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# Black Sea Knowledge Institutions Turn Green

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**“A Roadmap for awareness and implementation  
of energy efficiency and use of RES schemes  
in the Black Sea knowledge institutions”**

# Imprint

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## Print:

Citronio, Athens  
Greece, July 2012

The Roadmap was compiled in the framework of the BSEC-HDF research project “Green Cluster of Knowledge Institutions of Black Sea: A Roadmap on Renewable Energy Sources and Energy Efficiency for Research and Academic Institutions”, and was coordinated by the International Centre for Black Sea Studies, Greece ([www.icbss.org](http://www.icbss.org)) with the participation of TUBITAK Marmara Research Center, Turkey ([www.mam.gov.tr](http://www.mam.gov.tr)) and National Research University – Higher School of Economics, Russia ([www.hse.ru](http://www.hse.ru)).



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# Introduction

The Roadmap for awareness and implementation of energy efficiency and use of renewable energy sources (RES) addresses “knowledge institutions” in the Black Sea countries that are willing to make a commitment to assess, manage and improve their energy performance, aiming at reducing their conventional energy use, using energy efficiently, introducing the use of renewable energy sources, mitigating the effects of climate change and, thus, saving costs. The term “knowledge institutions” refers to research and academic institutions, such as universities, academies of science and research centers. This roadmap is compiled in the frame of the research project “Green Cluster of Knowledge Institutions of Black Sea: A Roadmap on Renewable Energy Sources and Energy Efficiency for Research and Academic Institutions”, which is co-financed by the BSEC-HDF and coordinated by the International Centre for Black Sea Studies (Greece) with the participation of TUBITAK Marmara Research Center (Turkey) and National Research University – “Higher School of Economics” (Russia).

This roadmap is a voluntary tool designed with a view to transferring knowledge and know-how to the BSEC Member States from international, European or Black Sea best practices of academic or research centers and consequently to guide them towards implementing simple and soft green practices, in order to become more energy and cost-efficient.

The development of this roadmap was mainly based on:

- The **international and European** existing manuals and guidelines for the improvement of energy performance of an institution / organization, such as the ISO 14001 manual, the Energy Star guidelines and the Energy Management Audit Scheme (EMAS) toolkit
- The current **national legal frameworks** of the Black Sea countries participating in the project (Greece, Turkey and Russia) and coordinated efforts of the **Black Sea countries** to strengthen efficient energy performance (conventions, the outcomes of the Black Sea Economic Organisation’s Working Group and Task Force on Energy, etc.) that provide suitable legal and institutional frameworks for the implementation of this Roadmap
- A number of international, European and Black Sea **best practices** in the sphere of energy efficiency and RES that have been successfully implemented in knowledge institutions

The starting point of the proposed tools is a “Plan-Do-Check-Act” approach, and the roadmap focuses on the energy performance of knowledge institutions: energy saving and use of RES in both the existing organizational structure and materials used by the institutions, and in horizontal

processes, such as the equipment procurement.

The roadmap is written in a non-technical manner, so it can be easily understood and implemented by non-experts. It is actually a manual proposing a step-by-step approach for evaluating the energy performance of an institution setting indicators and a monitoring system. This approach consists of seven specific steps:

Step 1: Commitment to energy efficiency and the use of RES

Step 2: State of the art

Step 3: Setting the general goals

Step 4: Development of Action Plan

Step 5: Implementation of Action Plan

Step 6: Evaluation of outcomes and continuous improvement

Step 7: Broadening the green practices

# Step-by-step approach

## › Step 1: Commitment to energy efficiency and the use of RES

The first step of the Roadmap includes the initial commitment of a knowledge institution to adoption of an energy efficient scheme and the use of RES. In order to commit, the Senior Management of the institution needs to appoint an Energy Manager and / or Energy Team, that will be fully aware of the environmental and financial benefits of the scheme's implementation and will, therefore, strive to improve the energy performance of the institution. The dedication and commitment of the Energy Manager will serve as a catalyst for the successful implementation of an energy efficient scheme.

### 1.1 Justification for the need to implement of energy efficiency measures and RES schemes

Institutions seeing the financial returns from superior energy management continuously strive to improve their energy performance. Their success is based on a regular energy performance assessment and continuous steps to increase energy efficiency. No matter the size or type of the knowledge institution, the common element of successful energy management is commitment. At the very beginning of this effort, the Senior Management of the institution should make a commitment to allocate staff and funding to achieve continuous improvement.

