Methodology and Quality Report of Household Energy Statistics

Version - 3.1

Quality Management

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1. Contact

1.1.	Contact organization	General Authority for Statistics
1.2.	Contact organization unit	Environmental, Agricultural, and Energy Statistics Department
1.3.	Contact person function	Director of Environmental, Agricultural, and Energy Statistics Department
1.4.	Contact mail address	P.O. Box: 3735 Riyadh, 11481 Kingdom of Saudi Arabia
1.5.	Contact email address	info@stats.gov.sa
1.6.	Contact phone number	199009

2. Methodology and Quality Update

2.1.	Methodology and Quality last update	18/11/2024

3. Statistical Presentation

3.1. Data description
The Household Energy Statistics present the data on the uses of electricity sources Household Energy statistics and data on the uses of electricity sources, fuel uses, consumption rates of different forms of energy in the dwelling, as well as identifying the means of rationalization, the extent of the household's desire to use photovoltaic energy (solar), the uses of biomass, in the dwelling in Saudi Arabia.

Household Energy Statistics is a statistical publication that provides data on key characteristics as follows:

- Obtain realistic estimates of energy consumption of various kinds in the domestic sector.
- Provide data on household uses of fuel of all kinds.
- Identify the patterns and forms of energy consumption used in the household sector.
- Identify the impact of economic, social, and geographical variables on energy consumption.
- Identify the behaviour of society in energy consumption according to its type and source.
- Provide data that contributes to the knowledge of energy efficiency in the household sector.
- Build a statistical database that includes indicators on energy consumption in the household sector at the level of
- the Kingdom's regions.

- Identify the extent of the desire of families in Saudi Arabia to use photovoltaic energy
  (solar) in the residence.

3.2. Classification system

The following classifications are applied in the Household Energy Statistics:

National Code of Countries and Nationalities (3166 ISO – codes Country):

A statistical classification based on the international standard (ISO 3166_Country codes), which is a standard issued by the International Organization for Standardization (ISO of the UN), and this classification gives numeric and literal codes for the world's (248) countries, based on the classification of countries.

The classification is used in the Household Energy Statistics to classify Saudi or non-Saudi individuals.

Metadata are collected through interviews, so that outputs can be produces in accordance with all relevant classifications.

The classifications are available on the GASTAT's website: https://www.stats.gov.sa/en

3.3. Sector coverage

Not applicable.

3.4. Statistical concepts and definitions

Terms and concepts of the Household Energy Statistics:

- Household energy consumption:

The energy consumed by the population for household purposes only (water heating, warming, air-conditioning, lighting, cooking, etc.)

- Fuel:

It refers to any type of material used to produce energy through a thermo-chemical.

- Diesel:

It is a liquid hydrocarbon fuel obtained through the distillation of crude oil and may be used in electric generators if the source of electricity is a private generator.

- Kerosene:

A flammable hydrogen liquid, often used as a fuel for cooking and also for lighting.

- Gas (cooking gas):

It consists of a mixture of gases and is obtained from natural gas or crude oil fractionation and is used as a fuel for heating and household cooking. It is usually marketed as metal cylindrical canisters or above- or below-ground tanks.

- Electrical energy:

The work required to move an electric charge through a conductor in a given time, and its unit is kilowatt-hours.

- Thermal insulation:

The use of materials with thermal insulation properties during the construction phase or after construction helps reduce heat leakage and transfer from outside the building to the inside in summer and vice versa in winter.

- Photovoltaic energy (Solar):

Solar panels allow the conversion of sunlight into electrical energy, with the primary goal of building sufficient photovoltaic capacity to generate electricity.

- Firewood:

all types of firewood used as fuel.

- Charcoal:

A solid material the main component of which is carbon. It is produced through destructive distillation of firewood while being secluded from air.

- Agricultural residues:

It is the solid residues from the fruits of trees, such as the residues from olive fruits after pressing them, and it has many benefits, as it can be used to generate energy for cooking or heating purposes.

3.5. Statistical unit

The statistical unit in household energy statistics is the household.

3.6. Statistical population

The statistical population for household energy statistics is all households, whether Saudi or non-Saudi, who are habitually resident in the Kingdom of Saudi Arabia.

