Preliminary version

Introduction

Functions of Municipalities

The functions implemented by European municipalities with respect to energy put them in different roles, as follows:

- The municipality as energy consumer
- The municipality as energy producer and supplier
- The municipality as regulator and investor in the local energy sector
- The municipality as motivator - a source of motivation for more efficient energy generation and consumption and for protection of the environment.

For the implementation of these functions, local authorities in Europe undertake a variety of actions. A considerable number of them orientate their efforts to reduction of energy consumption and diminishing municipal expenditures for energy costs, minimising harmful impacts on the environment from energy use on the area of the municipality and a change of the behaviour of end-users in the residential sector, the services and local industries.

The municipality as energy consumer

The most typical role of every municipality is that of energy consumer. This is the function, which is most frequently linked to the responsibilities of the municipality and with respect to which its initiative is

anticipated. Energy consumption in the municipality usually covers the following major spheres:

Municipal buildings – Administrative centres, schools, sports facilities, medical and social care establishments, residential buildings (municipal housing and other residential sites, allocated for public use).

Public transport – Service cars, waste collection vehicles, street cleaning motor vehicles, public city and intercity transport (in as much as it is subsidised by the local authorities).

Municipal services – Street lighting, water supply and sewerage.

Simultaneously with its strive for expanding the range of services and improvement of their quality, the municipality is trying to diminish the costs for their provision. Since energy is a significant component of the price of the majority of services provided by it – transportation, medical care, education, etc. – reduction of energy consumption is the main tool for minimising the costs of services.

The main actors in the performance by the municipality of its function as energy consumer are the municipal administration and the end-users and counterparts connected with it. These are the members of the municipal council, the employees of the municipal administration, the users of municipal services and sites, the energy suppliers, external consultants and private companies engaged to implement specific services, investors.

The function of energy consumer is the best developed one in most European municipalities. Energy conservation at end-users at municipal sites might significantly alleviate municipal budgets and become a prerequisite for diminishing of prices and improvement of the quality of services provided by the municipality to its residents.

The most common activities related to implementation by the municipalities of their function of energy consumers

The classification has been compiled of examples from selected European municipalities

Spheres of impact	Possible actions
Municipal buildings	Working out of programmes for retrofit of the municipal building stock
	Energy audits of municipal buildings and working out of projects for energy efficiency improvement
	Implementation of energy efficiency measures in municipal buildings
	Energy management in municipal buildings
Street lighting	Energy auditing of public lighting on streets, public squares and open public areas (parks, gardens, garages)
	Preventive maintenance of the street lighting systems and equipment
	Implementation of energy efficiency measures
Municipal transport	Monitoring of fuel consumption by the public transport
	Preventive maintenance of transport vehicles
	Renewal of the transport vehicles fleet

In some municipalities the opportunities for reduction of energy consumption are significantly lower than in others. For instance, in municipalities in which a policy for reduction of energy consumption has been conducted since years, specific results have already been achieved. Therefore, the possibilities for additional diminishing of consumption might be limited. In municipalities, which are just embarking on the implementation of such measures, these opportunities might turn out to be extremely high. Results in those municipalities may be expected mainly in the following directions:

- monetary savings, which the municipality might use for other more urgent public needs, in addition to the improvement of the quality of energy services;
- energy savings, which might contribute to alleviation of the load on the national or municipal energy system (provided the municipality is energy independent to some extent);
- reduction of environmental pollution (both on the area of the municipality and on a global scale through reduction of greenhouse gases);

- the reduction of energy consumption in municipal buildings might serve as an example and incentive for replication by other public and private energy end-users in the municipality.

The municipality as energy producer and supplier

The role of municipality as energy producer and supplier consists in meeting the energy demand of the inhabitants of the city and the business structures operating on its area. In European countries considerable differences have been noted with respect to the implementation of this function. Some municipalities have a significant influence on energy production, transportation and distribution, others have only limited or no opportunities for impact at all. In recent years this function has manifested rapid development in Europe.

Municipalities perform their function of energy producers and energy suppliers through activities in the following major spheres:

- heat and electricity generation, and sometimes thermal energy for cooling;
- use of renewable energy sources;
- use of solid urban waste as fuel for energy generation;
- energy transportation and distribution to the end-user sites.

