

# Data Collection and Analysis Methods for Effective Municipal Energy Management

Halyna Kopets

*Annotation*<sup>1</sup> – this article discusses the issues of the methods of collection and data analysis for municipal energy management.

*Keywords* – information collection and analysis, computer systems, the municipal energy management.

## I. INTRODUCTION

Ukraine has signed international agreements on sustainable development which provide for appropriation of balanced development of territories and regions, while maintaining an acceptable level of environmental and economic limitations and profitability of organizations that will ensure sustainable development of activities [1]. Therefore, energy efficient usage of resources of enterprises, municipal facilities and institutions is needed while providing educational, medical and social services. For the purpose of efficient usage of energy resources an objective analysis and monitoring of energy usage should be accomplished.

## II. RESEARCH RESULTS

Since 2006 city management of Lviv is using specialized software "Energyplan" in order to collect and analyze information for effective municipal energy management. This software was installed in 115 educational institutions, 27 institutions of culture and tourism, 20 health care facilities, 4 institutions of youth, family and sport, and in all 7 administrative buildings. It uses the PostgreSQL database with the complex structure of tables and functions, and Qt as UI framework.

Significant experience in gathering and analyzing information for effective energy management has NEFCO company (Nordic Environment Finance Corporation). This financial institution was established in 1990 by five Scandinavian countries: Denmark, Finland, Iceland, Norway and Sweden. It supports environmental institutions, particularly aimed at efficient energy consumption in Ukraine, Russia, Belarus and the Baltic countries [2].

In December 2009 in Lviv with the assistance of the project NEFCO energy managers were trained on issues of qualitative data collection and processing of information for municipal energy management. Trainings were conducted by REINERTSEN AS. 54 managers and energy auditors who are working in the municipal sector from all over Ukraine were trained [3]. NEFCO loan program provides various activities and exercises on energy efficiency in Ukraine. Management of training program of municipal investments in energy efficiency is carried out in cooperation with the Ministry of Housing and Public Utility and NAER (National Agency of Efficient Resources Usage of Ukraine). Funding is supported by the Ministry of Foreign Affairs of Norway.

Monitoring and processing of information for municipal energy management is accomplished for:

- objective monitoring and analysis of information on energy use at various municipal facilities;
- energy audit;
- working out ways of using energy more efficiently;
- providing comfortable conditions in educational, medical, utility and other facilities while using energy efficiently;
- efficient use of budget funds for maintenance of municipal buildings;
- effective financial tools to evaluate the feasibility of energy saving measures.

The typical energy efficient measures are:

- systems for monitoring of energy usage;
- operation instructions and servicing of equipment;
- energy efficient showers;
- installation of thermostatic valves;
- warming of pipes and valves;
- recuperation of heat, ventilation system;
- warming of exterior walls and windows;
- installation of new windows.

Calculation in conducting energy audit includes:

- representation of buildings, taking into account their specifics (type of building and its usage);
- economic, technological and technical features of the energy audit;
- calculation of energy (basic and measured/estimated) and adjustment in consumption (building type, climate characteristics, building regulations);
- software for economic calculations and financial instruments [4, 5];
- estimation of energy potential;
- writing energy audit reports.

## III. CONCLUSIONS

Collection, analysis and monitoring of energy usage will ensure energy efficiency in municipal buildings.

## REFERENCES

- [1] Ляпин А.Г., Ярошенко В.С. Проблемы экологии и энергосбережения и некоторые направления их решения // Материалы 3 Международного радиоэлектронного форума «Прикладная радиоэлектроника. Состояние и перспективы развития» МРФ-2008, 22-24 октября. – Т.1. - Ч.2.- Харьков, Украина, 2008. – С.147-149.
- [2] <http://www.nefco.org>.
- [3] <http://www.nefcities.org.ua>
- [4] Планирование и оптимизация: от Вергилия до ... APS-системы // Корпоративные системы, 2006, №27.- С.29-31.
- [5] Котляров А.В. Анализ подходов к оценке окупаемости проектов по внедрению информационных технологий // Материалы МНПК «Современные информационные и электронные технологии».- Одесса, 18-22мая 2009. – С.168.

---

Halyna Kopets – Institute of Economics and Management, Lviv Polytechnic National University, S. Bandery Str., 12, Lviv, 79046, UKRAINE, tel. +380(322)258-21-75. E-mail: gkopets@gmail.com