casket during a wake.

In terms of the fan product, respondents in Tondo households expressed no preference for the physical appearance of their fans and use whatever fans are readily available and affordable on the market, almost always second hand. Fans are not used as a means of display or for sharing cultural information (Douglas and Isherwood 1979), as opposed to the various items presented in **figure 6**. The fans have a practical purpose (broken fans are fixed or disposed of) and household members can be seen as making energy consumption decisions that satisfy their personal need for the comfort of circulating air, all the while taking into consideration their concern for costs. This satisfaction of needs relates more to the individual choice approach to consumption under Wilk's multigenic approach. This, however, is only a partial explanation – as we will see in the discussion section that follows.

<heading level 2> Air-conditioning usage among select Malate households

Air-conditioning in Malate homes is much more common, as are a whole host of other electronic appliances including television sets, rice cookers and stereos, but also video games and karaoke machines. Air-conditioning is often limited to nighttime usage in bedrooms only, or sporadic living room usage for the arrival of guests or on particularly hot days. The service of cooling is therefore related to what can be called 'secondary social services', including socializing with guests or special occasions. As one young woman explained:

> We don't have air conditioning in the salon and the dining area. We just have air conditioning in the bedroom. We usually go to the bedroom and watch TV and open the air conditioning […] Like for fiestas, birthday parties, Christmas party or family time, right

> after the lunch we congregate to the bedrooms, with everybody just hanging out in the bedroom and enjoying the air conditioning.

Air-conditioning provides more than just a social and cooling service: it is also seen as a way of filtering outdoor noise and air pollution, or offering the secondary service of perceived health and comfort benefits. One respondent explained why she prefers closed windows and air-conditioning usage to open windows:

> I'm living in an area where there are jeepney drivers, it's on the main road, and the jeepney drivers are very polluting. Because sometimes they park right in front of our home and leave the engines open so that's why we always leave the windows closed.

Jeepney vehicles, a form of public transportation unique to the Philippines that uses converted US military jeeps, are known for their bright decorations inspired by both Roman Catholic and US pop icons, and for their contribution to Manila's heavy traffic and pollution.

The cost of air conditioning remains an important consideration, with several respondents attesting to cooling a closed sleeping area for only a short period of time or joining other family members in the same sleeping area to save on electricity bills. For example, the monthly electricity bill of a Malate family of three was under 3,000 PHP, less than 1% of their monthly expenses. The household is also home for two live-in domestic workers, who share a room with no air-conditioning and use a television set in the evenings. Beyond the maids' room, the household has two air-conditioning units that are seldom used, along with three fans, a refrigerator, two laptop computers, a stereo and electrical cooking appliances. At an average usage rate of 312 KWh/month, the three main household members consume 104 KWh/month per person, or, if we include the domestic helpers, 62.4 KWh/month. This family is therefore spending a smaller percentage of their monthly expenses on electricity while using four times more energy per person than the Tondo household (see **Table 2**). This particular family uses air-conditioning very sparingly, because of their proximity to the cooler air coming from the Manila Bay, and the possibility of opening several large windows for air circulation.

Figure 7: Promotional real-estate image

OFWs represent an important target audience for housing construction in the Philippines where air conditioning plays a significant role, as explained by a real estate developer: "They even want to show the aircon jutting out of the window. *Diba*?". He shared the image of a house used for promotional purposes where the air-conditioning unit is placed in a prominent position just in front of the house and below a main window, encased so as to prevent theft **(see Fig. 7)**. The air-conditioning product is clearly serving a secondary service, that of display, in a way that communicates something about the owner through a cultural form of consumption where objects have a symbolic value ({Douglas, 1979 #46}). The air-conditioning unit also places the home-owner in a position of perceived strength in a form of social consumption, where consumers maintain and challenge social positions (Veblen 1994 / 1899).

<heading level 2> Air-conditioning usage among select Makati households

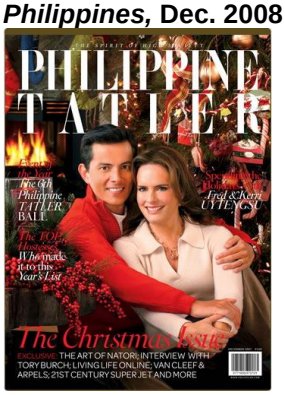
While air-conditioning remains a luxury for poorer populations, it is perceived as the norm among the more affluent households of Makati who enjoy the comfort service of indoor climate control (Shove 2003). An elderly woman remembers her first air-conditioning unit in the 1970s:

> We didn't want to spend the money. Then this friend bought if for us, she said that King [my husband] worked so hard, he deserved to have a good sleep. It was so that King could sleep in a more comfortable environment. And we had that one for a long time. But it was not that hot. Now, it's getting hotter, it's raining more. I don't know, something is wrong with the weather.

