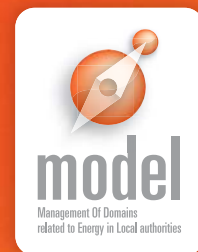


Guide for municipal decision makers and experts



MUNICIPAL ENERGY PLANNING



**Covenant
of Mayors**
Committed to local
sustainable energy



Towards low energy cities with a high quality of life for all!

After the failure of Copenhagen, it is becoming increasingly obvious that local authorities have an important part to play in finding solutions concerning energy and climate issues.

Of course, we need international agreements and commitments from the States to emphasise climate change and sustainable energy policies. Indeed these create favourable legal frameworks and help all types of actors and levels of governments to reorient the trends of their development.

But, in any case nobody other than local authorities, together with citizens and stakeholders, will be able to take practical decisions on the ground and invent a new way of life.

The MODEL project addressed local authorities from countries that recently joined the EU as well as from candidate and neighbouring countries. These countries still have similar obstacles to overcome and solutions to share, for instance in the following fields: mobility and transport, land use planning, district heating, energy retrofitting, new buildings and developments, use of local renewable energy sources, as well as fuel poverty or creation of jobs.

Based on actual practices, this Guide, available in 9 languages, has been prepared to help energy managers and units to fulfil the commitments of the elected members.

Mayors are indeed becoming increasingly conscious of their responsibilities and as a result many are committing themselves to achieving the EU energy and climate goals, in particular through the Covenant of Mayors.

I therefore encourage all local decision makers to use the methodology developed in the framework of the MODEL project without moderation!

A handwritten signature in black ink, appearing to read 'Gérard Magnin'. The signature is stylized and fluid.

Gérard Magnin

Executive Director

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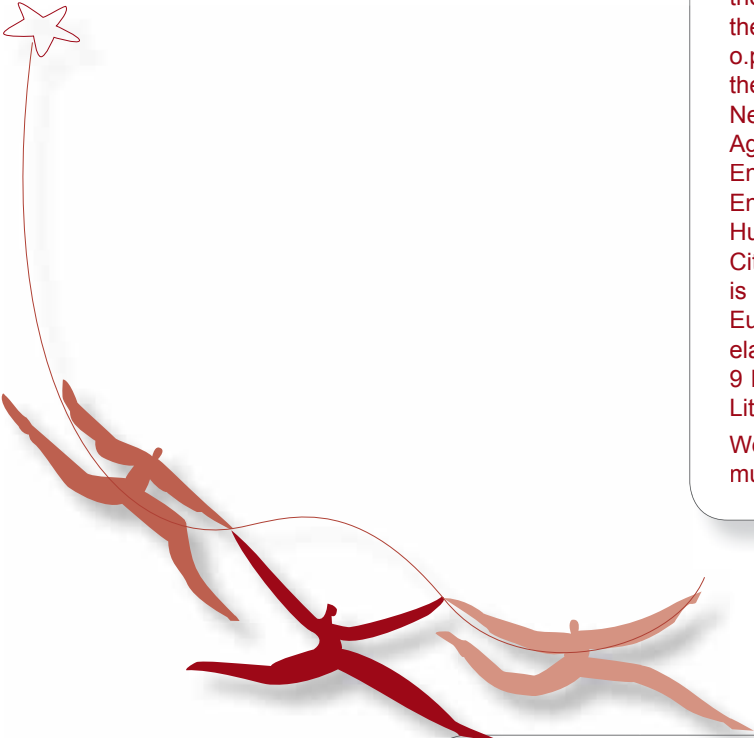
Dedrax / SolAir International

Guide for municipal decision makers and experts

MUNICIPAL ENERGY PLANNING

Common Framework Methodology





This Guide was developed by EnEffect, the Bulgarian Centre for Energy Efficiency, in the framework of the MODEL Project, financed by the European Commission under the Intelligent Energy – Europe Programme (2007-2010). During the elaboration process the herein presented methodology has been reviewed by the project participants and tested under real conditions in the pilot municipalities, nominated by the project.

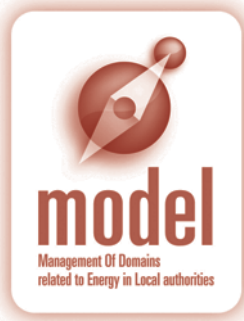
The authors' team acknowledges with thanks the contribution of all those, who assisted for testing and enrichment of the Common Framework Methodology for Municipal Energy Planning, which is the core of this Guide. The overall support of the Association of European Local Authorities Energie-Cités, the Energy Institute Hrvoje Pozar - Croatia, PORSENNA o.p.s. - Czech Republic, the Social Economic Fund - Latvia, the Kaunas Regional Energy Agency - Lithuania, the Polish Network "Energie-Cites", Orase Energie Romania, Razvojna Agencija Sinergija - Slovenia, the Bulgarian Municipal Energy Efficiency Network EcoEnergy, the Regional Energy Centers - Estonia, the Energia Klub - Hungary, the Hungarian Energy Cities Network and the Slovak Energy Cities Network Citenergo during the project implementation is highly appreciated. Special thanks are addressed to the European Commission, which made possible the successful elaboration of this guide and its translation and publication in 9 languages - Bulgarian, Croatian, Czech, English, Latvian, Lithuanian, Polish, Romanian and Slovenian.

We hope that this practical tool will be well received by all municipalities of the MODEL partner countries and beyond.

The MODEL project is also supported by ADEME, the French Agency for the Environment and Energy Management.

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The MODEL project received a special Award for the Most Promising Project on the second edition of the Sustainable Energy Europe Awards Ceremony.



Management Of Domains related to Energy in Local authorities

Originating from the BISE process that gathered 17 countries (New EU Member States, Western Balkans, Ukraine), the so-called “**MODEL**” project – led by Energie-Cités – has brought together 13 partners from 11 countries.

MODEL is the first structuring project initiated by BISE that gives a framework and a budget to work together. It is addressed to Central and Eastern European local authorities and is both practically and politically oriented.

Objectives

The **MODEL** project is called “MODEL” because its goal is to help local authorities from New Member States and Candidate Countries (NMS-CC) to become **models for citizens and other local authorities**.

To achieve this goal, **MODEL** has been working to:

- assist 43 pilot municipalities in planning, implementing and evaluating activities to improve local energy efficiency, focusing on the overall **process management**,
- improve their practical **capacities**,
- prepare the ground for **Sustainable Energy Communities...**

through the following practical activities:

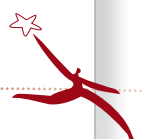
- establishing a **Common Framework Methodology** for the development, implementation and evaluation of Municipal Energy Planning,
- selecting **Shining examples** to offer additional detailed and specific information and lessons for wide dissemination throughout EU local communities,
- implementing **Municipal Energy Programmes** and annual Action Plans,
- organising **Municipal Intelligent Energy Days**,
- **disseminating results** at national, regional and European levels.
- The work was based on the development of networking and dissemination activities at three levels:
 - national to co-ordinate practical activities,
 - regional to exchange experiences between countries having a similar (energy) history,
 - European to gain from experiences and instruments.

Main results


The main direct results that **MODEL** has achieved include:

- Appointing or strengthening local Energy Management Units (**local organisation**),
- Defining a replicable common methodology (**tool**) that influences the management process and is usable in the respective countries,
- Implementation of activities such as Municipal Energy Programmes and annual Action Plans in the pilot municipalities (**practice**) aiming at saving at least 10% of the energy consumed in municipal properties, who will act as models and thus enhance other local authorities to take actions (**dissemination**),
- Promotion of awareness raising events and activities to sensitize all citizens and local stakeholders to possible sustainable actions in the field of energy (**citizenship**),
- Establishment in all countries of sustainable collective capacities such as networks to inform local authorities, initiate, coordinate and support municipal projects, train energy managers, etc. (networking).

To find out more about the MODEL project and achievements, please visit www.energymodel.eu which is available in English as well as in 8 Central and Eastern European languages (Bulgarian, Croatian, Czech, Latvian, Lithuanian, Polish, Romanian and Slovenian) as all major outputs are downloadable.



The Covenant of Mayors

**The European “touch”
to your local Energy & Climate strategy!** 

An initiative without precedent in Europe!

- December 2008: The European Union adopted its Energy & Climate Package, the “3x20”.
- February 2009: 350 mayors of European cities signed the Covenant of Mayors at the European Parliament.
- February 2010: 1,300 mayors are involved in these dynamics.

In addition to contributing to your local Climate & Energy strategy, the Covenant of Mayors provides you with an opportunity to:

- Commit to figure-based targets in your territory,
- Give a European dimension to your local strategy,
- Join forces with European counterparts, for example, to obtain an international Climate agreement.

What is it all about?

- Mayors are committing themselves, on a unilateral basis, to exceeding the EU objectives set for 2020, by reducing CO₂ emissions in their territories by 20%.

What are mayors committing themselves to?

- Establishing a baseline of energy use and generation with corresponding CO₂ emissions in their territories.
- Defining overall and sector figure-based CO₂ emission reduction targets.
- Preparing a Sustainable Energy Action Plan for the medium-term, in liaison with the citizens and local players within one year of signing the Covenant and presenting a first progress report within the first three years.

 **The Covenant of Mayors,
a city initiative encouraged
by the European Commission,
the European Parliament,
and the Committee
of the Regions** 



www.eumayors.eu

The European Commission provides signatory cities with:

- An Office responsible for promoting, co-ordinating and supporting the initiative.
- A Website for promoting and sharing successes.
- Tools and methods (guidelines, templates, etc.) for helping prepare standardised emission inventories and Action Plans in compliance with those in existence.
- Financial facilities, notably from the European Investment Bank, the Structural Funds, etc.
- Events for giving committed cities high political visibility at European level.
- A network of Support Structures for helping the smallest cities.

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Foreword

Why

Municipal energy planning

The times, when demand-side requirements were the major factor for energy generation measuring while the energy production itself was the exclusive monopoly of the states, have long passed away. Decentralization of energy generation, transmission and distribution, on one hand, and the opportunities for improvement of the efficiency of energy consumption, on the other hand, has nowadays changed radically the attitude towards energy in all phases of its realization – from generation to consumption. The possibility for this process to be planned and controlled centrally as well as at the regional and local levels is becoming ever more realistic.

For these reasons, an increasing number of people and institutions are nowadays paying special attention to energy planning as a significant element of their energy policy, but also of the policy regarding climate change. The since-long-ago recognized necessity of development of national energy plans by the Member States is today supplemented by efforts for broad introduction of local (municipal) energy planning. Agreement between top-down planning and bottom-up planning is presently one of the most important tasks, whose implementation will ensure realism and efficiency of the efforts of both central and local authorities.

The Municipal Energy Programme (MEP) is a political document for the development of the local community and is subject to political approval by the local self-government supreme bodies. That's why the methodology of MEP's development is addressed to the local leaders and specialists. It focuses on the activities that the local authority can undertake in the process of municipal energy planning. For the elaboration of strictly specialized surveys and analyses that require specific qualification technical assistance of outside experts or specialized institution should be sought. Nevertheless, the leading role of the local participants in all stages of the local energy planning should not be put under doubt.

Why

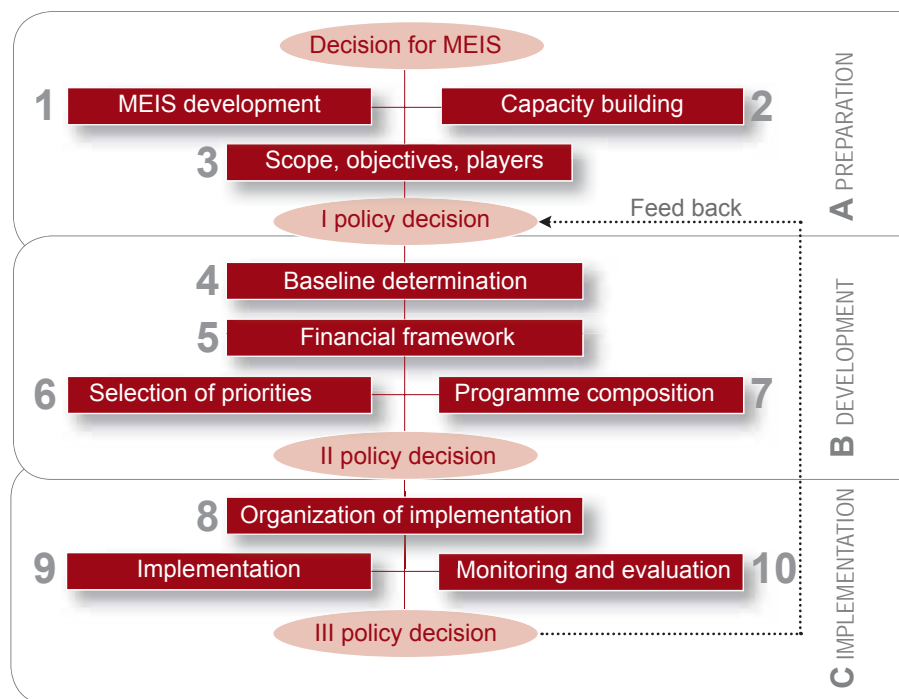
Common framework methodology

In the framework of the MODEL Project of the European Commission (2007-2010) EnEffect¹ has developed this Common Framework Methodology (CFM) on Municipal Energy Planning, designated for application in the new EU Member States. During its elaboration the CFM was repeatedly reviewed by representatives of project partners and later on was also tested in 43 pilot municipalities in these countries. Finally, the CFM was accepted as a **common** methodology for energy planning, because its main principles were agreed and coordinated by all MODEL project partners as appropriate and applicable in their local communities.

In the meantime, various specific changes and additions were made to the original draft, which added ever higher flexibility to the methodology and broadened the scope of its application under various concrete circumstances.

The CFM might be considered as a **framework** methodology for energy planning, which allows creative application in different municipalities. Fundamental principles related to the process were incorporated in the Common Framework Methodology but at the same time broad opportunities were provided also for concrete modifications and contributions by each country.

The overall apprehension of this methodology would gain from the introduction to the results from its pilot implementation in the municipalities involved in the MODEL project. For that reason this edition is accompanied by a CD, in which all case studies related to the pilot application of the methodology in the municipalities are presented. Included in the publication are also several annexes, which may be used for facilitation of the individual steps of the planning process. These auxiliary materials illustrate some model tools for collection and processing of information, which every concrete country and municipality may shape and upgrade according to its specific requirements and needs.



¹ In the framework of a GEF/UNDP-funded project for Bulgaria (1998-2004) the Centre for Energy Efficiency EnEffect developed a Methodology for Municipal Energy Planning, designated for application in the country when this activity was not yet regulated by the national legislation. This methodology was based on the experience of a number of developed countries, such as The Netherlands and USA, and countries in the period of transition, such as the Czech Republic and others. The methodology was applied in more than 40 Bulgarian pilot municipalities and later on was tested fully or partially in municipalities from Serbia, Moldova, Macedonia, etc. The experience from these tests under different conditions formed the grounds, on which in 2004 municipal energy planning became part of the national legislation in Bulgaria by being introduced as a mandatory obligation for all Bulgarian municipalities.

Introduction

What are the functions of municipalities

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

- The municipality as an energy consumer.
- The municipality as an energy producer and supplier.
- The municipality as a regulator and investor in the local energy sector.
- The municipality as a 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 municipalities direct their efforts to reduction of energy consumption and decrease of municipal expenditures for energy costs, reduction of harmful impacts from energy use on the environment of the municipality and change of the behaviour of end-users in the local residential sector, services and industries.

The municipality as energy consumer

The most typical role of every municipality is that of an energy consumer. This is the function, which is most fre-

quently 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 centers, 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 (as far as it is subsidized 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 decrease 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 minimization of the services costs.

The main actors in the performance of the municipal 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 render specific services, investors.

The function of energy consumer is the best developed one in most European municipalities. Energy conservation at end-users and municipal sites might significantly alleviate municipal budgets and become a prerequisite for reduction of prices and improvement of the quality of services provided by the municipality to its residents. (see Table 1).

Table 1. The most common activities implemented by the municipalities related to their function of energy consumer

Spheres of impact	Possible actions
Municipal buildings	Development of programmes for retrofit of the municipal building stock
	Energy audits of municipal buildings and development of projects for energy efficiency improvement
	Implementation of energy efficiency measures in municipal buildings
	Energy management in municipal buildings
Street lighting	Energy auditing of street lighting systems, public squares and open public areas (parks, gardens, parking lots)
	Preventive maintenance of 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

*The classification has been compiled of examples from selected European municipalities.

The municipality as energy producer and supplier

The role of the municipality as an 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 noticed with respect to the implementation of this function. Some municipalities have a significant influence on the energy generation, 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 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.

For the implementation of this function the municipality interacts with different actors, the most typical among which are: municipal councillors and employees from the municipal administration; local authorised companies (for instance companies, which have obtained a concession for district heating supply or have signed energy services contracts with the municipality, including to perform heat accounting, etc.) and municipal utilities in the energy supply sector; public and private, regional and national energy 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 optimization of the processes of energy generation, transportation

and distribution and 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, 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 utilization 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 networks, 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 systems for metering of consumption and billing, so that the consumer can control the 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, optimization of the infrastructure of the system in order to eliminate the waste of funds for unnecessary investments.

In energy consumption

Efforts for decrease of energy consumption per capita, per type of service or per company (without detriment to quality) and implementation 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 energy production and distribution general policy.

Street lighting system renovation (France)

The most important tender in the city of Lille in recent years has been for the city's streets, facades and passages lighting renovation. It involved the Public Lighting Service of the city, five bidders and several subcontractors. The budget of the project was 35. 2 million EUR - 4.4 million EUR per year. This is the first real eco-solution developed by the company, which has been selected to do the renovation. 30% of the energy for the city's public lighting is planned to be generated by renewable energy sources and the renovation is expected to produce 42% savings by 2012. This undertaking is initiated by several partners. The technical specialists were strongly supported by the elected representatives and the citizens living in the neighbourhood. Lille's old lighting systems will become energy efficient and the experience will be transferred to Lille's twinning town Saint-Louis in Senegal. The local engineers in Saint-Louis will be taught by Lille's

technical services department on how to organize the reconstruction of their old lighting system and how to manage and maintain it.

Comfort and security (Bulgaria)

When the street lighting project was first launched, the municipal experts in Svishtov counted about 1200 luminaries, the majority of which were crushed or rusted, one quarter of the total were out of order and another portion were fully depreciated. Upon completion of the project the number of lighting fixtures was increased by more than 18%, the luminance of the street was improved and nevertheless the electricity consumption had dropped almost threefold. The project had a social effect as well – the comfort along the street network had improved and the number of car accidents and criminal assaults diminished. The project is now expanded to cover also the 15 villages belonging to the municipality. [Source: EnEffect, Municipal Energy Planning, a Guide (2004)]

Good practices

A PREPARATION

B DEVELOPMENT

C IMPLEMENTATION

Introduction

Table 2. The most common activities for the implementation of the function of the municipality as energy producer and supplier

Spheres of impact	Possible actions
Heat and power generation and 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
	Decrease of losses in energy transportation and distribution networks 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

*The classification has been compiled of examples from selected European municipalities.

Two approaches (France and Denmark)

There are different examples in this respect. The energy system of France is centralized, while the energy production and distribution in Denmark are strongly decentralized. While in France the larger portion of electricity is generated by nuclear power plants, the Danish energy system is based on the use of various fuels, including renewable energy sources – wind, solar energy, and biomass. In France the energy generation capacities are aggregated and subordinated to a centrally managed energy grid, while in Denmark the individual energy generation plants have relatively small capacity and are spread all over the territory of the country. A number of territorial units possess a closed energy “production-transmission-distribution-consumption” cycle. The national grid in this case plays rather a regulating function [Source: EnEffect, Municipal Energy Planning, a Guide (2004)]

Co-generation (The Netherlands)

One municipal energy company in Amsterdam is implementing a programme for introduction of decentralized small co-generation plants (combined heat and power production). The power generated by them is fed to the grid, which is owned by the same municipal company. The heat energy is used in the administrative buildings of the municipal administration, hospitals, hotels and other big buildings with high energy consumption. The city has a solid waste incineration plant and the electricity generated by it is distributed via the municipal system. [Source: EnEffect, Municipal Energy Planning, a Guide (2004)]

Solar modules for hot water (Denmark)

A large space heating system of highly efficient solar panels is installed in the primary school in Skive. The municipal administration supplies the excess energy from the solar system to the local district heating network. The municipality proceeds with its policy for promotion of the use of RES by installing new solar heating systems in primary schools. [Source: EnEffect, Municipal Energy Planning, a Guide (2004)]

Use of biomass for space heating (Bulgaria, Greece and Austria)

The municipalities of Apriltsi (Bulgaria), Dadia (Greece) and Furth/Triesting (Austria) co-operate for the construction of local district heating systems fueled by waste biomass from carpenters’ workshops and sanitary forest clearing. District heating plants, boiler houses and fuel storage bunkers, from which the fuel is fed automatically to the combustion systems, are built with support from the European Union. At the beginning the local district heating plants supply heat to administrative and public buildings and later on they will extend their services to households as well. [Source: EnEffect, Municipal Energy Planning, a Guide (2004)]

Good practices

A PREPARATION

B DEVELOPMENT

C IMPLEMENTATION

Introduction

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 the local inhabitants' employment.

The municipality as regulator

Through a number of its activities the municipality may play also the role of a regulator on its territory. For instance land-use planning and organization 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 the energy consumption of the population and the various economic entities on the area of the municipality.

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

- Elaboration of development plans, which define the basic structure of the cities and their adjacent areas.
- Separation or combination of different functional zones of the city – residence, working and recreation zones.
- Design and introduction of transport schemes and programmes and the overall transportation policy on the area of the municipality.
- Elaboration of spatial development plans (new or update of the existing ones) for the entire population centres or for separate districts.
- Formulation of recommendations concerning building standards (for instance orientation of the buildings, thermal engineering requirements, passive use of solar energy, etc.) and their endorsement in local building rules and standards.
- Formulation and application of the policy with respect to local taxes, changes and prices.
- Establishment and development of comprehensively organised micro-districts within the boundaries of the residential districts, thus contributing to the alleviation of everyday life of the residents and the dependence on motor vehicle traffic.

Table 3. The most common activities in implementation of the function of the municipality as regulator

Spheres of impact	Possible actions
Planning of the sustainable development of the municipality	Development of municipal energy strategies as component part of the strategies for sustainable development of the regions and municipalities
	Elaboration of municipal energy programmes and action plans
Spatial and urban development plans	Elaboration of different variants for development of the energy networks
	Evaluation of the impact and selection of the optimum version of 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 reduce traffic intensity
Local building rules, standards and practices	Implementation of pilot bioclimatic (nature-friendly) architectural projects on the area of the municipality
	Perception of energy efficiency as a leading criterion in the evaluation of projects in the municipality
Technical infrastructure	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
	Reconstruction of the existing technical infrastructure with a view to minimizing energy losses and improvement of energy efficiency
	Construction of a new energy efficient technical infrastructure
*The classification has been compiled of examples from selected European municipalities.	

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Introduction

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 councillors and officials from the "Architecture/Urban Planning and Public Works" departments of the municipal administrations, investment companies and developers, architects, urban planners, civil engineers and other specialists, companies for urban, intercity and regional transport, associations of building owners, ecologists, etc., and the total population of the city, which is ever more often required to change its habits with respect to energy use.

In its capacity of a 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 decrease of their price.
- Evaluation of different scenarios for development of the energy networks.
- Evaluation of different scenarios for public works and transport arrangements on energy consumption and the levels of harmful emissions.
- Perception of energy efficiency measures and prevention of harmful emissions as leading criteria in the evaluation of the projects in the municipality.
- Search for adequate combinations of urban development

functions (residence, work and recreation) aiming at decrease of 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 bicycles or mopeds, etc.
 - Facilitation of the opportunities for charging of electricity or gas driven motor vehicles.
 - Influencing on price policy of local utilities (district heating 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 use of environmentally sound energy sources. (see Table 3).
- 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 the urban planners and public works experts.
 - Enhancement of employment opportunities and encouragement of more efficient energy use in industry.

Good practices

Directions of action (France)

The Mayor of Montpellier issues directives for actions with respect to construction and retrofit of municipal school buildings. They aim at achieving comfort for pupils and teachers at minimum cost during the entire life cycle of the buildings. Two major tasks are thus resolved: thermal comfort in winter (the use of electricity for space heating is forbidden) and ventilation and lighting in summer (the workplaces are located close to the incoming natural daylight). As a result, the average energy consumption for space heating in the schools has been reduced by 36% to 60% as compared to that of the old school buildings. [Source: Energie-cites]

Urban planning of energy supply (Germany)

As early as in the 1980'es zone planning was introduced in Mannheim, which provided for meeting the energy demand of each zone by using one sole form of energy (beside electricity). By determining zones, which will be supplied only with natural gas or will have district heating, made possible to concentrate all the efforts on the expansion of the respective systems. This in turn led to the improvement of the cost-efficiency of the energy systems. [Source: EnEffect, Municipal Energy Planning, a Guide (2004)]

- Achievement of energy savings in buildings.
- Creation of systems for promotion of energy efficiency.

The municipality as 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 of the local authority (except for the local administration). The municipality, on the other hand, possesses indirect means to influence the behaviour of the 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.

Introduction

There are multiple modalities and tools to motivate energy end-users to conscientiously decrease their consumption. Prices are only one of the tools, however municipalities might use 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.
- Use of efficient electric household appliances and computers in the households and at the workplace.
- Manner 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 "generation-transportation-distribution-consumption". These actors are above all:

- *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 influence of the municipality may be realised through a variety of activities. The most typical among them are:

- *Awareness raising* - opening of energy efficiency information offices (accessible to local residents and companies), dissemination of practical advices 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 local residents, educational activities in schools and

Table 4. The most common activities for the implementation of the function of the municipality as motivator

Spheres of impact	Possible actions
Investors and investments	Dissemination of information on the advantages of investments 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 acquisition of practical knowledge and skills on how to implement energy efficiency projects
	Introduction of moral and material incentives for improved demand-side energy efficiency
	Promotion of the development and use of public transport instead of using private vehicles
Local taxes and charges	Promotion of bio-climatic (nature-friendly) architecture
	Implementation of a taxation policy aimed at encouraging local residents to improve the efficiency of energy use
	Implementation of a taxation policy aimed at encouraging investments in energy efficiency measures

*The classification has been compiled of examples from selected European municipalities.

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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 energy performance, for use of energy efficient luminaries, for broader use of public transport and non-motorised mobility vehicles, for shifting to behaviour patterns leading to reduction of energy consumption and more rational use of water.

- *Joint actions* - focusing the information and its messages 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 information dissemination concerning the achieved results; setting up of energy consumers' clubs by categories of end-users.

Powerful tools for realization of the motivating function of the 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 encouragement of preferable activities to the public benefit. They are able to influence the manner of construction of new buildings and the opportunities for retrofit of existing ones, the use of renewables and the manners for collection of solid urban waste, etc.

- Incentive programmes may be based on both material and non-material incentives. The numerous success stories from international practice may serve as a rich source of ideas for the local practice (see Table 4).

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

Building labeling in Denmark

Building owners may request energy auditing, involving the energy performance characteristics of the building and recommendations about energy conservation measures on the building envelope and the in-house space heating system. Annual control by specially trained experts is performed for buildings with floor area above 1 500 m². The consumption of energy for heating and electricity and water is recorded on a monthly basis. The "Energy label" issued in result of the audit report, demonstrates the energy state of the building by a scale from A1 to C5 for small buildings and from A to M for larger ones (the highest rate being A). Another part of the audit is the "Energy plan", which recommends the feasible energy conservation measures for a short or long term. The analysis of the labeling scheme in 2000 revealed that there is a high energy conservation potential in buildings and that 45% of the owners of the small buildings have already invested in measures for heating savings. Although the energy label is mandatory in transactions related to purchase or sale of real property estates, only 60% of the houses possessed the required certificate. Almost half of the larger buildings cannot yet meet the requirements, however it has been found out that in the audited buildings the energy conservation measures were more expedient and the achieved energy savings higher than in the buildings outside the scheme. [Source: EnEffect, Municipal Energy Planning, a Guide (2004)]

Energy week in Helsinki (Finland)

The Helsinki Energy Management Agency has, in cooperation with MOTIVA (the National Centre for Information on Energy Efficiency and Renewable Energy) organized an Energy Week. All 7 to 8-year old children from a total of 150 schools in the city participated in this national event. They worked on projects related to energy: video films, exhibitions, role-playing, monitoring campaigns, etc. Helsinki was also involved in a pilot project for the development of an action plan for energy management in schools. Guides with useful hints, tips and ideas for pupils and teachers alike are disseminated in schools. [Source: EnEffect, Municipal Energy Planning, a Guide (2004)]

"A tested Watt – a saved Watt" campaign in Bremen (Germany)

One of the largest municipal energy utilities in Germany, Stadtwerke Bremen AG, organized a campaign jointly with the manufacturers OSRAM, PHILIPS and SYLVANIA and the retail network North Sea. The objective of the campaign was to increase the sales of compact fluorescent lamps under the motto "A tested Watt – a saved Watt". Half a million vouchers, which offered a discount of EUR 2,5 on the price of every purchased compact fluorescent lamp, were distributed. The collaboration with the manufacturers and retail traders proved to be constructive, and the campaign turned into a successful undertaking for both the municipal energy supply company and its partners on the energy market. In result, the energy

savings were combined with better services for the customers and with protection of the environment. [Source: EnEffect, Municipal Energy Planning, a Guide (2004)]

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Information campaigns in Bulgaria

Gabrovo. The Municipality of Gabrovo, in a joint effort with EnEffect, conducted information campaigns in a residential building and a school, in which implementation of demonstration projects for energy efficiency retrofit were envisaged. The campaign in the residential building was focused on the benefits from the introduction of thermostatic radiator valves at the end-users. In the school, the emphasis was laid on the benefit from the measures for energy efficiency improvement and on a change of pupils' attitude towards energy. The benefits of the efficient energy use were presented in understandable and appropriate manner. Meetings were held with the pupils and teachers and a specialized competition for children's drawings on the topic "Energy and the Environment" was organized. Special folders, describing the energy efficiency measures to be implemented in the school and the residential building, as well as the benefits from them, were distributed among the children and the tenants of the apartment block.

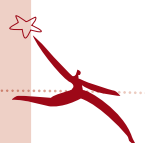
Pleven. In Pleven Municipality the local district heating company conducted a comprehensive campaign for dissemination of knowledge and experience in the field of energy conservation. A special brochure designated for high school pupils was developed. It was elaborated for group work with the students in the classroom and collection of proposals and ideas on how to save energy in everyday life. Demonstration stalls offering printed matter and components for energy conservation were opened at the offices for payment of the

heat consumption bills. A special telephone post was opened, at which the end-users obtained information about the possibilities for energy saving.

