Stats NZ
Tatauranga Aotearoa

Energy Use Survey 2013/2014

New Zealand Government

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Energy Use Survey Data Collection

The New Zealand Energy Use Statistics Programme resulted from the Domain plan for energy sector 2006–2016 that was published in 2006. The energy domain plan was produced by Statistics NZ in collaboration with the Energy Efficiency and Conservation Authority (EECA), and the Ministry of Economic Development (now the Ministry of Business, Innovation and Employment – MBIE). The domain plan identified energy use statistics as a key gap in energy information and prioritised a suite of energy use surveys.

The Energy Use Survey delivers information to help fill the gap and to provide a benchmark of energy use for New Zealand's economy, excluding households. Data from the survey also feeds into modelling systems that give current energy-use estimations and future demand forecasts. Modelling assumptions can then be updated, which improves the accuracy of modelled information.

Methodology

Data source

The New Zealand Energy Use Statistics Programme resulted from the Domain plan for energy sector 2006–2016 that was published in 2006. The energy domain plan was produced by Statistics NZ in collaboration with the Energy Efficiency and Conservation Authority (EECA), and the Ministry of Business, Innovation and Employment (MBIE). The domain plan identified energy use statistics as a key gap in energy information and prioritised a suite of energy use surveys.

The Energy Use Survey delivers information to help fill the gap and to provide a benchmark of energy use for New Zealand's economy, excluding households. Data from the survey also feeds into modelling systems that give current energy-use estimations and future demand forecasts. Modelling assumptions can then be updated, which improves the accuracy of modelled information.

Non-response and imputation

Unit non-response

Unit (or complete) non-response occurs when units in the sample did not return the questionnaire. We then adjust the initial selection weight of the remaining units in the stratum to account for the unit non-response (item non-response imputation does not occur for units that did not return the questionnaire).

Item non-response

Item (or partial) non-response occurs when units return the questionnaire but some questions are not answered. We carry out item non-response imputation for units that answered some but not all the questions they were required to (based on questionnaire routing rules). We classify respondents who did not answer any of the questionnaire as unit non-responses and the weights are adjusted accordingly. We impute for item non-response as follows.

Imputation of numeric variables

We use random donor imputation to impute for numeric variables. In this method, the responses of a randomly selected donor from within the same imputation cell as the non-respondent are imputed in the recipient unit. Donor imputation is used so the distribution is maintained.

Imputation of categorical variables

We use random donor imputation to impute for categorical variables. The donor supplies responses for all categorical variables requiring imputation. If the donor unit does not respond to any of the variables requiring a response, then the next-best donor is selected to supply this information. This is continued until all the variables have a response.

Special treatment

In 2018, six respondents (0.2 percent) to the NZ Energy Use Survey received ‘special treatment’. Special treatment is applied in rare cases where response has an undue influence on survey results. For example, if an enterprise provides an extreme outlier which would unduly impact the survey results, their enterprise is assumed to be unique and for that reason its survey weight is reduced so that they only represent themselves. The removed weight is then redistributed evenly over confirmed results for similar enterprises.

Energy units standardised

We collect information on energy usage in the unit that applies to each commodity – for example, litres for petrol and kilowatt hours (kWh) for electricity. We convert these units to a standard unit (terajoules, TJ) for reporting. This conversion enables the

energy contained in different forms to be compared directly. We applied a calorific value (enthalpy value) to each energy type and form for the conversion. We source or derive calorific values from MBIE's Energy in New Zealand File 2013.

See the table below for the calorific values for each energy type.

Time Method

Annual Survey

Sampling Procedure

Survey population

The KAU is used as the selection unit to allow the uses of energy to be associated with an activity as closely as possible. KAU data allows energy use to be separated for larger units with multiple branches involved in different activities (multi-KAU).

Sample design

The sample design is a two-way, one-stage stratified random sample. The stratification variables are ANZSIC06, GST sales, and rolling mean employment.

We collected information on the following commodities:

• electricity – all electricity purchased from the national grid and other energy sources used for input to electricity generation and cogeneration
• electricity generated in the KAU – electricity generated within the KAU's operations (this figure is not included in the total energy used, to avoid double counting)
• petroleum products – energy products derived from refining crude oil including:
• petrol – an aggregated figure of 96 and 91 octane petrol
• fuel oil – an aggregated figure of the major intermediate products, notably light fuel oil and heavy fuel oil
• diesel
• liquefied petroleum gas (LPG)
• aviation fuel

• natural gas
• coal – including all ranks
• wood and woodwaste – used for energy purposes.
We also collected information on energy management practices.

Measurement errors

The survey results are subject to measurement errors, including both non-sample and sample errors. Users need to consider these errors when analysing results.

Sampling error

Sampling error is a measure of the variability that occurs by chance because a sample, rather than the entire population, is surveyed. The level of sampling error for any given estimate depends on the number of sampled units, the variability of the estimate, and the sample size. Due to the random nature of the sample selection the error differs for different samples.

Non-sampling errors

Given the nature of the data we collect, there are limitations on the level of accuracy we can expect from the survey. For example, some respondents may not keep records in the form required for the survey, so may need to estimate, and non-sampling error may occur. Non-sampling errors include mistakes by respondents when completing questionnaires, variation in the respondents' interpretation of the questions asked, and errors made during the processing of the data. We have extensive procedures to minimise these types of errors, but they may still occur and are not quantifiable.

Sample design

The energy use survey 2018 covers the services sector as the third part of our three-year cycle. The services sector consists of eleven different industries for which we aim to ensure accurate results. As a result, in 2018 we focused on total energy use which we used to determine the most important enterprises.

Subjects	energy use, energy type
Keywords	electricity, petrol, diesel, natural gas, coal, wood and woodwaste, fuel oil, LPG, aviation

Variables

Concepts

EUS Concepts

Name	Description
ANZSIC 06	Australian and New Zealand Standard Industrial Classification System 2006 . The classification can be found under 'Classifications' and 'Codes'
Business Frame	**Business Frame** A register of all economically significant units operating in New Zealand.
Calorific value	**Calorific value** The energy contained in a fuel, determined by measuring the heat produced by the complete combustion of a specified quantity of the fuel. We converted all the different energy types into terajoules (TJ) to make them easily comparable.
Economically significant	**Economically significant** An economically significant organisation meets at least one of these criteria: - has greater than $30,000 annual GST expenses or sales - has a 12-month rolling mean employee count of greater than three - is part of a group of enterprises - is registered for GST and involved in agriculture and forestry - over $40,000 of income recorded in the IR10 annual tax return (this includes some units in residential property leasing and rental).
Enterprise	**Enterprise** A unit or business entity operating in New Zealand. It can be a company, partnership, trust, estate, incorporated society, producer board, local or central government organisation, voluntary organisation, or self-employed individual.
Joule (J)	**Joule (J)** A unit for measuring energy. The main unit we use in this release is the terajoule (TJ). One terajoule is approximately equal to the total electricity used by 35 households in one year. |--------|------------|----|-----|-----| ||**Name** | **Symbol** | **Multiple** | | Joule|J| 1J| | Kilojoule| kJ |103 J | | Megajoule | MJ | 106 J | | Gigajoule| GJ | 109 J | | Terajoule| TJ| 1012 J| | Petajoule| PJ | 1015 J|
Kind-of-activity unit:	**Kind-of-activity unit** A subdivision of an enterprise engaged in predominantly one activity and for which a single set of accounting records is available.
Rolling mean employment (RME)	**Rolling mean employment (RME)** A 12-month moving average of the monthly employee count (EC) figure. The EC is obtained from taxation data.