### 1.2 Appointment of Energy Manager / Team

Appointing an Energy Manager is a critical component of a successful energy program. The Energy Manager helps the institution achieve its goals by establishing energy performance as a core measure.

The Energy Manager is not always an expert in energy and technical systems. Therefore, if it is necessary, the Energy Manager can seek assistance of an external expert. Successful Energy Managers understand how energy management helps the institution achieve its financial and environmental goals and objectives. Depending on the size of the knowledge institution, the Energy Manager can have a full-time position or perform his duties in addition to other responsibilities.

The Energy Manager's key duties often include:

- Regular contact with the senior management
- Setting the specific energy goals and drafting the energy policy

- Overall responsibility and coordination of the energy policy and its implementation
- Securing accountability and commitment from different stakeholders of the institution
- Securing adequate resources to implement the energy goals
- Assessment of outcomes and identification of room for improvement
- Increase of visibility and awareness within and outside of the institution

If the institution does not appoint a specific person for these tasks, nobody will feel responsible and chances are that the required tasks will not be carried out. In addition, the role and competency of the Energy Manager must be communicated throughout the institution.

The Energy Manager must have the power to ask for support in areas in which he/she has little knowledge. One of the first tasks of the Energy Manager will be to get an overview of the information and data already available in the institution. Apart from written documents, there is much knowledge among the staff. If appropriate, the Energy Manager should therefore identify people (stakeholders) working in energy-intensive areas and in areas which have an influence on energy consumption. It will also be beneficial when an expert on renewable energy or energy efficiency issues supports the Energy Manager as an advisor.

Usually the Energy Manager forms an Energy Team which supports related activities and which acts as a link between the energy manager and other departments. The Energy Team consists of people who have a sound knowledge of individual processes and technologies. Their knowledge might be used to influence energy consumption in their departments and to contribute to the development and support of an institution-wide strategy. This is necessary, as practice shows that individual departments rarely co-operate to increase efficiency. In cases of small institutions, the energy manager will already be familiar with the organisational structures and co-operate on an informal basis.

### 1.3 Decision-making process

For an environmental action to be effective, individual roles and responsibilities must clearly be defined from the very beginning, as they relate to the achievement of environmental objectives and targets, and the overall operation of the environmental scheme. Senior management must supply the necessary resources, both financial and human, to ensure that the action is effectively implemented. The decision to formally appoint the Energy Manager rests on the senior management and depends on the dedication and motivation of the Manager.

## › Step 2: State of the art

### 2.1 Definition of the analysis

One of the first priorities of the Energy Manager is to clearly identify which energy areas will be included in the analysis. The areas of analysis and intervention can be threefold:

#### *a) Sectoral*

The sectoral analysis addresses different energy sectors, which may cover all the following or only a few:

- Heating and cooling
- Hot water
- Lighting
- Ventilation
- Construction design and materials

#### *b) Horizontal*

The analysis can also be horizontal, addressing one specific action that can be implemented in all departments of the institution, for example, the green public procurement.

#### *c) Departmental*

The third option is to limit the analysis in specific units of the knowledge institution, rather than scrutinize every single department (especially if the organization under analysis is a large campus or a research institute).

In each case the Energy Manager will have to define the specific needs and problems in each energy area / sector / department, in order to conduct an overall energy analysis.

### 2.2 Identification of data sources

An important phase for each institution is to understand its energy trends. In order to do this, the identification of relevant data and information sources is imperative. Sources of existing information are: invoices, meter readings, relevant measurements and audit reports that can be systematically collected and recorded. The gathering of sufficient data is considered necessary for on-going monitoring.

The collection of data can help:

- Identify energy consumption ups and downs and correlate them

to specific events or operations that occurred during that period of time

- Compare the institution's data with other knowledge institutions for benchmarking
- Identify areas where there is lack of adequate data, and work to fill in the gaps

## 2.3 Energy inputs and emission outputs

Energy inputs consist mainly of non-renewable energy such as oil, natural gas and electricity. Emission outputs include emissions and waste heat. Emissions such as carbon dioxide are directly linked with the institution's energy consumption and contribute to negative environmental effects. Emissions from district heating depend on the fuels combusted and will be provided by the plant owner. Emissions for electricity consumption depend on the power plant where electricity is generated and can be requested from the electricity supplier. Importantly, the institution's staff should be aware of these effects and realise that their activities do not only have an influence on consumption but also on the environment.

## 2.4 Technical specifications

The Energy Manager will certainly need more details and analytical information regarding technical aspects of the institution's energy system, covering the heating and cooling systems, lighting, ventilation and construction materials. For this purpose, the Energy Manager might need the assistance and experience of an external energy expert.

