



Description of the process leading to the determination of end-user prices for natural gas and electricity

Introduction:

In an era where energy consumption plays a pivotal role in our daily lives and global economic activities, the accurate determination of end-user prices for natural gas and electricity stands as a fundamental need. Energy price data have a vast impact on consumer spending and inflation.

This paper aims to provide a comprehensive account of the methodology employed by Energy Prices. Through a synergy of data sourced from respondents, collaboration with energy agencies across the European Union (EU) and the United Kingdom and real-time monitoring of local energy news. Data validation is through comparison with data from European energy utilities, making our methodology stand as a robust framework.

Data sources:

Respondents:

Unique to our methodology of price determination is the input of respondents. These are individuals and commercial entities that provide us with data on the prices per kilowatt-hour (or per cubic metre in some countries) that they pay according to their latest contractual obligations. Respondents may receive a compensation for their contributions.

Energy agencies:

Energy Prices maintains active communication and collaboration with energy agencies located in the EU member states and the United Kingdom, that provide us valuable updates on tariffs.

News articles:

numerous articles appear in local news outlets throughout the EU and the UK related to energy prices. Investigative journalism may reveal important details on actual prices paid by households and commercial consumers, making it a valuable source of information.

Data pre-processing:

Data cleaning:

It is crucial to examine the consistency and deviation between recent data inputs from our respondents and their previous submissions. All input is consolidated into a central, off-line database maintained at our premises. Incomplete data is removed, outlying data is filtered. All data is anonymised.

Data standardization:

Ensure that data units, formats, and scales are consistent. For instance, if respondents provide data in different units, they are standardized to Kilowatt-hour. Cubic metres converted to kWh. Prices in other currencies than euro are converted to euro, based on the current exchange rate.

Normalization:

In the normalization process, it is essential to determine the consumption pattern -a bandwidth is observed- to which the price data fits. We have identified four distinct categories of consumption patterns. These categories help us standardize the data, ensuring that it aligns with the appropriate consumption context and scales. See Appendix 1 for the consumer categories identified.

Data analysis:

Weighted average methods are used to determine the price per Kilowatt-hour for all four consumption categories.

General notes:

- EU Average Gross Calorific Value for natural gas is set at 38.48 (MJ/m³) is recognized.
- There is insufficient data to report on the natural gas markets for Cyprus and Malta in all categories. For Finland there is insufficient data to report on the natural gas prices for households.

Contractual:

Two distinct end-user contract models are identified: fixed and variable. The weighting of respondent's input is determined based on the prevalence of these contract models in their respective country.

Geographically:

Respondents are not equally regionally distributed in their respective country. The input from respondents is weighted geographically. Energy news articles are weighted individually.

Data Consistency Checks:

- a. Data consistency is checked by cross-verification between sources of data input -respondents, energy agencies, relevant news articles- in order to detect significant deviation.
- b. Data is checked against historical data and trends to detect anomalies.

Data composition:

Data consist of several price components. These components are not valued in the energy reports. The following components are identified.

Households:

- a. Natural gas, or electricity market price
- b. Main transport of natural gas or transmission of electricity, to local distribution centres.
- c. Local distribution to households
- d. Administrative costs, e.g. standing charges and metering
- e. All applicable taxes: excise duties, value added tax, green taxes, VAT etc.

Commercial:

- a. Natural gas, or electricity market price
- b. Main transport of natural gas, or transmission of electricity.
- c. Local distribution (when applicable)
- d. Administrative costs
- e. All applicable taxes and duties. Not included in the final price are recoverable taxes, Value Added Tax (VAT)

Validation:

Energy Prices compares its generated data with input from energy utilities. Energy Prices has access to relevant data from utilities to cross-verify to detect irregularities. When such is detected, the datapoint is investigated. When re-evaluation provides a similar outcome, the datapoint generated based on Energy Prices' sources is prioritized.

Presentation:

Energy Prices publishes true costs of energy for end-users in Europe. The average figure per country and consumer category.

For example: 0.1290 euro/kWh is paid to supply an office building in Croatia of electricity for the month of February 2022.

Approximately 10 working into the month, Energy Prices publishes data for the preceding month. For example, data for the month of September is published in October. For certain countries reporting per week is optional. Data is mostly published in Microsoft Excel documents.

Appendices:

1. Consumption categories that are reported by Energy Prices.
2. Number of respondents for households and commercial categories (accumulated), per country.

Appendix 1:

The bandwidth applied to annual consumption overall is 20%.

Consumer categories:

1. Households

Commodity	Annual consumption
Electricity	3,500 kWh
Natural gas	15,000 kWh

2. Commercial - Office building

Commodity	Annual consumption
Electricity	100 MWh
Natural gas	500 MWh

3. Commercial – Manufacturing plant

Commodity	Annual consumption
Electricity	2 GWh
Natural gas	10 GWh

4. Commercial – Industrial plant

Commodity	Annual consumption
Electricity	100 GWh
Natural gas	500 GWh

Appendix 2:

Country	Households	Commercial entities
Austria	94	12
Belgium	181	18
Bulgaria	88	7
Croatia	47	5
Cyprus	56	5
Czech Republic	55	8
Denmark	106	10
Estonia	25	12
Finland	77	15
France	86	19
Germany	72	21
Greece	87	12
Hungary	19	8
Ireland	54	12
Italy	68	14
Latvia	12	4
Lithuania	18	6
Luxembourg	60	9
Malta	25	4
Netherlands	135	23
Poland	52	16
Portugal	56	11
Romania	32	7
Slovakia	19	7
Slovenia	34	8
Spain	89	16
Sweden	77	15
United Kingdom	78	15