In the case described above, an 'early adopter' incited the couple to buy into the trend, an example of peer-to-peer persuasion (Gladwell 1997). Air-conditioning usage among this socio-economic group is associated with the secondary comfort services of being able to work productively or to get a good night's rest. In other interviews, respondents also expressed their belief that air-

conditioning can filter out air pollution and therefore allows them to breathe healthier air.

Figure 8: *Tatler Philippines*, Dec. 2008



People in higher-income brackets may be raising air-conditioning in winter months to follow Western fashion trends. At a social event in Makati in September 2008, the clothing style of some well-heeled guests led to a key observation: despite the tropical outdoor climate, one woman was wearing black tights and a woolen couture tailored suit, and another a cashmere dress. The large air-conditioning units were operating at full capacity but were encased in a wooden structure, perhaps indicating that the product aspect or symbolic value of these units are not relevant to this particular socio-economic group. They may not like the way these units look, but the secondary service of air-conditioning contributes to their own fashion sense of looking good, a secondary service that underlines air-conditioning as a social form of consumption. The cover of the 2008 Christmas Issue of the *Philippine Tatler* illustrates the use of this secondary service: a couple dressed in woolen sweaters poses in front of a roaring fireplace in their Metro Manila home (see **Fig. 8**). Clothes among a certain group of people in the Philippines reflect northern hemisphere seasons. A fashion designer confirmed the observation: he explained what he wore to a wedding just before the 'fall season' in Manila: "Although, when you think about it, autumn hasn't started yet. It will start in a few more days, September the 21st. That's why I was able to wear my linen suit". As another respondent put it, "I mean you can only layer so much and you can only be fashion forward in the summer collection, right? […] You need seasons to be really fashion forward." Clothing that emulated western fashion was already used to distinguish the wealthier groups from lower-income groups during the over 300 years of Spanish colonial rule, and clothing styles still demarcate socio-economic groups (domestic workers and administrative staff often wear uniforms, for example).

In this next example, the energy usage of a Makati household of fourteen is presented (including eight family members composed of a grandmother, mother and father, two adult male children, including one wife and two children, and six domestic helpers). Their monthly electricity bill was approximately 50,000 PHP, or less than 8% of their monthly expenses. The household has eight air conditioning units, seven refrigerators of different sizes, three stoves, three computers, five television sets, two stereo systems as well as several video games, MP3 music players and other electrical devices. At an average usage rate of 5,464 KWh/month, the eight family household members consume 683 KWh/month, or, if we are to include the domestic helpers, 390 KWh/month (**Table 2**). This family is spending more energy in absolute terms compared to the Tondo household: thirty-times as much energy per household member, or sixteen-times as much including the domestic helpers.

In **table 2**, we show the household members, income, electricity and CO_2 emissions of the three households presented in this study. As could be expected, CO_2 emissions from electricity and income are correlated. The average Filipino CO_2 emissions from household electricity consumption were 0.1 tons per capita in 2005 – consistent with the poorest household in this study. The fact that even the poorest have some access to electricity in Metro Manila can explain the fact that no household had household electricity emissions below the national average. The richest household, in contrast, not only had per capita emissions of a factor of 30 the poorest households and the Filipino average from their household electricity consumption: their emissions from household electricity consumption alone were more than double the national average. As lower income households attain better living standards, household electricity consumption can be expected to rise accordingly.

Table 2: Income, electricity consumption and CO_2 emissions of selected households in 2008. (Source: this research).

Head of household description	Household members (including domestic helpers)	Family members	Monthly house-hold income	Monthly electricity consum-ption	Annual CO_2 emissions from electricity (assuming 0.557 kg CO_2/kWh)		
					House-hold total	Per family member	Including domestic helpers
Units			*PHP*	*kWh*	*tonnes*	*tonnes/ capita*	*tonnes/ capita*
Makati: BC: male, 24-34 years old, Completed grad school and above	14	8	800,000	5,464	36.5	4.6	2.6
Malate: BA: female, 45-54 years old, Completed grad school and above	5	3	300,000	312	2.09	0.70	0.42
Tondo: MG: female,53 years old, High school graduate	7	7	5,000	175	1.17	0.17	0.17

<heading level 2> Discussion: Opportunities and Challenges for Charting Transitions to Sustainable Consumption

The following analysis provides insights on consumption drivers by socio-economic group.

