Philippines - Household Energy Consumption Survey 2004

National Statistics Office

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Overview

Identification

ID NUMBER
PHL-NSO-HECS-2004-v01

Version

VERSION DESCRIPTION
Version 1.0, final data

PRODUCTION DATE
2006-12

Overview

ABSTRACT
The 2004 Household Energy Consumption Survey (HECS) is a nationwide undertaking designed to collect and update data on household (residential) energy consumption patterns, preferences and application, among others. In addition, accounting of fuel consumption for transport uses in the household sector was also gathered for the first time in the 2004 HECS. Results of this survey provide substantive information and data which may serve as basis for further energy policy studies, researches, plans and programs.

The primary objective of the 2004 HECS was to gather data on household energy consumption, application and other relevant factors affecting such consumption. The data shall provide planning officers and policy-makers with updated and reliable bases for decision-making on energy demand and management in the household sector.

Specifically, the survey aimed to:

1. ascertain the relevance of socio-economic characteristics of the household and fuel preferences;

2. determine household utilization of fuels, energy supply systems and appliances, devices, equipment or motor vehicles;

3. identify patterns of energy use among households;

4. assess the potential household energy conservation and demand management techniques and inter-fuel substitution;

5. measure the incidence of cooking fuel switching and other changes in fuel consumption patterns that have occurred since October 2003 to September 2004;

6. determine the awareness of the household on government’s lighting and appliances labeling programs; and

7. determine the awareness of the household on natural gas as fuel substitute for cooking, heating and cooling.

KIND OF DATA
Sample survey data [ssd]

UNITS OF ANALYSIS
Households

Scope

NOTES
The scope of 2004 Household Energy Consumption Survey includes information on the consumption and utilization of energy sources as well as the household's practices and preference for the type of fuel.

TOPICS

Topic	Vocabulary	URI
consumption/consumer behaviour [1.1]	CESSDA	http://www.nesstar.org/rdf/common

KEYWORDS
electricity, petroleum products, energy, renewable energy

Coverage

GEOGRAPHIC COVERAGE
National, regional

UNIVERSE
The survey covered population residing in private households, that is, all household members (usual residents). Persons who reside in institutions are not within the scope of the survey.

Producers and Sponsors

PRIMARY INVESTIGATOR(S)

Name	Affiliation
National Statistics Office	

OTHER PRODUCER(S)

Name	Affiliation	Role
Department of Energy		Technical assistance in questionnaire design and data analysis

FUNDING

Name	Abbreviation	Role
Department of Energy	DOE	funding agency

OTHER ACKNOWLEDGEMENTS

Name	Affiliation	Role
National Statistical Coordination Board (NSCB)		technical assistance in questionnaire design

Metadata Production

METADATA PRODUCED BY

Name	Abbreviation	Affiliation	Role
National Statistics Office	NSO		Documentation of the study

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Sampling

Sampling Procedure

Sampling Design

The 2004 Household Energy Consumption Survey used the sampling design of the 2003 Master Sample (MS) starting in July 2003.

Domains

The 2003 MS considers the country's 17 administrative regions as defined in Executive Orders (EO) 36 and 131 as its sampling domain. A domain is referred to as a subdivision of the country in which estimates with adequate level of precision is generated. It must be noted that while there is demand for data at the provincial level (and to some extent municipal and barangay levels), these were not treated as domain because of its large number (more than 80) and the large resource requirement that goes along with it. Below are the 17 administrative regions of the country:

National Capital Region
Cordillera Administrative Region
Region I - Ilocos
Region II - Cagayan Valley
Region III - Central Luzon
Region IVA - CALABARZON
Region IVB - MIMAROPA
Region V - Bicol
Region VI - Western Visayas
Region VII - Central Visayas
Region VIII - Eastern Visayas
Region IX - Zamboanga Peninsula
Region X - Northern Mindanao
Region XI - Davao
Region XII - SOCCSKSARGEN
Region XIII - Caraga
Autonomous Region in Muslim Mindanao

Sampling Frame

As in most household surveys, the 2003 MS made use of an area sample design. For this purpose, the Enumeration Area Reference File (EARF) of the 2000 Census of Population and Housing (CPH) was utilized as sampling frame. The EARF contains the number of households by enumeration area (EA) in each barangay. This frame was used to form the primary sampling units (PSUs). With consideration of the period for which the 2003 MS will be in use, the PSUs were formed/defined as a barangay or a combination of barangays with at least 500 households.

Sample Size

The 2003 MS consists of a sample of 2,835 PSUs of which 330 were certainty PSUs and 2,505 were non-certainty PSUs. The entire MS was divided into four sub-samples or independent replicates, such as a quarter sample contains one fourth of the PSUs found in one replicate; a half sample contains one-half of the PSUs in two replicates.

Stratification

The 2003 MS considers the 17 regions of the country as the primary strata. Within each region, further stratification was performed using geographic groupings such as provinces, highly urbanized cities (HUCs), and independent component cities (ICCs). Within each of these substrata formed within regions, the PSUs were further stratified, to the extent possible, using data on the proportion of occupied housing units with roofs and outer walls made of strong materials (PSTRONG), engaged in agriculture (AGRI), and a measure of per capita income (PERCAPITA).

