

## Example of conversion to energy units

When converting to energy units, the network operator adheres to the network code on the operation of the gas market (<https://www.riigiteataja.ee/akt/129072017006>), according to which converting a quantity of gas to energy units means multiplying that quantity by the higher calorific value of the gas, which is calculated on the basis of the following formula:

$$E = H_s \times V,$$

where:

$E$  – the quantity of gas as energy units in kilowatt-hours;

$H_s$  – the higher calorific value of the gas during the balance period, in kilowatt-hours per cubic metre;

$V$  – the quantity of gas measured during the balance period, in cubic metres.

The value of kilowatt-hours is stated with a precision of two decimal places.

Pursuant to the Natural Gas Act, ‘balance period’ means the 24-hour period that starts at 7 a.m. in the morning

and ends at 7 a.m. in the morning of the following day; however, in the examples given, the word ‘day’ is used instead of ‘balance period’ for the sake of simplicity and clarity.

## Examples of converting a quantity of gas into energy units:

- 1) At Margit’s point of consumption, gas consumption is measured with a local meter. At the end of January, the reading at Margit’s point of consumption is 1546, and the reading at the end of the previous month, i.e. December, was 1486. The quantity of gas consumed by Margit in January in cubic metres is calculated as the difference between the readings at the end of January and December:  $1546 - 1486 = 60$

i.e.  $60 \text{ m}^3$  of gas was consumed in January.

Margit’s gas consumption of  $60 \text{ m}^3$  is divided over the 31 days of January (column c) based on the load schedule for the month of January.

The daily quantity consumed by Margit in energy units (in kilowatt-hours, kWh) (column e) is calculated by multiplying each day’s consumption (in  $\text{m}^3$ ) (column c) by the higher calorific value of the same day in kilowatt-hours per cubic metre (column d). For example, the daily consumption (in cubic metres) on 7 January is  $2.40 \text{ m}^3$ , and the calorific value for this day is  $10.57 \text{ kWh/m}^3$ , and the quantity of gas consumed that day in energy units (in kilowatt-hours) is calculated as follows:

$$2.40 \times 10.57 = 25.37 \text{ kWh.}$$

We can calculate the total quantity of gas consumed at Margit’s point of consumption in January in energy units by adding up the all daily quantities of gas in energy units for January, and the total amount is  $631.91 \text{ kWh}$ .

We get the weighted average calorific value at Margit’s point of consumption in January if we divide  $631.91 \text{ kWh}$ , the total quantity of gas consumed in January at the point of consumption in energy units, by  $60 \text{ m}^3$ , the quantity of gas consumed in January in cubic metres:

$$631.91 / 60 = 10.53.$$

The weighted average calorific value at Margit’s point of consumption in January is  $10.53$ .

a	b	c	d	e
Day	Proportion of consumption, %	Consumption, m <sup>3</sup>	Higher calorific value of the gas for the day, in kilowatt-hours per cubic metre, kWh/m <sup>3</sup>	Quantity of gas in energy units, kWh
1	3%	1.80	10.57	19.03
2	2%	1.20	10.57	12.68
3	4%	2.40	10.57	25.37
4	1%	0.60	10.57	6.34
5	4%	2.40	10.57	25.37
6	4%	2.40	10.57	25.37
7	4%	2.40	10.57	25.37
8	3%	1.80	10.57	19.03
9	5%	3.00	10.57	31.71
10	4%	2.40	10.48	25.15
11	2%	1.20	10.48	12.58
12	1%	0.60	10.48	6.29
13	4%	2.40	10.48	25.15
14	5%	3.00	10.48	31.44
15	5%	3.00	10.48	31.44
16	2%	1.20	10.48	12.58
17	4%	2.40	10.50	25.20
18	3%	1.80	10.50	18.90
19	2%	1.20	10.50	12.60
20	2%	1.20	10.50	12.60
21	5%	3.00	10.50	31.50
22	5%	3.00	10.55	31.65
23	3%	1.80	10.55	18.99
24	2%	1.20	10.55	12.66
25	4%	2.40	10.55	25.32
26	4%	2.40	10.55	25.32
27	2%	1.20	10.55	12.66
28	3%	1.80	10.55	18.99
29	3%	1.80	10.55	18.99
30	4%	2.40	10.55	25.32
31	1%	0.60	10.55	6.33
<b>Total</b>	<b>100%</b>	<b>60.00</b>		<b>631.91</b>

2) At Jaan's point of consumption, gas consumption is measured with a remotely readable meter. Jaan's remotely readable meter sends a reading every day; therefore, the quantity of gas consumed by Jaan in a month in cubic metres does not need to be divided by the number of days; instead, each day's consumption in cubic metres is calculated based on the differences in the readings.

Further calculations for Jaan are done based on the same calculation methodology as for Margit.