In implementation of this function the municipality interacts with different actors, the most typical among them being as follows: municipal councilors and employees from the municipal administration; local authorised companies (for instance companies, which have obtained a concession for district heating supply or have concluded an energy services contract with the municipality, including to perform heat accounting, etc.) and municipal utilities in the power supply sector; public and private, regional and national power and natural gas supply companies.

In this process the municipality collaborates with the local energy consumers and the actors from the economic sphere, financial institutions, the national and regional administration.

In implementation of this major function, the municipality applies measures for optimisation of the processes of energy generation, transportation and distribution among the end-users through the following more important groups of activities:

In energy production

Energy audits of the systems, feasibility studies, improvement of the performance of the system and reduction of the harmful impact on the environment, selection of energy sources depending on their economic, social and political suitability, the use of renewable energy sources (for instance firewood and wood waste, solar energy, wind energy and the energy of water), development of co-generation systems and support for certain independent energy producers, efficient utilisation of solid urban waste, alignment of production to meet the demand of a regulated end-use.

In energy distribution

Energy audits of the systems, improvement of the efficiency of the heat and water distribution chains, signing of contracts for operation of the facilities (for instance for distribution of natural gas and electricity) to the benefit of the municipality and its inhabitants, elaboration of a simplified system for metering of consumption and billing, so that the consumer can be able to control consumption individually, provision of updated information about energy consumption in the city by types of applications, types of consumers and consumer groups, integrated planning of resources for the energy networks, optimisation of the infrastructure of the system in order to eliminate the waste of funds for unnecessary investments.

In energy consumption

Efforts for diminishing of energy consumption per capita, per type of service or per company (without detriment with respect to quality) and undertaking of measures for achievement of this objective (for instance through demand-side energy management), alignment of production and supply according to the energy end-use

(least-cost planning), consideration of consumption as an integral part of the general policy on energy production and distribution.

The most common activities in implementation of the function of the municipality as energy producer and supplier

The classification has been compiled of examples from selected European municipalities

Spheres of impact	Possible actions
Heat and power generation and the use of renewable energy sources (RES)	Energy audits of the systems
	Improvement of the efficiency of heat and power generation
	Introduction of combined heat and power generation
	Identification of the potential for use of RES
Energy transportation and distribution	Optimisation of the systems for energy distribution
	Diminishing of losses in energy transportation and distribution and improvement of the energy efficiency of the systems
	Construction of facilities for energy generation from RES
Energy consumption	Introduction of demand-side energy management
	Introduction of least-cost planning
	Conducting of an integrated policy with respect to energy production, transportation and distribution

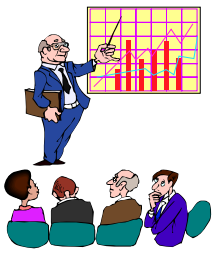
As a result of the implementation of this major function of the municipality the following more significant results may be expected:

- achievement of higher autonomy of the municipality in the energy field;
- achievement of fuel savings;
- development of local energy production;
- expansion of the use of local and renewable energy sources;
- reduction of environmental pollution from energy sources;
- ensuring higher quality of services for the inhabitants and the businesses on the area of the municipality at

a lower price;

- achievement of savings from avoided investments in the energy network;
- energy generation from waste;
- improvement of employment for the local inhabitants.

The municipality as regulator



Through a number of its activities the municipality may plays also the role of regulator on its territory. For instance, land-use planning and organisation of transport systems are responsibilities of the local authority. A number of strategic decisions, related to public works in the city, as well as numerous other decisions that should be made daily, affect directly energy consumption by the inhabitants and the various economic entities on the area of the municipality.

Most frequently the municipality appears in its role of regulator in the following spheres of activities:

- in the elaboration of development plans, which define the basic structure of the cities and their adjacent areas;
- in the separation or combining of different functional zones of the area of the population centre – residence, work and recreation;
- in the design and implementation of transport schemes and programmes and the overall transportation policy on the area of the municipality;
- in the elaboration of spatial development plans (new ones or updating of the existing ones) for entire population centres or separate districts;
- in the formulation of recommendations concerning building standards (for instance orientation of the buildings, thermal engineering requirements for buildings, passive use of solar energy, etc.), in the endorsement of local building rules and standards;
- in the formulation and application of the policy with respect to local taxes, changes and prices;
- in establishment and development of

comprehensively organised micro-districts within the boundaries of the population centres, thus contributing to the alleviation of the daily life of the residents and reducing dependence on motor vehicle traffic.

