

Methodological approach of urban areas development towards sustainable energy

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The concept of sustainable energy development can't be separated from the understanding of external costs of non-renewable energy resources and additional positive socio - economic effect of energy efficiency measures, energy savings, and implementation of renewable energy sources (RES). Energy first of all should be considered as local issue, especially when it is related with energy saving, energy efficiency (e.g. small scale CHP), and the use of renewable energy. However most often decisions, made by municipal and regional administrations, energy distribution companies, power supply companies, private investors, are based on feasibility studies dealing with particular investments either in energy conversion or in end – use system. Decisions based on such partial feasibility studies may not result in least cost solutions for the region / urban development as a whole. It seems that best solution could be found in the framework of regional / local development process.

The main methodological problem is to integrate energy efficiency, energy saving, RES projects into regional / local development procedures, so that energy elements may compile integral uniformity in terms of regional / local goals. The most difficult problem is to define possible external positive effect of energy project in framework of local / regional policy directions (financed by Structural Funds) and summarize these effects as total energy projects implementation input.

*An INTERREG IIIC Programme project **RUSE** (Redirecting Urban areas development towards Sustainable Energy) has been launched in order to transfer experience of EU15 to the New Member States in field of sustainable energy projects, financed by SF. In this project the exchange of experiences represent a very important European Added Value. The methodological approach for integration of energy projects into regional/local development process will be presented based on RUSE project results.*

Key words: Sustainable energy development, methodological approach, external costs.

INTRODUCTION

Large amount of Structural Funds (SF) resources are to be used in a most sustainable way, which means that economic, social and environmental aspects should be accounted for. The Lisbon strategy, adopted by the EU Member States emphasizes the linkage between mutual effects of the various policies: sustainable growth requires that economic growth contributes to social progress and respects the environment, that energy policy shores up economic performance and that environmental policy makes economic sense (European Commission, 2004).

Redirecting of energy towards sustainable development may play key role by implementing this strategy. We should point out that the local regional development is a key issue and there is an important role foreseen for the regions and local areas in the take up of sustainable energy policies. This role, nevertheless, has been only drafted as a

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stronger effort of integration of different and co-existing policies and programmes, but responsibilities have still to be clearly allocated at regional and local level.

Sustainable energy policies and objectives actually are not a major issue in the development agenda of local and regional bodies and in several cases, even if the sustainable energy objectives are defined; the programmes or other logical frameworks for the achievement of those objectives remain or too focused (e.g. a call for specific technological plants) or too vague (e.g. energy efficiency included as one of a long list of targets for innovation in industry). This aspect has been well underlined also in the analysis made by the BACCHUS project, funded in the framework of the previous SAVE II programme, on the contribution of the Structural Funds to the implementation of sustainable energy policies (Bacchus guidelines, 2003).

The lack of knowledge presents a problem both at regional and at municipal level, in large urban areas as well as in small cities. This gap is particularly reprehensible, as a lot of resources are managed at regional and local level (mainly as EU Structural Funds), and only a very small share has been utilised for clean energy projects up to now. There is an obvious lack of proportion between the replication potential of the available competencies and technologies developed by the EU energy research, demonstration and promotion, and the very limited clean energy experience and implementation through the programmes and projects supported by the development funds, in spite of the huge level of resources available.

1. METHODOLOGICAL APPROACH FOR INTEGRATION OF ENERGY PROJECTS INTO LOCAL DEVELOPMENT PROCESS

1.1. Exchange of practices as the springboard to the redirecting urban areas development towards sustainable energy

The main problem is to consider sustainable energy issues otherwise than a state/national level. It is first of all a local issue, especially when one considers actions for energy saving, energy efficiency (e.g. small scale CHP), and the use of renewable energy.

It seems that best solution could be found in the framework of regional/local development process because of projects for energy savings, improving of energy efficiency and RES usually are rather small and scattered through local or regional areas; for private investors such projects are usually not attractive because of noninternalising of externalities; it is difficult to receive bank loans for small projects.

Municipalities and NMS could play considerable role by promoting sustainable energy because of "local authorities are fulfilling their functions in the energy sector via a number of roles:

- As a consumer of energy.
- As a producer of energy.
- As a distributor of energy.
- As a trader of energy.
- As a regulator, planner and policy maker regarding energy using activities.
- As an awareness raiser of the issues relating to energy use and
- As a provider of incentives to improve energy performance" (MEELS, 2003).

Sustainable energy project pipeline¹ is important for the delivery of the strategies that can take cities to sustainable energy-oriented development paths. The project generation process should generate effective links between the several actions and measures carried out under the different policies and across different levels of energy policies. The **exchange of practices**, based on sustainable energy aspects, is the key to promote the development of projects at local level, satisfying the requests of the programme level.