3.7. Reference area

The household energy statistics cover 13 administrative regions in Saudi Arabia.

3.8. Time coverage

The data is available from the year 2017 to 2023, and time coverage for 2023.

3.9. Base period

Not applicable.

4. Unit of measure

- Some results are reported as percentage (e.g., Percentage of dwellings connected to the electric network.)
- Most results are measured in numerical values (e.g., quantity of electricity consumption).

5. Reference period

References period to the variables or dataset as following:

- Household energy statistics data in terms of residence data, household information, and household characteristics are based on the household's contact history.
- Household energy statistics data are based on data on fuel use, electricity use and

use of biomass (firewood, charcoal, agricultural residues) for the previous reference year.

6. Confidentiality

6.1. Confidentiality – policy

According to the Royal Decree No. 23 dated 07-12-1397, data must always be kept confidential and must be used by GASTAT only for statistical purposes.

Therefore, the data are protected in the data servers of the Authority.

6.2. Confidentiality - data treatment

Data of SMEs survey is presented in right tables in order to summarize, understand, as well as extract their results. Moreover, to compare them with other data, and to obtain statistical significance about the selected study population. However, referring to such data indicated in tables is much easier than going back to check the original questionnaire that may include some data like names and addresses of individuals, and names of data providers, which violates data confidentiality of statistical data.

"Anonymity of data" is one of the most important procedures. To keep data confidential, GASTAT removed information on individual persons, households, or business entities such a way that the respondent cannot be identified either directly such as: (Names, addresses, contact numbers, or identification numbers. etc.) or indirectly (by combining different - especially rare - characteristics of respondents: (age, occupation, education etc.).

7. Release policy

7.1. Release calendar

The Household Energy Statistics Publication is included in the statistical calendar.

7.2. Release calendar access

Available on the: https://www.stats.gov.sa/en/future-releases

7.3. User access

One of GASTAT's objectives is to better meet its clients' needs, so it immediately provides them with the publication's results once the Household Energy Statistics publication is published.

It also receives questions and inquiries of the clients about the Publication and its results through various communication channels, such as:

- GASTAT official website: www.stats.gov.sa
- GASTAT official e-mail address: info@stats.gov.sa
- Client support e-mail: cs@stats.gov.sa
- Official visits to GASTAT's official head office in Riyadh or one of its branches in Saudi Arabia.
- Official letters.
- Statistical telephone: (199009).

8. Frequency of dissemination

Annual.

9. Accessibility and clarity

9.1. News release

The announcements of each publication are available on release calendar as mentioned in 7.2. Release calendar access. The news release can be viewed on the website of GASTAT through the following link:

https://www.stats.gov.sa/en/news

9.2. Publications

GASTAT issues Household Energy Statistics Publications and Reports on a regular basis within a pre-prepared dissemination plan and are published on GASTAT's website. GASTAT is keen to publish its publications in a way that serves all users of different types, including publications in different formats that contain (publication tables, data graphs, indicators, and methodology and quality report) in both English and Arabic.

The results of the Household Energy Statistics are available at:

Household Energy Statistics | General Authority for Statistics (stats.gov.sa)

9.3. On-line database

The data is published on the statistical database

GASTAT (stats.gov.sa)

9.4. Micro-data access

Microdata are unit-level datasets derived from surveys, censuses, and administrative records. These datasets provide detailed insights into individuals, households, businesses, and geographic areas, supporting the development of statistical indicators and in-depth research.

The different types of microdata files to meet different information needs:

• Public use:

It consists sets of records containing information on individual persons, households, or business entities anonymized in such a way that the respondent cannot be identified either directly (by name, address, contact number, identity number etc.) or indirectly (by combining different - especially rare - characteristics of respondents: age, occupation, education etc.).

• Scientific use:

These files established based on specific methodology asked by data requester to extract the datasets with specific characteristics used for strategic studies and decision making as well scientific research purposes on individuals, households and enterprises with no direct identifiers, which have been subject to control methods to protect confidentiality.

Access to Scientific Use Files (SUF) is restricted to authorized researchers who comply with ethical and confidentiality standards. Representative samples of SUF can be obtained through GASTAT's secure platform, "Etaha," while more sensitive datasets are accessible only through secure physical lab environments managed by GASTAT.

