

PROPOSAL FOR REVIEW

Project Title: Romania: Capacity Building for GHG Emission Reduction through Energy Efficiency

GEF Focal Area: Climate Change

Country Eligibility: Convention Ratified June 1994

Total Project Costs: US \$ 6,478,000

GEF Financing: US \$ 2,268,000

Country Contribution: US \$ 1,160,000
US \$ 200,000 (RENEL)

Cofinancing/Parallel Financing: US \$ 1,850,000 (EU PHARE Programme)
US \$ 1,000,000 (Fonds Francais pour l'Environnement Mondial)

GEF Implementing Agency: UNDP

Executing Agency: Ministry of Industries & Romanian Energy & Romanian Energy Conservation Agency (ARCE)

Estimated Approval Date: February 1996

Project Duration: 5 years

GEF Preparation Costs: PRIF (RER/94/G41) US \$ 25,000

BACKGROUND:

1. In 1991, CO₂ emissions amounted to 123 Mt. Per capita emissions were almost 10t in 1989, but they have fallen to 6t in 1993 due to the sharp decrease in industrial production. However, GHG emissions in Romania remain high compared to the level of economic activity with 2,120t of CO₂ per US\$M of GDP, compared for example to 665t in the European Union. The same year, Total Primary Energy Supply (TPES) was 48 mtoe, ranking Romania third in terms of consumption in Eastern Europe, behind Poland and the Czech Republic. The Romanian economy is indeed very energy intensive: its energy ratio is 1.7 toe/1,000 US\$ in 1991, as compared to 0.38 in OECD countries. This high energy intensity is a combined effect of two factors:

- the structure of the economy with a large energy-intensive industrial sector; and
- the inefficient utilisation of energy in all economic sectors.

2. The industrial sector in particular is characterised by a high share of energy-intensive industries. In 1991, it contributed to 46.7% of the national GDP and accounted for 51.4% in the country final energy consumption (energy sector not included). Final energy consumption in the industrial sector was 17.1 mtoe in that year. Chemicals, iron and steel and machinery together accounting for 50%. The energy sector and combustion of fuels in industry are in fact the main sources of GHG (CO₂) emission, with 44% and 37% of the country's emissions, respectively.

3. Environmental policy is the responsibility of the Ministry of Water, Forests and Environmental Protection (MoE). The MoE has three departments dealing with the above subjects. With its research institute it operates 233 monitoring stations for air pollution throughout the country. The Department also has 40 district agencies in charge of inspection, issuing permits, analysis, monitoring and data collection. The Ministry of Health operates 86 air pollution monitoring sites in cooperation with the MoE. The district agencies require significant investment in control and monitoring equipment to cover the 41 counties of Romania, each of which includes between 2,000 and 5,000 point sources of pollution. Further work on the implementation of the FCCC will increase the cooperation between these various national institutions.

CONTEXT:

4. The Framework Convention on Climate Change was signed by the Government of Romania at the Rio Summit where the Minister of Environment announced that Romania expected that CO₂ emissions would, in the year 2000, be below those of 1989. Romania ratified the FCCC in June 1994 (Law No.24) and a "First National Communications Concerning the National Process of Applying the Provisions of the Framework Convention on Climatic Change" was submitted to the Secretariat of the Convention in January 1995. In accordance with the

global problem of climate change, the Ministry of Waters, Forests and Environmental Protection is integrating the strategy on climate change into the general strategy of environmental protection in Romania. The Government of Romania has implemented several strategic steps to support the Framework Convention. These are:

- adoption of regulations on air pollution emissions for each sector of the economy;
- the establishment of the National Commission for Climate Change;
- the establishment of a greenhouse gas inventory in accordance with methodologies set out by IPCC and adopted by INC of UNFCCC, for different sectors of the economy;
- preparation of a national monitoring system for air pollution (including GHG);
- identification of the sectors in Romania most vulnerable to climate change;
- mitigation options for each sector;
- public information with a view to broadening and strengthening the public acceptance of climate change strategy;
- the National Environmental Research programme will contain aspects for Global Air pollution and Climate Change;
- promotion of cooperation with other countries to improve the Convention; and
- negotiations on the development of specific targets for GHG emission reduction.

In the context of a very energy-intensive economy needing to comply with its international commitments, the Government of Romania made the decision to promote energy efficiency policies.

