Energy Consumption Surveys in Residential Sector –

Planning, Implementation, Challenges and Recommendations

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Outline

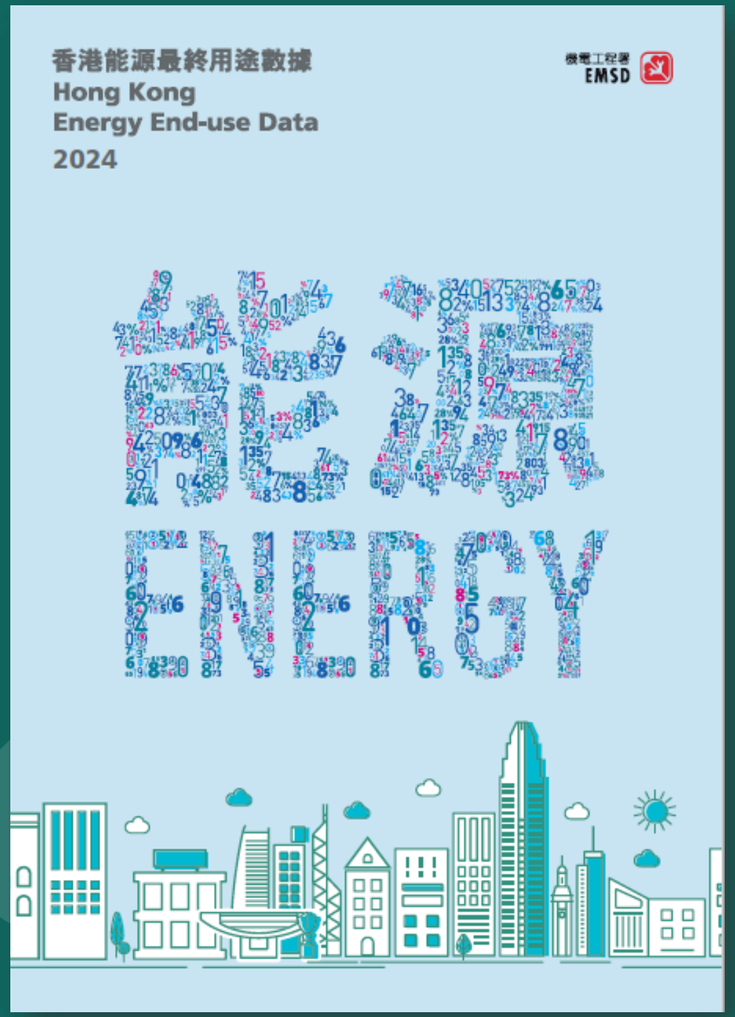
- Background and Objectives
- Survey Design and Methodology
  - Survey Plan
  - Sampling Methodology
  - Questionnaire Design
  - Training of Enumerators
  - Pilot Survey
  - Quality Assurance and Control
- Key Challenges and Recommendations
- Conclusion

Background

- Electrical and Mechanical Services Department, Hong Kong China (EMSD) has established the Hong Kong Energy End-use Database (HKEEUD)
- Energy end-use data of 19 segments under 4 major sectors, viz. Residential, Commercial, Industrial, and Transport

Survey Objectives

- To keep updating HKEEUD
- To obtain latest energy consumption data and characteristics of local households
- To compile energy consumption indices and breakdown of different end-uses in local residential sector



Hong Kong Energy End-use Database (HKEEUD)

Survey Design and Methodology

Survey Plan - a brief of how to conduct the survey

Survey Design and Methodology

Collection Sampling Methodology

Sampling frame from Census and Statistics Department

No. of random samples in proportion to distribution of various types of housings in different districts across the territory

Household as sample units

Energy consumption in common areas of buildings where the randomly sampled households reside also surveyed

Survey Design and Methodology

Sampling Methodology

Simple online survey questionnaire sent to sample households for “self-reporting” energy consumption data

“Self-reported” data verified and validated by follow-up visits (field surveys) or telephone interviews with detailed questionnaire

In case of refusal to survey, replacement samples of same housing type in same district effected

Survey Design and Methodology

Questionnaire Design (Household)

Household Features

- Housing Type
- Household Size
- Saleable Area
- Occupants' daily habits

12-month Metered Energy Use

- Energy Bills
- Electricity, Town Gas, LPG, etc.