In the course of decision-making on issues related to the above listed spheres usually different spatial planning considerations have to be taken into account and in the majority of cases the energy-related consequences are overlooked.

The majority of actors involved in these activities are frequently not representatives of the energy sector. These are most frequently municipal councilors and officials from the "Architecture/Urban Planning and Public Works" departments of the municipal administrations, investment companies and developers, architects, urban planners, civil engineering and other specialists, the companies for urban, intercity and regional transport, associations of building owners, ecologists etc., and the entire population of the city, which is ever more often required to change its habits with respect to energy use.

In its capacity of regulator, the municipality most often exercises its impact through the following major actions:

- orientation of the efforts towards broadening and improvement of the services provided by the municipality and diminishing of their price;
- evaluation of different scenarios for development of the energy networks;
- evaluation of the different scenarios for public works and transport arrangements on energy consumption and the levels of harmful emissions;
- application of energy efficiency and prevention of harmful emissions as leading criteria in the evaluation of the projects in the municipality;
- seeking of adequate combinations of urban development functions (residence, work and recreation) with a view to diminishing commuter trips;
- convincing people to refrain from using their private cars by introducing pedestrian zones, limited motor traffic zones, limited travel speed zones etc. and encouragement of the use of public transport at

improved level of the services;

- support for intermodal travel (train – tramway – bus – bicycle – on foot); facilitation and ensuring the safety of travel by bicycle or mopeds, etc.
- facilitation of the opportunities for charging of electricity or gas driven motor vehicles;
- influencing on price policy of local utilities (district hearing companies, water supply and distribution companies, municipal transportation companies, etc.
- encouragement of bio-climatic architecture, passive and active use of solar energy in buildings and the broader regions, and the use of environmentally sound energy sources.

The most common activities in implementation of the function of the municipality as regulator

The classification has been compiled of examples from selected European municipalities

Spheres of impact	Possible actions
Planning of the sustainable development of the municipality	Working out of municipal energy strategies as component parts of the strategies for sustainable development of the regions and municipalities
	Working out of municipal energy programmes and action plans
Spatial and urban development plans	Working out of different options for development of the energy networks
	Evaluation of the impact and selection of optimum versions for energy distribution
	Optimisation of the functional zoning in order to reduce transportation requirements (commuter trips)
	Optimisation of the transport communication schemes with a view to reduction of traffic intensity
	Implementation of pilot bioclimatic (nature-friendly) architectural projects on the area of the municipality
Local building rules, standards and practices	Establishment of energy efficiency as a leading criterion in the evaluation of projects in the municipality
	Study of the opportunities for introduction of local building rules, standards and practices, regulating the bioclimatic (nature-friendly architecture and architectural and civil engineering solutions for high energy performance

Technical infrastructure	Reconstruction of the existing technical infrastructure with a view to minimising energy losses and improvement of energy efficiency
	Construction of a new energy efficient technical infrastructure

The results from the above listed activities most often are manifested in:

- savings of costs as a result of reduction of energy consumption by transport;
- improvement of the living standards in urban areas through better management of the living space;
- reduction of air pollution;
- positive changes in the attitude and behaviour of urban planners and public works experts;
- enhancement of employment opportunities and encouragement of more efficient energy use in industry;
- achievement of energy savings in buildings;
- creation of systems for promotion of energy efficiency.

The municipality as a motivator

Households, companies, manufacturing enterprises and the administration, including the municipal administration itself, are energy end-users. It is their behaviour namely that determines the general energy efficiency performance on the area of the municipality.

At the same time, however, their decisions on these issues are not subject to direct control on the part of the local authority (except for the local administration). The municipality, on the other hand, possesses indirect opportunities for influencing the behaviour of energy consumers. It has the capacity to encourage or sanction them, or in general terms to motivate them in favour of a specific type of behaviour.

