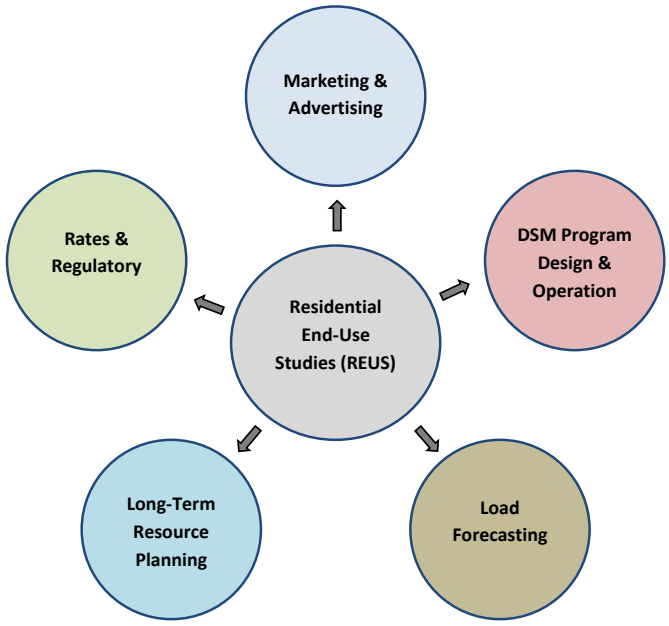
Residential End-Use Studies

Residential End-Use Studies (REUS) gather detailed information from households about their space and water heating equipment, appliances, dwelling characteristics, and energy and water use behaviours. Sometimes referred to as energy-use studies or appliance saturation studies, they represent a key first step in understanding the factors that influence consumption of energy and water resources in the residential sector.

REUS Stakeholders & Beneficiaries

Figure 1 illustrates the key utility departments benefiting from information and analyses associated with residential end-use studies. They include DSM program design, load forecasting, long-term resource planning, rate design and regulatory submissions, and residential marketing and advertising.

Figure 1: Key Utility Departments Benefitting from Residential End-use Studies



Topic Coverage

Many of the core topics addressed by end-use surveys are common to electric, gas, and water utilities. These include dwelling characteristics (e.g., square footage, insulation levels, window glazing, etc.), space heating, domestic water heating, energy and water use behaviours (e.g., weekly number of showers, dishwasher loads, clothes washer loads, etc), and socio-demographics (e.g., number of persons per household, household income, education, etc.). Attitudes and beliefs regarding conservation, and a range of issues important to the utility may be added. A comprehensive list of REUS topic areas, organized by type of utility, is provided in Table 1 (next page).

Table 1: Residential End-Use Study Topics by Utility

Topic	Electric Utilities	Gas Utilities	Water Utilities
Dwelling characteristics	✓	✓	✓
Space heating	✓	✓	
Fireplaces	✓	✓	
Water heating	✓	✓	✓
Cooking and cleaning appliances	✓	✓	
Lighting	✓		
Pools and hot tubs	✓	✓	✓
Past and planned renovations	✓	✓	✓
Energy and water use behaviours	✓	✓	✓
Attitudes and beliefs	✓	✓	✓
Interest in products and services	✓	✓	✓
Socio-demographics	✓	✓	✓

The broad range of topics addressed by residential end-use studies mean questionnaire length can become an issue (REUS questionnaires are typically between 10 and 20 pages in length). A strong project manager is needed to balance the diverse and sometimes competing needs of stakeholders to avoid an overly long and onerous questionnaire.

End-use studies represent a snap-shot in time but can be used to collect information about equipment additions and deletions, renovations, or other changes to the home that were made during the past four or five years. Understandably, recall accuracy diminishes with time.

Planned renovations and equipment upgrades can also be queried. Experience has shown that many planned energy-related renovations will occur.

Data from REUS surveys can be linked to customer's billing records to facilitate additional analyses (e.g., conditional demand analyses). Permission from the customer is typically required for this step.

Data Gathering Methods

Questionnaire length and the technical nature of the questions asked typically dictate that REUS questionnaires be delivered by mail (hardcopy), online or a combination of the two. One method currently achieving good results is to deliver the hardcopy survey by mail and provide an incentive to complete the survey online. Due to length and complexity, REUS surveys typically require some form of incentive to boost participation.

Frequency

End-use studies should be conducted every three to five years. This allows the utility to monitor trends in new construction, renovations, appliance saturations, and energy use behaviours. Best practices with repeated REUS studies include maintaining consistency of the topic coverage and question design while accommodating refinements in the question wording and changes to topic coverage.

Resource Requirements

Implementing a residential end-use study typically requires a project leader, the involvement of an internal stakeholder group, and input from technical or subject matter experts (e.g., residential appliances and equipment, building envelope, building codes and standards, etc.). Questionnaire development should rest with experienced practitioners with input from stakeholders. Fielding the survey and compiling the data is contracted to a marketing research firm. Analysis and reporting of the results can vary from simple (e.g., tabulated data) to complex (e.g., detailed analysis and write-up of results). The process can be completed internally or via experienced consultants.

Value-Added REUS Analyses

End-use surveys provide an excellent foundation for value-added analyses, including:

- Conditional Demand Analyses (CDA)
- Customer segmentation studies
- Appliance stock-flow modelling
- Conservation potential reviews
- Metering studies
- Decomposition analyses

Concluding Comments

An up-to-date residential end-use study is an essential tool for utilities. It offers an invaluable and defensible quantitative foundation for understanding residential customers and the factors that influence their use of electricity, natural gas, and water. They are also used to gauge preferences and attitudes towards energy and other resources.

End-use studies are complex and time consuming. However, a well designed and executed REUS, with a strong project manager, engaged stakeholders, and resources allocated for post-survey reporting and analysis of the data, provides unparalleled insight into residential customers.

Sampson Research has extensive experience with implementing and managing all aspects of residential and commercial end-use studies. Depending upon the client's needs and resources, Sampson Research can assemble a team of experienced professionals to deliver a turn-key solution or use the client's internal staff resources and preferred choice of marketing research provider.

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