PROJECT OBJECTIVES:

5. Experience shows that even if there is a potential for energy efficiency improvements which are financially viable, and even if credit lines are available, a considerable share of this potential is not realized because information, policy measures, local expertise are lacking. These barriers are particularly important in small and medium sized industries, and among commercial and residential energy users. This project is designed to help overcome these barriers. It will assist Romania in reducing the long-term growth of GHG emissions from district heating, power generation plants and from consumption of fossil fuel sources in other sectors. The overall objective of this project is developing self-sustaining national capability for the continuous improvement of energy efficiency. This objective is in line with the national strategy proposed by the Government for the reduction of GHG emissions. It is also consistent with Government policies to improve energy efficiency, sustain economic development and the move towards a market-oriented economy. The overall objective will be achieved through various activities which can be classified in two themes:

- (i) Improving capacity to implement local energy strategies and programmes leading to continuous improvement in energy efficiency; and
- (ii) Demonstrating and replicating specific energy saving technologies, with the emphasis firmly on ensuring their dissemination.

6. The first involves increasing the capacity to design and implement rational energy management strategies at municipal and industrial levels. This will effect savings in energy, and hence reduction in GHG emissions, through the implementation of modern management information systems and no-cost and low-cost measures. In addition, it will increase the flow of cost-effective projects and facilitate the financial evaluation of these projects so that they can be packaged for investment from financial institutions.

7. The second theme involves demonstrating a number of energy saving technologies, namely; improved combustion efficiency, energy efficient municipal lighting, improved building insulation, reducing electricity demand in buildings, industrial heat recovery and electric motor controls. The emphasis in this theme will be on rapid demonstration of results and closely targeted replication with project managers charged with responsibility for finding replication sites, preparing financial cases for outside lenders, and project management of implementation.

8. In order to focus the project tightly on quantifiable energy savings and hence reduction in GHG emission, the two themes will be implemented simultaneously within a selected geographical area to be designated an Energy Action Area. In this way all components of the project will be able to feed off each other and become synergistic. The objective will be to ensure maximum involvement and participation from all groups within the selected area.

PROJECT DESCRIPTION:

9. The project consists of nine components of three different types, which were discussed and agreed upon with relevant authorities in Romania and funding partners:

- a) Five components involving demonstration and transfer of technologies (components 4, 5, 6, 7, and 8).
- b) Three components focusing on training and information disseminations (components 1, 2 and 3).
- c) The last component (component 9) involves the organization of an overall Management and Coordination Unit. This coordination unit will function in joint team. Central coordination is necessary in order to integrate successfully the distinct elements of this project and to ensure coherent and timely completion of various elements.

10. Five alternative sites have been identified from which the first pilot Energy Action Area will be selected. Final selection of the site will take place during a meeting organized in September 1995 with national authorities and funding partners. Summary information with comments about each site is given in Annex 5. The establishment of a first Energy Action Area will take 18 months. After that, the project will focus on replicating this programme in other areas and aim to have established at least 20 Energy Action Areas within the five year programme. This is an ambitious but achievable target, as much emphasis will be placed during the pilot Area project on training local Agencies, so that they can take over the management of

the programme in other areas.

11. The following section discusses each component of the proposed project. The discussion centres on the objectives of the component, a description of the activity, a discussion of the transactions barriers preventing the component from being implemented in the absence of the project, the anticipated outcome of the component, and finally, the local partners who will be involved in the component.

11(a). **Component 1** **Improving energy management capacity (for selected small and medium enterprises) Total cost: US\$ 420 000; Proposed GEF funding: US\$ 320 000**

Objectives:

- To implement energy management information systems in industry and the public sector;
- To implement no- and low-cost savings opportunities;
- To train enterprise, ARCE and consultancy staff in energy management information systems; energy saving techniques; and financial evaluation; and
- To identify investment opportunities and prepare financial evaluations for project funding from banks.

Description: A major constraint on improving energy efficiency in Romania is the lack of experience in establishing management information systems and using such systems to identify and implement no-cost and low-cost measures. This component of the project aims to:

- Increase know-how and understanding of energy management information systems, energy saving techniques and financial evaluation;
- Implement energy management information systems, beginning with the largest enterprises and cascading out to smaller enterprises; and
- Use management information systems and consultancy to identify higher cost opportunities and prepare them for financing by outside agencies and local banks.

The approach used will be:

- to provide high level awareness training for senior managers in enterprises (one-day seminars) to create demand for energy management and provide operational level training in energy management information systems, energy conservation techniques and financial evaluation and provide training for the local ARCE office in these areas;
- to provide training for local consultants and consulting groups in these areas;
- to use local and international technical experts to implement energy management information systems in enterprises and assist in implementation of no- and low-cost measures; and
- to assist in preparing cost-effective programmes and projects.