Rousse. The Municipal Energy Agency in the city of Rousse organized a meeting of the subscribers of the local District Heating Company and the companies engaged in heat accounting. The objective of the meeting was to acquaint the subscribers of the district heating company with the fact that by the introduction of "heat accounting" energy savings and reduction of the heating costs of the households can be achieved. The meeting and the results were reported in the local press and electronic media. A similar kind of meeting was organized also with the management of the local Water Supply and Sewerage Company, whereat the emphasis was put on the rational use of drinking water. Through this type of events, which will continue in the future, the municipal agency wants to be recognized as the energy consultant of the citizens in relation to all issues concerning the efficient use of heat, electricity and water. [Source: EnEffect, Municipal Energy Planning, a Guide (2004)]

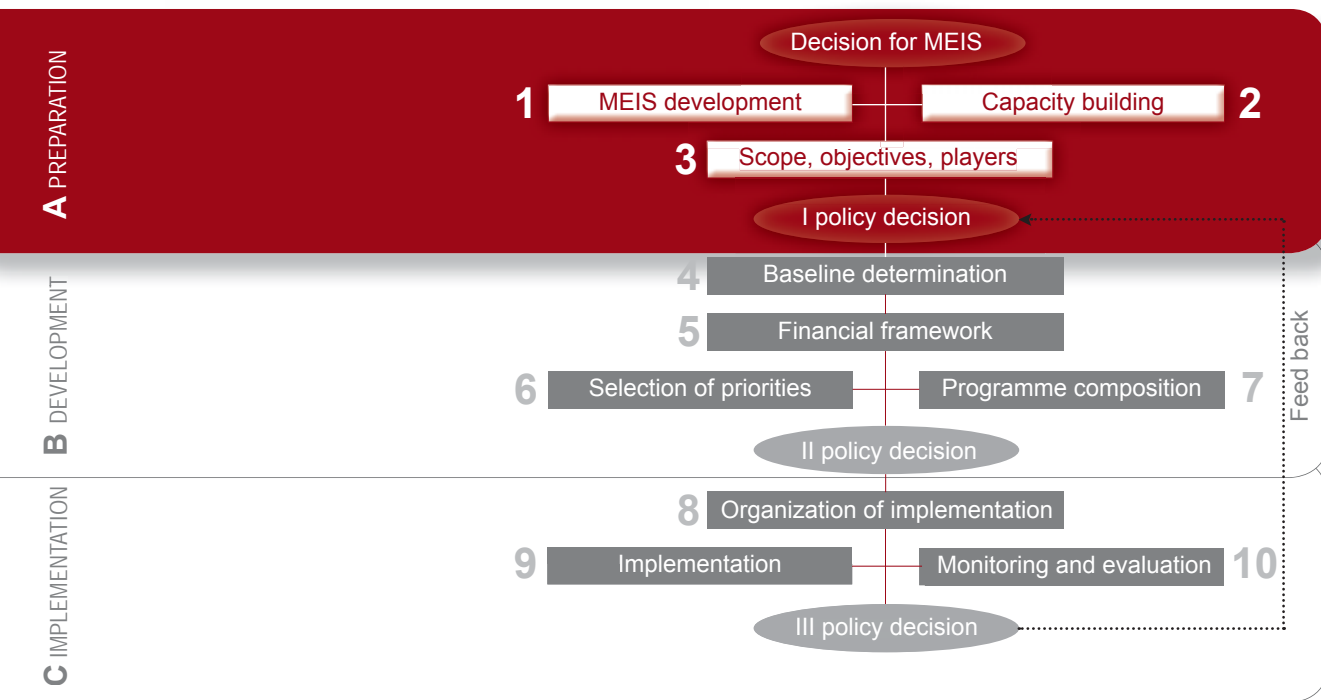
Energy conservation incentives in Gabrovo (Bulgaria)

A programme for encouraging of the subscribers to the local district heating company to purchase and install thermostatic radiator valves was implemented in Gabrovo. Every household, which had purchased one TRV, received another one for free. Further thermostatic radiator valves were distributed for free to low-income citizens. The supplier Danfoss distributed User Guides to all subscribers, who had obtained valves free-of-charge under this programme. Thanks to this initiative Gabrovo became the first municipality in Bulgaria, in which heat accounting was introduced among all subscribers of the system. The campaign was broadly reported in the local press and electronic media and enjoyed popularity among the inhabitants of the city. [Source: EnEffect, Municipal Energy Planning, a Guide (2004)]

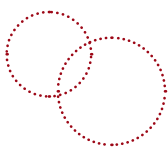


A.

Preparation Stage



In order to proceed with the compilation of a municipal energy efficiency programme a certain preparatory work will be needed to create the necessary prerequisites for energy planning. In the framework of this preparatory work an information database on energy efficiency is created and training of the experts, who will be engaged in the development, management and implementation of the programme, is conducted. During the same period the selection of the approach to and the method for the development of the municipal energy programme are performed, its objectives, scope and spheres of impact are formulated.



step

1



Municipal Energy Information System (MEIS)

Administrative commitments

The process of municipal energy planning starts with a decision for the development of an energy information system of the municipality. In its essence this is a decision of the municipal administration and can be taken by it or by the mayor.

Management decision

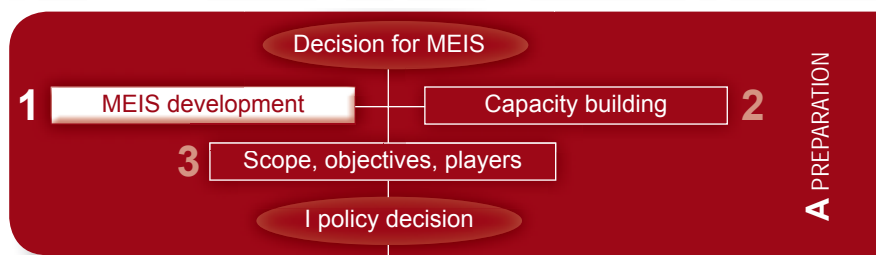
This decision of the management consists of the following major elements:

- Decision for the development of an energy information system of the municipality.
- Commitment of the municipal administration to the information collection process (internal organization of the data collection process).
- Nomination of the leading municipal energy information officer.
- Partnership agreements with local businesses and other players to contribute to the information collection process (external organization of data collection process).

General structure of MEIS

Municipal energy planning is realised on the basis of rich and diverse information about the current state and the prospects for development of the energy sector in the municipalities and the individual sites related to it. This information should contain data about the political and socio-psychological climate, the conditions under which the programme will be compiled and implemented, the general economic state of the municipalities and the individual sites which the programme should influence; about energy production, transportation and consumption; about the efficiency of use of fuels and energy, the technical state of and operating conditions in the sites of impact; the accessible financial resources for implementation of the programme; the capacity of the municipality to work out and manage the implementation of an energy efficiency programme, etc. This voluminous information may serve the needs of planning only if it is full, reliable and well arranged.

The municipal energy information system (MEIS) consists of two layers: (a) database (DB) and (b) analyses and evaluations (AE). Once created, the MEIS requires



permanent maintenance and further development. Therefore, the activities related to its design, maintenance and updating are of permanent nature.

Database

The database contains adequately selected and systemized objective information, which is used to evaluate the energy sector in the municipality as a whole and its individual sectors or sites. Usually, the building of the database requires involvement of different experts. Some of them are officials from the local administration, others are employed in the energy end-use sites, while others are connected with the fuel and energy suppliers. Part of the information in the database may be received from the national and regional statistical centres, another part requires conducting of specific studies, surveys and interviews (see Figure 1).

Development of the database passes through two major actions:

(a) Data collection, which consists of:

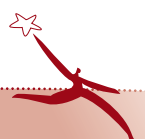
- Identification of the necessary information to be collected.
- Identification of the information sources.
- Provision / development of the appropriate software for data collection, processing and analyses.

(b) Determination of the missing information, which consists of:

- Identification of the information to be generated.
- Targeted studies to generate the missing information.

Technical data

The first steps in the development of the database begin with collection of technical information about the baseline



in the energy sector of the municipality prior to the start of programme implementation. The absence of this basic technical information will render impossible any efforts to either identify the bottlenecks of the energy system or to select the appropriate actions for solution of the existing problems. This part of the future energy database is the most voluminous and the most dynamic one as compared to the other parts. For this reason it needs permanent maintenance and update. A considerable portion of the technical information is easily accessible and may be collected by the experts of the local administration. There is, however, information, which is not available in the appropriate format. Such is, for instance, the detailed information about the individual sites in the municipality.

The basic elements of the technical information are:

- Energy and fuel consumption by end-users.
- Local energy generation by producers.
- Available renewable energy sources (RES).
- Available alternative energy sources.
- Technical status of end-user sites.
- Living comfort in end-user sites.
- Technical documentation of local end-users and energy producers.
- Data from monitoring and evaluation.

The technical data is needed for the determination of the technical status, the living comfort and the potential for energy efficiency improvements.

Non-technical data

The second component of the database is the information about the regulatory, institutional, human and financial capacity of the municipality to implement energy efficiency programmes. The majority of this non-technical information is of descriptive, non-quantified nature. It consists of information about:

- Norms and regulations (incl. local when available)
- Institutions and labour force
- Social capacity / affordability
- Financial framework

The non technical information serves for the determination of the legal and financial framework and the institutional and human capacity of the municipality to develop and implement municipal energy programme.

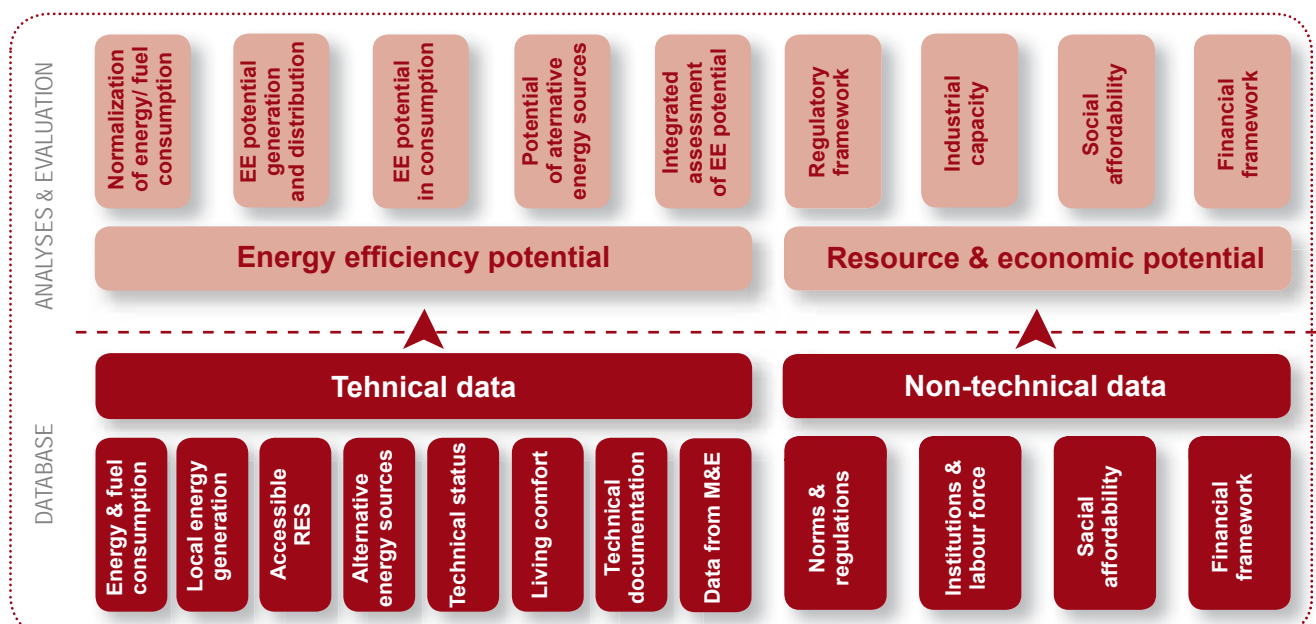
Analysis and assessments

The information in the database is necessary, however not sufficient for the compilation of the energy efficiency programme, since it does not contain data about the energy efficiency potential and does not offer ranking of the demand for energy conservation projects. To this end it is necessary to conduct periodically specific analyses and assessments of the available information.

The analyses and assessments of the information in the database are based mainly on objective technical and economic criteria. They are performed above all with the aim to determine the real potential for energy efficiency improvement in individual sites, in selected target groups or entire sectors of the municipality. On the basis of the thus established potential it is possible to select priority spheres of impact through energy conservation projects or measures.

The analyses and assessments are the connecting link between the objective information (the database) and the political objectives and tasks related to the compilation of the municipal energy efficiency programme. Although the analyses and assessments are performed mainly on the basis of the objective technical and economic information, a certain subjectivism might get manifested

Figure 1. Principle scheme of the Municipal Energy Information System



in the formulation of the evaluations. This subjectivism ensues from the different professional background, life experience and access to information of the experts performing the analyses and formulating the evaluations. The higher the qualification of the experts, the more reliable and objective the analyses and evaluations will be. Different methods, some of which are reviewed in this manual, are applied for minimizing subjectivism in the evaluation of the objective information.

Subject to analysis are both the technical (quantitative) and the non-technical (non-quantifiable) data in the database.

Analysis of technical data

The analyses of the technical data aim at determining the potential for energy efficiency improvements in the municipality and at creating prerequisites for the optimum energy balance achievement.

The analyses and evaluations of the technical data are based mainly on technical and economic criteria and are conducted mainly with the aim to identify the real potential for energy efficiency improvement in individual sites, target groups or entire sectors on the area of the municipality. On the basis of the thus determined potential it is possible to select priority spheres of impact through energy conservation projects or measures.

The analyses and evaluations of the technical information should be performed and updated on a periodical basis, where at the results from these should be stored in the database. In this way they may serve for identification and forecasting of the trends in the development of the energy sector in the municipality.

The analyses are realized in the following major directions:

- Normalization of energy and fuel consumption.
- Determination of the energy efficiency potential in energy generation and distribution.
- Determination of the energy efficiency potential in energy end-use.
- Determination of the potential of alternative energy sources / fuels.
- Assessment of the integrated energy efficiency potential of the municipality.

Analysis of non-technical data

The analyses and evaluations of the non-technical information usually cover the political, regulatory, socio-psychological and other factors. They are performed for the purposes of determining the municipality's capacity to implement an energy programme. This capacity is generally quite dynamic, although not directly related to the energy sector, and is often subject to significant influence by political and socio-psychological factors. For this reason, the analysis and evaluation of the non-technical information in the database is usually performed in the process of development of the programme and are not obligatory part of the energy database.

The analyses of the non-technical data are realized in the following main directions:

- Analyses of the regulatory framework.
- Assessment of the institutional capacity of the municipality.
- Assessment of the social capacity / affordability.
- Assessment of the financial capacity / framework.

The main outcome of the analyses is the determination of the technical and the economic/financial energy efficiency potential of the municipality. The energy efficiency potential is equal to the energy resource that could be secured by energy conservation (energy efficiency measures).

The energy efficiency potential can be determined in different ways:

- By energy audits implementation.
- Through comparisons with pre-defined key numbers.
- Through comparisons with other municipal programmes and projects.

Identification of the energy efficiency potential

The identification of the potential for energy efficiency improvement at the energy end-use is of exceptional importance for the compilation of the programme. The credibility of that potential is the basis for formulation of realistic programme objectives and for correct selection of the tools for their achievement.

The energy saving potential at the end-use may be identified through energy audits of the sites, which include performance of measurements, detailed calculations and analyses. Since this method is relatively expensive and takes a lot of time, the audits are usually conducted at sites, which are already envisaged for renovation. On the basis of the already conducted audits average values of the energy saving potential per m² (for buildings), per resident, etc. can be calculated. They may serve to determine with some approximation the potential of other similar sites (schools, child-care facilities, street lighting systems, etc.). If, for instance, the average estimated energy savings per m² or per pupil have been identified by energy audits in one or more school buildings, this value may be multiplied respectively by the total floor area or by the number of pupils of another school (or a group of schools) and hence to determine the approximate energy saving potential in it.

The bigger the number of similar sites, on the basis of which the average indicators for the energy efficiency potential have been calculated, the higher the degree of credibility of these indicators is. It is possible to extract such average indicators (key values) through data referring to different municipalities. Such data are suitable for calculation of the potential at the national and regional levels. When, however, they are used for a specific municipality, careful consideration should be given to the specific conditions in it and respective adjustment coefficients should be introduced. For instance, if the schools in a given municipality use solid fuel for space

heating, the data about the energy saving potential in them might be much different from that of schools using electricity or liquid fuel for space heating. The climatic characteristics may be taken into account using the degree-days for the specific municipality.

In order to check the credibility of the calculations, the total energy saving potential of a given municipality may be compared to the potential identified for other municipalities with similar structure of energy consumption and similar climate conditions. If significant differences are detected the possible reasons should be carefully analyzed, including whether the assumptions or calculations are correct or not.

Methods of analysis and evaluation of the available information

Scientific methods

There are different scientific methods of analysis and evaluation of the information, some of which require the application of sophisticated software. The application of these complex evaluation methods usually requires specific training and long practice. For this reason, this part of the analysis should be assigned to specialised institutions or complex teams of experts of proven capacities.

Expert assessment

The method of expert assessment is based on the evaluation by selected experts, who may be asked for help by the municipal administration. The expert assessments are made on the basis of collected data about the sites to be surveyed or observations and previous experience. This method may be applied with success in the cases when the subject of the evaluation is a smaller individual site or a target group in a small municipality. Experts from

the administration itself, who have their own impressions of the state in the target groups and individual sites from personal observations, should be included in the expert team.

There are different ways of collection of expert opinions. One very reliable method is to conduct interviews with a specific circle of specialists on the basis of preliminary drawn up survey forms (questionnaires). The elaboration of the questionnaires is a matter of key importance for the reliability of the evaluations. It is desirable to structure them in a way close to the structure of the database. The replies of the experts (the assessment) usually compensate for the absence of reliable objective data or time for conducting specific surveys, studies or measurements (see Figure 2).

Frequently made mistakes

Sometimes the data input is performed mechanically by the accounting or other departments of the municipality. For instance, often the unit for electricity is “thousand kilo-Watt-hours” (‘000 kWh), but the electricity consumption is erroneously recorded in “kilo-Watt-hours” (kWh) and hence 1000 times higher consumption is obtained. Sometimes, for some of the sectors, the input data are in kWh and for others – in ‘000 kWh. The same applies to natural gas, which is usually measured in thousand normal cubic meters (‘000 Nm³). In some cases, however, the information about natural gas is entered in the column of propane-butane gas. Sometimes, no difference is made when the naphtha for space heating is measured in tons or in litres – the two units are recalculated in tons oil equivalent (toe) under different formulas.

The heat for district heating is accounted in kilo-Watt-hours / Mega-Watt-hours (kWh/MWh) depending on the settings of the heat meter. In the reports the value is often quoted in Giga-calories (Gcal) and in the majority of cases it is not re-calculated.

Determination of information sources

Information for municipalities

The basic source of information is the accounting department where invoices for energy and fuels bills are kept with data about dates of payment and prices of the purchased energy / fuels.

The technical departments (territorial development, construction, and infrastructure) normally keep data about the municipal building stock. Similar information is also kept by the management of different buildings (hospitals, schools, kindergartens). With some help from the municipal administration this information could easily be afforded.

The most reliable data about the energy consumption of the street lighting systems is kept by the electric distribution companies. Due to possible conflicts of interest the municipality could keep its own records that

Figure 2. Data collection, processing and reporting of the analyses outcome (Software used by municipalities of the EcoEnergy Municipal energy efficiency network (Bulgaria))

	Quantity	toe	MWh	Amount (EUR)
Electricity (kWh)	27.000	2.319	27.000	3398.00
Heating naphtha (tonnes)	0.000	0.000	0.000	0.00
Heating naphtha (litres)	0.000	0.000	0.000	0.00
Heat (MWh)	0.000	0.000	0.000	0.00
Natural gas (thousand m3)	0.000	0.000	0.000	0.00
Heavy oil (tonnes)	0.000	0.000	0.000	0.00
Propane-butane (tonnes)	0.000	0.000	0.000	0.00
Light ship fuel (litres)	0.000	0.000	0.000	0.00
Light ship fuel (tonnes)	0.000	0.000	0.000	0.00
Gazoil (litres)	0.000	0.000	0.000	0.00
Gazoil (tonnes)	0.000	0.000	0.000	0.00
Wood (m3)	0.000	0.000	0.000	0.00
Coal (tonnes)	0.000	0.000	0.000	0.00
Petrol (litres)	396.000	0.305	3.546	370.00
Diesel oil (litres)	0.000	0.000	0.000	0.00
Water (m3)	0.000			
Total		2.624	30.546	3768.00
Related to heated area in m2 3632.00		kg oe/m2 0.639	kWh/m2 7.434	Amount/m2 0.94

could be compared with the data of the electric distribution companies.

The most reliable is the information received from the energy audits. When this information is available for separate sites only it can be extrapolated with sufficient accuracy to the rest of the similar sites. Such data can be obtained from pilot, demonstration and other types of projects.

Summary information for the residential sector

Data about residential building stock is normally kept by the municipality in the architectural, construction and public works departments and taxation authorities. Summary information about the residential sector is available in the official statistical reviews. Such information is often kept by the energy companies often (central heating and electric distribution companies, etc.).

Information about companies and enterprises

This is the most difficult type of information to be collected. This process can be facilitated to a great extent if the municipal management initiates a constructive dialogue with local businesses and patiently explains the meaning of the development of a municipal energy information system. The best approach is to explain how the business could benefit from the provision of energy security and sustainable development of the municipality.

Certain information about the business can be supplied by the official statistics as well as by the district heating and electric distribution companies on the territory of the municipality.

Information about the available RES

The determination of the potential of RES requires normally the involvement of a specialist who is well acquainted with the technologies for utilization of the different types of RES.

This information should be collected and evaluated with great attention, since it has a strong influence on the management decisions. The best aggregate information is the one, which is compiled on the basis of detailed data about the individual end-use sites. In all other cases the sources of aggregate information should be carefully checked and evaluated by experts.

Information system EcoEnergy (Bulgaria)

For the needs of the municipalities members of the EcoEnergy Municipal Network the Center for Energy Efficiency EnEffect has developed specialized software for survey of energy consumption in municipalities. Using it the municipalities from the network build and maintain their own municipal energy information systems (MEIS), which are an excellent basis for development of municipal energy programmes. MEIS contains basic information about the construction characteristics of the buildings, their technical equipment and energy supply sources, as well as about their physical state and comfort of habitation. In the database are kept actual data about the energy consumption by types of fuels, by periods and technologies, as well as information about energy production on the area of the municipality. On the basis of the entered information are generated reports about energy consumption at different levels (by end-users, by sectors), which provide opportunities for analysis of the energy state of the sites and for determination of the potential for energy savings in the municipality. The system makes it possible to compile other reports as well, depending on the concrete needs. In co-operation with the Norwegian company ENSI the information system was adapted to the needs of different countries and currently it is successfully applied in municipalities from Albania, Georgia, Kazakhstan, Kirgizstan, Macedonia and Russia. [Source: EnEffect]

Information system in the Internet (the Czech Republic)

Specialists from PORSENNNA have, jointly with a software company, developed a computerized tool for building an energy information system intended for the municipalities in the Czech Republic. It is accessible in the Internet in real time. It is used for collection of information for the energy consumption in municipal sites on monthly bases. It also gives access to technical documents, such as results from energy audits, etc. [Source: PORSENNNA]

Software for energy management (Romania)

In 2004 the Energy Agency in Brasov developed specialized software for assisting local authorities in the management of energy and water consumption in the municipality. The use of the software has begun in schools and other municipal buildings, whereby as a result of the processing of the energy and water bills a database has been created for the period 2003-2005. For implementation of this task the municipality has appointed energy managers in every municipal building. Alone during the first stage of use of the software a total of 52 schools were covered, two training courses for energy managers were conducted and two manuals for the energy managers were published. At the same time the database is used for the performance of energy

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audits and for orientation towards concrete measures for reduction of energy and water consumption in the municipality. At present an upgraded version of the software is used. It is used to perform monitoring of energy and water consumption in all schools and kindergartens in Brasov. The monitoring reports are used for localization of inefficient end-users and for conducting of energy auditing of these sites. The energy managers use the software for checking the energy and water bills by comparing them with the data obtained from the metering devices [Source: ABMEE]

SPIN 2020 (Estonia)

SPIN 2020 is a programme accessible in the Internet and designed for identification of opportunities for energy saving in buildings, and hence for protection of the environment and for ensuring sustainable development. The programme allows real estate residents and owners to check their energy consumption in real time and to control it daily, to envisage the necessary improvements and calculate the related costs for their implementation, as well as to broaden their general knowledge about the environment. SPIN 2020 helps the local authorities to compile regional economic plans for development of the habitations as required by law in Estonia, to perform monitoring on energy consumption in real time and analyze it. [Source: City Instruments Best Practice Catalogue]

The energy matrix of Cascais Municipality (Portugal)

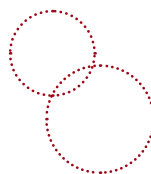
The energy matrix is a tool for development of municipal energy strategies and local policies and for their implementation. It reflects the specificity of the local energy consumption and reveals the main sources of greenhouse gases. The matrix helps to determine the level of GHG emissions for different sectors and social groups – transport, households, industry – and to identify the potential for use of local renewable energy sources. In this way the local politicians are assisted in determining the priorities and working out of sustainable development strategies and policies by promoting more efficient use of energy resources while ensuring competitiveness of the local economy and high standard of living of the local population. [Source: <http://www.cascaisenergia.org>]

ECO SPEED – a modelling tool in Internet (Germany)

Municipalities and districts in Germany may model and calculate their CO₂ emissions by means of the software ECO2-Region, developed jointly by the Swiss company Ecospeed, the Climate Alliance and B. &S.U. The software is based on a standard methodology, which makes it compatible with other programmes. It is easy to use and possesses significant calculation capacities. [For further information: <http://www.co2-kommunalbilanz.de> – in German]

Annexes

A set of practical tools for data collection and analyses is included in the enclosed to this guide CD.





Capacity building

Municipal energy planning is an interdisciplinary process. It requires expert knowledge and experience in different sectors – energy, economy, territorial planning, financing, management, data processing, etc. Knowledge about current legislation and the political and administrative organization of the local self-government is also needed.

Many of the municipalities and the smaller ones in particular, do not dispose of such capacity. This does not mean that municipal energy planning is not suitable for them. Different forms for building or mobilization of the existing capacity are available.

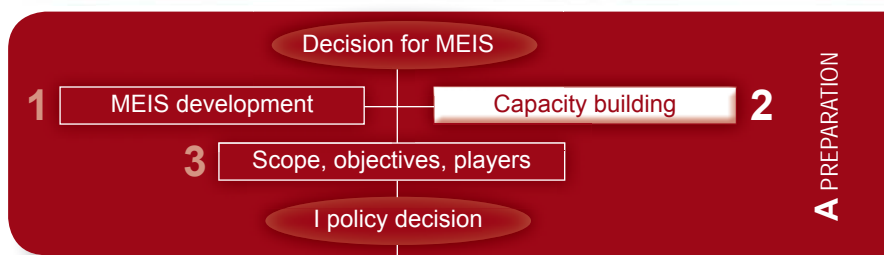
The building of local capacity is a permanent process which starts with the first management decision for the development of a municipal energy information system taken and goes on during the whole process of the energy planning. Due to its specificity this activity is part of the preparatory stage of the process in spite of the fact that it usually continues during the development and implementation of the programme also.

Players in energy management

There are different participants in the energy sector of a municipality but some of them have influence over its planning and management. These are the different public institutions, private companies, NGOs, specialists and citizens. The level of their training to participate in this process is different; different are also the interests they defend in the process of planning and management. This is the reason why the capacity building of the participants in the municipal planning is a complicated and long process.

Central and local authorities

The more centralized an energy system, the higher the ties of decision-making about its development are. Parliaments and governments usually formulate the energy strategy of the countries and make concrete decisions concerning the development of the energy systems. The role of municipalities in this process is quite limited. Municipalities, however, are those who bear the full burden of all hardships and crises in the energy system – the rising prices of fuels and energy, the fuel shortages, the overloading of the national power grid, etc. This is the reason why wide public participation in these processes under different forms is gaining ever-growing importance.



Municipal administration

If we limit ourselves to one single municipality only, we will find that the different activities in the energy sector are connected with different actors.

Municipal administrations are directly responsible for the management of energy consumption in school buildings, hospitals, kindergartens and the municipal administrative buildings. They are also responsible for the state and the operation of the street lighting systems and the public urban and local transport in the residential centres on the area of the municipality.

Wide range of public circles

Besides the municipal administrations, a wide range of public circles, companies and organizations are concerned with and participate directly in the formulation and implementation of the policy for public works on the area of the residential centres. For instance, fostering economic development, construction of roads, building of the technical infrastructure etc. are areas, in which the activities of many stakeholders intersect. A number of technical solutions in these spheres influence directly or indirectly energy efficiency.

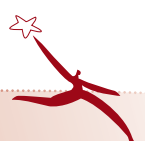
Energy end-users

Energy end-users (households, enterprises and companies) form another group of actors, which is very little dependent on the municipal administration. Their behaviour is formed mainly on the basis of their economic interest and the incentives provided by the legislation but they have strong impact on the general picture of the energy consumption. Therefore, their behaviour is also an object of public concern.

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Energy producers

Energy producers and state-owned, municipal or private (wherever they exist) energy supply companies play a role in the process of energy generation, transportation and distribution. In some European countries individual end-users play simultaneously also the role of independent energy producers.

The art to communicate with the different actors and to build and mobilize their capacity is an important condition for the success of the municipal administration in compiling and implementing an energy strategy enjoying broad public support.

The success of any municipal energy policy depends to a large extent on the ability of the municipal administration to involve in the process of its formulation and implementation the broadest possible circle of actors and stakeholders and to mobilize their knowledge and skills.

Training needs

Building of local capacity should be based on an objective estimation of the needs of training for each of the participants in the process. This estimation is made on the base of the non-technical data of the information system. It characterizes the state of the institutions and specialists engaged in the energy planning and management activities.

The analyses and assessments of the capacity of the municipality to develop and implement an energy efficiency programme aim at identifying the capacity of the local authority to influence the selected target groups or individual sites. The larger portion of these assessments might be realized by the experts of the municipal administration. There are some assessments, however, which require higher specific skills level. In these instances it would be feasible to attract external consultants to perform them. In any case, when some of the assessments are assigned to external contractors, the municipal administration should preserve its leading role in the management and co-ordination of activities like:

- How to mobilize political support for the municipal energy planning.
- How to organize the municipal energy planning process.
- How to identify the needs of external technical assistance.
- How to evaluate the impact of the external consultants.
- How to mobilize funding for the development and implementation of the municipal energy programme.
- How to mobilize social support for the energy programme implementation.

Building or mobilization of the existing capacity is done in two main directions: building of institutional capacity and development of expert capacity.

Institutional capacity

Institutional and human capacity building may precede the elaboration and implementation of the energy programme, although it may be also one of its tasks.

The activities connected with the municipal energy planning can be executed wholly by the municipal administration as well as by outside institutions or experts. Often both approaches are combined and mixed and working groups of municipal administration specialists and outside experts are created. In spite of the concrete decision of the municipality, an employee from the municipal administration should be specially appointed to coordinate the work of the different participants and to be responsible for these activities. It is desirable that this employee holds a higher post in the municipal hierarchy that will give him/her the opportunity not only to coordinate but also to control these activities being in direct contact with the administrative and political management of the municipality. Here follow examples of some of the most frequent decisions each of which requires specific approach for the building of the necessary knowledge and skills as well as for mobilization of the existing capacity.