PSTRONG was calculated using the data from the 2000 CPH. A roof is considered made of strong material if it is made of either galvanized iron, aluminum, concrete/clay tile, half galvanized-half concrete, or asbestos. The outer wall is considered

made of strong material if it is made of concrete, brick, stone, wood, half concrete-half wood, galvanized iron, asbestos or glass.

AGRI was determined in the following way: initially, an indicator variable was computed at the barangay level. That variable has the value 1 if more than 50 percent of the households in the barangay are engaged in agriculture or fisheries and 0 otherwise, based on the 2000 CPH Barangay Schedule. To obtain a measure at the PSU level, a weighted average of the barangay indicator variable was computed for all the barangays within the PSU, weighted by the total number of households in the barangay. Thus, the value of AGRI at the PSU level lies between 0 and 1.

PERCAPITA is defined as the total income of the municipality divided by the total population in that municipality. Note that the PERCAPITA value of the PSUs is the same if the PSUs are in the same municipality. The data on municipal income refer to year 2000 and were taken from the Department of Finance. However, if the 2000 municipal income was not reported to the Bureau of Local Government Finance (BLGF), 2001 income was used. If no 2000 or 2001 municipal income was reported, the income classification from the BLGF for this municipality was obtained. Using the data on income, which are presented in income intervals, the average of the lower and the upper values of the income interval for the municipal class to which this municipality belongs was determined.

Sample Selection

To have some control over the subsample size, the PSUs were selected with probability proportional to some estimated measure of size. The size measure refers to the total number of households from the 2000 CPH. Because of the wide variation in PSU sizes, PSUs with selection probabilities greater than 1 were identified and were included in the sample as certainty selections.

At the second stage enumeration areas (EAs) were selected within sampled PSUs, and at the third stage housing units were selected within sampled EAs. Generally, all households in sampled housing units were enumerated, except for few cases when the number of households in a housing unit exceeds three. In which case, a sample of three households in a sampled housing unit were selected at random with equal probability.

An EA is defined as an area with discernable boundaries within barangays consisting of about 150 contiguous households. These EAs were identified during the 2000 CPH. A housing unit is a structurally separate and independent place of abode which, by the way it has been constructed, converted, or arranged, is intended for habitation by a household.

More detailed information on sampling procedure is found in the "2004 HECS Final Report" provided as an external resource.

Response Rate

A total of 22,042 households were interviewed for this survey. Of this number, 21,961 households or 99.6 percent responded while 0.4 percent did not responded. The non-responses was due to the respondent had refused to be interviewed or the households temporarily away, on vacation or not at home.

Weighting

Estimation Procedures

Weighting

In the 2003 Master Sample Design, the probability that a household is included in the sample varies across domains/regions. However, the sampling design is epsem within domain (i.e. equal selection probabilities within region). The initial step in the construction of weights is to determine the unit’s base weight. This is defined as the inverse of its selection probabilities. The base weight is further adjusted to take into account possible nonresponse and possibly to make the estimates conform to some known population totals.

Base weights

In general, the base weight assigned to a sampled unit is the inverse of its selection probability.

Nonresponse Adjustments

All surveys experience some degree of unit or total nonresponse in which a sampled and eligible unit fails to participate in the survey (for example, the unit may refuse to participate, or may never be at home at the times the interviewer calls). Adjustments are made to the base weights to compensate for nonresponse by sampled units eligible for the survey. In essence the adjustment inflates the base weights of “similar” responding units to compensate for each nonrespondent.

The most common form of nonresponse weighting adjustment is a weighting class adjustment and that is the type of adjustment being used for surveys based on the 2003 MS. The full sample of respondents and nonrespondents is divided into a number of weighting classes or cells and nonresponse adjustment factors are computed for each cell.

The denominator of weighting class is the sum of the weights of respondents. The numerator adds together the sum of the weights for respondents and the sum of the weights for eligible nonrespondents. Together these two sums in the numerator give the sum of the weights for the total eligible sample. Thus, the nonresponse weight adjustment is the inverse of the weighted response rate. Note that the adjustment is applied with eligible units. Ineligible sampled units (e.g., vacant or demolished housing units and units out of scope for a given survey) are excluded.

Population Weighting Adjustments

Generally, weighted sample distributions do not conform to known population size. In particular, sample estimates of population counts generally fall short of true population counts because of noncoverage of households. Further weighting adjustments - termed as population weighting adjustments - may be made to make the survey estimates consistent with known population size. These weighting adjustments may be made within weighting cells like the nonresponse cells described above. In this case, the adjustments are often termed post stratification adjustments.

For adjusting household level estimates, the reference count of households is obtained by dividing the total projected population by the average household size. This is resorted to in the absence of projected number of households.

Final Survey Weight

The final survey weight assigned to each responding unit is computed as the product of the base weight, the nonresponse adjustment, and the population weighting adjustment. The final weights should be used in all analyses to produce valid estimates of population parameters.