As in all cases throughout this project, priority in the first phase will be given to those small and medium energy users with the largest potential energy savings, provided that these energy users demonstrate potential economic and fiscal solvency.

Transaction Barriers: Small and medium sized enterprises have little or no information about energy management systems and little ability, therefore, to make rational energy use plans and decisions. They also have little familiarity with the process of preparing loan applications for energy efficient investments. This component will overcome this hurdle by assisting as many of the firms in the Energy Action Area in establishing management information systems and providing information to assist them in carrying out no and low-cost energy investments. It will also help them to prepare more expensive, but cost-effective, investments for financing. Through implementing this component in the first and subsequent action areas, a useful network of information and investment support will be created to assist these small and medium firms that frequently do not receive adequate attention. It is clear from experience to date that such activities would not take place without the assistance of this project.

Expected Outcome:

- Energy management systems will be established in at least 15 of the enterprises in the first Energy Action Area;
- All no- and low-cost energy saving opportunities will be implemented in at least those 15 firms involved in the MIS Programme in the first Energy Action Area;
- Those large-scale energy saving opportunities which are identified in the large firms in the first Energy Action Area will be analyzed and subsequently presented for financing.

Local partners: ARCE, TIDCEM, local consultants

11(b). Component 2 : Development of Local Energy Strategy
(Total costs: US\$ 350 000; proposed GEF funding US\$ None

Objectives:

- To develop local capability amongst local decision makers, particularly in local government, to develop energy strategies and take energy related decisions;
- To develop local capability to produce sectoral energy utilisation studies with assessment of energy efficiency and GHG emissions, potential savings and abatement of GHG emissions through energy conservation and renewable energy strategies; and
- To extend the activities of the Energy Cities Network.

Description: This action is mainly concerned with local training on energy demand analysis, integrated resource planning and forecasting methods, as well as defining local energy strategies on both the demand and supply sides and energy-related decision making. As such, it builds directly upon the work already started by TIDCEM and the ORASE-ENERGIE energy cities network. Because it should have significant local benefits and is necessary for rational energy development, no GEF resources are requested under this task.

Transaction Barriers: Local decision makers (at the municipal level) typically have little or no understanding of integrated energy concerns and decision making. As a result, many of the decisions are uninformed by a perspective which views energy supply and demand as part of an integrated whole. This component seeks to train local-level decision makers in these perspectives and tools, making a systematic approach to energy decisions within the Energy Action Areas out of previously piecemeal efforts.

Outcome:

- The regional or local authorities will have the capability to define energy utilisation efficiency, make reliable energy forecasting models, and use those models to make decisions aimed at reduction of GHG emissions; and
- These activities will be replicated in the subsequent Energy Action Areas.

Local partners: TIDCEM, ARCE, ORASE-ENERGIE and local consultants.

11(c). Component 3 : General information dissemination
(Total costs: US\$ 400 000; proposed GEF funding US\$ 400 000)

Objectives:

- To develop clear, accessible, concise and practical information for specific target audiences;
- To develop information based upon project demonstrations for use in replicating project activities; and
- To use existing information channels to disseminate information, particularly for those activities of interest for the project.

Description: The Programme Coordination Unit will work with ARCE, the Ecologist Youth or Romania, TIDCEM and local NGOs to develop this component. They will disseminate information on energy usage, the need for energy efficiency and what actions can be taken to manage energy effectively to various target audiences. The information will be made relevant to the local Energy Action Area and support its development. The targets include municipal councils, large industrial consumers, small and medium consumers, the general public, trade unions, associations and school children.

The overall objective of this component will be to involve all groups of society within the Area and to build upon existing information dissemination systems. There is a need to develop information which includes an assessment of the experiences of the demonstration efforts funded as part of this programme, so that target beneficiaries in subsequent Action Areas can benefit from the experiences of these demonstrations. This activity will also include awareness raising, training, and public events. Targeting children will help to change young people's perceptions of the energy problems facing Romania, which can in itself contribute to change in the long term. This component will build upon proposals made by Non-Governmental Organizations

within Romania and will include:

- Publishing information packages, including energy booklets;
- Energy competitions for different age groups;
- Energy exhibitions aimed at industrialists, engineers, school children and the public;
- Contributions to school curriculum; and
- Use of local mass media.

This component will build upon pilot projects initiated by the European Union's PHARE Energy programme (the development programme for Central and Eastern Europe). After the successful completion of this component in the pilot Energy Action Area, a project officer will be appointed to assist dissemination of the project ideas to other municipalities as well as to make better use of the information gained through this project.