¹ Sustainable energy project pipeline is the process through which projects are defined, designed and brought forward for funding (SF co-financing and other financial sources).

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1.2. RUSE PROJECT – Redirecting urban areas development towards sustainable energy

Since 2004, the Structural Funds are available in the N1 States and are clearly an opportunity for linking sustainable energy and urban development by creating and stimulating the integration of energy issues in urban development policies including all its impacts on the environment.

Experience has already been gained in the EU15. This experience must be used by new Member states to avoid the same mistakes and to integrate these aspects in the preparation of the projects, as requested by the rules of ERDF (European Regional Development Funds). However practices which should be the standard often still are the exception and a majority of new infrastructure or building projects as well as major renovation schemes are still carried out without any consideration being given to their energy impact in spite of the EU defined priorities for the control of energy demand and for limiting CO₂ emissions.

The **RUSE** operation aims at improving the use of Structural Funds and other financial resources by municipalities and other stakeholders in charge of urban development issues in New Member States and candidate countries thus progressing towards a better integration of sustainable energy issues (energy efficiency, renewable and distributed generation) in their projects.

To achieve the improvement of the use of Structural Funds, the RUSE operation has the following **four main objectives**:

- To make municipalities and related bodies in New Member States and third countries more aware of existing Structural Funds related experience in European countries by disseminating information, promoting good practice and exchanging experience.
- To improve capacity building on energy issues in both individual bodies (municipalities) and collective structures (city networks, agencies, etc.).
- To prepare municipalities so that they can design projects dealing with their powers and responsibilities in a sustainable manner and to enable them to submit successful proposals under ERDF programmes (incl. INTERREG IIIA, URBAN, etc.). In other words, to help them integrate the concept of sustainable energy in urban plans and put them into practice.
- To influence national decision makers regarding the integration of energy issues in their programmes from the point of view of energy demand and the promotion of renewable energy, both of which are good methods for promoting local development.

1.3. Local programming approach to sustainable energy development. Netherlands experience

The most suitable tool for redirecting urban areas towards sustainable energy could be local programs. Municipalities have both policy instruments and the means to implement them and, moreover, they are in direct contact with citizens and business. The sustainable energy policy linked to specific national measures, could contribute to reducing and managing energy and environmental problems in general and greenhouse gases in particular. Very interesting example is Netherlands experience.

In the last decade every municipality developed a policy on energy efficiency, which, in practice, forms a welcome springboard for the introduction of a climate policy.

Municipal climate policy in the Netherlands is based on a covenant between central government and representative bodies from the municipalities and the provinces. The tasks are clearly defined: broadly speaking, central government focuses on identifying the climate objectives - including basic standards - and furthermore acts as a facilitator, while the municipalities will be the ones to actually do the work. The Ministry of Housing, Special Planning and the Environment (VROM) makes subsidies available so that municipalities can release extra capacity for implementing the policy. The level of these subsidies is linked to the degree of ambition and the actual results achieved. A total of 37 million euro has been made available for the coming years.

The underlying principle for climate policy implementation is therefore that municipalities decide for themselves the topics on which they will focus their policy. VROM has commissioned Novem, The Netherlands Agency for Energy and the Environment, to draw up an ambitious programme for municipalities wanting to set up a climate policy. Novem advises municipalities on putting the programme into practice.

The programme provides a timely insight into the opportunities available within the municipality to get started on reducing CO₂ emissions and to implement the programme in combination with other policy topics, because climate policy is an integral item. A climate scan establishes the point of departure for the policy and the results of this scan indicate which ambitions and priorities are of interest in the municipality and which specific opportunities are in store for certain themes. The programme has seven themes. A list of options has been developed for each theme from which choices can be made. These choices involve concrete activities with a clear goal and result.

Each municipality chooses its own theme(s):

- Municipal buildings and installations.
- Housing (new and existing).
- Businesses (fixtures and fittings and business parks).
- Agricultural sector.
- Traffic and transport.
- Sustainable energy.
- International.