For 2004 HECS , the final survey weight is the product of the base weight and the nonresponse adjustment multiplied by two since the survey used only half of the MS.

More detailed information on sampling procedure is found in the "2004 HECS Final Report" provided as an external resource.

Questionnaires

Overview

The HECS Form 1 is a 23-page questionnaire (including the front cover page) which will be used to gather information on the consumption and utilization of energy sources as well as the household's practices and preference for the type of fuel.

It contains the following sections:
Section A. Electricity
Section B. Petroleum products
Section C. Transport
Section D. Renewable energy sources and technologies
Section E. Cooking fuel swithching
Section F. Household Practices
Section G. Labeling system
Section H. Natural gas awareness
Section I. Family income

Pls. see external resources for more detailed information of the questionnaire.

Data Collection

Data Collection Dates

Start	End	Cycle
2004-10-08	2004-10-31	N/A

Time Periods

Start	End	Cycle
2003-10-01	2004-09-30	N/A

Data Collection Mode

Face-to-face [f2f]

Data Collection Notes

The 2004 Household Energy Consumption Survey pretested the questionnaire before the conduct of the actual survey. This is to test the feasibility of the form as capture instrument in collecting the data needed relative to the survey's objective and to ensure the clarity of the questionnaire and correctness of their sequences. The pretest was conducted on Jnauary 26 to 28, 2004 in two areas in Bataan; Barangay Bagumbayan, an urban barangay and Barangay Banawan, a rural area both in the municipality of Bagac. There were two supervisors and 14 interviewers conducted the interview. Eight personnel were from the National Statistics Office (NSO) and eight from the Department of Energy (DOE). The interviewers were assigned to cover ninety six (96) households for each of the area. They were instructed to personally interview the households using the HECS Form 1. On the average an interview lasted 43 minutes both for urban and rural area.

Before the 2004 HECS enumeration, three levels of training was conducted. The first level or task force training was attended by 25 selected NSO Central Office personnel, 19 selected NSO personnel from the field offices and 35 personnel from the Department of Energy (DOE) on September 6-11, 2004. The participants for this training acted as resource persons during the second level training at NSO Regional Offices.

The second level training was held on September 20-24, 2004 at the NSO regional offices. This was attended by the Regional Directors (RDs) and their Statisticians, Provincial Statistical Officers (PSOS)/OICs and their assistants. The participants for this training was acted as trainers in the third level training.

The third level training was conducted at the provincial offices on September 27 to October 1, 2004 and was participated by the DSOs/SCOs and hired Statistical researchers (SRs) of each province who were involved in the HECS field operation.

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Data Collectors

Name	Abbreviation	Affiliation
National Statistics Office	NSO	

Supervision

The Regional Administrators, Provincial Statistical Officers and their assistants and DSOs were given eight days each for supervision to allow them to visit their area of jurisdiction during the survey operation. It is expected that there should be a strict supervision of the conduct of the survey. The role of the supervisor are to observe how the interview was being conducted and point out errors to avoid the same mistakes in succeeding interviews; scrutinize accomplished questionnaires for correctness, completeness and consistency of entries; conduct a random reinterview of households; help solve problems encountered by enumerators such as refusals, callbacks; collect EN's reports; ensure that the expected output of the ENs are met; fill up the Supervisor's Report form; and be available if the ENs need assistance in relation to the conduct of the survey.

Central office personnel and DOE personnel also supervised and conducted spotchecks during the field operation. The whereabouts of the supervisors and the area of assignment of the ENs should be made available at the field offices to ensure close coordination among persons involved in the operation and to be able to locate the ENs much faster.

Data Processing

Data Editing

Data processing involves two stages:

a) Manual processing refers to the manual editing and coding of the questionnaires. The provincial staff, DSO's/SCOs who are stationed in the provincial offices and hired SRs do the manual processing of the questionnaires. This process includes folioing of the questionnaires, completeness and consistency checking of the responses, editing, coding and verification of totals.

b) Machine processing involves all operations that are done with the use a computer and/or its accessories, that is from data encoding to tabulation. The machine processing includes data encoding, completeness and consistency check . This was done at the NSO Regional Offices.

Processing of the 2004 HECS, from data entry to tabulation, was done using the programs developed by the NSO in Census and Survey Processing (CSPro). Specifically, a system named Integrated Survey of Household Processing System (ISHIPS) was created and designed to integrate the machine data processing requirements of all the household-based surveys conducted by the office.

Detailed documentation of the editing of the data can be found in the "2004 HECS Manual Processing" provided as an external resources.

Data Appraisal

Estimates of Sampling Error

The Standard Error (SE) can be used to calculate the confidence interval within which the true value of the estimates falls. The Coefficient of Variation (CV) is a measure of relative variability that is commonly used to assess the precision of a survey estimate. It is defined as the ratio of the SE to the estimate. An estimate with a CV value of less than 10 percent is considered precise.

Details of the sampling errors are presented in the "2004 Household Energy Consumption Survey Final Report" in the sampling errors table presented in the external resources.