Municipal energy agency

This is one of the widely used forms in the EU countries, which is encouraged by its programmes and is applied in big and medium size municipalities. Activities that are habitual for the municipal energy agencies are energy audits of municipal sites, awareness raising on energy efficiency issues, fund raising, energy efficiency projects implementation, etc. In some EU countries the municipal energy agencies are organized in national associations while in the framework of the Union they are uniting in networks that actively exchange information and useful practices. The well staffed and functioning municipal energy agency is the best partner of the municipal administration in the preparation, development and implementation of the municipal energy programme.

Municipal energy unit (working group)

Some of the municipalities create specialized energy units (working groups) that support the municipal administrations in the formulation and implementation of their energy policy. These units normally carry out monitoring and control on the supply and consumption of fuels and energy. The members of these units may vary from one person to complex teams of municipal specialists (in the larger municipalities). These teams can be independent units, part of the municipal administration or to be composed by specialist from different departments of the administration – technical, financial, investment. If needed external specialist can be involved in these activities.

The municipal energy units can carry out functions that are similar to those of the municipal energy agencies. As they are staffed by municipal employees their activities are usually limited to the fulfilment of their immediate tasks while municipal planning and management should be the basic subject of activities of such units.

It is highly desirable that the members of these units should pass a specialized training in municipal energy planning and management, which will acquaint them with the energy efficiency issues, the development, financing and implementation of municipal energy efficiency projects and promotion of energy efficiency among citizens and enterprises on the territory of the municipality. Support for such training can be afforded by the national energy agencies, by NGOs as well as by national and international programmes.

Municipal energy manager

The municipal energy manager in the general case is an employee of the municipality, with technical background and is responsible for the realization of the energy policy of the municipality, monitors the state of the municipal energy consumers, the quantity of fuels and energy consumed by them, initiates and develops projects related to the efficient use of energy and looks for sources for their financing. A template of the energy manager's job description is given in Annex 1.

It is possible that the energy manager could be an external expert or an energy service company. Such company can ensure the energy management of several municipalities simultaneously. This is the reason why this can be applied for small neighbour municipalities, with limited local capacity and small number of sites, subject of municipal energy planning, predominantly.

The training of the participants in the process of municipal energy planning can be conducted under different forms – from classical lectures to the contemporary forms of distance or correspondence learning based on specially prepared for the purpose electronic tools.

The Energy Group in Leicester (Great Britain)

Leicester has been declared the first environmental city in Great Britain and has been awarded the title of European Sustainable City. The energy management group has a staff of six and is housed in the administrative building of the municipality. Some of its members participate in the British Energy Institute, which was set up to support those working in that field through information, printed matter and training. Leicester is member of the European network Energie-Cités and since 2007 is its Deputy Chairman. The city has a substantial contribution for the identification of the side (non-energy) benefits from the policy of support for energy efficiency and the use of RES. As early as in 1970 Leicester built low-energy houses and incorporated passive solar heating in several buildings. In 1980 it became the leader in the introduction of co-generation and in 1990 the Municipal Council approved its own Energy Strategy. It is the result of many years of work financed by different sources and serves to present the quantitative benefits from the reduction of energy consumption and formulate the actions, to which the city orients its efforts in order to reduce carbon emissions. The Energy Strategy envisages further development of co-generation, energy efficiency improvement and use of RES, introduction of energy consumption management in the municipality, training and education, renovation of transport. Promotion of the use of bicycles in the city, introduction of incentives for households for energy efficiency improvement, promotion of waste recycling, provision of advisory services for households, etc. are envisaged. Leicester encourages the inhabitants' involvement in the implementation of the energy strategy by organizing series of events, among which the annual Energy Efficiency Week. The activity of the Energy Group is financed by the municipality, as well as through national and European funds. [Source: MODEL database]

Handbook for municipal energy managers (the Czech Republic)

The Czech non-governmental organization PORSENNA has organized training courses for energy managers in the pilot cities under the MODEL Project. In order to improve the effect from the courses a "Handbook for municipal energy managers: boost of energy managers' education" was developed, which covers a broad range of subjects related to the energy management in the municipalities. The handbook may serve both as a guide and as a teaching aid for self-learning. It is distributed to all interested municipalities, including to local politicians. The content covers the following thematic spheres: fundamentals of energy management and energy-related legislation; opportunities for energy saving; energy sources in the municipalities; how to develop and update a municipal energy plan; energy management tools; management of concrete projects; good practices. [Source: PORSENNA]

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Energy group in Kaunas (Lithuania)

An energy group of 10 experts was set up within the framework of the Economic Department of the municipal administration in Kaunas. Each of the experts is responsible for a specific local or international energy or environmental energy-related project, for instance coordinates the heat energy supplies. This group is responsible for all energy-related activities in the municipality. It is supported by the Commission on Economic and Energy Affairs with the Municipal Council. Together with the Kaunas Regional Energy Agency (KREA), the energy group participates in European projects, such as Energy 21, the Display Campaign and the European Energy Award. [Source: KREA]

Municipal energy networks

Romania. The Orase Energie Romania network is a non-governmental organization established in 1994 with the support of the PHARE Programme and the European network "Energie-Cités". Its objective is to support Romanian local authorities in the introduction of high energy efficient technologies, as well as to promote the use of renewable energy sources. The network realizes its objectives through exchange of experience among the member-municipalities, organization of training courses, support of local authorities in the implementation of their energy policies, dissemination of information on innovative experience and technologies, support for the legislative initiatives of the local authorities, conducting of information campaigns, and participation in international and national forums. The network covers 37 municipalities with a total population of 3.9 million people. Its management is performed by a 7-member Management Board, elected for a period of two years. The activity is coordinated by an Executive Director assisted by the Secretariat. Since 1997 the network is collective member of the European network "Energie-Cités". [Source: OER]

Poland. The Polish network "Energie-Cités" (PNEC) was registered in 1994 as a national not-for-profit non-governmental association of municipalities with headquarters in Krakow. The main objectives of the network are to support the development of municipal strategies for energy efficiency and protection of the environment, to promote the use of renewable and local energy sources, to assist the exchange of experience among the municipalities, to facilitate the transfer of know-how and to initiate energy efficiency projects. The objectives of the network are realized through activities in the field of local policy for energy efficiency and RES, integrated energy planning, environmental training, exchange of information on good practices and available funding sources, search for partners. In addition, the network is lobbying at the local and national level, conducts information campaigns and participates in international events. Members of PNEC are 30 municipalities, in which crucial need of training and co-operation for establishment of sustainable development policies has been identified. The network

has participated in many national and international projects. [Source: PNEC]

Bulgaria. EcoEnergy Municipal Energy Efficiency Network is an association of Bulgarian municipalities, which are willing to improve the efficiency of fuels and energy use. It was founded in 1997 with the aim to contribute to the establishment of energy efficiency as an important component of the policy for sustainable development of Bulgarian municipalities. The membership of the network comprises 50 regular and 30 associated members. It is a collective member of the European network "Energie-Cités" and participates in international projects of the European Commission and West European state agencies. Through its activities EcoEnergy assists the municipalities to improve the efficiency of energy end-use. It promotes the collaboration among municipalities in the field of energy efficiency and assists in the development and management of energy efficiency programmes and projects. The network helps its members to overcome the barriers to efficient energy use and to submit proposals for legislative measures in the field of energy efficiency. One of the major activities of EcoEnergy is the training of municipal decision-makers and experts and dissemination of information about achievements in the field of rational use of energy and innovative energy efficient technologies. [Source: EcoEnergy]

Training on MEP (Bulgaria)

EnEffect is the author of a genuine Bulgarian methodology on municipal energy planning (1998-2004). On its basis and with the help of international consultants a team of Bulgarian experts, trainers on municipal energy planning and management were trained. At present these trainers conduct periodically specialized training of municipal top officials and specialists, which learn how to formulate the priorities of the municipal energy policy, to identify energy efficiency projects and to manage the process of their implementation. The training is oriented towards technical experts, specialists in municipal finances and specialists in European integration, programmes and projects of the municipal administrations. The training process is based on the "learning by doing" method, under which in parallel with the theoretical knowledge the trainers and trainees jointly developed concrete municipal energy programmes and investment projects. On the base of the experience accumulated through the training activities and the joint work with the trainees, EnEffect is constantly upgrading both the methodology on energy planning and the training curricula and methods. Since the year 2000 more than 300 municipal experts from almost 130 Bulgarian municipalities have undergone training. [Source: EcoEnergy]

More savings through better management (Poland)

The Bielsko Biala Municipality is individual member of both the Polish network “Energie-Cités” PNEC and the European network “Energie-Cités”. It is one of the Polish municipalities, in which a specialized group for energy management has been set up in the municipal administration. This group operates since 1997 and is responsible for the survey and development of the local energy market by preparing and managing the implementation of the municipal plan for heat, power and natural gas supply. It performs monitoring of the implementation of the currently enforced regulations concerning energy consumption on the territory of the municipality. It also takes care of the energy networks on the part of the investors. In addition, the energy group monitors energy consumption in municipal buildings and recommends investments for retrofit of the existing sites or construction of new ones on the basis of analyses of the economic benefits from their operation in the future. [Source: PNEC]

Energy manager in Naples (Italy)

The Italian Government has obliged public and private organizations, which consume significant quantities of energy, to appoint energy managers. The latter should be responsible for the efficient use of energy and for introduction of RES. In Italy are appointed about 2,650 energy managers. They perform the following major tasks: to register all energy consumers and study the degree of energy efficiency at each one by periodical update of the information; to perform periodical inspections of the manner of operation of the individual end-users; to propose optimization of consumption in compliance with the enforced regulations; to compile programmes for maintenance of the end-users' equipment for the purposes of improvement of their energy efficiency; to perform technical and economic analyses of the possible methods for optimization of energy consumption and of the activities, which might affect it; to propose energy budgets; to analyze the energy-related components of significant investment projects; to draw up economically feasible plans for energy conservation. The regional and local (municipal) authorities define the specific functions of the energy managers and guide their work in compliance with the laws governing energy efficiency. The energy managers are expected to request from the energy distributors to comply with the targets related to energy efficiency and RES. According to the provisions of the law the energy manager issues certificates for compliance of the data from the inspections of the end-users' equipment with the established regulatory

requirements concerning the buildings and systems. The builders or building owners will be allowed to continue the construction and installation works on the sites only if they possess such certificate. The Energy Manager of Naples, who is the Head of the Energy Group with the municipality, coordinates jointly with the Naples Energy Agency (ANEA) all activities related to energy conservation. For instance, ANEA surveys the installation of photovoltaic systems in public buildings. It coordinates also the provision of public subsidies for households for installation of solar collectors and for replacement of electric water heaters by gas-fired units. The agency launched the project “100 solar energy municipalities”, which disseminates information and knowledge about energy efficiency and solar energy among 100 municipalities in Southern Italy. The project implements pilot projects for solar heat and photovoltaic installations in the participating municipalities. [Source: City Instruments Best Practice Catalogue]

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Scope, objectives, players

In these cases it is habitually called Programme for energy efficiency. More and more municipalities are developing their programmes on the base of their four major functions (see 0. Introduction. Functions of Municipalities). In this way they create conditions for balanced and sustainable development of the energy sector. A programme developed in this way is usually called an Energy programme. In our methodology we assume that the strategic target of the municipality should be the development of a full energy programme. The methodology presented here has been developed on this base. This is the reason why we will use this concept from now on.

When the energy programme surveys the functions of the municipality as producer and consumer simultaneously it studies:

- Energy efficiency in the demand side.
- Energy efficiency in the supply side.
- Possibilities for utilization of alternative energy sources and fuels (electricity, oil, natural gas, co-generation, etc.).
- Possibilities for utilization of RES (biomass, production of heat and electricity from solar energy, wind energy, geothermal energy, small hydro-power stations, etc.).

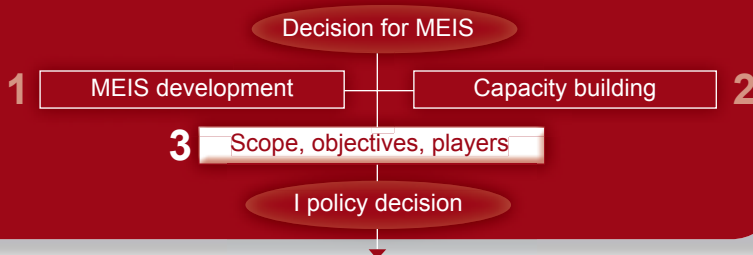
When the programme examines the municipal functions as regulator and motivator it studies the possibilities for:

- Encouragement of energy efficiency measures implementation by local norms and regulations development.
- Encouragement of energy efficiency and utilization of RES by adequate local taxes and fees.
- Development and implementation of local energy efficiency and RES incentive programmes.

The complex energy programme creates prerequisites for the development of a local (municipal) energy balance based on the optimum combination of local demand of energy and the opportunity to satisfy it by the available local resources.

Areas of influence

In some cases the influence of the municipal energy programme is limited to sites that are municipal property and are managed and maintained by the municipal budget. In other cases the influence can cover all sites that are on the territory of the municipality regardless of the ownership. In general the sites that are maintained by the municipal budget are in the focus of the municipal energy programme. The sustainable development of the municipi-



The formulation of the policy objectives, the scope and the spheres of impact is an extremely responsible, complicated and sometimes time-consuming activity, although it is formalized through a single decision of the political decision-making body of the municipality. This decision predetermines also all follow-up activities, related to the compilation of the energy efficiency programme. Although it precedes all remaining actions related to the compilation of the programme, the formulation of the objectives should remain in the focus of attention of the local authority throughout the planning process. The objectives are subject to permanent specification and updating, and sometimes also to radical amendments.

The formulation of the objectives is task of the top policy management of the local authority, since it should mobilize all resources of the municipality and influences the entire future development of the local economy. In Bulgaria, for instance, the Municipal Council is directly engaged in this task.

Scope and areas of influence

The scope and the contents of the municipal energy programme depend on the extent to which the concrete municipality performs its functions in the energy sector. Some municipalities focus their programmes in one sole sphere. Others select a larger number of spheres and distribute their actions among them. In each concrete case the selection of the scope and the contents is performed on the basis of the specific conditions in the respective municipality and in compliance with the political will of the local decision-makers.

Scope of a programme

When a municipal energy programme focuses on the energy demand side mainly, it most often includes projects and actions for improvement of the energy consumption.

pal territory however is closely connected with the rest of the energy end-use sites, of energy generation, transfer and distribution.

In most cases the three basic groups of sites are:

- Sites that are municipal property (schools, hospitals, kindergartens, sport halls, street lighting systems, municipal district heating plants, city/town transport, etc.).
- Sites that are state property (governmental establishments, universities and specialized schools, big regional hospitals, cultural buildings, military objectives, etc.).
- Private sites (residential buildings, local industrial enterprises, agricultural sites, private sites for local services, etc.).

Programme objectives

The formulation of the objectives of the municipal energy programme is usually based on:

- (a) The national policy in the field of energy and the environment.
- (b) The municipal strategies and policies in this field.
- (c) The specific conditions and needs of the respective municipality.

In European countries in recent years an increasing emphasis has been laid on mitigation of greenhouse gas (GHG) emissions. This is answer of the growing concern about climate change and its negative impact. On the other hand, the international commitments addressing climate change have moved up to the top of the agenda as priorities at the European, the national and the local levels.

Different approaches are used for formulation of the objectives of the municipal programmes. They may be assembled in two major groups – political approach and expert approach.

Important requirements

A. The goals and objectives of the Municipal Energy Programme should correspond to the strategic goals and objectives of the Municipal Strategy/Plan for Sustainable Development – MSSD of the municipality (long- or medium-term document).

B. The goals and objectives of the MSSD should correspond to the national development goals (incl. energy and climate protection strategies).

C. The national goals should correspond to the EU goals for sustainable development, incl. energy and climate protection strategies (20%-20%- 20% strategic goal).

Political approach

This approach to formulation of the objectives of the municipal programme is based on the preliminary elaborated political objectives and tasks, around which the structure and contents of the programme are developed. An example for a set in advance policy objective is the reduc-

tion of GHG emissions or the resignation to use electricity generated by nuclear power plants. In the first case the objective is quantified (emissions reduction in percentage), while in the second case a more general idea (a vision) is formulated, characterized by a significant political, emotional and psychological charge. In many cases these objectives ensue from important national priorities or commitments made under international treaties and protocols (UN Framework Convention on Climate Change, Kyoto Protocol). Local authorities in Western Europe are ever more often developing their programmes on the basis of political objectives elaborated in advance.

Environmental goals

In European Union such political target is the mitigation of GHG emissions and the decrease of energy consumption by 20% annually till 2020 towards the levels of 2007. At the same time, for the same period, the production of energy from RES is planned to reach 20% of the total energy production of the EU countries.

On the base of these political targets each EU country defines its own targets, which in their turn become the base for the elaboration of the municipal energy programmes.

Economic goals

The formulation of the economic targets aimed at decrease of the expenditures for energy is typical for many municipalities. As the energy expenditures are among the most sizeable items of the municipal budget, their reduction could release a substantial financial resource that can be used for social or other needs. The economic targets can be connected with the utilization of local energy sources and the production of fuels and energy on the territory of the municipality or with other similar activities. In this way the money for purchasing of fuels and energy can be reduced while revenues for the municipality can be generated through their local production. In this way the bases of the energy independence that more and more municipalities are striving for, may become reality.

Quality of energy services

Very often these targets are helping the municipalities to solve problems connected with the low level of comfort in the public and residential sectors. A typical problem in some countries is the under-heated classrooms and the bad street lighting. In a wider sense the problem for the municipalities is the security of energy supply. The solution of these problems can be the implementation of energy efficiency and RES projects, which can help for the achievement of the desired level of services at a lower price.

Technical and economic approach

Objectives, based on the technical energy efficiency potential

This approach is based on the objective analysis of the state of the energy sector in the specific municipality and of the opportunities for impact on that state, including

through energy efficiency measures. Usually, a significant amount of objective technical and non-technical information should be collected for the needs of these analyses. The analyses help to identify the critical spheres of energy supply or consumption, select the appropriate means (measures) for impact on them, define the priorities and formulate the objectives and estimated results. The technical & economic approach is more accurate and more objective than the political one however it requires considerable preliminary preparations prior to the formulation of the objectives of the programme.

Objectives, based on the economic potential of the municipality

The realization of the technical potential depends on the economical resources of the municipality. Economical resources of the municipality mean not only the possibilities for financing of the activities by the municipal budget but also the opportunities to raise additional funding from specialized funds, trade banks, public private partnerships, etc. The economic potential of the municipality is accessed not only according to its financial status but also according to its institutional and human capacity.

Integrated approach

Usually, in practice the political and the technical & economic approach are combined. The target that is aimed at is to reach the political goals to the greatest extent by the combination of the two approaches rendering account of the objective limitations of technical and economical nature at the same time.

Possible programme objectives

The formulation of the objectives of and the estimated results from a municipal energy programme, as well as the scope and spheres of impact of the programme are performed on the basis of expert assessments and discussions with a wide circle of specialists and representatives of the broad public. This process is usually led by a specially set up team of experts from the municipality, which prepares a report to the Municipal Council with a draft-proposal for decision. The objectives, which the local authority lays down in its energy programme, should ensue from the real circumstances and demand in the concrete municipality. Therefore, they might turn out to be quite different for the different municipalities. Special attention should be given to this step in every specific case. It should be implemented under conditions of maximum public participation and should build on the entire intellectual potential of the municipality.

The energy sector in the municipalities is an extremely sensitive topic and every action in this field casts its shade over a number of other spheres of public activity. For this reason, the formulation of the objectives of the municipal energy programme should be performed in the framework of the broader programmes for sustainable development of the municipality and the region. It should comply with the strategic development objectives and correspond to

the public needs and expectations. Several examples of possible objectives of the municipal energy programme are listed below.

Reduction of the local authority's energy costs

One possible objective of a municipal energy programme is, for instance, the reduction of the energy costs (bills) paid out of the municipal budget. Formulated in this manner, the objective might orient the actions also to measures for reduction of the expenditures irrespective of the rest of the consequences these measures might entail. Sometimes municipalities allow temporary deterioration of the quality of the provided services – partial switch off of the installed heating units and/or lighting fixtures, lowering of the indoor temperature and/or shortening of the heating periods, etc. Such measures may be admissible only temporary, for short periods of time in the event of acute financial problems. Reasonable reduction of the energy costs paid out of the municipal budget can, however, be achieved through energy efficiency measures, which provide for preservation of the quality of the services or even its improvement. It is such measures that should be laid down in the energy programmes of municipalities.

Reduction of the end-users' energy costs

The municipal leadership might set an objective to reduce the energy costs at energy end-user sites not owned or maintained by the municipality and therefore costs not paid by the municipal budget – households, small and medium-size enterprises, industrial enterprises. Through the thus formulated objective the local authority might leverage indirect benefits for the municipality. By alleviating the energy costs burden of the households it might moderate social tensions and by encouraging the local businesses it might increase the taxation revenue to the local budget. This objective is normally achieved through methods of indirect impact. Such tools are, for instance, the urban development plans and the engineering infrastructure plans, the plans of the transport communications in human settlements. Effective tools of impact are the information and awareness raising campaigns, incentive programmes, etc. In the implementation of objectives of this kind the municipality may comprehensively fulfil its functions of regulator, investor and motivator.

Improvement of the quality of energy services

Objective of the municipal energy programme may also be the improvement of the quality of energy services. Improvement of the quality of lighting and space heating often means to increase the degree of illumination and the temperature, where they are still below the hygienic norms. This may lead to increase of energy consumption. The most natural and accessible tool to prevent incurring additional energy costs is to implement measures for demand-side energy efficiency improvement. These measures may produce also a number of additional ef-

facts, such as stabilization of heat supply, improvement of the maintenance of the systems by the district heating company, as well as upgrading of the heat accounting system. Improvement of the quality of energy services might include also programmes for promotion of energy efficiency and programmes for raising the loyalty of end-users to the energy suppliers, etc.

Reduction of energy prices

When a municipality is adequately performing its function of an energy producer and energy supplier, it may set as an objective to reduce the energy price, which end-users pay per unit consumed energy. This may be achieved by setting the price and the price rate on the basis of the full and real production costs without direct or indirect subsidies and in the event that the municipality has the opportunity to influence the energy production. It may be anticipated that in the future this will become more and more realistic opportunity for many municipalities.

Reduction of GHG emissions

Municipalities are among the major energy consumers and their responsibilities for the implementation of the commitments under the Kyoto Protocol will depend to a significant extent on their engagement in activities for energy efficiency improvement. For this reason municipal energy programmes will increasingly include the reduction of GHG emissions in their strategic objectives.

Combination of several objectives

In their energy programmes the municipalities may lay down broader objectives, which are a combination of several of the above mentioned ones. For instance, reduction of budgetary expenditures for energy costs might be combined with the objective for gradual improvement of the quality of energy services. Energy conservation might be tied up to obligations for reduction of greenhouse gases, etc.

The model objectives reviewed above do not exhaust the existing multitude of opportunities. They represent only a small fraction of the most common cases, which demonstrate how specific and how responsible exercise the formulation of the objectives of a municipal energy programme are so that they can correspond to the actual needs and expectations of the people. The formulation of the objectives is made by means of a declaration, which should clearly spell out:

- The level of progress expected to be achieved as a result of the implementation of the programme.
- The baseline (scenario), which will be used as a reference for measuring the progress.
- The time frame for achievement of the set objectives.

In formulating the objectives it is necessary to determine also the minimum levels of success, which have to be achieved or exceeded by the programme. Results below these minimum values should be evaluated as failure. Defining the criteria for cost-effectiveness is a matter of particular importance. On the base of these criteria you may

approve or reject a project or evaluate the results from its implementation. When the available funds for implementation of the programme are gravely limited, it might become necessary to introduce other criteria for selection of priorities. This set of criteria is also subject to determination by a political decision of the local authority.

Players in the MEP process

An important condition for the successful elaboration and implementation of the municipal energy programme is the availability of well-trained specialists and institutions. Different approaches have been observed with respect to the procurement of the institutional and human capacity needed for the programmes. In the majority of European countries besides the capacity of the local specialists also the human potential of the local energy companies, which are municipal property, is used as well as that of the energy agencies and specialized consultants.

Existing structures

In the majority of cases the structures of the municipal administration are actively involved in the development and implementation of the energy programmes.

Austria and Great Britain. The environmental protection department in Graz is responsible for both the elaboration of the municipal energy programme and for its implementation. Initially, the energy department of the City Council in Leicester, Great Britain was responsible only for achieving savings in the municipal buildings. Gradually, its tasks were broadened to cover all spheres of energy consumption. This department is responsible also for the compilation of the municipal energy action plan.

Bulgaria. The departments responsible for the technical infrastructure, regional development, the environment and finances are the most frequently encountered participants in the development and implementation of the municipal energy programmes in the municipalities from the Bulgarian EcoEnergy network.

New structures

In a number of cases special new administrative structures are set up for the development and coordination of the implementation of the municipal energy programmes. In many European cities specialized regional, municipal and island energy agencies have been created, which provide active assistance to the local authorities in the study and solution of problems related to energy efficiency and protection of the environment. The establishment and activities of these agencies are supported by programmes of the European Commission.

Examples

Examples

Germany. There are different examples of innovative administrative structures or working groups of experts for the development and coordination of the implementation of municipal energy programmes. Independent departments for rational energy use have been set up at the environmental offices in Heidelberg, Mainz and Stuttgart and at the offices for high-rise housing in Duisburg, Freiburg and Cologne. In Bredstadt a coordinator on energy issues has been nominated, who is responsible for the management and coordination of the specific activities of a working group of experts from different departments of the local administration.

Poland. In Bielsko Biala an energy management office was set up. It manages municipal property and coordinates the activities of the different departments of the local authority related to the development and implementation of the energy programme.

Bulgaria. With the creation of the municipal energy efficiency offices with the local administrations in the municipalities of the EcoEnergy Municipal Energy Efficiency Network have undertaken the organizational and institutional back-up of the activities related to development and implementation of the energy efficiency programmes.

Local energy companies

Local energy companies are important actors in the development and implementation of the energy programmes. They play the most significant role in the cases when their owners are the municipalities.

Examples

Denmark. The local energy utility in Copenhagen is the main driving force of the implementation of numerous initiatives in the field of efficient energy production and energy end-use.

Germany. The municipalities of Saarbrücken and Hanover are owners of the local energy utilities. For this reason the energy programmes are developed and implemented jointly by the municipality and the utilities.

Examples

Austria. Four working groups of representatives of the utilities, the local authorities, companies and NGOs have been set up with the environmental protection department in Graz and consultancy services from the Austrian Energy Agency have been used. Each of the working groups focuses its activities on different spheres of impact.

Great Britain. In Leicester the energy plan of action is developed in close cooperation with the energy working group, among whose members are representatives of the public, the private sector and NGOs. In this way un-

External consultants

External resources are also mobilized for the development and implementation of the municipal energy programmes.

First political decision (FPD)

Approval of the political objectives

The decision, by virtue of which the objectives of the municipal energy programme are formulated, is a political act. The top decision-making body in the municipality – the Municipal Council – is the one that should take up the responsibility for it. Approval of the objectives of and the expected results from the municipal energy programme is the first political decision in the energy planning process. The specific significance and responsibility of this decision ensues from the fact that in practical terms the objectives of the programme predetermine the entire further planning process and the selection of the spheres of impact of the different actors in the energy sector on the area of the municipality.

The political decision to be made by the Municipal Council consists of two main parts:

(a) Decision for the development of an energy programme.

This part of the decision defines the general deadlines and responsible officers, as well as the funds allocated by the municipality for the development effort.

(b) Decision for the approval of the programme objectives.

This decision outlines the most general parameters of the objectives.

It is advisable, prior to the submission of the draft-decision for approval by the Municipal Council, to acquaint the members of the specialized commissions with the Council about the draft decision. Checking the public opinion and winning public support for the decision may also contribute significantly for the definition of the proposed objectives with greater precision and to convince the Municipal Council in their feasibility.

der the municipal guidance are involved and motivated the ordinary citizens who also take part in the implementation of the plan.

Poland. The services of a specialized organization for investigations, design and implementation have been used in the development of the plan of the Municipality of Szczecin.

Towards mandatory energy planning (Estonia)

In Estonia municipal energy planning has been practiced for more than 10 years now. It was first launched in 1998 as part of a project financed under the PHARE Programme. In the framework of the project technical assistance was rendered to more than 40 small and medium-size Estonian municipalities for the development of their energy plans and more than 80 municipal experts participated in a specialized training course in energy planning. A set of handbooks and teaching aids on planning was developed as well. Five main steps are distinguished in the planning process: identification of the real energy consumption; forecast of the future energy demand; formulation of the necessary actions and selection of priorities; compilation of an Action Plan; implementation and coordination. The practice proved that the elaboration of the municipal energy programme and conducting of all the surveys related to it cannot be realized by individual experts alone. It requires the involvement of multi-disciplinary professional teams. These teams are usually guided by the municipal administration and are composed by: the head of the administration, who has the authority to lobby for political support and to procure the necessary human and financial resource; the manager of the local district heating company; representatives of other energy supply companies and key fuel suppliers; representatives of the major consumers (households, services, industry), as well as experts in energy technologies and planning techniques. The functions of the individual participants are carefully determined. After the project completion this practice continues to be operational, although local energy planning is as yet not mandatory in the country. [Source: Regional Energy Centers REC]

The municipal energy programme as a development tool (Slovenia)

The Energy Law in Slovenia obliges municipalities to develop their own energy plans, which are the basic tool for implementation of a local energy policy. The practice in Slovenia has forced the municipalities' ideas on the energy programme as a study, which presents the holistic conception of the municipality for energy production and consumption on its territory. In strive for sustainable development every municipality in Slovenia tries to lead balanced energy policy. The Municipal Energy Programme includes different scenarios for the development of one municipality or a group of municipalities, and action plans for medium-term and short-term periods. On that basis are prepared investment projects for energy efficiency improvement and for security of energy supply at minimum cost that spare the environment. The municipal energy programmes are oriented towards the use of local energy resources, including renewable energy sources, by linking them to the renovation of municipal buildings. In view of the high public benefit from the municipal energy programmes, the Ministry of Spatial Planning

is subsidizing 50% of the costs for their elaboration in compliance with the contracts between the local authorities and the programme designers. [Source: MODEL database]

Both energy generation and consumption – elements of a municipal energy programme (the Czech Republic)

One Czech municipality has included in its programme both energy consumption and energy generation on its territory. This approach is always recommended but seldom successfully implemented, since municipalities usually do not have at hand information about the energy generation potential and do not possess adequate experience in that field. The Czech municipality, however, has several years experience already as a result of the implementation of a project for construction of a co-generation plant, based entirely on the use of natural gas. The municipality elaborated an energy balance to find out to what extent the new production of heat and power can satisfy the future demand of the municipality. After training and long discussions the Municipal Council decided to vote for a model of co-generation that will be based on natural gas, as well as on solar energy. (Source: PORSENNA)

From strategy to actions (Romania)

Brasov is one of the first Romanian municipalities, which joined the Agenda 21 Programme. Currently the Municipal Energy Management Agency (ABMEE) is the major factor in the development and implementation of the municipal energy strategy. In implementation of that strategy and of an international project a proposal was drafted for new standards for energy performance of buildings. Based on this proposal a regulation was developed for energy efficiency certification of buildings. The proposal for new standards and regulation has been compiled after profound analysis of the existing regulatory framework and the pilot certification of 24 buildings in a pre-selected city district. After summarizing the results from the pilot application of the new standards the final version of the standards and regulation, designed for both new and existing buildings, have been approved. In implementation of the energy strategy the municipality has decided to fulfil a plan for replacement of the existing co-generation capacities by more efficient systems and to review its approach to RES. The awareness level was also increased while the local authorities were getting feedback from the end-users about their expectations and needs. [Source: ABMEE]

Good practices

A PREPARATION

B DEVELOPMENT

C IMPLEMENTATION

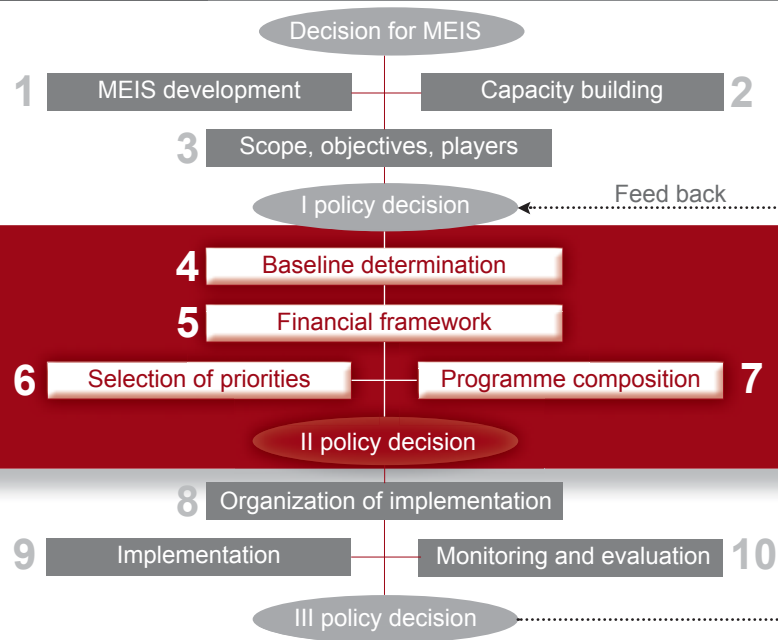
B.