Before a municipality can get to work on one or more themes, it attaches a level of ambition to it. This serves to indicate how far the municipality wants to take this theme. **Distinctions are made between an active policy, a leading policy and an innovative policy.** Based on the outcome, the municipality establishes its policy for the next five years. This policy is then implemented by means **of a phased plan, which is also provided for by the municipal climate policy programme.**

2. GUIDELINES FOR SUSTAINABLE ENERGY DEVELOPMENT FOR LITHUANIA

2.1. Sustainable energy development context in Lithuania

The main long-term planning document - Long-term Lithuanian Economy Development Strategy was approved in 2002. It comprises 15 branch strategies. The main principles of sustainable development are integrated in these strategies. Some of these branch strategies are directly aimed at interaction between sectors (the factors of social development and economic factors of employment, economic factors of environmental protection, tourism development, etc.). Despite a great integrity of the certain strategies, there is a lack of clear relations between the aforementioned 15 strategies. In order to solve this problem the National Strategy of Sustainable Development was adopted in 2003. This strategy includes 6 branches of economy (transport, industry, energy, agriculture, household, tourism), 4 environmental sectors (air,

water, biodiversity and waste), 4 main social aspects (employment, poverty and health, education, cultural identity) and regional development issues. All these economic, social, environmental and regional development issues are presented in close integrity. Sustainable development indicators for economical, social and regional development and state of environment are selected in the strategy for the monitoring of sustainable development however this system of indicators were **not applied for the analysis of trends and only some targets of sustainable development were set using these indicators**. Approach to integrate sustainable development indicators into national planning systems should be used with more extent by the following steps:

- To set targets of sustainable energy development;
- To analyse trends and interlinkages of selected indicators of sustainable development;
- To formulate response actions based on performed analysis;
- To monitor the progress achieved towards set targets;
- To evaluate efficiency of implemented policies.

In this chapter the sustainable energy development indicators approach was used to illustrate preparation of sustainable development strategy (Cegis and Streimikiene, 2005). Energy sector is the priority sector in economic development because energy is closely connected with social, economic development, quality of life and it's production and consumption has the significant impact on environment.

The energy use in Lithuania is considered as a basic driving force that impacts environment. It is major contributor to environmental problems of global concern, such as climate change, acidification and urban air pollution. Energy is crucial for economic and social development, quality of life and consumption level. According sustainable development concept it is necessary to incorporate sustainable development goals into all sectoral policies (World Energy Assessment, 2000).

Appropriate list of sustainable energy development indicators were selected for the Lithuanian sustainable energy strategy based on priority areas. These priority areas are related with EU accession:

- Energy consumption.
- Energy intensities.
- Structure of the economy.
- Energy security.
- Energy prices and energy affordability.
- Environmental energy situation.

Trends in economics and demographics are the main socio-economic indicators that's can be considered as driving forces for energy consumption, energy intensities, environmental energy situation etc. So first of all it is necessary to assess trends in economics and demographics. Later trends in energy consumption and energy intensities, structural changes in economy and other trends can be assessed. Later trends can be related to implemented energy policies and new policies can be formulated. First four priority areas are attributable to economic dimension indicators. Energy prices and energy affordability reflect social dimension indicators. Environmental energy situation is represented by environmental dimension indicators (CO₂ emissions).

From analysis of energy consumption using few indicators (total primary energy, final energy and electricity supply per capita) the following conclusions was drawn:

- Final energy consumption per capita is more than 2 times lower in Lithuania than in EU and is continuously decreasing. At the same time final energy consumption per capita is slowly increasing in EU. So the difference between final energy consumption level in EU and Lithuania is still increasing.
- Electricity per capita consumption growth trends are negative in Lithuania. Since 1994 some stabilisation of electricity per capita growth can be noticed. This trend is negative because there is no other way to increase economic growth and quality of life without increase in electricity consumption per capita.

- Low final energy and electricity consumption per capita shows the low income and low living standards in Lithuania. Therefore the further analysis of energy affordability is necessary seeking to define reasons for such low final energy and electricity consumption.
- The big difference between Total Primary Energy Supply (TPES) and Final Energy consumption per capita shows the low energy conversion efficiency in Lithuanian energy system comparing with EU. Further analysis of energy utilisation efficiency and energy intensities is necessary seeking to define measures able to improve situation.

The most problematic areas in Lithuanian energy sector are: energy intensity, utilisation of renewable energy sources and energy affordability. The huge problem of energy security will arise after closure Ignalina NPP. New policies to address these problems should be implemented (new support schemes for low income population to increase energy affordability, new measures to enhance renewable energy sources utilisation, reduction of energy transformation losses in the system, local and international climate change mitigation measures). Very important role by solving problems above could play municipalities.

2.2. The guidelines for local sustainable development approach in Lithuania

2.2.1. Framework of sustainable energy programmes

It must be taken into account that each country has their particular problems which are to be solved according situation in this country. Following the Netherlands experience of climate policy management overall framework of the sustainable energy strategy could be presented as follows:

- Municipal Sustainable energy policy should be based on a covenant between government and representative bodies.
- Local Sustainable energy plans are based on national Sustainable energy strategy.