This Roadmap will not go any deeper analysing the technical specifications of this step, as it is merely a descriptive and not technical tool. For more details on technical aspects, please refer to other manuals, such as the EMAS Toolkit on Energy Efficiency.

## › Step 3: Setting of general goals

### 3.1 Definition of overall goals

The energy manager has to clarify the scope of the analysis and set the general goals for the intervention. The most common goals that are expressed are:

- Reduce energy consumption from non-renewable energy sources

This goal is usually expressed in terms of specific decrease in quantity or percentage of energy use.

- Reach a certain level of performance compared to an established benchmark, such as another institution that is presented as a good practice

This can include a general review, the investigation of unusual losses, and the institution's position in relation to benchmarks as well as organisational aspects influencing consumption.

- Environmental improvement which translates energy savings into pollution prevention or reduction goals

These goals represent the major concern in reducing the institution's environmental footprint and can be expressed by quantified examples of specific targets.

Certainly, the level at which performance goals will be set, depends on the nature of the institution and the way it uses energy. Common levels for setting goals include:

- Institution-wide

This level includes the entire institution and provides an overall frame for the institution's vision for improvement.

- Departments

At this lower level, goals may vary and depend on the performance and needs of each department.

- Procedure

At this level, goals are set for a specific process followed in the institution, such as the procurement of new equipment.

- Time frame

Establishing appropriate and realistic target dates for goals ensures that they are meaningful and promote change. A combination of short and long-term goals can be effective, such as annual goals used to track progress on a regular basis, and long-term goals used for the institution's strategic planning respectively.

## 3.2 Decision-making

As soon as the Energy Manager formulates the general goals (if necessary with the help of an external expert), he/she brings them forward to the Senior Management of the institution (Rector, Directors, Executive Board). It is up to the Management to make decisions and set the strategy that will be mandatory. On the other hand, even though the participation of key stakeholders in this stage is optional, it could be helpful, in order to increase the legitimacy of the decision-making process.

## › Step 4: Development of Action Plan

### 4.1 Specific targets

Development of a concrete Action Plan is the next step after the initial definition of the overall goals. This includes the setting of specific goals that will help the Energy Manager and/or the Team to:

- Set the fields for intervention throughout the institution (e.g. horizontal intervention by implementing green procurement, implementation of specific actions in specific departments or in specific sectors, such as ventilation or waste management)
- Measure, control and monitor the benefits and drawbacks of the concrete Action Plan
- Motivate the staff and students
- Demonstrate commitment to reducing environmental impacts

A key-point in this procedure is that as soon as the specific goals are established, they should be formally recognized by senior management, so as they can be legitimately promoted as a strategic mission in the whole institution.

### 4.2 Mapping and involvement of the main stakeholders

The involvement of stakeholders in the implementation of the Action Plan is not mandatory, but it is certainly helpful in the decision-making process, and, therefore, it is highly recommended. The Energy Manager needs to perform a detailed mapping of the relevant stakeholders that should be involved in this process. In the case of higher education institutions, the stakeholders can be categorized as follows:

- Academic staff
- Researchers
- Administrative staff
- Students
- Suppliers

In research institutes, the stakeholders' categories are respectively:

- Researchers
- Administrative staff
- Customers
- Suppliers

### 4.3 Technical division of labor: roles and resources

As soon as the main stakeholders have been identified, the Energy Manager needs to attribute specific roles to them: who should be involved, to what degree and what their responsibilities will be.

The definition of available resources is also another important parameter. The Energy Manager has to estimate costs for every activity in terms of both, financial expenses and human resources.

## › Step 5: Implementation of Action Plan

### 5.1 Raising awareness

The effective implementation of the Action Plan largely depends on awareness raising among the key stakeholders of knowledge institutions. All these actors need to be aware of the energy goals and act responsibly towards this end. To increase awareness about the energy use can be achieved through multiple ways:

- Distributing information materials (posters, leaflets etc.), providing basic information about everyday actions that affect energy use and impact the environment, or even energy sources used at the institution along with the associated pollution that results from this use
- Organising events, workshops, conferences, summits etc., for the dissemination of the Action Plan outcomes
- Establishing an Information Office, website etc., for environmental sensitization, energy-saving options and distribution of relevant material and information addressing a general audience

The key for awareness rising is to identify the different groups of audiences and select the most appropriate information to address to each one of them. The information should be tailored to the specific characteristics of each group. For example, the manager of a university would be interested to know the cost of energy per activity, while a student would be more attracted to a tip about the energy use of his/her computer.