Development Stage

A PREPARATION

B DEVELOPMENT

C IMPLEMENTATION



Energy planning is a process designed to formulate short-term and long-term policy objectives and to identify activities, tools and deadlines for their achievement. The elaboration of the programme passes through the following major steps: (4) Determination of the baseline in the municipality prior to the start of programme design; (5) Determination of the financial framework of the programme; (6) Selection of priority fields, towards which the impact of the programme will be oriented; (7) Composition of the municipal energy programme.

The compiled programme should be approved by the Municipal Council, after which its implementation may start, as well as the survey, analysis and evaluation (monitoring) of the results from the implementation of the programme.



Baseline determination

The activities under this step are based on the data about the individual sites. When the municipality has a database about the energy production, energy consumption and the status of the sites, the determination of the baseline takes relatively short time. If, however, the information database is not in place, it will be necessary to conduct the preliminary work (see Step 1).

In the course of this step the available information about the status of the sites prior to the implementation of the programme (initial status or baseline) is summarized.

The baseline is a set of data that describes the status before the municipal energy programme implementation. The baseline serves as the starting point for evaluation of the outcomes and the impact of the programme implementation, which are equal to the difference between the initial status (the baseline) and the status after the programme completion.

What does the baseline consist of?

Technical data

Technical data show the produced and consumed energy, as well as the status of the systems for production and consumption, the potential for energy efficiency and the available RES on the territory of the municipality. Data if needed for:

- Energy generation / supply.
- Energy demand / consumption.
- Technical / physical status of the sites.
- Utilization / living comfort.

Non-technical data

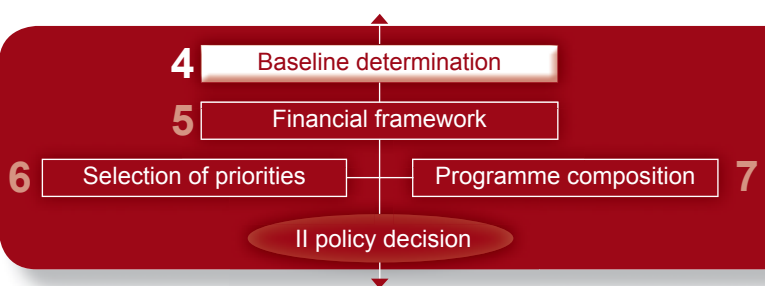
Non-technical data characterizes the possible limitations in the development and implementation of the municipal energy programme of regulatory-legislative nature as well as the level of qualification of specialists and awareness of the municipal institutions. It is necessary to have information for:

- Regulatory framework.
- Institutional capacity.
- Financial frames and opportunities.
- Social climate and affordability.

Baseline scenarios

The full characteristic of the baseline should contain:

(a) A “snapshot” (initial status, baseline) of the municipality (including its sites) prior to the start of the programme implementation and



(b) A forecast about the development of this initial status for the duration of the programme.

Actual baseline scenario

It is very important to take into account the expected changes in the sources of energy supply and in the energy end-use. Possible trends of the development of the initial status in case there is no an energy programme show the baseline scenario.

The established tendencies towards increase or drop of energy production and consumption should be reflected in the baseline scenarios. As far as they are based on a set of assumptions, various types of baseline scenarios could be determined – low, medium or high. These types correspond to various forecasts about the changes of the levels of energy consumption for the programme period. Sometimes, baseline scenarios are characterized as optimistic, medium or pessimistic. Ironically, low (optimistic) baseline scenario may be the reason for lower energy savings, while the high (pessimistic) baseline scenario is a base for higher energy savings.

The baseline scenario is usually considered as “business as usual” (BAU) scenario, because it shows how the initial status would change in case municipal energy programme does not exist (see Figure 3 and Figure 4).

Normalized baseline scenario

In some cases low energy consumption might be measured because the premises in a given building are heated

Figure 3.
"Business as usual" scenario

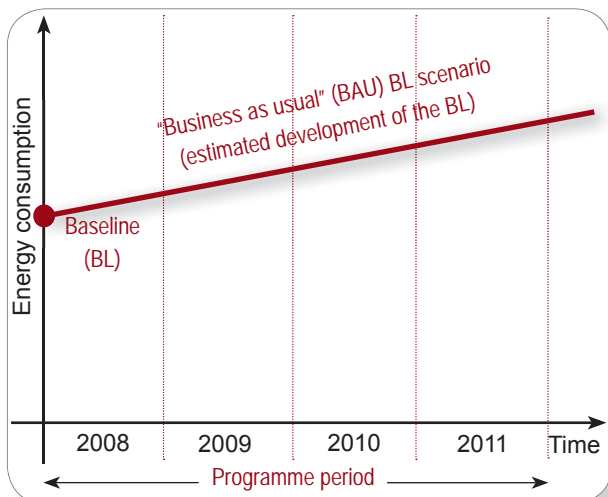


Figure 4. High (pessimistic),
medium (realistic) and low (optimistic) scenarios

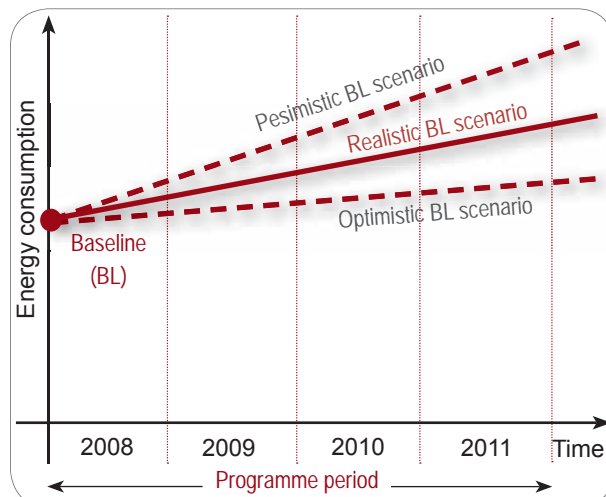


Figure 5.
Normalized baseline scenario

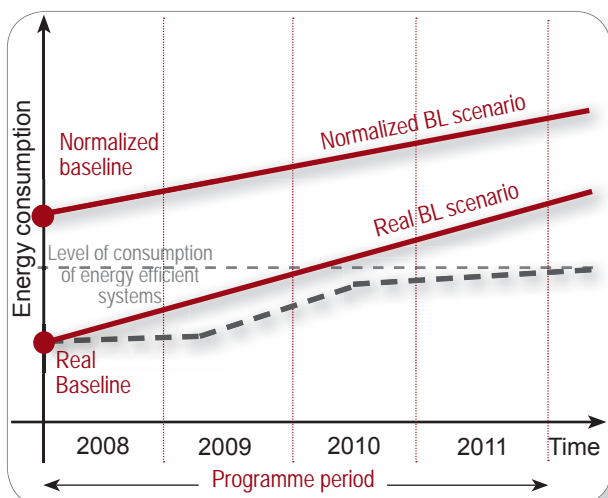
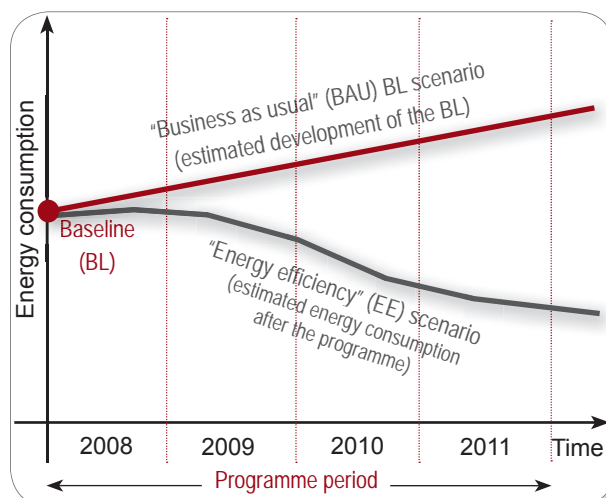


Figure 6.
Energy efficiency scenario



LEGEND:

Figure 5.

The level of the normalized BL scenario is calculated before energy efficiency improvements. EE scenario may not reach its level aiming at the level of consumption of energy efficient systems (buildings, street lighting systems, etc.) – see Figure 7.

Figure 6.

The surface between the baseline of the BAU scenario and the EE scenario represents the energy savings, achieved after MEP implementation.

below the hygienic norms levels. This could be also found out, when the streets, the public areas or the classrooms in the schools are underlit. In this way costs savings are at the expense of the quality of energy services (see Figure 5).

The normalised baseline is expressed by the calculated energy consumption, which would provide the hygienic norm levels of the energy services in the sites (most frequently applicable for lighting and space heating). Normalized baseline scenarios could also be calculated as low, medium or high. Normalized baseline also consists of:

- Normalized initial status and
- Normalized baseline scenario (see Figure 5).

"Energy efficiency" scenario

The "energy efficiency" scenario displays the predicted change in the baseline scenario and its changes as time

passes in case that the energy programme (project) is being successfully implemented. Under normal conditions in result of the implementation of the energy programme (implemented energy efficiency measures, introduction of RES, etc.) energy consumption will be reduced which will result in reduced energy bills. If the scenario of the reduced energy consumption is compared with the baseline scenario the amount of energy and economic savings will be determined and the reduced GHG emissions will be calculated (see Figure 6).

But in case the initial status and the baseline scenario should be normalized the situation could change considerably. When the living comfort standard has been underestimated for a long period of time the first energy and money savings that have been realized are usually directed to the improvement of comfort. This normally lasts until the set up comfort standards are reached and only then the owners of the sites (or the municipal administrations) are able to take advantage of the actual energy savings.

If the consumption after the programme implementation is compared to the actual baseline, it will be found out that savings have not been accomplished but even the energy consumption has increased. But this “over-expenditure” has led to improvement of the energy services and to the insurance of normal conditions of habitation that correspond to the standards for comfort. Such improvements should be encouraged.

Which scenario should we use?

When we defend our energy efficiency projects and we are usually making use of comparisons of the baseline scenario (baseline scenario or “business as usual”) and the scenario of reduced consumption in result of the implementation of the programme (or of separate projects), i.e. the “energy efficiency” scenario. A question that is often asked is: which are the best scenarios that can successfully defend our projects.

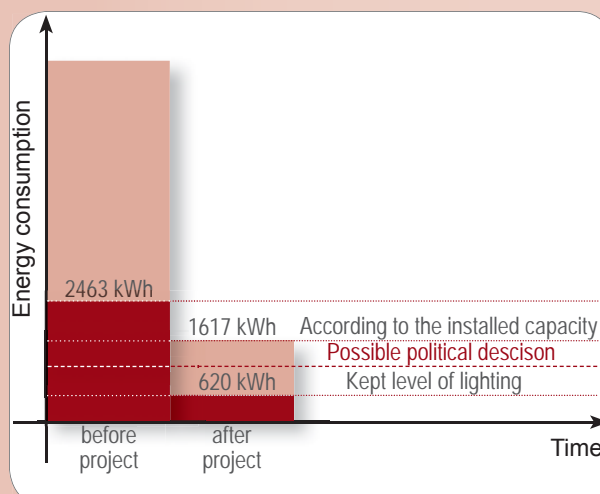
When this defense is done for the political management of the municipality it is correct to compare the actual initial status and the actual baseline scenario. This comparison gives opportunity to present all effects of the programme - the savings of energy and money and the improvement of the quality of services. This defense is relevant also when the projects are presented in front of local and foreign donors whose priorities exceed the financial benefits – reduction of GHG emissions, improvement of the comfort of leaving and the servicing of population, etc.

But when big investment projects should be defended in front of trade banks additional arguments and guarantees are needed sometimes. If the actual baseline is considerably lower than the normalized one the bank could easily find out that the municipality will not realize actual saving in the beginning of the programme implementation and will be able to take advantage of them to pay the credits received. This is why the municipality should afford sufficient additional guarantees for its solvency to be given the credits it needs.

Energy efficiency in street lighting

While developing the baseline scenario for the street lighting system in the city (late 90-ies) the energy consumption by the operating luminaries was found to be significantly below the one envisaged in the project design and the lighting level quality much lower. It was found out that 6,400 of the total installed luminaries (designed and installed according to the norms with an energy consumption calculated at the level of 6,535 kWh) only 31% were in operation. This meant that the actual initial status was at the level of 31% of the normalized level (measured 2,463 kWh).

Figure 7.
Project results, compared to the baseline



An energy efficient project was developed, envisaging entire renovation of the system, including the replacement of all existing luminaries by new energy-efficient ones. The measurements revealed that when all installed new efficient luminaries were put in operation, savings to the amount of 846 MWh were achieved as compared to the actual energy consumption prior to the project implementation (2,463 kWh). If compared with the normalized level (6,535 kWh) the achieved consumption accounted at about 25% of it or about 65% of the actual consumption before the projects.

The municipal administration gradually increased the level of comfort. It started with energy consumption of about 25% of the actual one before the project implementation (620 kWh) or less than 10% of the normalized level (6,535 kWh). For several months they reached the full capacity (100% or 1,617 kWh), ensuring much better comfort and safety in the streets and social approval.

Examples

Setting the baseline in Rotterdam (The Netherlands)

Determination of the baseline in Rotterdam aims at creating a clear idea about the carbon emissions during the baseline year (1990) and during the initial year of the period of validity of the programme (2005). On this basis are made the long-term forecasts of the programme till 2025. The measurements distinguish three groups of sources of emissions: (i) industry and energy generation; (ii) transport; (iii) build-up areas (including residential and commercial buildings). The answer to the question in which spheres the highest amounts of emissions are generated is sought and where should the priorities of the programme be oriented (Rotterdam Climate Initiative). Two methods for presentation of the emission data are envisaged: (a) regional, under which the emissions are reported for the whole city; and (b) individual (for every end-user), under which the emissions are linked to the actual consumption by the energy end-users in Rotterdam. In this case the carbon emissions are linked to the amount of electricity produced in the city and are attributed to the business or the household, in which it is consumed. [Source: City Instruments Best Practice Catalogue]

The baseline as basis for planning (Bulgaria)

The municipal management of the municipality of Smolyan makes a profound analysis of the energy consumption in the municipality before the start of the energy programme. The sector analysis highlights the high share of consumption by the educational sector (65.76%), the social care activities (12.05%) and the street lighting (12.10%). In the educational sector the heating and lighting bills of schools and kindergartens account for the most significant share of the expenditures. This serves as an indication of the need of actions for reduction of heat losses through insulation of the external walls and upgrade of lighting, as well as for fuel shift in the boiler houses and introduction of automation of the management of the energy consumption in buildings. The expenditures in the services sector are formed mainly by the electricity bills for street lighting, where quick and effective solutions are sought, related to technical improvements as well as changes in the schedules of lighting system by operation seasons and tariffs. In this way the municipal administration determines the scope and priorities of the energy programme using as a starting point the in-depth analysis of the state at the end-use sites. On this base projects are selected for implementation and are envisaged initiatives for optimization of the energy

consumption and the rational use of space; for raising the discipline of operation in the sites and the level of awareness in the energy efficiency issues of the services and administrative personnel; for introduction of energy efficiency as a leading criterion when public procurement tenders are conducted. [Source: Municipal Energy Programme of Smolyan 2008-2013]

Baseline state in Black Sea municipalities (Bulgaria)

The Association of Bulgarian Black Sea Municipalities analyzes and evaluates the energy situation in the region and defines the baseline state using it as a precondition for the development of municipal energy programmes in the future. The results from this analysis show that the energy demand for operation of the outdated municipal building stock account for a significant portion of the expenditures from the municipal budgets without ensuring a satisfactory comfort of habitation. Some interesting conclusions were made when due account was taken of the results from already implemented energy efficiency projects and measures. It was found that in all the municipalities of the region the municipal energy programmes had been approved by the respective Municipal Councils and energy audits had been conducted in 14% of the buildings. The share of energy efficiency projects accounts for 10% of the total volume of investments of the municipalities – 5% designed for rehabilitation of buildings and 2% for street lighting projects. There is no information concerning the investments in industry and private housing. In the different projects the various activities for energy efficiency improvement are in different proportions. For instance, measures related to the windows are envisaged in all the projects, replacement of the combustion systems are envisaged in 76% of the projects, in half of the sites are envisaged energy audits and 10% of the projects envisage awareness raising campaigns. It has been found out that electricity consumption is highest in buildings (75%), while natural gas consumption accounts for 19%, liquid fuel consumption for space heating accounts for 6% and the share of firewood, coal and light ship oil is only 1%. An energy balance for the region is worked out on the basis of these results, demonstrating how the ratio between the different fuels will change and how their consumption will decrease. This in-depth analysis of the baseline situation is a solid basis for the further energy planning and management in the municipalities of the region. [Source: <http://energy21.diphuelva.es>]

Financial framework

This action serves to determine the financial means, which the municipality commits to allocate from its own budget, as well as the means that are expected to be procured from external sources.

Local budgets are usually developed on the base of the municipality's own revenues from local fees and taxes, business activities, privatization of municipal property and the state budget subsidies. Other financial means are credits, public-private partnerships, leasing and concessions deals, different schemes of third-party financing, donations, etc.

To formulate the financial framework of the municipal energy programme means to identify the financial resources, to which the municipality has access, as well as the schemes and mechanisms for getting hold of these resources. At the same time it is necessary to identify and evaluate the financial risks of the programme, as well as the actions for local capacity building on financial matters.

Approaches for the financial framework definition

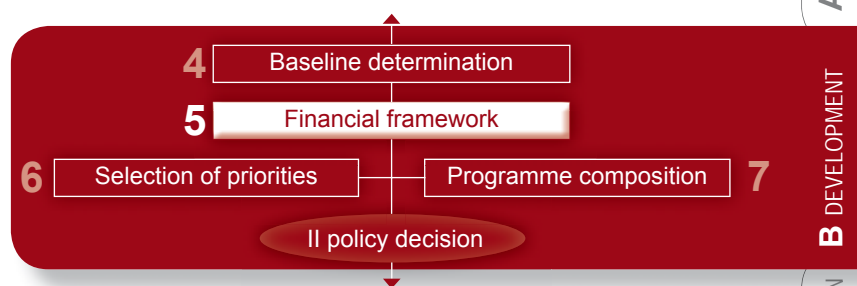
At the time of the definition of the financial framework of the municipal energy programme two main groups of conditions and limitations are taken into consideration. One of them evolves from the national legislative and financial framework and the other is determined by the concrete conditions and financial status of the given municipality.

In general the **top-down approach** consists of analyses of the existing legislative framework for the definition of the national and local (municipal) budgets, as well as of the trends of its development. For the utilization of this approach the following activities should be performed:

- forecast of the trend of municipal budgets in the period of the MEP operation;
- survey and foresight of the legal frame development in the period of MEP operation;
- survey of expectations of the changes of the national and the local taxation policy and their impact on the municipal income;
- survey of the expectations for extra-budgetary income of the municipality, etc.

When **bottom-up approach** is applied the assessments are based on calculation of the financial means per unit

(for example, per pupil in schools, per hospitalized person in hospitals, etc.). The combination of these two approaches may lead to the preliminary determination of the MEP financial framework.



Balancing of the energy programme

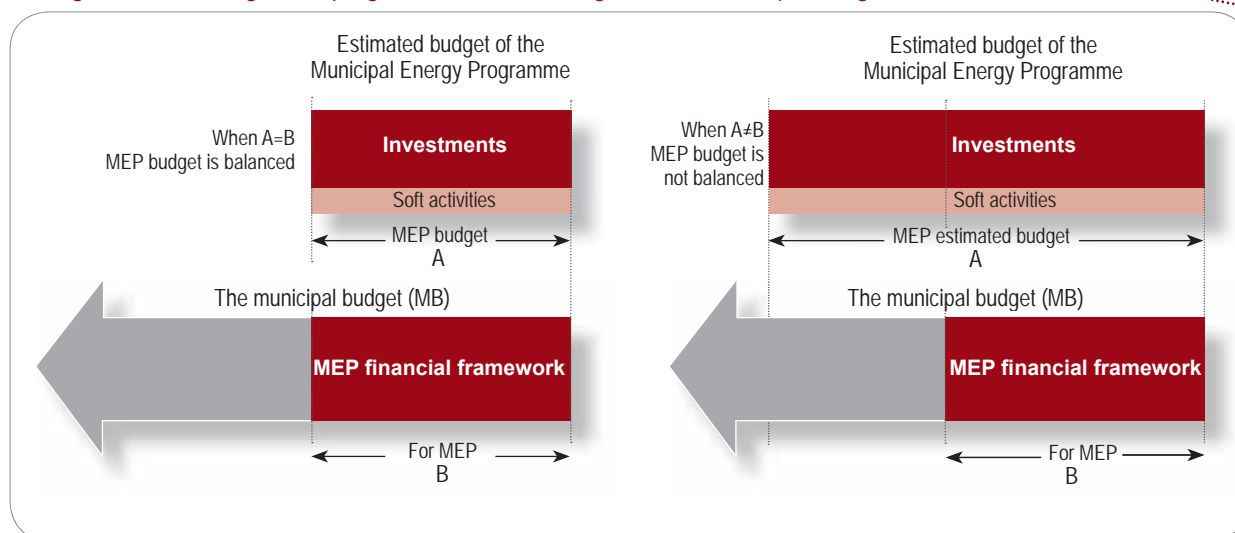
Before outlining the budget of the programme, the preliminary financial framework should be compared with the **financial means needed** for the MEP implementation. To make this assessment objective information should be collected for:

- the technical and financial state of the sites, which will become subjects of planning;
- the costs of feasibility studies, energy audits, design, management and operation, related to those sites;
- the costs of materials, components and construction works, based on aggregated data and indicators;
- forecasts for the trend of municipal budgets in the period of the programme implementation, based on both external and internal sources of revenues.

On the base of the analyses of the listed above information the municipal administration should define also the **local limitations** that will be taken in consideration during the development and implementation of the programme:

- capacity of local institution and human resources to develop and implement the programme budget;
- public procurement procedures, seasonal and technological requirements and limitations;
- legal / regulatory limitations of the investment share

Figure 8. Balancing of the programme with financing from the municipal budget



to be covered by the municipal budget, which might be determined by the national financial legislation;

- share of the investments for energy efficiency out of the total volume of investments, which might be determined by the national financial legislation;
- share of external revenues of the municipality that could be used for financing the programme (for example, from local taxes and fees, third party financing, concessions, leasing, municipal bonds, privatization of municipal assets, etc.) (see Figure 8).

Alternative forms of programme financing

To use the opportunities for external financing of energy efficiency programmes, the municipal administrations should be very well acquainted with the multiple financial instruments available in the country as well as with the innovative financial schemes that are widely used in international practice. Among them are, for instance:

- Financing from dedicated energy / environmental funds.
- Issuance of dedicated municipal bonds.
- Use of commodity / commercial credits.
- Leasing of equipment.
- Third party financing (incl. ESCO schemes, performance contracting).
- Public-private partnership (PPP) – concessions, etc.

A wide variety of financial sources, schemes and instruments are applicable for MEP financing. The EU municipalities rely not just on their national and own financial resources but also on financing from the Union. The municipal energy programmes can be financed by the Structural funds, but also by a number of specialized programmes in the field of energy, transport, environment, etc.

If to these financial sources, the multiple opportunities offered by banks, specialized funds, international programmes and the private sector are added, a motley picture of opportunities will be created. The good knowledge of the elements of this picture is an underlying condition for the successful financing of the municipal energy programmes.

How to allocate money from municipal budgets?

Money from the municipal budget should be used predominantly as seed money for raising external financial means. Most of the external financial sources are available against reliable guarantees of the corresponding municipalities. One of the classical forms of guarantee of external financing is the participation of the credit recipient in the projects (programmes) implementation with its own funds.

In general municipalities participate in the financing and guarantee of their projects and programmes with budget means or budget property. The optimum use of the municipal own budget means turns increasingly in their priority task. The municipal budget should be used economically and reasonably to secure co-financing or to cover the investments that cannot be covered otherwise (see Figure 9).

Relation with other steps of the MEP process

Energy database

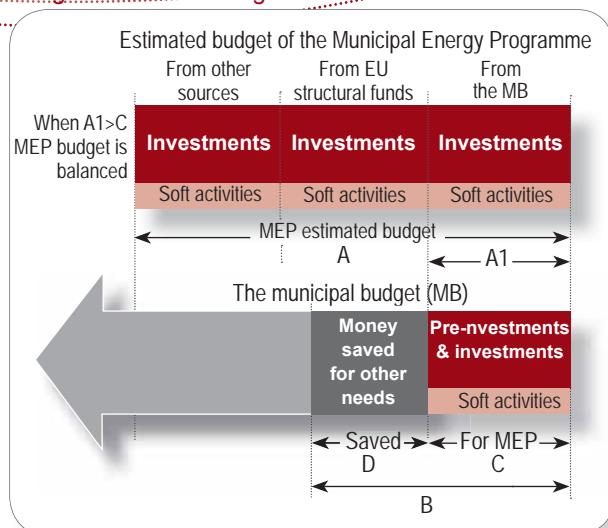
In order to perform the necessary analyses, the information database should contain data about the budgetary revenues and expenditures, the liabilities under current payments and bank credits and the anticipated amounts receivable. Besides this data, the municipal information system might contain entries about financial schemes and specific mechanisms used in previous projects.

It is recommended to perform an inventory of the financial partners of the municipalities and to store basic information about them. Part of this activity may be performed by the financial experts of the local authority. External consultants might be attracted to provide help.

Local capacity

Sometimes the implementation of the municipal energy programme turns out to be strongly dependent on the capacity of the local specialists to procure the required financing from domestic or external sources. The absence

Figure 9. Fund-raising



LEGEND:

A - Estimated MEP budget

A1 - Part of the MEP budget, which is not covered by EU structural funds and other sources

B - Preliminary MEP financial framework as part of the municipal budget

C - Budget means allocated for MEP

D - Reduction of the preliminary MEP financial framework

administration should objectively analyze and assess the capacity of its own specialists and institutions. It is recommended as early as during the stage of the programme development to plan actions for setting up and strengthening of the necessary institutions and for human capacity building in the area of financing.

As is the case with the rest of the fields where local capacity is needed, the training of local specialists on financial issues is desirable to precede the work on the programme development. This training can also become part of the programme itself being part of a wide circle of "soft" activities for training, dissemination, awareness raising, etc.

of adequate local financing institutions or specialists might be a serious obstacle for the achievement of the programme objectives.

This is why to be able to develop a realistic and well balanced budget for its energy programme the municipal

Low-interest credits for energy efficiency (Italy)

A scheme for low-interest credits for energy renovation of the existing building stock has been worked out in Italy. Because of lack of sufficient experience in this field and due to certain concerns that projects of this kind are connected with high risks, the banks were not interested in offering this specific banking product to their customers. The Milano Province decided that it was the appropriate time to inform the banks and potential borrowers about the advantages of this initiative. Preliminary negotiations and studies were conducted with the aim to attract the attention of the stakeholders, by convincing them to join and encourage the low-interest credit scheme use. In 2007 the scheme was officially launched and its application started. It is expected that in the next 5 years the effect from it will become evident from the achieved savings of 35,000 toe/year. [Source: City Instruments Best Practice Catalogue]

Specialized funds (Bulgaria)

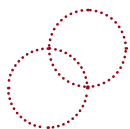
Energy Efficiency Fund (EEF). The fund was established under the provisions of the Bulgarian Energy Efficiency Act. Its capital is collected through a project of the Global Environmental Facility and the World Bank, as well as from donations of the governments of Austria and Bulgaria and of several private donors. The Fund is structured as a self-financing commercial mechanism for investments in energy efficiency, which stimulates the development of the energy efficiency market in Bulgaria. It is the only specialized institution for financing of investment projects in the field of energy efficiency in Bulgaria, which lends credits and credit guarantees, as well as technical assistance to its customers. Part of the projects financed by the Fund is based on public-private partnerships. Customers of the Fund are municipalities and enterprises, as well as associations of households. Although EEF operates in a strongly

competitive environment, it finances about 25 projects per year on the average, whereat during the first four years of its existence all lent credits have been serviced successfully. As a result of that for two consecutive years it has received recognition by the World Bank. With its activity the Fund contributes to improvement of the energy efficiency in the country, as well as for meeting Bulgaria's commitments with respect to reduction of CO₂ emissions. [Source: www.bgeef.com]

Environment Protection Fund. The Municipality of Lom is implementing a project for renovation of the street lighting system in the city, which is financed by an environmental fund with the Ministry of the Environment and Waters. This Fund is designed to finance predominantly projects of ecological nature and only part of it is oriented towards energy efficiency projects having significant effects with respect to reduction of GHG emissions. Through the project in the city of Lom the lighting of about 130 streets and four public parks has been improved, involving replacement of more than 1,700 lighting fixtures, optimization of the duty cycle of the system and introduction of two-tariff reading of electricity consumption. The result is the achievement of significant savings of energy and money, which ensure 2 years payback of the invested capital. The project has a visible environmental and aesthetic effect, as well - it contributes to raising pedestrian and traffic safety, and at the same time contributes to improvement of the skills of the municipal experts involved in the design and implementation of the project. [Source: Lom Municipality, RUSE project database]

Partnership for energy conservation in Berlin (Germany)

On the basis of partnership with private investors EUR 60 million has been invested for reduction of energy consumption in public buildings. The result was reduction of the energy costs in the buildings of schools,



kindergartens, universities and administrations by 25%. To achieve that and to curtail energy consumption and GHG emissions the local authorities have transferred the financing, planning and implementation of the energy efficiency measures to a private partner. The contract with this partner contains guarantees for minimum energy savings. The contractor will receive the value of the reduced energy costs only if the agreed savings are achieved. In this way both public and the private interests are equally protected. [Source: City Instruments Best Practice Catalogue]

Public-private partnership (Bulgaria)

Public-private partnership (PPP) is one of the most effective forms for attraction of additional capital for investments in the municipal infrastructure. Typical forms for realization of such partnership are the joint ventures and third-party financing, which are realized through energy services companies (ESCOs) on the basis of performance guarantee contracts. One of the most experienced companies of this kind in Bulgaria is Enemona Plc, which co-operates actively with Bulgarian municipalities. These forms of co-operation with the private sector help municipalities to overcome the shortage of investment funds.