9.5. Other

Not available.

9.6. Documentation on methodology

Household Energy Statistics Framework:

The Household Energy Statistics Publication is based on concepts, definitions, and classifications in line with the international recommendations for energy statistics adopted by the Statistics Division of the United Nations.

International recommendations for Energy Statistics

9.7. Quality documentation

Quality documentation covers documentation on methods and standards for assessing, measuring, and monitoring the quality of statistical process and output. It is based on standard quality criteria such as relevance, accuracy and reliability, timeliness and punctuality, accessibility and clarity, comparability, and coherence.

10. Quality management

10.1. Quality assurance

GASTAT declares that it considers the following principles: impartiality, user orientated, quality of processes and output, effectiveness of statistical processes, reducing the workload for respondents.

Quality controls and validation of data are actions carried out throughout the process in different stages such as the data input and data collection and other final controls.

10.2. Quality assessment

GASTAT performs all statistical activities according to a national model (Generic Statistical Business Process Model - GSBPM). According to the GSBPM, the final phase of statistical activities is overall evaluation using information gathered in each phase or sub-process. This information is used to prepare the evaluation report which outlines all the quality issues related to the specific statistical activity and serves as input for improvement actions.

11. Relevance

11.1. User needs

GASTAT's internal users of household energy statistics data:

- International indicators department.
- Strategic Communication and Client Support Department
- Population, Gender, and Diversity Statistics Department
- Price Statistics Department

Some several external users and beneficiaries greatly benefit from Household Energy Statistics, including:

- Government entities.
- Regional and international organizations.
- Research institutions.
- Media.
- Individuals.

The disseminated key variables that used by external users:

- The amount of electricity consumption in the household sector.
- The percentage of electricity sources in the household sector.
- The percentage of fuel used for cooking in the household sector.
- The percentage of households that want to use photovoltaic (solar) energy.
- The percentage of households that are concerned with reducing electricity consumption in their residence.
- The percentage of households that apply energy-saving instructions in the use of electrical appliances.
- Percentage of dwellings with thermal insulation.

11.2. User satisfaction

Not available.

11.3. Completeness

Household Energy Statistics data are based on completed household data where all data are published in the form of statistical indicators, and the status of data is complete.

12. Accuracy and reliability

12.1. Overall accuracy

- The data collected is improved through the researchers, that have been selected according to a set of practical and objective criteria and training program related to the field of work.
- Alert, prevention, and correction rules are applied during the data collection process on the electronic questionnaire for livestock statistics to improve data quality.
- Data is checked with previous years to identify any significant changes in the data.
- The internal consistency of the data is checked before it is finalized.
- The links between variables are checked and coherence between different data series is confirmed.

13. Timeliness and punctuality

13.1. Timeliness

The General Authority for Statistics is committed to applying internationally recognized standards regarding the announcement, clarification of the time of publishing statistics on its official website, as outlined in the statistical calendar, as well as adhering to the announced time of publication. In the event of any delay, updates will be provided accordingly.

13.2. Punctuality

The publication takes place according to the published release dates on the statistical calendar for Household Energy Statistics on the website of the General Authority for Statistics.

The data are available at the expected time, as scheduled in the statistical release calendar, If the publication is delayed, reasons shall be provided.

14. Coherence and comparability

14.1. Comparability - geographical

The data are fully comparable between the administrative regions of Saudi Arabia.

14.2. Comparability - over time

The Household Energy Statistics publication began in 2017 as an annual publication, and the following are the main changes that have occurred in recent years:

- 2020:

Estimated data was relied upon due to the census and the coronavirus pandemic.

- 2021:

The transition to computer-assisted telephone interviews (CATI) was made due to the coronavirus pandemic.

- 2022:

The Computer Assisted Web Interviewing (CAWI) method was added, and the framework of the 2022 General Population and Housing Census was used.

14.3. Coherence- cross domain

Not applicable.

14.3.1. Coherence - sub annual and annual statistics

Not applicable.

14.3.2. Coherence- National Accounts

Not applicable.