### 5.2 Training

Training is another significant aspect of implementing the Action Plan. Through training, staff and relevant stakeholders realize the importance of energy efficiency and get access to valuable knowledge in order to make informed decisions. For this reason, a series of events, workshops and training seminars can be organized for the institution's staff and students. Additionally, the universities can include environmental courses for graduate and post-graduate students aiming at increasing their environmental sensitization and awareness.

The type and nature of training vary by institution and by action plan. According to the Energy Star guidelines, common training programs include:

- Training on the processes of reducing energy use and increasing energy production from renewable energy sources, which usually targets specific audiences, such as facility managers, operations, and maintenance staff.

- Training on collecting data, recording, evaluating and monitoring in order to support energy management.
- Training on specialized equipment or tools to secure more efficient operation.

### 5.3 Monitoring and reporting

Monitoring is the specific duty of Energy Manager / Team who will take care of it throughout the Action Plan's implementation.

A tracking system is the means by which an energy program's activities are monitored. The system should be comprehensive and available for all to use for measuring progress towards established targets. Maintaining a tracking system enables the assessment of necessary steps, corrective actions, and identification of successes. Periodic review of the activities outlined in the Action Plan is critical to meet energy performance goals. According to the Energy star guidelines, the following steps are vital in a monitoring process:

- Perform regular updates

A system is only effective if the information it contains is up-to-date and comprehensive. Data needs to be collected and incorporated into the system at intervals that correspond to the program. Many organizations perform weekly and monthly updates of their tracking systems.

- Conduct periodic reviews

Periodic reviews of the progress in meeting interim goals and milestones should be conducted with the management team, the energy team, and selected groups of employees. The frequency of these reviews will vary depending upon the audience. Such reviews should focus on progress made, problems encountered, and potential rewards.

- Identify necessary corrective actions

A tracking system is a good way to determine whether a program is performing well. It will help identify when a specific activity is not meeting its expected targets and is in need of review.

## › Step 6: Evaluation of outcomes and continuous improvement

### 6.1 Performance indicators

The assessment of achievements permits to measure energy performance after the implementation of the Action Plan.

- Review energy use and cost data
- Produce reports and data from tracking and monitoring efforts
- Analyze energy efficiency achievements based on the established performance metrics
- Compare energy performance with a baseline
- Compare actual performance against established goals for environmental performance and financial savings
- Compare energy performance with peers and competitors to establish a relative understanding of where the performance ranks.

### 6.2 Rewarding

Recognizing and rewarding the accomplishments of individuals and teams that were actively involved in the Action Plan's implementation is key to sustaining support for energy management initiatives. Rewarding particular efforts sets the example for what constitutes success and helps motivate employees through increased job satisfaction. Recognition can strengthen the morale of everyone involved in energy management.

The recipients of rewards could be either specific individuals, or teams who worked collectively, or even whole departments that can be rewarded for energy performance accomplishments.

There is a variety of ways to provide recognition and rewards. Depending on the purpose and the type of institution, forms of recognition can range from formal acknowledgements and certificates, to simple forms of appreciation. In every case, the rewarding should be provided by the Head of the institution through a formal procedure, in order to increase the degree of recognition and the importance of the activity.

Rewarding can also appear as an external recognition for environmental achievements. Public reporting of the Action Plan's outcomes can lead to the validation of the institution's energy performance and make its public image more attractive. Especially, when external recognition comes from governmental sources and programmes or world-wide recognized standards of performance the reputation of the institution is reassured and the potential for financing is increased.

## › Step 7: Broadening of green practices

### **7.1 Examining further steps for implementing green practices in other sectors of the institution**

The last step of the roadmap has the character of continuous improvement and incremental development and implementation of green practices. As long as the assessment of the action plan indicates positive outcomes, there is always room for new actions and further implementation of green schemes. Certainly, continuous environmental interventions depend on the dedication of the Energy Manager and the will of Senior Management of the institution. Based on the monitoring process, the next steps could focus on the broadening of departmental and/or sectoral activities, where environmental practices could be implemented.

### **7.2 Cooperation with similar institutions in building green networks and clusters in Black Sea countries and EU**

Equally important is the cooperation with other institutions willing to implement similar practices or having already implemented green schemes. This kind of cooperation leads to the establishment of networks where usually exchange of ideas, knowledge and know-how is easier and comparisons with other successful practices can be proven valuable.



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The project is co-financed by the  
BSEC-Hellenic Development Fund