Joint venture in Stamboliyski Municipality. Because of the termination of the activities of the old and depreciated district heating company in the city of Stamboliyski, the municipality decided to set up a new company for combined heat and power generation on the basis of partnership with a private company. The plant will be fuelled by natural gas and new heating mains were constructed. The new company takes also the obligation for share-based distribution of the heat energy among the subscribers, as well as the provision of services for repair and installation of the energy equipment. On the basis of a comprehensive business plan the new company obtained a bank loan and started the construction of the energy supply facility. All required licenses for heat and power generation and transportation have been obtained and the proposed prices have been approved by the State Commission for Energy and Water Regulation. Since the end of 2002 the district heating in the city of Stamboliyski is operating normally. [Source: EcoEnergy Journal]

Energy performance contracts in Karlovo. Enemona Plc has implemented an energy efficiency project in five kindergartens, which are municipal property. The municipality and the contractor have signed a performance contract, whereby the financing of the contractor has been provided by the Energy Efficiency Fund. The implemented measures comprise installation of thermal insulation on the building envelope and the roofs and replacement of the doors and windows. These measures have produced up to 73% savings of heat energy and 5% savings of electricity as compared to the consumption rates prior to the renovation. As a result of the implemented improvements the buildings earned Certificate A for energy efficiency performance. As an integral part of the contract between the municipality and the contractor a plan for accounting and payment of the energy

savings based on the baseline costs for space heating and electricity paid by the municipality prior to the start of the project is agreed. Upon expiration of the contract and pay-off of the investments made by the company, the municipality will continue to pay only for the reduced energy consumption. [Source: Energy Efficiency Fund]

State programme for renovation of apartment residential buildings (Estonia)

Heat losses in the existing residential buildings in Estonia amount up to 20% and are the main reason for the high maintenance costs. This fact gives rise to an acute need of urgent renovation of the majority of the building stock built prior to 1990, when thermal insulation used to be very rare. Although the comfort of habitation needs improvement, the potential for heat conservation reaches up to 30-35% and may be realized through a variety of measures. The most common among them are insulation of the external walls, replacement of windows, installation of modern substations and balancing of the space heating systems. Special attention is paid to the ventilation of the buildings in order to avoid the effect of "sick buildings", which often manifests itself after installation of insulations and good-quality windows. For overcoming of these problems a National plan for development of the housing sector by 2010 was approved, on the basis of which a National programme for the period 2003-2008 was elaborated. The plan and the programme are supervised by the Ministry of Economy and Communications and the building renovation measures are implemented by the Estonian Guarantee Fund for Crediting and Export and the local authorities and NGOs active in the housing sector. The necessary funding is provided from the state budget and is oriented towards the associations of residential buildings owners and flats in apartment buildings. The main objective of this plan is to support the renovation of the existing housing stock in the country and the improvement of its energy efficiency performance. [Source: City Instruments Best Practice Catalogue]

Municipal bonds for energy efficiency (Bulgaria)

Emission of municipal bonds is a financial mechanism, which was used by several municipalities in Bulgaria (Varna, Sofia, Samokov, Sliven, Dupnitsa, Plovdiv, Dimitrovgrad, Pazardjik etc.). The street lighting audit in Varna revealed that the system's efficiency was quite low. The municipality decided to modernize the street lighting, but was faced with the sad fact of shortage of the necessary financial resources. For the purpose of overcoming this problem the management of the city issued municipal bonds whose sale procured the necessary funding for the implementation of the infrastructure projects. A significant portion of these funds were invested in the project for renovation of the street lighting system, which resulted in considerable decrease of the electricity costs, improved safety and general change of the appearance of the resort city. [Source: EcoEnergy Magazine]



Selection of priorities

Introduction

After we define the baseline (Step 4) and the financial frame of the programme (Step 5), in Step 6 we select the priority activities and projects that will lead to the achievement of the preliminary defined objectives of the programme (Step 3). This selection is done on the bases of the conclusions drawn from the analyses of the information system data (Step 1), that allow for the composition of an inclusive list of possible actions and projects directed to the achievement of the objectives defined in the programme.

Basic requirements

The selection of priority activities and projects is defined by several important prerequisites:

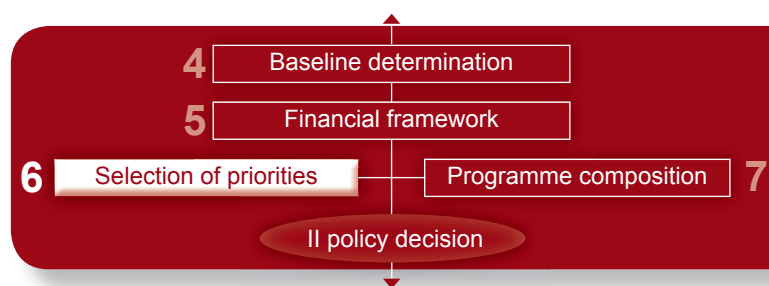
- Correspondence of the selection of priorities to the goals and objectives of the Municipal Energy Programme (MEP).
- Correspondence of the goals and objectives of the MEP to the goals and objectives of the Municipal Strategy for Sustainable Development (long- or medium-term).
- Correspondence of the goals and objectives of the development strategy to the national development goals.
- Correspondence of the national goals to the EU goals for sustainable development (incl. energy and climate protection strategies).

Why do we select priorities?

Normally the analyses of the information system data define a great number of different possible activities and projects that can contribute to the achievement of the programme objectives. Some of them are alternative (mutually replaceable) because the same objectives can be reached in other ways. On the other hand the inclusive lists of activities and projects will often surpass the current opportunities of the municipality and could presume implementation in longer terms. That's why the selection of energy programme priorities in a set time limit is an optimization problem. It can be used by the municipal administration for the ranking of the possible activities and projects by importance, time and level of available resources or other indicators. The priorities selection is done on the basis of a complex of preliminary accepted criteria and observation of defined limitations.

Evaluation methods

The essence of the selection of priorities is the estimation and ranking (grading) of each separate activity or project on the bases of a complex of preliminary chosen criteria or groups of criteria. To facilitate the evaluators each of



the selected criteria as well as the separate groups of criteria as a whole can be given weight coefficients that will tie the criteria to the corresponding priority objectives of the municipal energy programme.

The development of an evaluation scale is subject of careful study and discussion followed by an expert decision, which may contain definite political considerations.

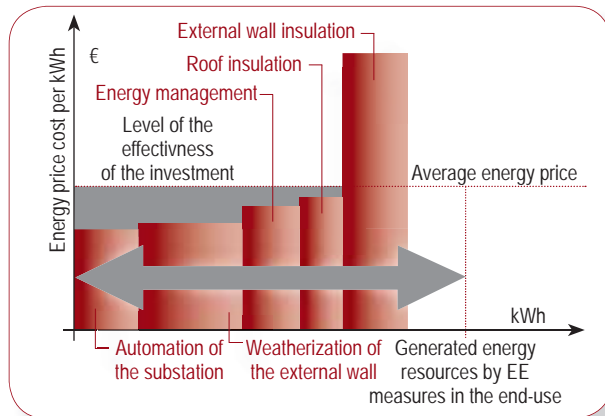
Political considerations

The municipal energy programme is a political document. This is the reason why the political considerations can be decisive for the priorities selection. Generally the political approach is used for the formulation and ranking (grading, arrangement) of the programme objectives.

For example one municipal programme may contain objectives that evolve from the strategic objective of the European Union to reach energy consumption reduction by 20%, GHG emissions reduction by 20% and 20% share of energy generation by RES by the year 2020.

The political considerations can be applied for the selection and grading by importance of activities and projects that may lead to the achievement of a specific objective. For instance following specific political considerations a given energy or energy efficiency project can get advantage over another one. But as a whole the pure political approach has rather limited application in this step. The selection of activities and projects is usually done on the

Figure 10. Assessment of the demand-side energy efficiency potential



bases of careful technical and economical assessment of their efficiency.

Least cost planning

The Least Cost Planning (LCP) is the most frequently utilized method for selection and ranking of activities and projects in a municipal energy programme. It is based on grading in accordance with the expenditures needed for their implementation. The activities and projects that need the least resources will get the highest priority rating. This is the way to estimate both activities and projects in the energy demand and supply sides (see Figure 10).

The expenditures determination for a specific project on the base of its total life cycle gives the most explicit idea about its financial advantages or disadvantages in relation with the rest of the projects. Sometimes projects with low initial investments are found to be rather expensive for operation, which can significantly burden the municipal finances for a long period of time.

Integrated resource planning

Often the method of Least Cost Planning (LCP) is identified with the Integrated Resource Planning (IRP) method. Although they do not differ in nature the IRP expresses an important idea that remains at the background when the Least-Cost Planning is applied. To clarify this idea we will remind what the difference between this method and the traditional “complex planning”, broadly applied in the past is (see Figure 11).

The integrated resource assessment is the base for the definition of the local energy balance

Complex planning is based on taking due account of a wide range of factors – historical, political, social, psychological, economic, natural, technological, etc. This approach has not at all lost its utilization under present conditions as well.

In recent decades it has become evident that the natural resources are limited and hence their use should be comprehensively reconsidered. More efficient use of resources has become an important priority of contemporary science and technologies.

Efficiency is ever stronger viewed as a resource

Integrated planning of resources is grounded entirely on the traditional complex planning, however it introduces additional requirement - that of the efficient use of available resources. Increase of efficiency might produce saving of resources and thus decrease the need to extract new ones. For that reason efficiency is ever stronger viewed as a resource. This understanding is fundamental for integrated resource planning.

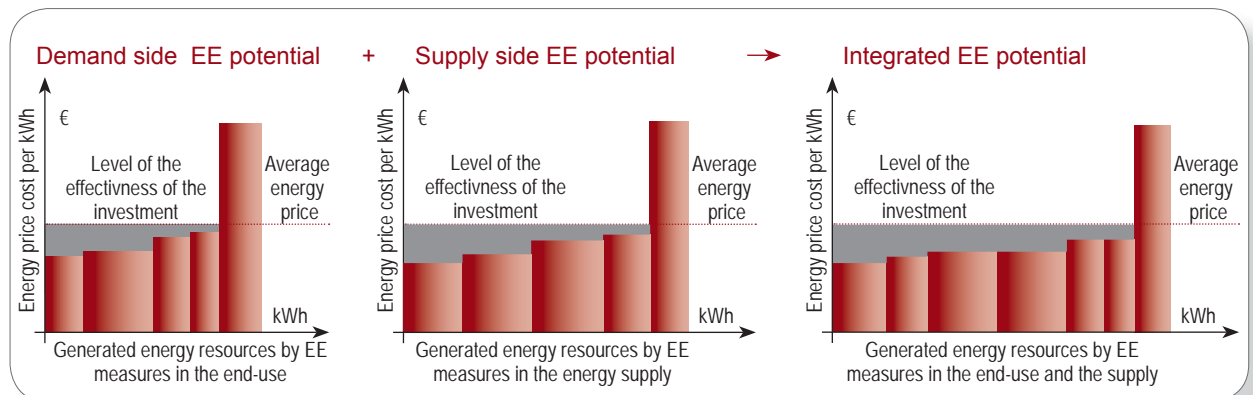
In integrated (resource) planning, the energy and water resources, saved as a result of improved efficiency, participate in the energy/water balance on a par with the newly extracted resources.

The municipal energy balance is an instrument for achievement of the best set of energy generating capacities, based on alternative, available energy sources and energy efficiency measures in both local demand and supply sectors of the municipality.

Saved energy as a valuable energy resource

Efficiency has always been in the focus of attention of the technical experts and economists. However, under conditions of relatively low water and energy consumption and unrealistically low prices of resources, this criterion did not have the adequately high relative weight in the past. The progress of science and technology led to an uneven and sharp increase of consumption of natural resources in general, and of energy resources in particular. There are some forecasts, which predict that in not so distant

Figure 11. Integrated assessment of the demand-side and the supply side energy efficiency potential



future some of the most important raw materials for the energy sector would be practically exhausted.

This situation puts on the agenda the exclusively acute challenge of the rates of use of the still available resources and of how to bring about substantial improvement of the efficiency of their use. It has become evident that through improvement of the demand-side energy efficiency, a significant additional energy resource may be created for the energy end-use sector. It may help meet the new demand without having to spend energy resources for generating new quantities of energy.

Saved energy resources, obtained through efficiency improvement, are cheaper than the newly produced

As a rule, the saved resources (energy or water), obtained by improvement of the efficiency of their consumption, are cheaper than the newly produced. Viewing efficiency as a major component of planning, the integrated approach in fact proposes least-cost planning of resources. Therefore in practice integrated planning is also known as Least-Cost Planning. The essence and effects of the integrated planning turn it into a major tool for the achievement of conditions for balanced and environmentally friendly use of natural resources and the realization of additional benefits for the society and the environment.

Criteria for selection

Binding criteria with programme objectives

The criteria for selection of priority activities and projects are defined on the basis of preliminary formulated priority objectives of the programme (Step 3).

For example if the most important (priority) objective of the programme is the decrease of energy expenses that are covered by the municipal budget, when selecting the activities and projects preference will be given to those whose implementation will lead to the biggest savings of budget resources.

But if the priority objective is the decrease of GHG emissions preference should be given to activities and projects that will limit these emissions to the greatest extent. In this case if we have to choose between two buildings one of which is heated by an old local coal boiler with considerable emissions, while the second one uses ecological fuel, we should give preference to the first one. Improvements of the building envelope and boiler and the fuel switch in particular would cause considerably greater decrease of CO₂ emissions.

If the priority target of the programme is the improvement of the comfort of living, and of the lower strata of society in particular, the attention should be directed to the buildings that are underheated or to the buildings for elder people or abandoned kinds.

Usually the municipal energy programmes have more than one objective that is habitually ranked (graded) according to their importance. In these cases a reasonable

balance between the different groups of criteria should be sought.

Possible types of criteria

Depending on the character of the municipal energy programme objectives the municipal administration can adopt different groups of criteria, on whose base the priority activities and projects of the programme can be classified.

Financial criteria

This group of criteria serves for the definition of the weight of different activities and projects in relation to the financial targets of the programme as for instance is decrease of budget expenditures for energy. Examples for financial criteria could be the specific values of basic economic indicators that are easily and precisely measurable like: Net Present Value (NPV); Return of Investments (RoI); Internal Rate of Return (IRR).

Other possible criteria of the kind could be: the volume of investments needed; opportunities for financing by the municipal budget (or co-financing); availability of accessible sources for grant financing.

Social criteria

By means of social criteria the social climate is evaluated and the programme is implemented on its background. This group of criteria is habitually connected with the targeted social objectives of the municipal programme for sustainable development and with the municipal energy programme in particular. Very often the objectives are connected with the building comfort of living, including buildings of social importance like kindergartens, schools, homes for elder people or abandoned children, children with mental diseases, etc. This type of criteria can be of predefined, measurable values.

The social criteria give an opportunity for estimation of the overall social climate on whose background the energy programme will be implemented. This climate is determined by the existing legislative and regulatory framework, the condition of the institutional and human resources, the available incentives for energy saving, the socio-psychological condition of the local community and the social affordability of the energy saving measures included in the programme.

Ecological criteria

The ecological criteria correspond to the ecological objectives of the municipal energy programme. They should be defined in a way that gives opportunity for easy and exact measurements. Such criteria could be:

- Decrease of CO₂ emissions.
- Decrease of the emissions of harmful gases and dust.
- Decrease of the share of built-up sites of human settlements, planting of roofs, etc.

Technical (energy) criteria

Using technical criteria the technical means and technologies needed for the achievement of the defined

objectives are estimated. These criteria are usually measurable and are connected with the level of technical risks. Energy criteria can be related to them.

Examples of technical (energy) criteria are:

- Level of reliability of the technology chosen.
- Minimum technical risk during the project implementation.
- Achievement of the preliminary calculated energy savings with minimum technical risk.
- Exploitation of accessible (available) energy sources.
- Minimum relative energy consumption after the project implementation (maximum energy savings).
- Minimum expenses for management and maintenance.

Criteria connected with the energy efficiency measures

The nature of the concrete measures and actions for energy efficiency improvement can be of considerable importance for the definition of the priority activities and projects of the programme. Very often the measures implemented are technical, organizational, regulatory and incentives. Depending on the objectives of the programme the municipal administration can give preference to one or other group of measures.

Knowledge of the advantages and disadvantages of the different criteria for selection is a prerequisite for the successful packaging of energy saving measures

If a decision is made to implement limited number of measures in a maximum number of sites (for example replacement of the old joinery in all municipal buildings), the organization of the implementation can be facilitated by the specialization of a limited number of persons. At the same time the implementation of one single measure in a great number of sites can make impossible the implementation of other necessary measures, which in the end may mean that none of the buildings is rehabilitated totally and the effect of the improvements is insufficient.

The opposite approach assumes focusing of the programme on a limited number of sites in which the full range of applicable energy saving measures can be implemented. This could give opportunity to reach the full effect in the buildings selected but the implementation could be more difficult to manage. The municipal administration can make a decision to implement a set of measures in selected sectors – education, healthcare, etc. This is a way to facilitate the programme management because the respective departments of the municipal administration will do it. The above approaches are very rarely implemented alone as very often they are combined. The knowledge of the advantages and disadvantages of each one is a prerequisite for the successful selection of priority measures.

Restrictive conditions and risks

Restrictive conditions

To choose and rate correctly the activities and projects that will be included in the municipal energy programme the specialists that will work on its elaboration should carefully evaluate a whole variety of restrictive conditions. These conditions are specific for each municipality and change as time passes.

One of the main restrictions is the financial resource that the municipality can allocate for the programme implementation. This is the reason why in Step 5 special attention is paid to this basic restriction.

Besides financial resources an important restriction could be the human resources needed for the programme realization. If it is found out that these resources are not sufficient or not enough trained, special actions to involve additional human resources from the municipal administration or outside it (by competition or special incentives) or the organization of specialized qualification courses can be envisaged in the programme.

Essential restrictions could be the insufficient technical provision of the programme, the seasonal character of some of the activities and projects and the shortage of public support for some of the activities and projects.

Although during the selection of activities and projects the restriction conditions can be carefully analyzed and taken into consideration some of them can still continue to be active during the programme implementation. Therefore the main risks for the programme implementation are usually related with them.

Risk assessment

The selection of activities and projects that will be included in the programme should be based on the careful estimation of all risks that may endanger its implementation. These risks are specific for each municipality although some of them are valid for all of them. The risks can be of political, internal or external, technical or financial nature. To reveal and realistically estimate them is an important task of the municipal administration.

Internal risks

Internal risks are usually connected with the municipal administration's capacity. For instance the risks related to the programme management are the most characteristic demonstration of the dependence of the municipal administration on the managerial skills of its employees. The appropriate selection of technologies and equipment can also be of great risk for the realization of the programme when, due to insufficient qualification, inadequate or insufficiently efficient equipment is chosen. Similar risk is hidden in the process of search and selection of viable financial institutions. The municipal administration can reveal a lot of other specific internal risks.

External risks

The external (for the municipality) risks can be related to the national state of the energy sector or the unstable regulatory frame, which can be subject of changes. External risk for a municipality could be the prices of energy and equipment that can be influenced by the international market situation. Influence on the programme can exercise risks connected with some of the partners of the municipality on which the municipality relies for the programme implementation.

External risk is the eventual instability of the banking system as well as some of the force majeure circumstances, which are difficult to foresee.

Political risks

The programme can be influenced by the political situation in the country or in the municipality. National or local elections can lead to radical changes in the structure and political orientation of the authorities. On the other hand this may cause revision of both the priority objectives of the programme and the concrete activities and projects included in it. Influence can even exert international political situation.

Technical risks

Preference of tested and proven technologies reduces technical risks

The technologies and equipment selected contain definite level of risk that can be reduced if preference is given to tested and proven in practice technologies. The use of high quality materials and products can also reduce this risk. Preference of materials and products with low initial price at the expense of considerably higher exploitation costs can often mean considerable risk for future losses. This is the reason why preference should be given to materials and products with certificates for high quality that can decrease the technical risks related to their exploitation. Considerable risk is hidden in the selection of the specialists/companies that will execute the different projects of the programme – designers, builders, fitters. Good references and proven experience should be the leading arguments for this choice.

Financial risks

The most typical financial risk for the success of the energy programme is the impossibility to secure the financial means for its implementation and in particular of the share that the municipality has to allocate from its own budget. This risk can be managed by the selection of priorities and the correct planning of the expenditures for the implementation of each activity or project.

Risk can be contained in the choice of financial institution (bank, fund). Occasionally, behind the extremely favourable terms of initial financing an insufficient reliability of the financial institution may be hidden. Preference should be given to banks or funds with proven reputation

and experience in financing energy efficiency projects as a means for risk diminishing. Such critical attitude is extremely necessary when an ESCO is selected that will be responsible both financially and technically for the implementation of a project.

Risk can also be contained in the choice of financial tools for the programme implementation. In parallel with the traditional credits new financial instruments are introduced into practice whose financial viability and reliability should be carefully evaluated for each separate case. For example, the purchase of technologies and equipment under leasing agreements can facilitate the municipality to decrease the volume of its direct investments. In some cases the emission of municipal bonds can attract additional financial means for the programme implementation.

Verification of the priorities selection

Before the final decision, concerning the priority activities and projects is made, the municipal administration can test the correctness of the preliminary decisions. One of the reliable forms of such tests is the comparison with successful practices of other municipalities in the country or abroad. It may be useful to make comparison with other municipalities (for instance neighbouring or similar by size and structure) that are not yet announced as good practices but solve similar issues.

When the programme foresees replication of fixed measures their impact could be first tested in one site only. In certain cases it could be advisable to implement demonstration projects that may show the efficiency and usefulness of the planned in the programme actions and projects, which will mobilize the political and public support for their presence in the programme.

When considerable number of one and same type of projects or activities are planned to be implemented, pilot projects may be useful. With their implementation certain technical solutions could be specified and the optimum organization of the implementation to be reached. Afterwards, this can considerably facilitate the replication of those projects.

The selection of priority activities and projects to be included in the municipal programme is a step of extreme importance. The variety of activities in this step requires special qualification that could not be innate of every municipal administration. That's why the involvement of external technical support could be decisive for the successful composition of the programme. This help is extremely needed when the set of criteria for the estimation of the activities and projects is developed, for the selection and implementation of certain methods for assessment, and for the definition of the limits and risks that the programme implementation can be faced with.

Two development scenarios (Austria and Great Britain)

Graz Municipality. The analysis and evaluation of the collected energy data formed the basis for development of two development scenarios: “low development” and “ambitious development”. Each of them is then compared with the baseline scenario, which takes into account the future consumption in the event of absence of active energy efficiency policy. In the framework of the performed analysis of the energy conservation potential of the different packages of measures it has been found out that the highest energy savings may be achieved through actions in space heating, transport and lighting. As a follow up of these evaluations seven major sub-programmes were worked out and laid down in the two scenarios. The “low development” scenario describes the potential for reduction of CO₂ emissions and energy consumption as a result of the implementation of the different sub-programmes. In the “ambitious scenario” besides the technical measures is envisaged restructuring of the energy policy by the introduction of new standards and charges and certain amendments to the existing legislative documents. The success of these scenarios depends to a significant extent to the support by and active involvement of the federal government and the provincial governments. The comparison between the two scenarios and the baseline scenario has demonstrated that the implementation of the second scenario will produce almost twice higher energy savings and respectively reduction of CO₂ emissions.

Newcastle Municipality. Two alternative scenarios have been elaborated. The first scenario is entitled “Business as usual”. It shows what would happen in the future energy consumption if the rates of application of energy efficiency measures and technologies remain the same as they used to be before the start of the programme. Account has been taken of the estimated increase of energy consumption as a consequence of the construction of new residential buildings, the growth of business activities and the broader use of appliances and vehicles. The second scenario is entitled “Innovative policy initiatives”. It considers the impact of a large-scale application of established technologies in the field of energy efficiency and use of RES. The comparison between the two scenarios reveals that in the first case the newly emerged energy demand will obliterate the effects of the actions for energy efficiency improvement, while as a result of the implementation of the “Innovative policy initiatives” scenario it would be possible to reduce energy consumption and hence CO₂ emissions by 45%. In the afterwards elaborated Action Plan the major components of the “Innovative policy initiatives” scenario have been included, grouped in four main directions: (a) introduction of co-generation; (b) introduction of energy generation from RES; (c) energy efficiency improvement; and (d) upgrade of the urban transport. [Source: Municipal Energy Planning, a Guide (2004)]

Software for selection of priorities (the Czech Republic)

The non-governmental organization PORSENNA has developed software based on Excel tables for facilitation of the selection of priorities for municipal energy programmes. By means of this software the activities are arranged in the timeframe depending on the year of their implementation. With the help of different filters it is possible to create an overall Action Plan for a specific period of time. The software has turned out to be particularly appropriate for identification of the goals, selection of priorities and formulation of the objectives of the programme. It assists the energy manager to gradually compile the programme by introducing his/her ideas and formulating step-by-step his/her vision, objectives and priorities. [Source: PORSENNA]

Selection of priorities in the municipalities of Dobrich and Smolyan (Bulgaria)

Although in formulating the major priorities and objectives of their energy programmes Bulgarian municipalities take account of the specific conditions, they often end up with priorities, which are of similar nature. Thus, for instance, almost all municipalities indicate buildings as the sector having the highest energy saving potential. The municipalities of Smolyan and Dobrich make no exception, whereat the latter orients its attention besides public buildings also to residential and industrial buildings. The elongate urban structure of the town of Smolyan, which is composed of independent neighbourhoods, singles out the energy efficiency of the urban transport and the renovation of street lighting as the most important priorities of the energy programme with significant potential for savings. Since the town of Smolyan is located among centuries-old forests in the southern end of Bulgaria, the local authority lays specific focus on the use of RES and biofuels. Special attention is paid also to the creation of a reliable energy information system for the municipal sites as well as for the industrial enterprises and households. Dobrich plans introduction of an energy management system, while Smolyan is implementing an ambitious programme for raising the awareness of the local population and training of local experts. [Sources: Municipal programmes of Dobrich and Smolyan 2008-2013]



Programme composition

Introduction

After we have already selected the priority activities and projects that will be included in the municipal energy programme in Step 6 what is left to be done is the elaboration of the final draft that will be presented to the Municipal Council for adoption.

The programme is a political document, with its internal logic and sequence of statements that correspond to its main purpose. That's why the structure and contents of the energy programme do not coincide with the sequence of the process of municipal energy planning although separate sections of the programme are composed on the bases of the results of the activities in these steps. If these activities (Step 1 to 6) are done with due seriousness and responsibility the drafting of the final programme is not expected to create difficulties.

Structure and contents of the programme

With certain conventionality the energy programme can be segmented to four major components: (i) Baseline; (ii) Priorities and expected results; (iii) Financing; (iv) Implementation. An example of the programme content is presented in Annex 2. The instructions for this step of the municipal energy planning process are developed on the base of the content given here as an example. The four major components of the programme and their parts are sequentially reviewed. The instructions given below have tentative character. They have to be followed creatively and when necessary to be adapted for the specific conditions of a given municipality.

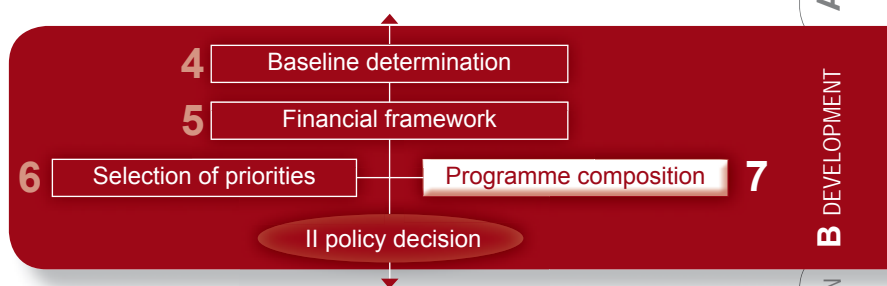
MEP – a basic policy document

The Introduction presents the character of the document as part of the general strategy of the municipality for sustainable development and defines the time limits of the programme. Very often these programmes are developed for the term of the mandate of the corresponding municipal administration. That's why the most appropriate period for the development and adoption of the programme is the beginning of the mandate.

Compliance of the programme with other strategic programmes

Municipalities are generally elaborating different strategic documents for their development – programmes for

sustainable development; programmes for environment protection; programmes for introduction of RES, etc. These policy documents should be well bound both in scope and objectives and in implementation and financing. The Municipal energy programme is part of this set of strategic documents and should be in close interaction with them.

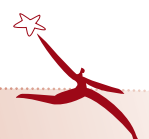


This interaction is usually carried out in Step 3 of the process of energy planning where the scope, objectives and participants in the energy programme are outlined.

It is obligatory that these should follow from the more general objectives of the sustainable development programme of the municipality. If a separate environmental programme has been developed the energy programme should coordinate with its objectives concerning harmful emissions and climate change. If RES are subject of a special programme the energy programme should take into consideration its objectives and expected results.

Baseline

As defined in Step 4 the baseline is a set of data that describes the status before the municipal energy programme implementation. The baseline serves as a starting point for evaluation of the outcomes and the impact of the programme implementation, which are equal to the difference between the initial status (the baseline) and the status after the programme completion. The baseline includes general description of the municipality based on the strategic documents for its development and concrete data about the condition of the energy sector. Baseline data is derived and systematized in Step 4 of the energy planning process using the Municipal Energy Information System – MEIS (Step 1).