There are multiple modalities and tools to motivate energy end-users to conscientiously diminish their

consumption. Prices are only one such tool, however municipalities might apply a number of others as well. Most frequently these tools take the form of specific material or moral incentives, which may be introduced independently or as part of comprehensive incentive programmes for energy efficiency improvement in different spheres.

Various competitions, specific targeted awards, energy efficiency labels or awarding of honorary titles are only a small fraction of the broad range of tools used by local authorities in Europe for fostering energy conservation through changes in the behaviour patterns of end-users. Dissemination of information on efficient energy use, development and realisation of educational programmes and broad offer of advisory services on the issues of efficient energy use are used in many countries as effective tools to motivate end-users to more efficient use of energy.

The function of the municipality as a motivator may be manifested in different spheres of impact. The most often reported ones are as follows:

- space heating and air conditioning in buildings;
- indoor lighting of residential and work premises;
- the use of electric household appliances and computers in the households and at the workplace;
- the modality of use of urban and intercity transport or private motor and non-motor vehicles;
- various technological processes;
- waste management.

The motivating function of the municipality is oriented towards the energy end-users. It is, however, implemented in interaction with different actors in the chain of energy “production-transportation-distribution-consumption”. These actors are above all the following:

End-users

- Households and in a growing degree also individual occupants, commercial sites, banks, schools and universities, administrative services units, hospitals, industrial enterprises, community services companies, transport companies.

Intermediaries

- Different associations (housing associations, transport associations, municipal centres, etc.), trade union and professional associations, NGOs;
- Regional and national energy management *agencies,* energy companies.

The motivating impact of the municipality may be realised through a variety of activities. The most typical among them are as follows:

Awareness raising

- Opening of energy efficiency information offices (accessible to private individuals and companies), dissemination of practical hints on energy efficiency in buildings and transport, publication of municipal newsletter on energy efficiency, implementation of demonstration projects as success stories of energy conservation measures applied by the local authority or private individuals, educational activities in schools and higher educational establishments, advisory services related to procurement of technical and financial assistance.

Incentives

- For broader application of energy audits, for construction of energy efficient buildings, for retrofit of existing buildings for improvement of their thermal performance, for use of energy efficient luminaires, for broader use of public transport and non-motorised mobility equipment, for shifting to behaviour patterns leading to reduction of energy consumption and more rational water use.

Joint actions

- Focusing the information and its massage on the objectives set by the municipality, provision of consultations on the widest possible scale; ensuring broad public participation in the development of the overall energy policy of the municipality, promotion of the dissemination of information about the achieved results; setting up of energy consumers' clubs by categories of end-users.

Powerful tools for realisation of the motivating function of local authorities are local taxes and charges and the incentive programmes.

Local taxes and charges may be used both through limitation of inappropriate behaviour and through encouragement of preferable activities to public benefit. They are able to influence the manner of construction of new buildings and the modalities of retrofit of existing ones, the use of renewables, the modalities of collection of solid urban waste, etc.

Incentive programmes may be based on both material and non-material incentives. The numerous success stories from the practice abroad may serve as a rich source of ideas for the practice in other countries.

The most common activities in implementation of the function of the municipality as motivator

The classification has been compiled of examples from selected European municipalities

Spheres of impact	Possible actions
Investors and investments	Dissemination of information on the advantages of investment in energy efficiency measures
	Dissemination of information about the incentive investment and taxation policy of the municipality
Energy end-users	Dissemination of information about accessible opportunities for more efficient energy use
	Implementation of demonstration projects, which demonstrate the advantages of energy efficiency and practical ways and means to achieve it
	Provision of consultancy support for implementation of energy efficiency projects
	Launching of training programmes aimed at the acquirement of practical knowledge and skills on how to implement energy efficiency projects present
	Introduction of moral and material incentives for improved demand-side energy efficiency
	Promotion of the development and use of public transport for the account of private vehicles
	Promotion of bio-climatic (nature-friendly) architecture

Local taxes and charges	Implementation of a taxation policy aimed at encouraging energy end-users to improve the efficiency of energy use
	Implementation of a taxation policy aimed at encouraging investments in energy efficiency measures

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The four major functions of municipalities in the energy sector determine the feasibility of different initiatives. The combination of these initiatives makes the municipal energy policy a principal component of the local sustainable development policy.