

ABSTRACT

The thesis is presented in 71 pages. It contains 2 appendixes and a bibliography of 16 references. 35 figures and 12 tables are given in the thesis.

Theme urgency. Nowadays, energy, namely energy supply, is an integral factor not only for ensuring a prosperous and comfortable life of the population, but also for the growth of socio-economic status in all countries of the world. It is safe to say in the modern sense that there is a direct relationship between quality of life and energy consumption. At present, mankind uses a lot of energy to make food, to spend free time, and in many other activities associated with the modern way of life.

Notwithstanding the fact that energy-saving technologies in countries that are developed at a high level and with a high quality of life and that a significant amount of production has been relocated to Asian countries, as well as that currently developing countries have low energy efficiency, consumption in these countries is low. In the ratio between highly developed countries and developing countries, developed countries consume on average 5-6 times more energy. It is obvious that the increase in energy use is accompanied by an increase in living standards.

Also, the relevance of the development of this software for this topic of the thesis is that there are no systems that perform analysis immediately in relation to existing data. Therefore, it was decided to create an appropriate system.

Thesis connection to scientific programs, plans, and topics. This thesis is performed according to the plan of scientific work of the Ptoukha Institute for Demography and Social Studies of the National Academy of Sciences of Ukraine.

Research goal and objectives. The purpose of this thesis is to create a mathematical and software system for assessing the relationship between energy consumption and quality of life.

To solve this problem, it is necessary to solve the following problems:

a) Review and qualitative analysis of existing solutions;

b) Conduct a review and qualitative analysis of mathematical methods for solving the problem, which will be used to assess the relationship between quality of life and energy supply;

c) Prepare input data for analysis;

d) Develop software to implement the selected method;

e) Conduct testing of the developed product, as well as analysis for the results.

Research methods. This paper uses various methods of data classification, namely methods of cluster analysis. These methods are the K - Means method, agglomerative clustering method, spectral clustering method. Data visualization methods such as correlation matrix construction and dimension reduction algorithm are used. Appropriate measures are used to compare the effectiveness of clustering methods.

Scientific novelty of the work is, that there are no systems that perform an evaluation of relevant data immediately.

Practical value of obtained results lies in the ability to determine the relationship between quality of life and electricity consumption according to countries. The results obtained can be compared with each other for evaluation.

Keywords: cluster analysis, quality of life, electricity consumption.