14.4. Coherence - internal

Household Energy Statistics estimates have full internal coherence, as they are all based on the same corpus of microdata, and they are calculated using the same estimation methods.

15. Used Resources

Description	Total
Total employees (GASTAT employees and researchers).	80
Number of survey units.	40,592
Total number of days during which data is collected (end date- start date).	54
Average number of interviews carried out daily (throughout data collection phase).	200

16. Data revision

16.1 Data revision - policy

Not applicable, only final results will be published.

16.2. Data revision - practice

Not applicable, only final results will be published.

17. Statistical processing

17.1. Source data

Household Energy Statistics publication data are based on two sources:

First source: Household Energy Survey data, which is the household energy survey.

Second source: from administrative records of household energy statistics.

- Ministry of Energy.

17.2. Frequency of data collection

Annual.

17.3. Data collection

Data collection from the survey:

Household Energy Statistics data is collected through computer-assisted Personal Interviews (CATI).

Data collection from administrative records:

In coordination with GASTAT's relevant departments involved in conducting the survey and managing data collection, the administrative data of the publication of the Household Energy Statistics is obtained from the Ministry of Energy.

The data is stored in the authority's databases after undergoing auditing and review processes following approved statistical methods and recognized quality standards. If errors or discrepancies are discovered, the data is cross-referenced with the data source for correction or clarification.

17.4. Data validation

Data are reviewed and matched to ensure their accuracy and precision in a way that suits their nature with the aim of giving the presented statistics quality and accuracy.

The data of the publication's current year are compared with the data of the previous year to ensure their integrity and consistency in preparation for processing data and extracting and reviewing results.

In addition to the data processing and tabulation to check their accuracy, all the outputs are stored and uploaded to the database after being calculated by GASTAT to be reviewed and processed by specialists in Energy statistics through modern technologies and software designed for this purpose.

17.5. Data compilation

Data Coding:

Interviewers in the Household Energy Statistics collect from respondents, a detailed description of each field. This information is then coded in-house by an automated process, which is reviewed by a small-dedicated team of coding experts using a series of consistency checks.

Data editing:

Specialists of the Energy Statistics team have processed and analyzed data in this stage, and this step was based on the following measures:

- Sorting and arranging data in groups or different categories in a serial order.
- Summarizing detailed data into key points or data.
- Combining many data segments and ensuring their interconnection.
- Processing incomplete or missing data.
- Processing illogical data.
- Converting data into statistically significant data.
- Arranging, presenting, and interpreting data.

Compensation (for non-response cases or incomplete datasets):

Cases of non-response:

The response is analyzed at the level of the completed sample, and the weight is then estimated for each preview unit for dissemination to the entire community.

Incomplete data sets:

The General Authority for Statistics uses statistical methods to process anomalous values and some missing data within the sections of the Household Energy Statistics such as: The use of measures of central tendency at the level of the targeted groups or strata.

Extrapolation and weighting:

After processing the data collected from respondents, survey weights were generated to produce indicator tables by following two main steps in creating survey weights:

- Adjustment of non-response.
- Calibration weight

Applied statistical equations:

GASTAT has relied on the formulas approved by the international standards in calculating the key indicators for Household Energy Statistics., as follows:

- The percentage of households interested in reducing electricity consumption in their residence = (Number of households interested in reducing electricity consumption in their residence / Total households) * 100.
- The percentage of households applying energy conservation instructions in the use of electrical appliances = (Number of households applying applying energy conservation instructions in the use of electrical appliances in their residence / Total households) * 100.
- The percentage of households that want to use photovoltaic (solar) energy in their residence = (number of households that want to use solar energy in their residence / total households) * 100.
- The percentage households using electricity for cooking = (number of households using electricity source for cooking / total households) * 100.
- The percentage of dwellings that use gas (cooking gas) for cooking = (Number of dwellings using gas as a cooking source / Total number of dwellings) * 100.
- The percentage of households using biomass products (firewood, charcoal, agricultural residues) = (number of households using biomass in their residences / total households) * 100.
- Percentage of dwellings with thermal insulation = Number of dwellings with thermal insulation / Total dwellings * 100.

17.6. Adjustment

Not applicable, only final results will be published.

18. Comment