Appliances Information

- Type
- Brand, Model
- Quantity
- Fuel Type
- Power Rating
- Dimensions
- Operating Hours
- Standby Hours

Survey Design and Methodology

Questionnaire Design (Common Areas)

Building Features

- Building Age
- Usable Floor Area
- Club House
- Central E&M Installations
- Operation Schedules

12-month Metered Energy Use

- Energy Bills
- Electricity, Town Gas, LPG, etc.

Appliances Information

- Type
- Brand, Model
- Quantity
- Fuel Type
- Power Rating
- Dimensions
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Survey Design and Methodology

Training of Enumerators

Training Sessions

- For capacity building of enumerators to conduct the surveys
- To ensure enumerators fully understand the survey objectives, requirements, logistics, questionnaire contents, etc.
- Debriefing of Pilot Survey

Training Manual

- Safety guidelines
- Important points to notes before, during and after each field visit (e.g. procedures, manners, etc.)
- Fundamental technical knowledge (e.g. types and typical power range of light bulbs, air-conditioners, domestic electronic products, etc.)

Survey Design and Methodology

Pilot Survey

- Conducted on a small number of sample subjects
- To assess the applicability of the questionnaire and survey logistics
- Improvements effected in the main survey

Examples of Findings

	Finding	Improvement
1	Respondents confused in conversion between energy units (kWh, MJ, etc.)	More options of common energy units to be provided on questionnaire for respondents to pick
2	Power rating information of appliances not available	Enumerators took photos and recorded details (e.g. brand, model no., etc.) of the appliances, then estimated power rating via desktop search
3	Frequent mid-way terminations / Respondents' loss of patience in telephone interviews	Face-to-face interviews preferred and more efficient

Survey Design and Methodology

Quality Assurance and Control

01 Experienced field work supervisors for spot-checks and on-site supervision

02 Quality checkers checking 100% returned questionnaire for complete-ness, coherence and correctness

03 Follow-up telephone calls for incomplete, inconsistent or incorrect items on returned questionnaire

04 Verification of returned data via phone calls to random samples of completed questionnaire

05 Compare and contrast energy consumption data returned with energy bills submitted

06 Random replacement samples for any returned samples that failed the quality check

Key Challenges and Recommendations

01

Challenge –

- Prohibition of entry into some residential premises

Recommendations –

- Prior consent from property management
- Advance liaison with large property manage-ment companies who manage different residential premises

02

Challenge –

- Suspicions about genuineness of the survey

Recommendations –

- Official announcement of the survey on authority's website(s)
- Prior mail of official invitation letters
- Official work passes and uniforms of enumerators

03

Challenge –

- Low response rate; reluctance to participate

Recommendations –

- Flexible interview time at respondents' choices
- Concise questionnaire
- Multiple channels of submission (e.g. websites, apps, hotlines, etc.)

04

Challenge –

- Unavailability / Limited availability of energy bills (e.g. only for recent months)

Recommendations –

- Energy fee records
- Backward deduction of total annual energy consumption from energy fees

CONCLUSION

1. Survey conducted to compile latest energy consumption characteristics and indices of local residential sector
2. Survey plan, an essential instrument to outline and plan for an effective and valuable survey
3. Concise and precise questionnaire design, training of enumerators and pilot survey help pave the path to a smooth and efficient main survey
4. Quality assurance and control to ensure data completeness, coherence and correctness
5. Prior planning and preparations to combat potential challenges such as prohibition of entry to premises, low response rate, etc.

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