Sharing the tasks between regional (countries) and local authorities are to be solved as well Implementation of National sustainable energy strategy should be supported by energy efficiency policy (Klevas and Minkstimas, 2004). Moreover, the next SF programming period 2007-2013 is crucial for real implementing of sustainable energy into practice. It should be focused to regional and local sustainable energy programmes as a whole (not only to vertical themes).

The fact that municipalities can link their climate policy to their own local themes makes climate policy by definition vivid, specific and recognisable. This removes the risk of vagueness and the feeling that it has no relevance to local issues. Improved traffic situations, sustainable business parks, healthier houses and less pollution: these are points that enter the picture thanks to climate policy. Municipalities occupy a key role when it comes to energy saving in existing housing. They are involved right from the beginning in renovation and restructuring plans and have a decisive contribution to make to energy saving and energy provision. They can make agreements with housing associations about the quality of energy in the rental sector. The municipality can also exert its influence on individual homeowners. However there is need to support this process and the most feasible solution could be based on local programming approach (Klevas and Zinevicius, 2000).

The main methodological problem is to integrate energy efficiency, energy saving, RES projects into regional/local development procedures, so that energy elements may compile integral uniformity in terms of regional / local goals.

The most difficult problem is to define possible external positive effect of energy project in framework of local/regional policy directions (financed by SF) and summarize these effects as total energy projects implementation input.

Additional positive effect to energy saving, energy efficiency measures and RES most often compile with local and regional development objectives:

- RES, being indigenous sources of energy improve the security of energy supply and diversity of the fuel mix.
- RES have advantages for regions, in which power and heat supply costs are considerably higher than average costs in the country. Thus use of RES – electricity and heat in small isolated systems can also help to avoid or delay expensive extensions to the grid.
- Some RES are a labour intensive form of industry and create jobs especially at location sites in rural areas.

The method of evaluation of above named advantages to be included into evaluation process in feasibility studies is under elaboration.

The methodological approach for solving this problem and consequently integration of energy projects into regional/local development process has been drafted by (Klevas and Antinucci, 2004).

2.2.2 Potential of Use of structural funds for promotion sustainable energy in Lithuania

Structural Funds (SF) are the European Union's main instruments for supporting social and economic restructuring across the Union. Lithuanian Common programming document and its supplement for 2004-2006 establishes the main priorities, operational programmes and aims of structural funds use in Lithuania. The Lithuanian Single Programming Document (SPD) is being implemented by specific strategies described in five Operational Programmes (OP). Sustainable energy projects can be implemented using the schemes from the first operational programme: "Development of Infrastructure".

As regards investors preparing projects resulting in increased energy efficiency, energy savings or use of renewable and secondary sources, the possibility to acquire assistance through SF is primarily orientated to the Measure ID 1.2 Ensuring of Energy Supply Stability, Accessibility and increased efficiency which includes 3 priorities relevant to sustainable energy projects:

- Renovation of boilers and biomass or natural gas conversion.
- Local and Renewable Energy Sources.
- Increase of Energy Efficiency in Public Sector.

The main objective of measure 1.2 is to ensure stability, reliability, flexibility and accessibility of energy supply, increase of EE and to form a basis for the stable growth of national economy.

Structural Funds have a great role to play in improving energy efficiency and the use of renewable energy sources (BACCHUS guidelines, 2003). Up to now, we remain quite far of what is expected despite some interesting examples opening the way for the future. Therefore the preparation of financial perspectives 2007-2013 is crucial and regional development must be energy sustainable.

CONCLUSIONS

1. The Lisbon strategy, adopted by the EU Member States emphasizes the linkage between mutual effects of the various policies: sustainable growth requires that economic growth contributes to social progress and respects the environment, that energy policy shores up economic performance and that environmental policy makes economic sense.
2. Local development experts, responsible for a large part of the innovative actions at local and/or regional level are in general unaware of the potentialities of clean energy technologies for the local sustainable development, creation of new enterprises, job creation, and the development of sound initiatives with local resources.

3. Municipalities and NMS could play considerable role by promoting sustainable energy because of "local authorities are fulfilling their functions in the energy sector via a number of roles.
4. The **exchange of practices**, based on sustainable energy aspects, is the key to promote the development of projects at local level, satisfying the requests of the programme level.
5. An INTERREG IIIC Programme project **RUSE** (Redirecting Urban areas development towards Sustainable Energy) has been launched in order to transfer experience of EU15 to the New Member States (NMS) in field of sustainable energy projects, financed by SF. In this project the exchange of experiences represent a very important European Added Value (EAV).
6. The most suitable tool for redirecting urban areas towards sustainable energy could be local programs. Municipalities have both policy instruments and the means to implement them and, moreover, they are in direct contact with citizens and business.
7. Following the experience of Netherlands, sustainable energy management framework for Lithuania has been presented.

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