Short description of the municipality

Information is given here for the location of the municipality and its contacts and communications with neighbouring municipalities and the regional center, the condition of the environment and the valuable natural resources. Local industry and agriculture are briefly presented as well. The leading branches and activities and first of all those that are connected with the biggest energy consumption should be mentioned as well. Transportation activities and those that are of local (municipal) importance in particular should be presented. Special attention should be paid to the structure and condition of the building stock, which is responsible for about 40% of the total consumed energy in general. The data that characterizes the municipality is derived from different available documents, publications and surveys. Usually, the municipality has at its disposal a lot of information and occasionally this first component often is needlessly long and unbalances of the document.

Condition of the energy sector

Greatest attention should be paid to the description of the energy sector. This is necessary for the creation of the baseline and for the comparison of the results from the programme implementation (see Step 4). The condition of the energy sector is characterized by the data supplied by the MEIS (Step 1).

Functions of the municipality

Here information about the execution of the four functions of the municipality in the local energy sector before the start of the programme should be presented.

Energy consumption and energy generation / distribution

Supply and demand side in the municipality (the first two functions) are presented both by data for the current energy generation and consumption and by three scenarios for their expected development (the baseline scenarios) – pessimistic, optimistic and realistic.

Local regulations and incentives to save energy

It is also necessary to describe to what extent the municipality realizes its other two inherent functions – as a regulator and as a source of motivation. This is necessary for the creation of a base for estimation of the impact of the activities in the directions that are subject of the programme.

Potential for energy efficiency

An important element of the baseline is the potential for energy efficiency. It shows the quantity of energy resource that can be generated by energy efficiency measures implementation. Further the share of resources that is foreseen to be utilized in the frames of the current energy programme (expected results) should be defined.

Potential for the use of RES

Another important element of the baseline is the general assessment of the potential for RES on the territory of the

municipality. This data should be available in the information system (Step 1).

Financial framework

The financial framework of the municipal energy programme is one of the most important elements of the baseline. This framework is defined in Step 5 and here general data of the financial frames in which the energy programme has been developed should be presented.

General assessment of the baseline

After the description of the realization of the four functions of the municipality in the field of energy and after the data for the potential for improvement of energy efficiency and use of RES is presented and the financial framework of the programme is outlined, the general estimation of the baseline can be defined. This baseline will serve for periodical comparison of the results of the programme implementation and in the end – for the final evaluation of these results.

Priorities and expected results

In this part of the programme are described the priority objectives, activities and projects. These priorities are the bases for the programme structuring.

Priority objectives

The priority objectives of the energy programme are developed in Step 3 and are adopted with the First political decision. During the development of the programme they can be defined more precisely or can be changed if there are enough convincing arguments for this. In the end they are subject to the second adoption together with the overall programme draft.

Priority activities and projects

Priority activities and projects are defined in Step 6 and are bound with the adopted priority objectives of the programme. In the text of the programme they can be classified in different ways:

- By functions of the municipality (producer and supplier, consumer, regulator and motivator).
- By sectors (education, healthcare, culture, etc.).
- In accordance with the expected results in relation to the priority objectives of the programme (as for instance according to the financial results, the energy savings, the reduced GHG emissions, social effects, etc.).
- Or by any other classification depending on the specific condition in the municipality.

The activities and projects can be presented in tables in which a column for expected results from the different activities and projects can be inserted.

Expected results from the programme implementation

The results from the programme implementation can be summarized here. The summary can be made on

the bases of the accepted classification of activities and projects as well as for the programme as a whole. Expected results should be related to the priority objectives of the programme with reference to the effects that are foreseen for each objective, for instance ecological, financial, social, etc.

Financing

In this part of the programme the investments needed for the programme implementation, the secured or expected sources of financing and financial instruments that will be used are presented. Data is described in Step 5 of the MEP process.

Investments needed

Investments needed for the realization of the activities and projects included in the programme can be presented for each activity and project separately and as total sums depending on the specific approach accepted in this part – by functions of the municipality, by sectors, by results, etc. The data about the investments is presented in tables.

Financial sources

While the programme is developed only part of the financial sources might be allocated. They should be described with explanation of the level of security. The activities and projects that will be financed by the municipal budget should be explicitly stated. At the same time activities and projects that are still without secured financing have to be mentioned.

Financial instruments

The programme should clearly state the forms of financing of the separate activities and projects. For those that unconventional financial instruments are planned to be used additional explanation should be provided. Such could be purchase under leasing contracts, third party financing, financing by municipal bonds, financing by public private partnerships, ESCO financing, etc.

Implementation

In this part of the programme are presented the participants in the programme implementation, the organization of the realization of the separate activities and projects, the methods of monitoring, analyses and evaluation of the programme implementation as well as the potential risks and the ways they can be limited or surmounted.

Participants in the programme implementation

The participants in the implementation are defined in Step 3. The separate groups of participants should be clearly differentiated and their responsibilities described.

Special attention should be paid to participants that are appointed from the staff of the municipal administration. Participants from different local institutions and individual

specialists who live and work on the territory of the municipality should also be added here.

External participants from the country or even from abroad can also be involved if certain activities or projects require this. Substantial resource is the public-private partnerships, which deserve special attention if such have been foreseen to be used as a specific instrument.

Organization of the programme implementation

The organization of the programme implementation is subject of development in Step 8. The overall organization as well as the organization by types of activities and projects is described there. Activities for the improvement of the management capacity of the municipal administration and the contacts with external partners and consultants are also described. The procedures for public procurement and the manner of selection of subcontractors for the separate projects implementation are outlined here.

Monitoring of the programme implementation

Monitoring is subject of development in Step 10, where the manners of monitoring, analyses and evaluation of the programme implementation as a whole and of its separate activities and projects are executed. These manners should be described in the programme and they create the prerequisites for drawing conclusions and recommendations concerning the programme implementation. The conclusions should be presented to the municipal management for corrections concerning the rest of the annual planned cycles every year. In the end of the programme these conclusions and recommendations become the bases for the third political decision, which creates the starting point for the next planned cycle.

Management of the risks for the programme implementation

Formulation of risks is subject of Step 6. All basic risks connected with the programme implementation should be clearly pointed – internal (in the frames of the municipality itself) and external (on the national or international levels). At the same time the ways for limitation or overcoming of each of these risks should be pointed in the programme. Risk management is subject of monitoring and evaluation, which is part of the total monitoring of the programme implementation.

Communication

Communication with the public is subject of development in Step 8. In this part of the programme the conclusions formulated in this step are described. Communication is of considerable importance for the mobilization of the human resources for the programme's successful implementation. Communication with the public should be considered as an instrument of the local policy and should be based on active dialogue with the local community.

The programme should demonstrate the main models

of this communication as well as the elements of the communication cycles. The energy programme should be accompanied by a plan for communication activities. This plan is developed for definite target groups and contains clearly formulated objectives, messages and means of communication.

Second policy decision (SPD):

Approval of the Municipal Energy Programme

The approval of the Municipal Energy Programme is the second and the most important policy action, which the municipality takes during the whole planning process with long-term impact on the overall sustainable municipal development. With this decision the political management of the municipality approves the main elements of the Municipal Energy Programme, as follows:

(a) Major programme indicators: goals, objectives and priorities of the programme; baseline and baseline scenario; definition of the energy efficiency potential and the scope and areas of influence of the programme.

(b) Priorities: selected priority investment and non-investment projects and actions included in the planning period; programme outcomes, specified by projects/activities and by years.

(c) Necessary financing: financial means needed for the programme implementation; determines (or authorizes the mayor to identify and use) alternative sources, instruments and schemes for the programme financing.

(d) Participants and responsibilities: commitment of the municipality to implement the programme; determines (or authorizes the mayor to nominate and hire/contract) the officers in-charge, the energy team, the municipal energy manager; determines the partners for the programme implementation.

(e) Implementation arrangements: strategy for risk reduction; timetable for the preparation and implementation of the projects and actions by years; organization of public procurement, contractual and commissioning procedures.

With the second policy decision the Municipal Council may also approve the Annual Action Plan for the first year of the planning period.

In the conclusion the main messages of the municipal energy programme can be stressed on. They may be derived from the priority objectives of the programme, to be based on the major activities and projects or to be connected with the most important expected results from the programme implementation.

Examples

Logical Framework Matrix (LFM)

The “Logical Framework Matrix” method is used in the compilation of complex and heterogeneous programmes and is designated for use above all by those, who design such programmes and perform monitoring on their implementation. It is based on description of the actual initial state prior to the start of the programme (baseline) and the establishment of clear hierarchy of the objectives and the estimated results from the implementation of the programme. At the same time the possible risks, which might emerge in the course of implementation of the individual projects and activities

and jeopardize the achievement of the specified results, are studied and described. Measures for overcoming of each of these risks, in the event they really happen in the course of implementation, are also formulated and laid down in the programme. An important element of this method is the identification of measurable indicators of successful implementation of the individual programme components, as well as of reliable ways for collection and corroboration of the data used for measuring the indicators. The logical framework is usually presented by means of a standard table, called “matrix”, from where the name of the method originates.

Table 5. The “Logical framework matrix” (LFM)

	Description of activities	Indicators	Sources of information	Assumptions and risks
1	2	3	4	5
a	Strategic objective / goal of the programme			
b	Main objectives and estimated outcomes of the programme			
c	Concrete outputs from activities			
d	Tasks and activities for achievement of the planned results			

It is desirable to use the “Logical framework matrix” with respect to the overall programme, whereat its individual sections form the main results from the programme (Column 1). In the vertical columns is provided consecutive description of the respective activities (Column 2); list of the selected indicators for evaluation of the implementation of the individual activities (Column 3); the sources of information and the ways of corroboration of that information (Column 4), as well as the preliminary conditions (assumptions) and possible risks, connected with the implementation (Column 5).

In row (a) of the matrix is described the strategic objective or vision (goal) of the programme. That is a summary of the overall impact of the programme on the development of the municipality and the life of its population, which is usually expressed by one or more (however a limited number) objectives/goals. In row (b) are described the main objectives of and the expected impacts (outcomes) from the implementation of the programme. These objectives are usually more than one and quite often are oriented towards different sectors, for instance buildings, public transport, public lighting, etc. In row (c) are described the concrete actions, by which the objectives from the previous row, as well as the immediate results and products from them (outputs) will be achieved. The last row (d) is designated to the tasks and activities by which the objectives, listed in the previous rows, will be achieved.

For better clarity the objectives and the expected results (outcomes), described in row (b) of the matrix can be divided into several sections, while rows (c) and (d) may be joined/combined with row (b) as its subdivisions. In this way every objective may be easily tracked by the concrete results and products from the activities implemented for achieving them. A municipal energy programme compiled in this manner can be easily monitored in the course of implementation and its outputs can be reported periodically. The “Logical framework matrix” may be used as an annex to the main text of the programme, compiled along the structure described above.

Examples

Good practices

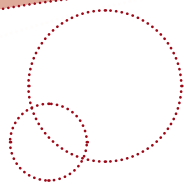
Local Agenda 21

The international initiative Local Agenda 21 lays the focus on a number of activities, which in their entirety aim at motivating and stimulating the efforts for sustainable development and energy efficiency. To this end are worked out municipal strategies for sustainable development, following the below listed major steps: (a) formulation of the vision; (b) analysis of the current situation; (c) formulation of strategic objectives and tasks; (d) development of a concrete Action Plan; (e) implementation of the programme; (f) monitoring and control; and (g) feedback, evaluation of results and programme adjustment.

Vision is a dream, an aspiration for something strongly wished for. It is not limited by the scarce capacities of today, but rather transfers the values of the cultural specifics and identity far into the future. That is not the vision of experts or the municipal administration. That is the vision of all inhabitants of a given municipality. It is shaped in dialogue with the representatives of

different social groups – the local authority, the citizens’ organizations, business circles, academic circles and the media. The vision outlines the picture of how the municipality will look like in the future, some 20-30 years ahead, without breaking away from the realities and the historical and cultural peculiarities.

The main strategic objective of the municipality, the sub-objectives and strategic tasks form the so-called “tree of objectives”. It helps to visualize the links and subordination between the objectives, sub-objectives and tasks for the implementation of a specific strategy, on the top of which stands the primary strategic objective and in its base – the tasks and specific actions for implementation of the strategic objectives. The primary strategic objective is a result of an in-depth analysis of the current situation or the trends of development or stagnation during the previous 5-10 years and the ensuing development priorities. The main objective is linked to the vision for development of the municipality. It fixes a period of several years and is usually related to the mandate of the municipal management. The primary



strategic objective of the municipality is formulated by “assembling of the puzzle” of strategic policies in the individual sectors of municipal activities: economic development, social activities, protection of the environment, engineering and social infrastructure, land use and settlement network, local self-government and democratization of society.

The Action Plan formulates the necessary efforts and resources for the implementation of the laid down objectives and tasks. It should be specific in several directions: time, space, objects and subjects on which its implementation depends. Every concrete measure, undertaken for the implementation of the strategic objectives and tasks, should be backed up by the appropriate plans, resources, funding, responsible officers and deadlines. [Source: www.vn.org/esa/snstolev/agenda21.htm]

Structure of the municipal energy programme (Slovenia)

According to the Energy Law in Slovenia the municipal energy programme is a concept for energy generation and consumption in the municipality. In addition to the implementation of a number of investment and non-investment-related projects and measures, it is linked also with the change in the energy-related attitude of end-users through raising their awareness about rational energy use. The municipal energy programme analyzes and identifies the following: (a) the current state (baseline) as regards energy supply and rational energy use. Special attention is paid to municipal buildings, to which the very first energy audits should be oriented; (b) the access and the cost-effectiveness of local renewable energy sources, which might increase the security of energy supply. Any projects in this direction contribute at the same time for the reduction of CO₂ emissions and limit the unfavourable impact on the environment; (c) the municipality's objectives in the field of energy. These objectives are defined by means of quantitative indicators, which allow survey, accounting and evaluation of the implementation of the programme. They are formulated in compliance with the National Energy Programme and at the same time make allowance for realization of the long-term development of the municipality in the energy sector; (d) Action Plan, which comprises activities or projects for implementation of the formulated objectives; (e) schedule for implementation of the activities and projects. Some of the objectives that may be selected for the municipal energy programme are: rational use of energy in all fields; broader use of RES; mitigation of the unfavourable impacts on the environment; promotion of co-generation and district heating fueled by biomass; replacement of fossil fuels by renewables; reduction of the energy consumption at end-users; conducting of energy audits in municipal and residential buildings; introduction of heat accounting and energy management in municipal buildings; reduction of

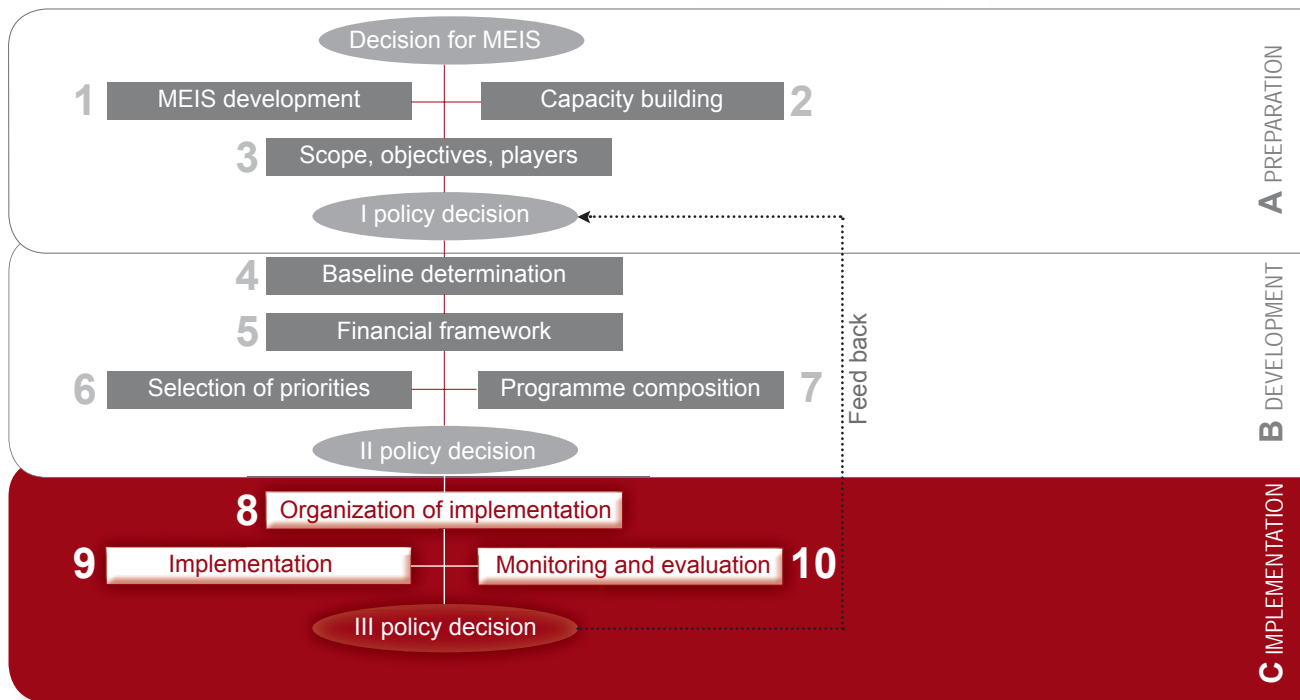
energy consumption at the big end-users, including industry and transport; promotion of energy advisory services; dissemination of information and training. [Source: Sinergia]

Energy efficiency plan of Bologna (Italy)

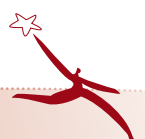
Bologna responded to the Kyoto Protocol by committing itself to reduce CO₂ emissions by 6.5% as compared to the baseline year 1990. In order to achieve this objective the municipality acts in three directions: (a) reduction of energy consumption in existing buildings and expansion of the use of RES; (b) curtailing of the further urbanization of the non built-up land and (c) reduction of the energy consumption by the transport. The energy plan of the city envisages upgrade of the legislative framework and further development of the database of energy consumption and GHG emissions. Sustainable urban planning measures are envisaged for reduction of the energy costs and introduction of management of the energy consumption in public buildings while complying with the concrete needs of the citizens and the capacity of the territory. The plan consists of several volumes, in which are consecutively presented data about energy consumption and GHG emissions, analyses of the territory and description of the priorities and expected results, plan for energy savings and broader use of RES, energy database for buildings and handbook for energy consumers. Methods for evaluation of the plan were adopted, which are based on the balanced growth of the city and reduction of the energy demand, as well as on close co-operation between the municipal administration, local politicians and experts and consultants involved in the programme design. [Source: City Instruments Best Practice Catalogue]

Implementation Stage

C.



The fulfillment of the municipal energy program is the most complex and the longest stage of the total process. The objectives of the programme are realized by the implementation of the projects and activities included in it. That's why the organization of the steps of this last stage of the process is decisive for the overall success. Seldom, during the implementation of the programme changes, amendments or updates of the preliminary planned activities are needed strict control and evaluation of each separate activity of the programme is of extreme importance. The monitoring of the implementation is that mighty tool by which the local authorities can control and exert influence on the projects implementation and can secure the achievement of the preliminary defined objectives of the programme.





Organization of the implementation

A PREPARATION

B DEVELOPMENT

C IMPLEMENTATION

Before the start of the MEP implementation the municipal administration should carefully prepare the next steps. The first one is to set up a Programme Management Unit (PMU) from employees of the municipal administration. In some cases the programme management could be assigned to an external body or specialist. When outsourcing for selection of the programme management is made, serious attention should be paid to the preparation of the tender documentation and procedures. The same approach should be followed for the selection of energy auditing, design and consultancy companies, as well as for the selection of contractors for the execution of the energy efficiency measures (retrofit). In some countries the involvement of financing institutions in the implementation of MEPs is also a subject of public procurement

- Development and carrying out of training programmes for the operating personnel and the end-users.
- Timely reporting, at the adequate quality level, of the results from the implementation of the measures.
- Modifications and improvements in the process of implementation of the programme, whenever this is necessary.

The other participants in the implementation of the municipal energy programme also have important responsibilities, like for instance servicing of the debt or ensuring that the results from the implementation of the programme are adequately reflected in the overall policy of the municipality.

Preliminary tests

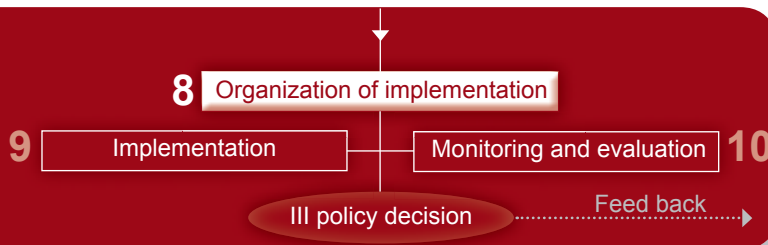
Depending on the desirable and established partnerships and the type of the selected measures to be implemented in the framework of the programme, the municipal administration may skip the preliminary tests and proceed directly with the regular implementation. However, in some cases the uncertainty or the foreseen risks may require partial of overall tests of the most critical components of the MEP. Three types of tests are applicable to reduce the risks and ensure adequate pre-conditions for effective MEP implementation.

Experimental projects

When some of the investment activities are related with a significant uncertainty or when innovative technologies are to be applied, experimental projects may serve to tune up the organization and secure the necessary conditions for successful implementation. Experimental projects are implemented to check single technical or other solutions before planning or implementing them in practice. Although in some cases experiments may lead to negative results, they are valuable with the lessons learnt, which often protect from unreasonable risks or costly mistakes. Experimental projects are carried out before or after the programme approval, if further planning or the implementation needs such tests.

Demonstration projects

Demonstration projects are to show (demonstrate) the outcomes, effectiveness or impact of an important part of



The programme implementation is the synthesis of all planning and preparative activities from the seven preceding steps, irrespective of whether each of them has been implemented in real terms or not. The process of programme implementation is something more than a mere application of selected technical measures or an ordinary installation of the envisaged equipment. This step requires high skills and talent on the part of the personnel, who will coordinate the implementation of the programme.

Those responsible should be able to ensure:

- Timely delivery of the necessary materials and equipment and availability of labour force for the implementation of the planned measures.
- High quality of workmanship for the implementation of the selected measures.
- Survey, analysis and evaluation (monitoring) of the technical, financial and organisational outputs from the implementation of the programme.

the municipal energy programme. These projects could mobilize political and/or social support for the programme implementation. They might be carried out before or after the programme approval, when mobilization of support for the programme implementation is most needed. In order to fulfill their role, demonstrations should be successful and provide visible and easy-to-understand effects. This is why they should be very carefully selected and prepared before starting their implementation.

Pilot projects

Pilot projects are small scale models of critical parts of the programme (or of an important individual site) that will be repeatedly carried out during the regular programme implementation. They serve to demonstrate the processes and methods of implementation of the programme and to test whether they have been planned and understood correctly by those responsible for their realization. Pilot projects are applicable before the start of large scale operations in multiple number of similar sites (for example retrofit of a large number of schools, kindergartens or residential buildings). They are carried out after the programme approval and the eventual execution of experimental and/or demonstration projects.

The implementation of a project with short payback period and high rate of return will be very useful for enhancement of the transparency of the programme and for more rapid winning of public support for it. A well-selected and implemented pilot project may play this role. An early success may have a strong influence for the further advance of the implementation efforts. The same applies to the early failures. Therefore, the first steps in the implementation of the programme are of extreme importance for the final success.

Pilot projects are launched after the specification and testing of the programme by single demonstrations. Their objective is to perform the final check of the overall functioning of the system for implementation of the programme under real conditions by testing the links and mutual influence among the individual components. The implementation of pilot projects is not mandatory and may be omitted. It is, however, very useful in the case of programmes that last several years, envisaging implementation of a large number of identical measures on a large scale and in a large number of sites. In the course of the pilot project implementation, it is possible to find out whether the changes planned beforehand are needed prior the launching of the regular implementation on a mass scale.

Partnerships

Types of agreements

The programme implementation needs a wide range of partnerships with the local stakeholders. Various types of partnerships are usually applied - with local utilities, citizens, local industries (PPP) and NGOs.

Communication strategy

At this stage a strategy for communication with the public should be outlined and accepted. Its objectives could be information exchange or change of selected target groups behaviour or provision of a feed-back for the evaluation of the programme implementation. Possible target groups of the communication strategy could be local politicians and municipal administration, households, local industries or pupils and children in the kindergartens. Typical outcomes of the communication with the public could be the achievement of transparency of municipal energy & environmental policy, mutual confidence of the municipal administration and the local community or stronger social support for the municipal energy programme implementation.

Experimental, demonstration and pilot projects could serve as effective instruments for verification of the MEP indicators and facilitate the programme implementation. Targeted and well structured partnerships of municipalities with local businesses, households and civil society are the base for successful MEP implementation and for the achievement of sustainable impact on the local development. The successful communication strategy is the best mechanism for building of social confidence and mobilization of social support for the programme implementation.

Partnership with NGOs (the Czech Republic)

Partnership for assistance of the municipalities in the process of municipal energy planning has been established between the Czech non-governmental organizations PORSENNA and the Healthy Cities Network. Initially it was realized in the selection of pilot cities to join the MODEL Project of the European Commission. Later on the partnership continued during the conducting of training courses for municipal experts. [Source: Porsenna o.p.s.]

Partnership with the business (Great Britain)

The Environmental Business Pledge is a free scheme, which works in partnership with the local businesses to identify and implement changes that reduce their environmental impact and improve their business's efficiency. This is done through on-site consultations, which provide information and sign posting to other environmentally focused business-support organizations, such as the Carbon Trust and Envirowise. The scheme encourages and supports businesses to work according to Bronze, Silver and Gold award criteria, thereby improving their environmental performance and demonstrating their environmental credentials. Once the awards have been achieved, regular contact with the businesses is maintained in order to track progress improvements and capture the details of improvements with the hope of monitoring and improving the success of the scheme. [Source: <http://www.pepsecenergyplanning.eu>]

Organization of MEP implementation in Lom and Madan (Bulgaria)

The Municipality of Lom is situated on the northern frontier of Bulgaria along the Danube river bank, while the Municipality of Madan is situated in the southern end of the country among the centuries-old pine forests of the Rhodopes Mountains, the mountain of Orpheus. Taking into account the local conditions and possibilities, each of the two municipal administrations creates its own organization as to how to implement the municipal energy programmes. For implementation of the programme in Lom a Working Group (WG), composed of energy efficiency experts under the leadership of an energy manager was set up, while in Madan a Management Body (MB) was set up, directly subordinated to the Deputy Mayor of the municipality. The WG and the MB are authorized to manage and realize the organizational and control activities related to the programme. The municipal experts participating in the WG in Lom have undergone training in municipal energy planning and management and work in collaboration with energy experts, representatives of the selected priority sites, NGOs and citizens' organizations. The WG in Lom and the MB in Madan manage and control the implementation of the programme by hiring external contractors under

the provisions of the Public Procurement Act, but at the same time rely on the active contribution of the specialized units of the municipal administration and the managers of the sites (schools, kindergartens, etc.), in which the concrete projects are implemented. WG and MB report to the municipal management and to the specialized commissions of the Municipal Councils. The difference in the objectives of the municipal programmes of the two municipalities exerts influence on the activities of these two bodies, but there are still a number of common features. In Madan special attention is paid to the activities related to energy generation from RES and the preparation of projects to be financed by the Operational programmes. In Lom a system for communication was created, involving periodical meetings and submission of reports by the WG, public debates, radio emissions and publications, hot telephone lines and dissemination of printed matter. The leadership of the Municipality of Lom envisages annual reporting on and updating of the municipal energy programme on the basis of the results from its implementation [Sources: Municipal energy programmes of Lom and Madan 2008-2013]

Programme implementation

The implementation of the Municipal Energy Programme is the step, which takes the longest time, efforts and financial means. Many different players take part in the implementation, while the local society recognizes the real impact of the MEP and its overall influence on the local economy. This is the reason why at this stage the mobilization of the social support and the involvement of the population and the key players in the MEP process obtain critical importance.

The practical implementation of the municipal energy policy is a complex process, which comprises a series of policy steps and whose success depends on many factors of diverse nature. We might have worked out an excellent municipal energy efficiency programme and may have proposed the best possible measures for its implementation, based on the latest scientific and technical achievements. The elaborated business plans might be economically feasible and justified in detail from the point of view of the management. This, however, is not a guarantee for success. Finally, whether the energy efficiency policy of the municipality will be implemented or will remain a pile of useless paperwork depends entirely on the human factor. The success of the municipal energy policy is related to the extent to which people are willing and capable of assuming their responsibility for the state of the environment.

Immediate actions

At the implementation stage a series of immediate actions are to be foreseen. The first one is setting up a Programme Management Unit (PMU) from employees of the municipal administration (if this has not been done in the previous stage). In some cases the programme management could be assigned to an external body or specialist. When outsourcing for the selection of the programme management is made, high priority has to be given to the organization of the tender documentation and procedures.

The same approach should be followed for the selection of energy auditing, design and consultancy companies, as well as for the selection of contractors for the execution of energy efficiency measures (retrofit).

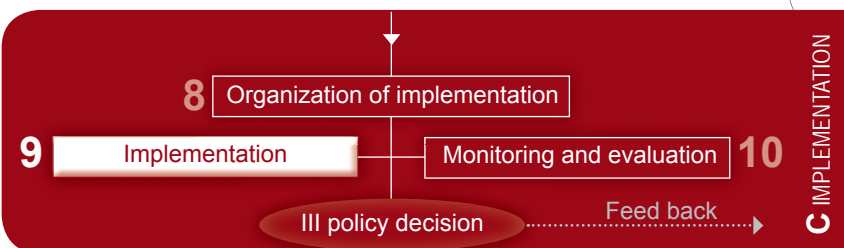
In some countries the involvement of financing institutions in the implementation of MEPs is also subject of public procurement.

Communication with the public

Dialogue with the public

The tools for implementation of the local energy policy comprise a multitude of various measures, which differ in the manner of their application and the estimated effects.

The practice has shown that communication with the public has played a particularly important role in all cases of successful policy in the field of energy and protection of the environment. It contributes for awareness raising on significant problems, for improvement of the level of knowledge and for bringing about a change of people's behaviour. For this reason, in the process of the municipal



energy strategy elaboration it would be recommendable to pay special attention to the question how to organize its practical implementation. This means that it is necessary to ensure besides good internal communication (management bodies of the sites and activities, inter-departmental exchange and dissemination of information, etc.) also efficient external communication (information for the broad public, education and training of personnel, public debates and consultations with the target groups). Dialogue with local public is needed, since it may help to achieve the change in the attitude and behaviour of all stakeholder groups and individuals on energy-related issues.

Communication with the public is successful only when the holdbacks to changes of people's behaviour towards more effective energy savings are not too many. It has better chance for success in the cases when communication is combined with other tools – legislative or financial.