<heading level 3> Lower socio-economic groups and the limits to the individual choice approach.

It would seem obvious, at first, that the poorest could be incited to reduce their energy usage through arguments that promote lower electricity expenditures (or through more efficient devices), following the individual choice approach to consumption. They need to save money and would therefore be compelled to meet this need. This particular approach, however, is too limiting in understanding choice sets among the lower socio-economic groups interviewed and observed for this article: these household members actually do not have much of a choice. The physical

structure of their living conditions *determines* their use of cooling devices. Without the fans turned on, the lack of natural ventilation in these units would make basic living for several people at a time unbearable. Despite the higher percentage of household expenditure devoted to electricity among this group as compared to the two other groups, fans are left on continuously because structural conditions do not allow for natural ventilation.

For Christer Sanne, structural issues such as urban conditions for living and working, historical trends towards an individualization of society, and pervasive marketing techniques all lead to consumers who are "locked-in by such circumstances […] often deliberately created by producer and business interests" (Sanne 2002: 286). Cement structures are certainly the norm in Manila, with no building codes governing ventilation standards or requiring natural forms of ventilation, an institutional condition that must also be taken under consideration. An elderly woman remembers the housing conditions in the Manila of her youth:

> Most of the buildings are now made of cement. Before we used nipa roofing, the same thing for the floor. It's nice to stay in a nipa hut. Nipas were cut down in the swampy areas we had, they have become our farmland. It's hard to gather nipa for the roof.

Nipa huts, made from bamboo and a type of palm-thatched roofing, allowed for a natural passage of air between floors and between indoors and outdoors. A return to such structures may be difficult to imagine, in terms of the time needed for roof maintenance, as well as the challenge of using bamboo in high-rise structures. Cement structures also have the advantage of enduring tropical storms and other weather hazards (a real estate developer interviewed also promotes cement structures as a way to reduce the risks associated with shootings in certain neighborhoods).

However, structural elements that facilitate the flow of air from outdoors to indoors could be integrated into building plans relatively easily. Innovative solutions may be found among the poorest populations: a self-proclaimed green architect from the Tondo area has already begun

helping households to create rain-protected openings in their roofing structures, to allow for the passage of air. It would be difficult, however, to accomplish such a retro-adjustment in an already constructed cement building, or to envision bottom-up building designs that originate from among the poor and which would call into question "the entire architecture of knowledge on which the post-World War II development machine is founded." (Appadurai 2003: 49). As the construction industry continues to boom in Manila and other urban areas of Southeast Asia, policy-makers must find ways to mandate and enforce building ventilation standards – particularly for low-income housing developments so that the poor are not hit the hardest with rising energy costs.

<heading level 3> The growing middle-class and the influence of global trends on local consumption patterns

An argument to help reduce electricity usage based solely on energy efficiency or a lowering of expenses would not be sufficient for the growing middle-class. As a real estate developer explained, "West is best," expressing his view that OFWs tend to emulate the styles and tastes of their host countries upon their return to the Philippines, regardless of local climatic conditions that are vastly different from those of the northern hemisphere. Global trends must therefore be taken into consideration when evaluating local energy consumption patterns, including the impact of labour migrants; a bounded geographic analysis would be too limited. If certain groups are emulating and importing energy-greedy Western consumption habits, optimism around "leap-frogging" must be tempered. These housing choices become structural conditions that will lock-in the need for air-conditioning for years to come.

Air-conditioning units are popular because they are tied up in cultural and social factors, but less energy-intensive forms of consumption are becoming socially significant in the West and could also influence migrant choices. Solar panels can become symbols of economic success, for

example, based on a growing popularity for renewable resources abroad and in the Philippines. Real estate developers and architects could also be incited to design model homes that include solar panels, natural ventilation and other features, promoted as being more 'advanced' and 'fashion-forward' than air-conditioned homes. The circulation of outdoor airs indoors could be positioned as a health benefit, versus air-conditioned air, so long as the outdoor air quality is acceptable. The long-term cost-savings of natural ventilation is also an important but subordinate message, particularly for OFWs who often foot the bill not only for housing construction but also maintenance and usage over time. Various elements must be brought together in a comprehensive strategy that would reach different stakeholders, with a focus on OFWs and their families, in the Philippines and abroad.