Types of communication

The elaboration and implementation of the municipal energy efficiency strategy presumes the three major

Table 6. The energy planning process - priority objectives of communication during the different stages of the municipal energy policy development

Stages in the development of the municipal energy policy	Follow-up actions	Priority objectives of communication
First policy decision Decision to elaborate an Energy Efficiency Strategy	- Elaboration of an energy efficiency strategy - Local capacity building - Elaboration of a Municipal Energy Programme	- Dissemination and exchange of information - Announcement and dissemination of the adopted policy
Second policy decision Approval of a Municipal Energy Programme	Implementation of the Municipal Energy Efficiency Programme	- Building of awareness towards the energy efficiency issues - Changes of the habits and behaviour patterns of the target groups
Third policy decision Assessment of the implementation of the Municipal Energy Programme	Feedback in the process of evaluation of the implementation	- Improvement of the efficiency of the municipal policy - Guarantees for democratic decision-making

policy decisions – on the development of a strategy, on the approval of the municipal energy programme and on the evaluation of the implementation of the programme. It is important to take into account the fact that the priority objectives of communication with the local public are different for each of the phases and this predetermines the differences in the recommended forms of communication (see Table 6).

Major dilemmas in communication

The dialogue with the local communities on the issues of energy efficiency and environment protection is charged with the most unexpected challenges. Achievement of a change in people's value systems, attitudes and behaviour has always been a difficult process. People are apt to neglect any information, which casts doubt on their established habits. They usually seek confirmation of their old ideas and most frequently do not easily open their minds to new ways of reasoning. The daily activities of groups of people and individuals are often full of contradictions with respect to energy efficiency because they are responses to a multitude of different factors. For instance, a given individual may one day use the public transport and on the next chose to use his/her private car.

Someone may always maintain lower temperature of the district heating at home, while at the same time continues to purchase all kinds of household appliances for heating. If you ask people to explain the contradictions in their behaviour, you will often hear unsubstantiated arguments. However, it is exactly these arguments that should be assumed as the starting point in the planning of all further actions, since in this case perception is the only reality. What is more, the awareness on the energy efficiency issues does not automatically lead to a more conscious behaviour towards energy. The gap between the awareness on a given problem and the actions in this respect is related to the "social dilemmas" phenomenon. These dilemmas obstruct the transformation of the attitude into an energy-conscious action.

Some of the frequently shared social dilemmas are as follows:

Collective versus individual interests

The collective/community benefits from energy conservation are less tangible to the individual than the immediate inconveniences of changing one's own behaviour (e.g. reduction of individually perceived comfort).

Short-term effect versus long-term one

Short-term effects, such as reduced comfort when using public transport instead of one's own car, are obvious. The long-term effects, however, such as preservation of the available deposits of fossil fuels for a longer period of time, are difficult to perceive or to comprehend.

The "here and there" effect

The fact that the use of fossil fuels causes damage to the environment elsewhere in the country or in another part of the world is often not clear to the individual using that energy source.

Other reasons, that might cause the failure of some energy efficiency programmes aimed at changing people's attitude and practices, are as follows:

Lack of knowledge

People often lack information about alternative equipment of higher energy efficiency characteristics that is available on the market and is sold at affordable prices.

Contradictory messages

Some people refuse to switch off fluorescent light when they leave the room for one hour because they are convinced (they have heard from some expert?!) that frequent switching of fluorescent lamps ON/OFF leads to excessive energy consumption, i.e. it costs money. The correct message is that any switching OFF of the fluorescent lights when one leaves the room leads to energy saving.

The “after you, sir?” effect

People tend to pin responsibility on other people or institutions but not to bear it themselves. For instance, they say: “Why should I sell my car, when my neighbours have two cars, using them for stupid things!” Or “Why should I sit in a dark and uncomfortable house when the municipality building is full of lamps burning even at night! Let the authorities act first!” In as much as the communication is an important policy tool, it should be planned beforehand in the least detail. The most tangible effect is obtained when it is correctly co-ordinated with other tools and other messages of the local authorities. In order to use them effectively for the implementation of the municipal energy efficiency policy, the public relations officers and the municipal employees working on energy efficiency and environmental protection issues should be well-acquainted with:

- The general conditions under which the activities of the programme will be implemented.
- The general policy on energy efficiency and protection of the environment.
- The thoughts, feelings and protective mechanisms of the local community.
- The recommendable methods and tools for public relations in the different phases of the programme implementation under different conditions.

Communication process

Model of the process

There are many definitions of the notion “communication”. In this case it will be useful to assume as a starting point the following definition:

Communication is a process, in which a sender conveys information to a receiver through a communication channel in order to bring about certain response in the receiver.

For conveying a successful communication the sender should be familiar with the interests of the different target groups, their knowledge and previous experience, the manner of selection of the information and with the channels of the messages receipt.

Communication cycle

The communication strategy (public relations) is a process based on five major elements: target group, target, message, organization and means.

Target group

The target group is an accurately described group to which the specific message will be focused. For instance,

the notion “the citizens” is not a good description because it is too broad (a 20 years old female reads different media than a 60 years old male and will accept as reasonable different arguments from those acceptable for him). It is important to remember that the target groups are end-users with specific common models of energy end-use, but at the same time they are human beings with their inherent propensities, biases, knowledge, behaviour patterns, (un)conscious interests, (un)willingness for change.

Target

The targets of the communication ensue from the objectives of the formulated policy. They should take into account what a specific target group has to know, feel or do. It is preferable to quantify the percentage of the target group that has to meet these targets and to set deadlines when the targets must be achieved.

Message

The message refers to the contents of the communication, which you want to convey to the selected target group.

Means

With view to transmitting successfully the intended message, it is important to select the organizations or individuals that can play the role of intermediaries for its communication. Some methods are more adequate than others for the selected targets and target groups.

Organization

The organization concerns the planning, timing, distribution of tasks and budget, guidelines for internal and external co-operation (for instance intermediary organizations or individuals), etc.

Designing a communication strategy is not a linear, but rather a cyclic process. The practice has shown that quite often it is necessary to go back a step and to reformulate earlier stages of the cycle (for instance of the message or the target group) in order to be able to proceed successfully forwards (see Figure 12).

Planning communication

Definition of communication targets

Prior to the development of your communication strategy it is necessary to clarify the issues covered by the municipal energy efficiency policy. This will help you to identify:

- The concrete problems which you will have to deal with and
- The specific role of communication in the framework of the general energy efficiency policy.

The best way to perform this analysis is through conducting discussions or “brainstorming” with colleagues and basic sources of information. Since the very beginning it is assumed that the issues in question are of the competence of the local authorities.

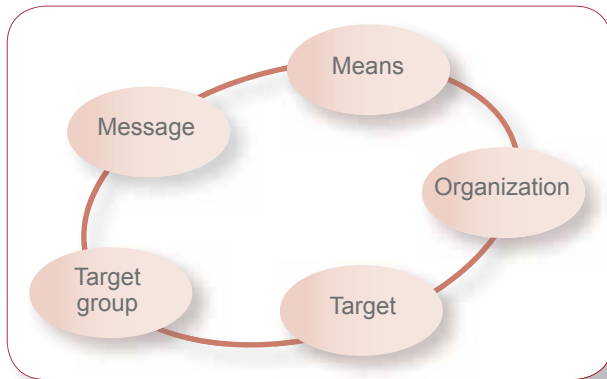


Figure 12. The communication cycle

Definition of the target groups

When defining the target groups of your communication strategy, try to stick to the following steps:

- Make an overview of the target groups that play some role with respect to the energy issue selected by you. Try to be as specific as possible (for instance, the occupants of flats on a specific street or area).
- Try to rank them in order of importance. The more responsible or the more involved in the energy issue target group, the more important it is to launch a dialogue with that group.
- Indicate the approximate size of the group (it might probably be necessary to make additional clustering of those incorporated in it).
- Formulate their position in the social networks and look for individuals, who might be of interest (from the point of view of their capacity to exert influence).
- Formulate the extent to which the target group can be defined and accessible.
- Make assumptions concerning the feasibility of their contribution for the solution of the specific energy issue (what can they do?).

Definition of the communication targets for each target group

In general, we distinguish four types of communication targets:

- Targets concerning attention (having heard about, having an opinion).
- Targets concerning awareness of the issue, knowledge and understanding (being aware of it, knowing about it, understanding it).
- Targets concerning willingness and motivation (wanting, being motivated, being ready).
- Targets concerning behaviour and skills (doing, being able, participating).

These types of targets may be related not only to the implementation of the approved policy or project, but may also serve to make the results widely known and to promote the reputation of the local authority.

Definition of the messages

The central question here is: "What is the core message to the respective target groups?" The following two steps should be passed to answer this question:

- Formulation of the main topic - it should reflect the com-

munication target and should be related to the general policy target.

- Formulation of the specific sub-topics - they should focus on the benefits for the specific target group and attract the attention of its members.

It is recommended to opt for a balance between rational and emotional aspects by carefully weighing up the nature and attitudes of the target group. Present the issue for the respective target group in a simple, clear and understandable form avoiding unnecessary details or background information. Try to find a balance between the emotional and rational attitude. Be honest and use positive images. Point out how other people or organizations contribute to the solution of the problem.

Definition of the means of communication

Some well-known means for conveying the messages are, for example, distribution of leaflets and brochures, sending letters and conducting meetings. In order to be able to use these means in the most effective way it is advisable to use local media as well.

It is wise to look for a combination of communication means. The practice proves that personal communication gives the best results. But it is also time consuming and thus often not very efficient. Moreover, only a limited number of people may be reached in this way. Mass media are much more appropriate for reaching out a large number of people. The disadvantage in their case is that the information is frequently too general and the use of mass media can be expensive.

Organization of the implementation

Whether your communication plan succeeds or fails depends to a great extent on the organization of the implementation process. Usually, the available personal capacity and financial means determine the targets you can work with and the media you can use. The following issues are of particular importance concerning the organization:

Tasks and responsibilities

Find out which persons are responsible for the communication activities in the municipality and how their activities are coordinated.

Budget

Make a preliminary estimate of the costs and indicate how the individual activities will be financed. If the available budget is insufficient, it might be possible to:

- Formulate priorities.
- Split activities in individual phases, so that the costs may be spread over a longer period of time.
- Find additional sources.
- Establish cooperation with other actors (for instance local citizens' organizations).
- Attract private professional organizations of freelancers to carry out some of the activities (sometimes this is more efficient).
- Skip activities or choose for cheaper alternative ones.

Planning

It is recommendable to arrange the activities in a chronological order and to determine who has to do what and when.

Implementation of a communication plan

The success of the implementation of the communication strategy and communication plan requires particular attention for the following more important reasons:

Establish coordination

It is most likely that your communication plan consists of various activities for the specific target groups. It is even likely that these activities are assigned to more than one person. In that case coordination is very important. The messages for the specific target groups should be clear and unambiguous. The activities should be carried out in a logical order, so timing is imperative. When communication activities cause confusion, there is a danger that the target group may drop out and that it will not be easily accessible again for further information.

Set an example

If you want your target group to change its behaviour, you or your organization should set an example. If this is not the case, you will weaken your message. As a result of that, your target group will confront you with your behaviour instead of changing its own.

Give a feed back

Show your audience the results of their efforts, for instance:

- Give personal feedback to the individuals, who have independently made some efforts.
- Present calculations that show what it means when every citizen behaves energy efficiently in his/her house. Knowing about the results of their actions is a motivation for people to continue with their efforts.
- Give explanations and use the negative situation to turn it into a positive starting point for further actions. Never lie about the results.

Use intermediaries

Using intermediary organizations as a primary source of information can be very effective for various reasons:

- Their credibility is sometimes higher than yours (as an agent of the local authority).
- NGOs or their intermediaries often have a lot of experience on specific items.
- Making use of NGOs or other intermediaries may save you time and money.

Invest in networking and make notice to involve interesting intermediaries as early as in the initial phase, i.e. the phase of planning communication activities. To help you

when implementing your communication activities checklists are used.

Evaluation of implementation

It is important to evaluate both the communication activities and the cooperation with the partners in the course of the communication programme implementation. Such evaluation could be made twice – one halfway of the activities and once at the end of the communication programme. It would be best to evaluate separately the internal and external cooperation. Internal cooperation refers to cooperation between the responsible municipal departments and the rest of the departments of the municipal administration. External cooperation refers to cooperation between the responsible department of the municipal administration and the external organizations (NGOs, institutes or consultancy agencies).

Evaluation could be based on a registration of complaints and questions, informal contacts with players, analysis of messages in the media, interviews (meetings or telephone calls) with colleagues, key informants, members of the target group (the most active), panel discussions and consultations with members of the target groups, evaluation meeting with colleagues or key informants, circulation of questionnaires at the end of meetings or sending out exhaustive questionnaires to the target groups with a request to fill it in and return.

The implementation of the MEP requires appropriate capacity and experience, as well as public procedures and communication. Special attention should be paid to the legitimate and transparent public procurements, which require specific qualification, experience and ethics of the municipal officers involved.

Outsourcing a Programme Manager (PM) might be an appropriate solution for many municipalities, which could compensate the shortage of management experience and technical capacity and ensure objectiveness and reliability.

The specific responsibilities of the Municipal Energy Manager (MEM) and his/her relations with the PM (if external) should be clearly defined and endorsed by the municipal management in an official contract.

Specific responsibilities of the municipal departments with the PM and the MEM should also be clearly defined and endorsed by the municipal management.

European energy award for Kaunas (Lithuania)

The Municipality of Kaunas improved its energy efficiency step by step by implementing a variety of activities. They were highly appreciated through the European energy award, because: (a) all energy-related activities were analyzed and evaluated; (b) the strengths and weaknesses of the energy sector were visualized and the energy efficiency potential was highlighted; (c) the objectives of the local energy policy were clearly defined; (d) the work programme for implementation of the local energy policy comprised both long-term and short-term projects; (e) the Action Plan was fulfilled step by step; (f) permanent survey and evaluation of the results from implementation of the programme was performed. [Source: KREA]

Shared costs for energy audits (Germany)

Energy audits performed in school buildings in Berlin are used for training of pupils, teachers and the administrative staff on issues related to the efficient use of energy. The implemented energy efficiency measures have resulted in real energy savings. The saved costs are shared at the ratio 50:50 between the owner of the school building (the municipality) and the school itself. This is turning into a mighty incentive for the two parties to perform energy audits and implement measures for energy savings in a growing number of sites. Very important is the fact that the pupils, who are the future citizens and politician of the city, are actively involved in this process. [Source: City Instruments Best Practice Catalogue]

Sustainable co-operation raises awareness (The Netherlands)

The Sustainable Co-operation Programme has been developed with the aim to assist the inhabitants of North Rotterdam to learn more about sustainable development and change their behaviour in that respect. Special attention is paid to waste collection, parking, air pollution and sustainable way of life. This innovative initiative aims also at teaching the citizens on issues related to energy and its rational use. One of the priority target groups in the community is the emigrant community. As a result of the implementation of the programme the social relations with that community have been improved, information is being broadly disseminated and helps to involve the population. It is assumed that otherwise this population would not have had adequate access to energy services and is not in a position to reduce its energy consumption and curtail carbon emissions. Replication of a similar approach in other settlements and countries appears to be possible, since it does not depend on the concrete

political system or the local regulatory framework. [Source: City Instruments Best Practice Catalogue]

Network of information centers (Italy)

Presently, different information centers, which have important role for raising public awareness, are created all over Europe. Bringing information close to the people is of great importance, particularly on topical issues like energy. The information, disseminated by means of leaflets or magazines often puzzles people and makes them doubt whether they will be able to apply the different systems for improvement of energy efficiency. Quite often they need additional information. Therefore, it is very important to set up centers, which really aim at providing the answers to people's queries. They may contribute to prevent the citizens from beginning to hesitate or to be frightened by the numerous challenges related to the implementation of energy efficiency measures. The information centers may orient their actions to the biggest end-user groups, in which trends of increase of consumption have been observed – buildings and households. The Italian experience in the creation of such centers may be disseminated in many other countries. [Source: City Instruments Best Practice Catalogue]

The example of Kaskais Municipality (Portugal)

In order to optimize the implementation of energy saving measures in municipal buildings the Municipal Energy Agency in Cascais introduced a system for real time distance monitoring of energy consumption in every municipal building. The installation of distance sensors for analysis of the energy consumption in the municipal buildings supplies information on the basis of which various activities for reduction of the consumption are proposed. The Municipality decided that its administration building should set an example. In addition to the installed sensors energy audits are made and activities for raising the awareness of the employees in the monitored buildings are conducted, achieving in this way the maximum effect from the applied measures. Reduction of energy consumption and carbon emissions is obvious, but much more important turned out to be the increased productivity of the personnel. The Municipal Energy Agency has developed a collection of recommendations for integration of passive technologies in architecture, as well as for more rational energy use and selection of appropriate cost-effective technologies. The Agency continues also its activities on broadening the awareness among pupils. [Source: <http://www.cascaisenergia.org>]



Monitoring and evaluation

Upon completion of the installation works and the implementation of each individual project, as well as upon the expiration of the period for the overall implementation of the programme, a quantified expression may be given to the realised changes. The easiest way to do this is through comparisons using data about:

(a) The state of the sites, which have been object of impact, and the municipality as a whole, prior to and after the implementation of the programme.

(b) The total amount of energy saved for the entire period of implementation of the programme and the projections for a certain period ahead, using the data from real measurements and the forecasts based on the actual results from the implemented measures.

Baseline comparison

The comparisons can be performed by using the baseline established at the start of the project (step 4) and the forecast calculations about the estimated state of the sites/municipality and the energy savings. The evaluation of the programme should include also a comparison of the achieved results for each of the set quantitative and qualitative objectives of the programme – alleviation of the burden of energy costs, reduction of emissions, improvement of the quality of energy services and other indicators subject to ascertaining and measurement.

The primary units of measure with respect to the success of a municipal energy programme are as follows:

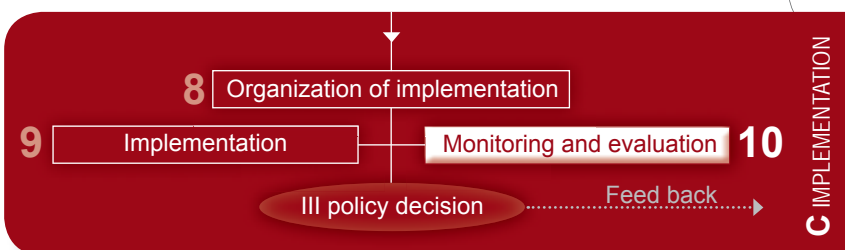
- (a) Achievement of the preliminary set objectives.
- (b) Creation of conditions for replication of the successful implementations on the area of the municipality or in other municipalities.
- (c) Degree of impact of the programme on other spheres of planning and development in the municipality.

The above listed indicators for success of the energy programme may be controlled in the course of the programme implementation and/or after its completion. For this purpose sufficiently long and well organised monitoring should be performed. This step is particularly important for guaranteeing the sustainability of the achieved results and avoidance of errors, as well as omissions and weaknesses identified during and after the project implementation.

Monitoring procedures

Monitoring and evaluation (M&E) may cover various stages and aspects of the MEP process. It usually starts from the very first steps and continues after the completion of the programme implementation. It is strongly recommended to continue M&E long after the programme period expires in order to establish the long-term impact of the programme on the local economy, the energy sector, the environment and on human behaviour.

Monitoring of the management and operation of the MEP is critical. It could be organized locally (within the municipal administration) or externally (outsourcing independent monitoring company).



When monitoring focuses on the management of the MEP implementation, outsourcing for the M&E execution may well ensure objectiveness and transparency. Independent monitoring may also give a valuable feed-back to the municipal management.

In all cases monitoring and evaluation of the M&E should be carried out on the base of pre-defined indicators, approved by the municipal administration.

Success indicators

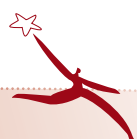
The identification of success indicators is a task of great responsibility. The following ones could serve as an example and guidance:

- (a) Reaching the preliminary stated qualitative programme goals and objectives.
- (b) Reaching the preliminary stated quantitative programme goals and objectives.
- (c) Creation of conditions for replication of successful practices in the same and/or other municipalities.
- (d) Impact of the programme implementation on other planning & development departments of the municipality.
- (e) Effectiveness of the programme management.

A PREPARATION

B DEVELOPMENT

C IMPLEMENTATION



Success indicators should not be numerous, but clear, measurable and easy to follow and verify.

Feed back

The implementation of the MEP is the last step of the planning process, but it is not the end of the planning activities. They usually start from the very beginning of every new mandate of the municipal administration. The lessons of the implementation are useful base for the next planning cycle and the M&E report plays critical role in this respect.

Most usually, the M&E report is subject of a political sanction, which is taken by the Municipal Council. As soon as the political management approves the MEP itself, the impact of its implementation should also be a subject of a political decision. This is the third political decision in the MEP process.

Third political decision (TPD)

Purpose

Once the term of implementation of the programme has expired, it is necessary to report the results using data from the performed monitoring of the implementation. As noted, the evaluation of the implementation is performed by comparing the achieved results with the baseline and the baseline scenario. Besides the objective technical and economic results, it is necessary to report also the non-quantifiable outputs, as well as the indirect results.

As a result of the evaluation amendments to some of the objectives and parameters of the programme may be proposed, as well as changes in the tools for its implementation during the next term of office. This is subject of the Third Political Decision (TPD). Thus, the M&E report and the decision of the Municipal Council gives a valuable feed-back to the next planning cycle.

Main elements of the TPD

Most usually the Third Political Decision consists of the following core elements:

- (a) Adoption of the Monitoring & Evaluation Report for the overall implementation of the MEP.
- (b) Adoption of the quantitative & qualitative results of the programme implementation.
- (c) Adoption of the achievements as baseline for the next planning period.
- (e) Adoption of recommendations for the next mandate of the municipal administration (next planning cycle).

The third political decision adopts the programme results on the base of the monitoring report and additional surveys (when necessary).

The TPD gives evaluation of the lessons learnt and formulates recommendations for further replication of the successful practices identified during the programme implementation.

The TPD gives valuable feed-back to the next municipal management to determine the baseline for the next mandate and identify the goals and objectives of the next stage (next planning period) of the Municipal Energy Programming.

Monitoring and evaluation should cover both the management and the implementation of the programme.

Adequate outsourcing of monitoring and evaluation activities may provide an objective feed-back to the municipal management to improve the implementation in motion.

Programme indicators that will be monitored should be carefully selected and endorsed by the municipal management before the start of the programme implementation.

Monitoring of the implementation of MEP in Dobrich (Bulgaria)

A system of measurable indicators synchronized with Eurostat has been designed for monitoring of the implementation of the Municipal Energy Programme of Dobrich (MEP-Dobrich). These indicators are systematized according to the objectives of MEP-Dobrich as follows:

Objective: Improvement of the energy efficiency of municipal buildings. Indicators: number of buildings with implemented energy conservation measures; number of control and metering devices; number of automated systems for management of the temperature processes in the building.

Objective: Renovation of the street lighting. Indicators: introduced system for centralized control of street lighting; 100% built-up street lighting system; replaced cables of the street lighting system (in linear meters).

Objective: Improvement of the energy efficiency of urban transport. Indicators: introduced automated system for traffic control; reduced number of traffic accidents by 30%; built bicycles lanes (in km); updated transport schemes; ensured at least 150 new parking places; constructed co-generation unit for the needs of the Trolleybus Transport SPLtd.

Objective: Start of the processes of overall renovation of the housing building stock, with priority of panel apartment

blocks. Indicators: developed Programme for promotion of activities for energy efficiency improvement of residential buildings; implemented 2 pilot projects for energy efficiency improvement in residential buildings; conducted information campaigns; number of services provided to the citizens in the Energy Efficiency Information Office.

Objective: Capacity building for energy efficiency - municipal institutions and human resources. Indicators: created Municipal Energy Agency; created Municipal Energy Efficiency Information Office; creation of a position "Municipal Energy Manager"; development of a programme for training of municipal decision-makers and experts in energy efficiency.

Objective: Study of the energy efficiency potential in the municipality and the opportunities for its utilization. Indicators: elaboration of an energy balance of the municipality; number of projects for technical assistance in the field of energy efficiency; 100% maintained municipal energy information system.

Objective: Mobilization of public support for the implementation of the energy programme on the basis of broad partnership with the business sector and organization of the civil society. Indicators: number of implemented information campaigns for the purposes of MEP. [Source: Municipal Energy Programme of Dobrich 2008-2013]

Conclusion

As mentioned in the beginning of this guide the methodology of development of municipal energy plans is addressed to the municipal leaders and specialists. That's why it is free of complicated and expensive analyses which are intended rather for specialized scientific institutions and not for municipal administrations. In this guide is presented a minimum number of actions than can lead a municipality to a successful result. At the same time this methodology describes the fields in which the technical support of outside specialists can be useful and even necessary.

The methodology offers a frame in which the municipal authorities can organize and develop alone, without any outside support or with a minimum one, a municipal energy programme. Each concrete situation in this methodology can be additionally specified and amended to reflect the specific conditions in a municipality – the political and economic situation, the local market for energy efficiency, the stability of the financial and banking systems, etc.

For example if we proceed from the size and economic profile of the municipality different scopes of the programme are possible. Depending on the level of capacity of the local personnel and institutions certain steps of the development process can be given higher priority (for instance training or institutional building) or to search for outside consultants for the implementation of the programme. In some municipalities the objectives of the programme can be defined fully on the bases of the existing local potential for energy generation from RES or from energy savings, while in others political targets based on the indicative objectives of the national programmes and plans can be adopted (for instance the target 20%-20%-20%).

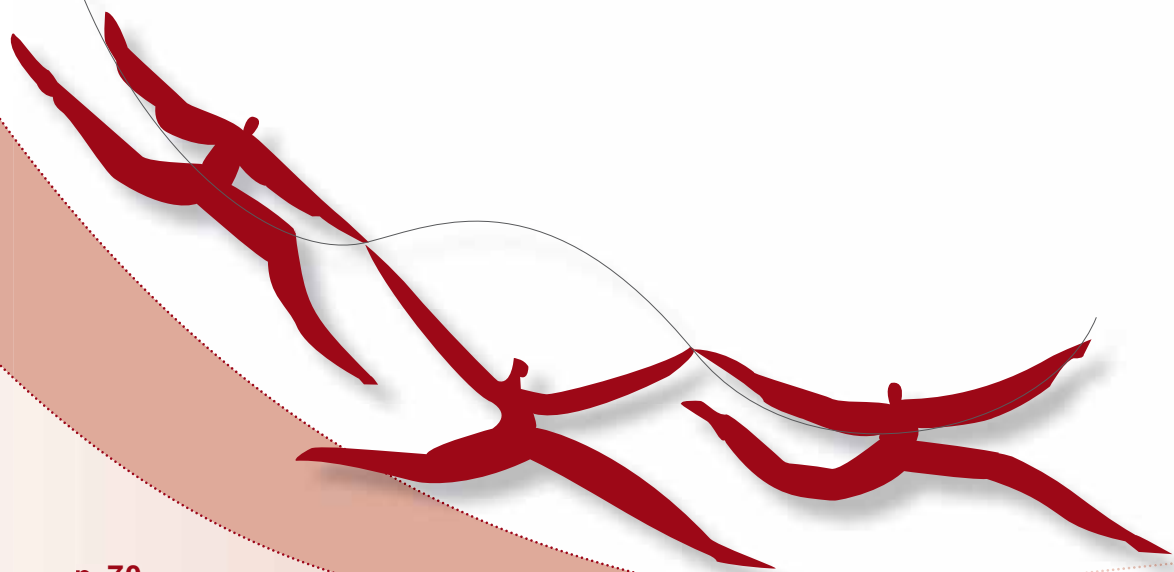
In some cases the selection of priorities can be made in accordance with the economic benefits giving preference for projects and activities with the biggest and fastest economical effect while in other cases preference may be given to activities, which could have substantial social significance for the concrete municipality. Considerable distinctions may appear when programmes are implemented as well. As already mentioned the management and monitoring can be implemented by the municipal administrations or to be performed by outside specialists under the strict control of the local authority.

However there are steps and actions whose implementation should not divert substantially from the methodology. For example the development of the programme should not be based totally on the intuition and expert capacity of the local authorities and experts but on reliable data bases for the energy generation potential and the energy consumption of the end-users. Institutional development and training of local experts should not be underestimated as well, even if the development and management of the programmes is assigned to outside organizations and experts. Last but not least is the significance of the monitoring on the implementation of the programmes and it should not be overlooked likewise in the evaluation of the results.

This methodology is an alive and flexible document that is subject to updating and perfection. This is the reason why every comment for its applicability and vitality in concrete conditions will be highly appreciated by the authors.



ANNEXES



Energy manager

Sample job description

of the municipal Energy Manager (EM) / municipal Energy Management Unit (EMU)

Introduction

The Energy manager is a key figure that carries out important measures related to the Kyoto targets, such as the energy efficiency certificates mechanism, the national targets for renewable energy sources, the buildings certification procedure, the emission trading and the IPPC directives. In some EU countries like Italy various laws, decrees, and technical standards have implied the development of the EM's role that has become a very complex figure with expertise in many fields, like energy, environment, finance, and communication. Hence the establishment of the EM's institution and its successful operation should be supported also by the national legislation and the central government. The EM should have support on specific training, collection of problems, and best practices, dissemination of best practices among EM through designated web site, publication of an electronic yearly book collecting the appointed EMs, reporting the main figures on the subject, and giving advices on the appointment procedures, etc.

Typical barriers

Some typical barriers that EMs may face in their work are: (a) energy far away from the everyday activities of the municipal management; (b) top management unaware of the energy issues; (c) lack of ability on the part of the Energy Manager to speak non-technical language with the people who make the decisions about investments; (d) lack of economical and financial resources; (e) unfavourable rules for the EM's budget allocation.

Practical solutions

To overcome these issues some possible practical solutions might be: (a) to use mass media campaigns to create a general awareness about energy issues; (b) to train the EMs in order to give them environmental, financial and communication skills; (c) to promote the creation of ESCOs capable to offer services which include third party financing and energy performance contracting; (d) to convince the top management to leave to good EMs part of the savings that they guarantee by the energy projects and measures implementation.

Option one: Acting as part of the municipal administration

Municipal Energy Manager (EM) / Municipal Energy Management Unit (EMU)

Role

This option is applicable in medium and big municipalities. The EM leads and manages the whole process of energy production, distribution, and consumption on behalf of the municipality on the entire municipal territory. The EM secures the sustainable implementation and successful practice of the municipal energy planning process.

Position in the municipal administration

The EM should be appointed at a high administrative level of deputy mayor or chief architect and reports to the mayor/deputy mayor in charge. The EM's contract should be of long-term one and should not depend on the duration of the municipal management mandate.

Functions

The EM ensures and mobilizes through the mayor political support for the consistent and sustainable MEP and energy management processes. To initiate, develop, organize, implement, coordinate, and report to the municipality management the results of the MEP implementation. The reports should be provided regularly at least twice a year, for example before and after the heating season. In addition, the EM should report any other time when it is requested by the municipality management or in emergency cases.

Tasks

The EM should: (a) initiate, manage and maintain a municipal information system for the energy consumption on the municipal territory; (b) assist the municipal management in the process of MEP; (c) organize and monitor the MEP implementation process; (d) identify the needs of external technical assistance; (e) organize and monitor the procurement process for energy efficiency consultancy/design and construction supervision services; coordinate the implementation of the energy efficiency projects in building, transport, industrial, tourist, commercial, service, and agriculture sectors related to

energy production and consumption; support the use of sustainable and Renewable Energy Sources etc.; (f) evaluate the contribution of external consultants and the impact on the MEP process; (g) mobilize funding for the development and implementation of MEP; (h) mobilize social support for the implementation of MEP; (i) be responsible for the activities related to carbon emissions reduction; (j) ensure the participation of the municipality in EU and international programs and projects for efficient use of energy and water resources and the environment protection; (k) ensure the dissemination of good practices, the successful results of MEP and demonstration projects implementation, etc.