<heading level 3> The highest socio-economic groups and the need to address secondary social and cultural services

The wealthy may only represent a small percentage of the total population in Manila, but this socio-economic group exercises an influence on other groups: on outdoor billboards, on the cover of magazines and in the press, the Filipino upper classes and celebrities set consumption trends that are emulated by some who aspire to these lifestyles. The idea of looking good is already tied to cool air for a broader group of people, as the rows of deodorizing products and colognes to counter perspiration might indicate (which often include the added feature of skin whitening).

For the highest income groups, arguments around energy efficiency and cost savings would have very little impact on the reduction of electricity usage. Air-conditioning provides a social secondary service: these groups do not just want to feel cool, they want to look cool and follow Western fashion and seasons. Energy conservation would need to be approached without talking about energy at all, but rather addressing the question of housing styles and fashion. A new trend is

already in the making: while OFW and middle-income groups currently seek Western-style housing structures, it is the wealthy that are moving towards contemporary interpretations of traditional housing styles that use bamboo and nipa materials. Nipa could become fashionable and cashmere unfashionable among the rich and famous in Manila, for example, with increased international visibility for local architects and the promotion of home-grown fashion houses. Fashionable people should be engaged within Manila high society to help in a campaign that would not focus on energy-saving messages, but rather on lifestyle and specifically housing and clothing styles, through peer-to-peer persuasion. The goal remains energy reduction, but the way to get there is not solely by talking about energy for this socio-economic group.

< heading level 3 > A socio-economic approach to assigning environmental responsibility

Research on energy distribution has found that inequalities exist within all countries (Jacobson, Milman et al. 2005). A similar study for the Philippines would most likely show the large inequalities seen above in the example of the three households: the higher income groups are using the most energy per household member. Wealthy Filipino consumers may share more in common with the average American than with other Metro Manila residents in less favored neighborhoods, underlining the need for a more micro-level distinction for carbon emission responsibility that could be relevant to post-Kyoto negotiations. Rather than assign 'common but differentiated responsibilities' for climate change at the national level, recent research emphasizes the need to look at "the world's high-emitting individuals, who are present in all countries" (Chakravarty 2009: 1). The consumption patterns of the world's highest-emitting groups must be called into question, with governments worldwide given the responsibility of understanding differences across socio-economic groups and setting targets.

<heading level 1> Conclusion

In Metro Manila, one of the key opportunities for more sustainable forms of energy consumption lies in institutional and structural choices regarding electricity generation and urban planning. Building codes are a priority, as well as an increase in renewable energy particularly for the Luzon electricity grid. If consumers are to play an active role in transitioning towards more sustainable lifestyles, policy measures and communications that focus solely on moral or cost arguments around energy savings will not suffice. These approaches need to be seen as part of a more comprehensive strategy that addresses what we are calling here the social and cultural secondary services of energy-intensive products, a strategy that would also be relevant to other regions of the world. In addition, any approach to understanding consumption in a local context must take into consideration the differences among local socio-economic groups as well as the role of transnational populations. International negotiations related to sustainable consumption issues must also recognize the role of elite populations within developing countries and their roles and responsibilities regarding resource depletion and pollution, which could translate into national efforts that would focus policy initiatives on the highest emitting groups.

Once all of the evils are unleashed on mankind, Pandora is said to find Hope at the bottom of her box. This article has attempted to balance what we know to be significant in terms of household energy usage in Metro Manila with how consumers perceive and use energy in their daily lives. Consumption patterns can be assessed through quantitative data and analysis, as is usually the case in industrial ecology. The hope is that a deeper understanding of consumption drivers – and barriers – can be revealed through bottom-up qualitative research by talking to and observing consumers, and through an approach to consumption grounded in economic anthropology. Combining environmental science and social science can help define priority areas for policy-makers, while also determining what can be realistically expected from consumers, beyond moving to more efficient technologies. Consumer interviews and observations can also

reveal structural and institutional lock-in conditions that limit room for manoeuvre at the household level. The complex issue of sustainable consumption merits the kind of context-based, systemic and multi-disciplinary approach that has been proposed in this article.

About the Authors

Marlyne Sahakian is a PhD candidate at the Graduate Institute of International and Development Studies in Geneva, Switzerland. Julia K. Steinberger is a Senior Researcher at The Institute of Social Ecology, Faculty of Interdisciplinary Research (IFF), University of Klagenfurt, in Vienna, Austria.

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Address correspondence to Marlyne Sahakian, The Graduate Institute of International and Development Studies, 20 rue Rothschild, 1202, Geneva, Switzerland, marlyne.sahakian@graduateinstitute.ch.

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