Qualification

It is advisable to appoint EM of the following subjects: economist, mechanical engineer, electrical engineer, plumbing engineer, structural engineer, or architect. Management experience and computer skills are a must. English knowledge shall be an advantage.

Professional background

The EM should have at least five years experience in the energy and financing projects management; consultancy sector; design and construction works' supervision and person with good reputation; experience in municipal activities and environment protection projects will be an additional advantage.

Main activities

The EM coordinates the everyday work of all municipal departments (for instance Public Works Department, Legal Department, etc.) and officers involved in the municipal energy program implementation process. Negotiates, mobilizes, organizes and coordinates the designated external task force for the everyday work on the MEP. Reports to the municipality management the new MEP or current the MEP implementation progress and takes all necessary corrective actions. The EM deals with mass media, private businesses and the population on all aspects of energy efficiency and the municipal initiatives as Energy days, Cars free days, etc.

Option two: Acting as external consultant

Municipal Energy Manager (EM) / Municipal Energy Management Unit (EMU)

Role

The EM or the EMU leads and manages the whole process of energy production, distribution, and consumption on behalf of the municipality on the entire municipal territory. The EM or the EMU secure the sustainable implementation and successful implementation of the municipal energy planning process.

Relations with the municipal administration

This option is applicable in small municipalities. The relations between the municipality and the external EM/EMU along with the scope of work, time frame, mutual commitments and rights, technical and financial issues should be arranged on the legal basis of bilateral contract which should be subject of the approval of the mayor and the municipal council. The mechanism of payment should reflect the delivery /poor performance /good performance of the appointed external EM/EMU. The external EM or EMU shall report according to a settled time schedule to the mayor/deputy mayor in charge, the chairman of the municipal council and the chief financial officer of the municipality.

Functions

The EM/EMU could serve as external consultant for more than one municipality in the region. EM/EMU ensures and mobilizes political support through the mayor and the municipal management for the MEP and energy management process implementation. The EM/EMU initiate, develop, organize, implement, coordinate, and report to the municipal management the results of the MEPs realization.

Tasks

EM/EMU should: (a) initiate, manage and maintain the municipal information system for energy consumption on the municipal territory; (b) assist the municipal management in the MEP process; (c) organize and monitor the MEP implementation process; (d) identify the needs and propose additional external technical assistance; (e) assist and monitor the procurement process for energy efficiency projects; (f) organize and monitor the MEP implementation process; (g) evaluate the contribution of external consultants and the impact on the MEP process; (h) be responsible for the activities related to carbon emissions reduction; (i) mobilize funding for the development and implementation of MEP; (j) mobilize social support for the implementation of MEP; (k) ensure the participation of the municipality in EU and international programs and projects for energy and water

use efficiency and environment protection; (l) ensure the dissemination of good practices, the successful results of the MEP and demonstration projects implementation, etc.

Qualification

NGO, energy agency, private/independent consultancy, municipal or ESCO company with relevant experience and good reputation/references.

Preferable background

At least five years experience in the energy and financing projects management; consultancy sector; design and construction works' supervision. Experience in Public Private Partnership projects, municipal activities and environment protection projects will be additional advantage.

Main activities

The EM/EMU implements the following activities: (a) communicates and coordinates on behalf the mayor/ deputy mayor in charge the everyday work of all municipal departments (for instance Public Works Department, Legal Department, etc.) and officers involved in the municipal energy program implementation process; (b) negotiates on behalf of the municipality, mobilizes, organizes and coordinates the designated external task force for the everyday work on the MEP; (c) in line with the specified time schedule reports to the municipal management the new or current MEP implementation progress and takes all necessary corrective actions; (d) involves also the asset managers with the responsibility to control the energy consumption of the buildings - which impacts on their revenue budgets and focuses their attention on the energy use; (e) deals with mass media, private businesses and the population on all aspects of energy efficiency and also assists the municipality in the organization of initiatives as Municipal Energy Days, Car/ CO₂ Free Days, etc.



Municipal Energy Programme

Sample content of a Municipal Energy Programme (MEP)

Introduction

The Introduction presents the character of the document as part of the general strategy of the municipality for sustainable development and defines the time frames of the programme. Very often these programmes are developed for the term of the mandate of the corresponding municipal administration. That's why the most appropriate period for the development and adoption of the programme is the beginning of the mandate.

Character of the document

Here the MEP is presented as part of a set of strategic policy documents for sustainable development of the municipality, based on the general strategy for sustainable development of the municipality and the use of RES. The general timeframe (mandate) of the programme is also outlined here.

Compliance of the programme with other strategic programmes

The correspondence of the MEP with the goals and objectives of the main policy documents for sustainable development of the municipality is presented here: (a) with the programme for sustainable development; (b) with the programme for environment protection; (c) with the programme for introduction of RES, etc.

Baseline

The baseline is a set of data that describes the status before the MEP implementation. The baseline serves as a starting point for evaluation of the outcomes and the impact of the programme implementation, which are equal to the difference between the initial status (the baseline) and the status after the programme completion.

General description of the municipality

General data and descriptions present the condition of the municipality before the start of the MEP: (a) location of the municipality and its contacts and communication with neighbouring municipalities and the regional center; (b) condition of the environment and the valuable natural resources; (c) local industry - leading sectors and activities and first of all those that are connected with the biggest energy consumption; (d) local agriculture - leading branches and activities and first of all those that are connected with the biggest energy consumption; (e) transportation activities of local (municipal) importance; (f) structure and condition of the building stock.

Condition of the energy sector

The condition of the energy sector in the municipality is characterized by the data supplied by the Municipal Energy Information System. (Step 1 and Step 4). The following should be described here: (a) functions of the municipality in the energy sector; (b) energy consumption; (c) energy production / distribution; (d) local regulations in the energy sector; (e) local incentives to save energy; (f) potential for energy efficiency; (g) potential for the use of RES (Step 1).

Financial framework

The financial framework is defined in Step 5 and here general data of the financial frames, in which the energy programme has been developed, should be presented.

General assessment of the baseline

The general estimation of the baseline will serve for periodical comparison of the results of the programme implementation and in the end – for the final evaluation of these results (Step 4).

Priorities and expected results

In this part of the programme are described the priority objectives, activities and projects. These priorities are the bases for the programme structuring.

Priority objectives

The priority objectives of the energy programme are developed in Step 3 and are adopted with the First political decision. During the development of the programme they can be defined more precisely or can be changed if there are enough convincing arguments for this. The main priorities should be listed here:

Priority objective 1:
Priority objective 2:
Priority objective 3:, etc.

Priority activities and projects

The priority activities and projects are defined in Step 6 and are bound with the adopted priority objectives of the programme. In the text of the programme they can be classified in different ways: (a) by functions of the municipality (producer and supplier, consumer, regulator and motivator); (b) by sectors (education, healthcare, culture, etc.); (c) in accordance with the expected results in relation to the priority objectives of the programme (as

for instance according to the financial results, the energy savings, the reduced GHG emissions, social effects, etc.); (d) or by any other criteria depending on the specific condition in the municipality.

Expected results from the programme implementation

The results from the programme implementation can be summarized here. The summary can be made on the bases of the accepted classification of activities and projects as well as for the programme as a whole. Expected results should be related to the priority objectives of the programme with reference to the effects that are foreseen for each objective, for instance ecological, financial, social, etc. (Step 7).

Financing

In this part of the programme the investments needed for the programme implementation, the secured or expected sources of financing and financial instruments that will be used are presented. Data is described in Step 5 of the MEP process.

Investments needed

Investments needed for the realization of the activities and projects included in the programme can be presented for each activity and project separately and as total sums depending on the specific approach accepted in this part – by functions of the municipality, by sectors, by results, etc. (Step 7).

Financial sources

While the programme is developed only part of the financial sources might be allocated. They should be described with explanations of the level of security. The activities and projects that will be financed by the municipal budget should be explicitly stated. At the same time, activities and projects that are still without secured financing have to be mentioned (Step 7).

Financial instruments

The programme should clearly state the forms of financing of the separate activities and projects. For those that unconventional financial instruments are planned to be used additional explanation should be provided. Such could be purchase under leasing contracts, third party financing, financing by municipal bonds, financing by public private partnerships, ESCO financing, etc.

Implementation

In this part of the programme are presented the participants in the programme implementation, the organization of the realization of the separate activities and projects, the methods of monitoring, analyses and evaluation of the programme implementation as well as the potential risks and the ways they can be limited or overcome.

Participants in the programme implementation

The participants in the programme implementation are defined in Step 3. The separate groups of participants should be clearly differentiated and their responsibilities described: (a) internal partners – from the municipality, incl. the municipal administration; (b) external partners – from the country of abroad; (c) public-private partnerships.

Organization of the programme implementation

The organization of the programme implementation is subject of development in Step 8. The following issues should be described here: (a) overall organization, as well as organization by types of activities and projects; (b) improvement of the management capacity of the municipal administration; (c) communication with external partners and consultants; (d) procedures for public procurement and the manner of selection of subcontractors for the separate projects implementation.

Monitoring of the programme implementation

Monitoring is a subject of development in Step 10, where the manners of monitoring, analyses and evaluation of the implementation of the programme as a whole and of its separate activities and projects are executed.

Management of the risks for the programme implementation

Formulation of the risks is subject of Step 6. All basic risks connected with the programme implementation should be clearly pointed: (a) reduction of internal risks (in the frames of the municipality itself); (b) reduction of external risks (on the national or international levels); (c) monitoring and evaluation of risk management.

Communication

Communication with the public is subject of development in Step 8. Communication with the public should be considered as an instrument of the local policy and should be based on active dialogue with the local community. The Communication Plan demonstrates the main models of communication as well as the elements of the communication cycles. It is addressed to definite target groups and contains clearly formulated objectives, messages and means of communication.

Conclusion

In the conclusion the main messages of the MEP can be stressed on. They may be derived from the priority objectives of the programme, to be based on the major activities and projects or to be connected with the most important expected results from the programme implementation.

Annexes

A list of annexes should be attached to the text of the Programme.



Monitoring

Guidelines on how to conduct monitoring² of the implementation of Municipal Energy Programmes (MEPs)

Introduction

The survey and evaluation (monitoring) of the implementation of any Municipal Energy Programme represent the final step of the municipal energy planning process. The significance of that step is of exclusive importance for the identification and evaluation of the actual results from the implementation of the programme and for ensuring the results sustainability. Through the survey and evaluation of the results from the implementation of the Municipal Energy Programme the following tasks are realized:

To avoid the formal approach to Municipal Energy Planning (MEP)

There are still municipalities, which make certain efforts in developing Municipal Energy Programmes to meet specific regulatory requirements without being fully aware of the need of accurate and consistent implementation of these programmes. That attitude influences both the process of working out of these programmes and the process of their implementation. Sometimes, despite of the existence of municipal energy programmes the local authorities' actions continue to be random and chaotic, the energy efficiency projects and measures are being selected on the basis of subjective decisions and without correspondence with the approved municipal programmes. In practical terms this approach makes the programmes pointless and therefore it should decisively be rejected. Introduction of mandatory survey and evaluation of the results of the on-going implementation of the programme is a significant precondition for compliance with the approved programme and its consistent implementation.

To improve the results from the implementation of MEP

The observations reveal that programmes (not only related to municipalities and energy efficiency), whose implementation has been monitored, achieve up to approximately 30% higher results as compared to similar programmes whose results have not been subject of survey and evaluation.

To ensure reliable updating of MEP

MEPs are usually compiled for medium-term periods of 4-5 years, which corresponds to the mandate of the

elected local authorities. Frequently, certain changes in the conditions for implementation of some of the planned energy efficiency projects might occur during those periods. For instance, the real capacity of a given municipality to implement the projects or to apply certain measures, as well as the available financial means may not always correspond to those laid down in MEP. Because of these or some other circumstances it may become necessary for some of the projects to be implemented earlier than scheduled or to be postponed for later periods. All these factors impose the need of annual update of the programmes which is done by the annual Action Plans. Any such update, on the other hand, should be based on accurate data about the current state of the municipality. Such data is provided by the information system and also by the survey and evaluation (monitoring) report of the changes that have occurred as a result of the programme implementation during the past periods.

To provide data for accounting the contribution of the municipalities

In connection with the implementation of the national programmes for climate change mitigation municipalities periodically submit information about their energy consumption, about implemented projects and measures for energy efficiency improvement and introduction of energy generation from RES, reduced CO₂ emissions, realized investments, etc. The monitoring of MEP implementation reports are the sole reliable sources of such information.

The subject of this Guide comprises the organization, implementation and reporting of the activities related to the survey and evaluation (monitoring) of Municipal Energy Programmes. Every action is reviewed separately from the rest in order to clarify its substance and significance. In fact, some of these actions run consecutively, others take place simultaneously.

There are no accurate recipes as to how to perform monitoring of the MEP implementation. There are, however, good practices and lessons learned which may serve as examples for preliminary consideration and organization of the activities. Described in this Guide are also possible methods for implementation of a set of activities related to the survey and evaluation.

2/ The notion "monitoring" is usually used to denominate a complex of three basic actions – survey, analysis and evaluation. Since the evaluation is always performed on the basis of certain analyses, the word "analysis is sometimes omitted (it is assumed to be implicit) and monitoring is presented as "survey and evaluation". In this guide we use the term "survey and evaluation" and for short also the summary notion "monitoring", which is gaining ground as a term in many national languages.

Preliminary arrangements

This first action precedes the rest and creates prerequisites for timely launching of monitoring and its regular application during the entire planning period. The preliminary arrangements will give answers to the following major questions:

- *Why is monitoring performed?* This is the point, at which the objectives of the monitoring are set up and who and how will use the results from it.
- *What is the subject of monitoring?* To answer this question the following items should be defined: which elements of the implementation of MEP will be the subject of survey and evaluation; what data will be collected – detailed data about the implementation of specific indicators or summary data of the major priorities and objectives of MEP; what sources of information will be used.
- *Who will perform the monitoring?* The idea is to determine the composition of the team of experts, including municipal experts and /or hired external experts.
- *What will be the frequency of reporting?* Decision is made as to the periods for which the data from the monitoring will be summarized and analyzed and recommendations will be made.
- *What funds will be required?* These funds should be envisaged and allocated in the budgets of the municipal energy programmes themselves.

The answers to these questions help to define the monitoring objectives and scope, the necessary resources (human, material and related to timing) and the frequency of reporting.

The activities related to monitoring of the implementation of any Municipal Energy Programme, as well as the human and funding requirements, shall be planned in the Programme itself and in its budget. For that reason this Guide shall be treated as an integral part of the Guide on Municipal Energy Planning and more specifically as an aid to the performance of the activities under the last Step 10 of the MEP process.

Scope, indicators and output data

This action serves to define the scope of monitoring, the indicators for evaluation of the implementation of the programme and the set of output data, that will be generated in result of the surveys.

Definition of the scope of monitoring

First of all it is necessary to define which elements (objectives, projects, measures or activities) of the Municipal Energy Programme shall be the subject of survey and evaluation. These may be the main objectives of the programme – reduction of energy consumption; limitation of fuel and energy costs and minimizing of GHG emissions or improvement of the quality of services. Subject of the survey may also be the investments made and their cost-effectiveness (rate of return), as well as the

number of the population that has been affected by the programme. Certain more ambitious programmes may contain broader plans for survey and evaluation, under which every individual project or activity of the programme can be a subject of survey, analysis and evaluation. The description of the scope of monitoring is part of the programme itself. On the grounds of the approved scope of the monitoring the necessary human and technical resources (experts and equipment) shall be determined as well, while the required financial resources shall be envisaged in the budget of the programme.

Identification of the indicators to be evaluated

The identification of the indicators for evaluation of the results from the implementation of the programme is of decisive importance for the final success and for the practical benefits from the monitoring. The major requirement with respect to the indicators is that they should be clear and measurable - an important precondition for their objective reporting. Some possible indicators are as follows:

- Volume of investments made (for instance in millions of the respective currency).
- Energy saved (in absolute figures – kWh) or reduced energy consumption (expressed as a ratio in percentage).
- Specific energy consumption (for instance in kWh/m² floor area of the building or in kWh/inhabitant).
- Comfort level (for instance indoor temperature or luminance level of rooms or streets).
- Quantity of reduced emissions (for instance in absolute figures – t CO₂ or as a percentage as compared to previous emission levels).
- Rehabilitated floor area of buildings (in absolute figures - m² or compared to the number of population - m²/inhabitant);
- Rate of return on investments made (for instance as the value of the Internal Rate of Return – IRR or as a Payback Period – PB).
- Production cost per unit of energy saved or reduced emissions (for instance €/kWh energy saved or €/t CO₂ emissions reduced).

In a number of cases the accounting of an individual indicator cannot ensure complete picture of the results from the implementation of the programme if it is not compared with other indicators. For instance, if the absolute energy consumption is reduced, this fact should be compared with the achieved comfort of habitation (lighting and space heating). In this way it is possible to establish whether the reduced consumption is the result of the improved energy efficiency only or is also the consequence of decreased comfort of habitation.

In selecting indicators for evaluation of the programme it would be appropriate to take also into account the specific data, which the municipal administration commonly collects for the elaboration of different types of reports and statements for the central authorities, most frequently for the Ministry of Finance, the Ministry of Energy or the Ministry of the Environment. In the event of good compa-

tibility of the indicators with the needs of such data the time it takes to prepare such reports may be decreased significantly. At the same time the reliability and accuracy of the information is ensured and the submission of different data to different institutions is avoided.

Determination of the necessary input data

During the performance of surveys on the implementation of the programme specific data is collected, which is recorded in protocols. On the basis of summary and analysis of the data the degree of implementation of the respective indicators is determined. When the data refers to energy consumption or determination of the comfort level, the most accurate information is obtained by metering using the appropriate devices. Data of this kind is for instance energy savings (% or kWh) in the individual sites or in the municipality as a whole, floor area (m²), indoor temperature in the individual sites (t⁰), degree of luminance (Lux) of the rooms and open spaces, etc.

When the data refers to financial expenditures, the information is usually obtained from accounting documents and bank statements, which are kept by the financial departments of the municipal administration. This information may be presented both as absolute values and as a relative value of the investments per inhabitant or per m².

It is necessary to identify the most reliable sources for collection of the data required for performance of the analyses and evaluations. Such are, for instance, the data obtained by measurements, which should be performed periodically or continuously by skilled experts. To this end metering devices are installed, whose readings should be given and analyzed periodically. On the other hand, certain information might be obtained from the respective energy managers of big sites or their top officials (school headmasters, directors of hospitals, child care establishments, etc.) or from the respective financial and technical departments of the municipality or the big sites. It is desirable that any information obtained indirectly (not by measurements) is carefully checked or corroborated by a second source.

Methods for performing monitoring

Different methods for performance of monitoring are used in practice. The selection of any of them or a combination of several ones depends on the type and size of the municipality, of the nature of the main projects and activities envisaged in the programme, of the manner of financing and reporting, of the experience and capacities of the involved team, etc.

Monitoring is most successful when the bases for its survey and reporting are laid down as early as in the process of compilation of the programme.

The selection of the method for performance of monitoring on the implementation of a municipal energy programme depends to a large extent on the political will of the municipal administration to control certain aspects of the programme.

Theory-based evaluation

This type of evaluation is usually applied for comprehensive and detailed survey of a large number of indicators. It is appropriate for very big municipalities with complex programmes, whose implementation would require multi-aspect survey and complex data analyses. To perform monitoring of this type is usually expensive and beyond the capacity of a single municipality. It requires involvement of big research centers and the use of complex and expensive methods of analysis and evaluation.

Impact / performance evaluation

Under this type of evaluation the monitoring is focused on the impact of the programme implementation and the sites performance after the realization of the improvements. Some of the indicators to be used for evaluation in this case are the degree of impact of the programme on the behaviour of the entire population or on the behaviour of the residents/users of the respective sites (residential buildings, hospitals, schools). The subject of survey may also be the performance of the sites after the implementation of the projects – buildings, lighting systems, transportation networks etc., for which respective measurements are conducted. It is also possible to monitor the impact of the programme on the quality of the services provided by the municipality – public lighting, transport, district heating, etc.

Cost-benefit (cost-effectiveness) analysis

When the socio-economic impacts of the programme are promoted as priority of the monitoring effort, the evaluation is usually based on comparative analysis of the costs and benefits and/or analysis of the cost-effectiveness. In such cases the evaluation is performed using economic indicators, such as Investments Rate of Return and the Payback Period, compared to the different benefits from them. Specific attention may be paid to the impact of the programme on the amount of public expenditures, which may be the subject of different kinds of studies (public expenditure tracking surveys).

Evaluations through sociological surveys

The information about the effects of the programme may be collected also through public debates, opinion polls and surveys or any other techniques of sociological studies. Ensuring the broad participation of the local community in the evaluation of the effects from the implementation of the municipal energy programme, especially those that are not technically measurable and are evaluated through subjective criteria, is certain guarantee for achieving credibility of the evaluations and ensuring public support for continuation of the implementation. To this end the results from the implementation of the programme may be periodically announced and subjected to public debate, mobilizing in this way the public support for the further implementation of the programme.

Evaluation on the basis of a logical framework

Recently planning, based on “logical framework”, acquires growing popularity thanks above all to its simplicity and clear internal logic. Under this modality of compilation of the programme the major indicators for evaluation of the effects from its implementation are identified simultaneously with the selection of priorities, which makes monitoring much easier and effective. Using this approach the advantages of the above listed methods may be successfully combined.

Recording of monitoring data

In the course of generation and recording of data from the surveys several simple rules should be observed in order to prevent errors and inaccuracy of the obtained information and later on of the conclusions made.

Frequency of data generation and reporting

Data generation

The accurate determination of the regularity (frequency) of data generation (collection) is an important condition for the success of the monitoring. This frequency should be set up on the basis of the programme objectives and careful analysis of the selected indicators. For instance, measurements may be performed on an hourly basis, at specified hours of the day, on a daily, weekly or monthly basis, etc. Depending on the requirements of the analysis solutions should be selected, that will not lead to generation of excessive amounts of useless information, but would rather ensure sufficient data to allow the accomplishment of comparative analyses.

Data reporting

The frequency of reporting the results is another important prerequisite for the credibility of the conclusions. Irrespective of the frequency of data collection, the reporting may be performed on a monthly, quarterly or annual basis. Not all the data however can be collected and reported at identical time periods. That is why it is necessary to coordinate carefully the periods of collection, analysis and reporting of the information. It is desirable that the information and conclusions reported to the municipal decision-makers should cover sufficiently long periods of time in order to prevent making erroneous conclusions on the basis of temporary deviations. Quarterly reporting is usually a suitable time frame for periodic information of municipal decision-makers, while in-depth annual analytical reports with recommendations are a mandatory basis for drafting the Action Plans for the next year.

Data about the various impacts of the programme implementation

As a result of the implementation of any municipal energy programme (or of individual projects and activities) different direct or indirect effects may be achieved, as well as effects which are manifested both within the period of validity of the programme and beyond its limits.

Direct effects

The technical energy efficiency measures in buildings result in energy savings, which might be assumed as direct effect from their implementation. Direct effects are also almost all that are in result of the implementation of investment projects for energy efficiency improvement. These effects are commonly represented as the difference between the baseline energy consumption (established prior to the start of the project) and the reduced consumption for the respective year as a result of the projects implementation. These values are most often determined by measurements or by the data from the accounting documents.

Indirect effects

Through training of officials from the municipal administrations conditions for better energy management in municipal sites can be created. As a result significant energy savings can be achieved, which however are not directly measurable. The effect of the majority of these “soft” measures or activities (training courses, information campaigns, incentives for promotion of energy conservation, etc.) are indirect, although they might be considerable in value and importance and have a long-term impact. There are different methods for calculation of such indirect effects, which might involve taking account of some side factors that have influenced them.

Effects in the framework of the programme (medium-term effects)

Both direct and indirect effects from the implementation of the programme and some of its individual elements (projects and activities) attain certain values during the period of validity (implementation) of the programme. These effects are reported at the end of the planning period in the final report on the monitoring.

Post-implementation effects (long-term effects)

In the majority of cases the effects from the projects and activities laid down in a municipal energy programme continue to be felt even after the period of validity of the programme itself. The technical measures applied in a building (direct effects), for instance, may have a life cycle of 10-15 years, while the term of the programme has been only 5 years. The improved capacity of the municipal administration (indirect effects) may also have a longer influence on the local authority’s activities than the timeframe of the programme itself, etc.

For a number of objective and subjective reasons the direct and indirect effects may decrease with the time. This situation is taken into account by the introduction of adjustment coefficients (the “causality” factor), which are set up through expert assessment and reflect the estimated decrease of the effects (savings, impacts) in regard to their initial maximum volume.

The effects, which get beyond the timeframe of the programme, should not only be reported at the end of the planning periods, but should be surveyed after it. In this way conditions can be created for their sustainable up-keeping for the longest possible time. In the course

Table 1. Direct energy savings in the framework of the programme validity

Year	Total floor area affected by the EE measures	Energy savings kWh/m ²	Adjustment factor (coefficient)	Total energy savings kWh	Total reduction of CO ₂ emissions
1	2	3	4	5	6
2010			1		
2011			1		
2012			1		
2013			1		
Total					

Table 2. Direct savings after the project implementation

Year	Total floor area affected by the EE measures	Energy savings kWh/m ²	Adjustment factor (coefficient)	Total energy savings kWh	Total reduction of CO ₂ emissions
1	2	3	4	5	6
2014			1		
2015			1		
2016			0.8		
2017			0.8		
2018			0.8		
2019			0.6		
2020			0.6		
Total					

of the survey all effects of the projects and activities – direct and indirect, medium-term and long-term (after the period of the programmes validity) – should be taken into consideration. Each of these effects should be recorded and tracked under separate items in the database.

Recording of energy savings

Direct savings

By means of the model table “Direct energy savings” the energy savings and reduced CO₂ emissions, achieved as a result of the implementation of energy efficiency projects and measures in buildings which are incorporated in the municipal energy programme, may be recorded and reported.

In column 2 is recorded the total floor area of the buildings, which has been affected by the programme. In column 3 are recorded the energy savings related to one square meter floor area, and in column 5 – the total energy savings for the total floor area affected by the measures. In column 6 is recorded the total volume of reduced CO₂ emissions.

When a shorter (for instance one year) period of the programme implementation is surveyed, it is possible that the energy savings will be equal to those calculated initially. If, however, the survey covers a longer period (several

consecutive years), it may be assumed that in the course of the years certain changes in the conditions might have taken place, which would eventually decrease the effect of the measures and limit the savings. In such cases an adjustment coefficient may be introduced (“causality” factor).

Recording of the effects of the programme implementation (in particular the energy savings) may continue in the same way after the expiration of its planned period. Reasonable setting up of the adjustment coefficient is of particular importance for this recording.

Indirect savings

Indirect energy savings are determined not by measurements with specific devices and hence their accounting is connected with a considerable degree of subjectivity. Such savings are usually achieved by the implementation of “soft” projects or measures. Monitoring of the indirect effects (savings) may be performed in two ways:

(a) Top-down method

This type of monitoring is based on preliminary determined total energy saving potential in the municipality. In the programme it is defined what portion of it can be mastered through “soft” projects or measures. It can be assumed, for instance, that by raising the awareness and

training of households the residents' energy-related behaviour could be changed. On the basis of expert assessment we may assume that this behavioural change would contribute to the utilization of 10% of the energy efficiency potential in the buildings occupied by them. To pick up the rest of the potential we may envisage technical energy conservation measures.

(b) Bottom-up method

In the case of bottom-up monitoring it is necessary first of all to calculate the estimated savings per selected unit (m², inhabitant, household, site, etc.) and multiply it by a coefficient of replication. In order to determine the savings, which a medium-size household may achieve, we may again apply the assumption that as a result of the changed energy-related behaviour it may save 10% of the total energy saving potential of the building. The identified in this manner energy saved per household we may multiply by the number of households influenced by the project (using the coefficient of replication) and obtain the total energy savings resulting from that project.

In order to achieve the highest possible degree of credibility of the expectations from the programme, two approaches of survey and evaluation may be applied simultaneously – top-down calculations and bottom-up assessments – finding in this way the reasonable cross-cutting effect. In this way on the base of the concrete example mentioned above the number of households that should be included in the project may be found.

Organization of the information

Contemporary development of computer hardware and software is a perfect precondition for building and maintaining an information system for municipal energy planning and management. It is recommended that every municipality should create its own computerized information system. Such system should contain information about the status of the sites in the municipality at every moment as well as historical data about their status in previous years. Every new data that is entered in the system as a result of the monitoring on the implementation of the current Municipal Energy Programme would enrich the system and improve its reliability.

The credibility of the information is a major prerequisite for the reliability of the conclusions from the analyses. Since the information is normally collected from different sources, sometimes the input data is in different, often incompatible dimensions (kg/tons, kWh/kW, etc.), which influences the final results. In order to avoid errors of this kind it is necessary to design simple conversion tables with clear instructions as to how to fill in the required data, while the responsible officials should be duly trained or instructed beforehand as to how to use them.

Evaluation and reporting of the results

The evaluation of the results from the programme implementation is based on the data, which show

the degree to which the preliminary defined success indicators have been met. The existence of clear and easy-to-measure indicators is a precondition for avoiding the subjectivism of any evaluation. For instance, when the indicator "energy savings per m² floor area" is tracked, the data is obtained by summing up the energy saved as a result of the implementation of the individual energy efficiency projects in different buildings on the area of the municipality. This data is filled in periodically and is accumulated so that at every specific stage of the implementation of the programme it is possible to trace out the degree, to which a given indicator has been achieved. That may give the municipal leaders grounds to take the appropriate actions to support and accelerate the implementation of certain projects or to redirect resources from one direction to another if that would be in the interest of the overall implementation of the programme.

When monitoring data is analyzed it is possible to compile summary reviews of the results by sectors (buildings, services, transport) or to establish summary indicators, which have not been previously selected as success indicators (specific energy consumption, cost per 1 t saved emissions, investments per inhabitant, etc.). Using graphs and comparisons the conclusions from the monitoring may be visualized and turned into an effective management tool.

The analyses, conclusions and recommendations compiled on the basis of the results from the monitoring are summarized as reports for the municipal management. The periodicity and contents of these reports shall be agreed beforehand among the stakeholders. In order to serve the municipal leadership, it is recommendable that these reports should contain the following information:

- Description of the baseline status, in relation to which the comparative analyses in the report are made.
- Summary data about the implementation of the programme by each of the predetermined success indicators.
- Evaluation of the data by individual indicators and recommendations concerning the next stages of implementation (in the final reports these recommendations address the next planning period).
- Description of the conditions, under which the monitoring has been performed during the period under review, any encountered difficulties/barriers and the opportunities for their overcoming.



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Intelligent Energy – Europe Programme (IEE)



ADEME, the French Agency
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Energy Management

The MODEL project
received a special
Award for the
Most Promising
Project on the
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