Transactions Barriers: There are very few good Romanian examples of improving the efficiency of energy service delivery as well too little an awareness of how energy needs can be met through improved management, better technology, and approaching energy from a service-delivery perspective. There is also little information and awareness about the potential for enhanced energy efficiency. As much of this project focuses on energy use in industrial applications, this component first will seek to provide useful information about the demonstrations carried out as part of this project. The audience in this first case will be other industrial end-users in both this Energy Action Area and other Energy Action Areas. In addition, there will be public awareness elements attempting to inform consumers, educators, students and the general public about using increased energy efficiency to improve the quality of life and reduce GHG emissions.

Outcome:

- Involvement of the main local groups in the Energy Action Area;
- Development of appropriate information to expansion of Energy Action Area programme; and
- Use of all existing information channels to provide energy information.

Local partners: ARCE, The Ecologist Youth of Romania, TIDCEM

11(d). **Component 4 : Combustion efficiency service**
(Total costs: US\$ 260,000; proposed GEF funding: US\$ 60,000).

Objectives:

- To provide technical assistance in analyzing the efficiency of combustion systems employed by enterprises in the Energy Action Area;
- To provide a combustion efficiency service to other Energy Action Areas (medium term);
- To provide a combustion efficiency service to top 200 fuel users (excluding power

stations) in the country (long term).

Description: The experience of ARCE local branches and international consultants carrying out energy audits has shown that average combustion efficiencies in Romania are very low, typically 65% to 70%, as opposed to 80% plus achieved in advanced economies. This inefficiency is a major contributor to the emission of carbon dioxide, as well as other pollutants such as sulphur dioxide. This component will establish a team charged with the objective of providing a combustion efficiency service for the enterprises in the Energy Action Area. This will service local ARCE staff as well as local consultants. The combustion efficiency service will deliver technical assistance to local enterprises supporting those enterprises in their effort to analyze the efficiency of on-site combustion systems and to make cost effective improvements. The service will be offered to enterprises in the area (initially at no costs), starting with the largest and the most economically viable entities. It will offer the following:

- combustion efficiency spot checks;
- adjustments of burners to provide optimum combustion;
- regular checks (weekly, monthly depending on size of burners);
- training for enterprise staff in larger enterprises;
- identify opportunities for investment such as automation of combustion controls; and
- provide demonstration investment in efficient combustion equipment such as burner automation.

An improvement in average combustion efficiency of 5 to 10 percentage points would make a major contribution to energy efficiency and would simultaneously reduce GHG emission. This should easily be achievable using combustion analysis equipment and regular monitoring. Additional gains will be made by automation of combustion.

The team trained in the pilot Energy Action Area will become the core of the national unit that will aim to provide the service to the top 200 fuel burning sites (excluding power stations) in the country. This core team should operate in the following manner: it should set standards for combustion efficiency testing, provide training and accredit consultants to carry out testing. At first, the service will be supported by GEF funds, but there will be an explicit objective of becoming self-supporting within two years. The benefits from regular combustion testing far outweigh the cost; therefore enterprises should pay for the service. Early in the lifetime of this activity, efforts will be made to ensure that this project component becomes fiscally sustainable through charging clients for the service produced. In this way, and through accreditation, rather than direct service provision, this activity will promote the growth of the market for energy efficiency services and products.

Transaction Barriers: To date, this activity has not been carried out for three reasons. First, there has not been a cadre of trained individuals familiar with modern combustion optimization techniques. Second, the equipment required for carrying out these optimizations is not available locally and will require some demonstration. Third, until recently, energy prices were subsidized so heavily that incentives for undertaking this type of investment were limited. With

the reversion to non-subsidized energy prices, this latter obstacle has been removed. This component is designed to obtain the requisite equipment and train a cadre of professionals to utilize it to keep boilers in the Energy Action Area constantly tuned-up. There will also be demonstrations of automated controls, automated oxygen trim, multi-stage burners, and condensing low NOx burners. After the start-up of the combustion efficiency service, this agency should be financially independent, as client companies will be required to pay for the services provided.

Outcome:

- Improved combustion in all enterprises in the Energy Action Area (short term);
- Improved combustion efficiency in other Energy Action Areas (medium term);
- Improved combustion in top 200 fuel users in Romania (long term);
- Identified and evaluated investment opportunities in improved combustion equipment and automation; and
- Demonstration of a number of techniques for improved combustion efficiency.

Local partners: ARCE, local consultants, ICEMENERG.

11(e). Component 5: Heat recovery in industry
(Total costs: US\$ 680,000; proposed GEF funding: US\$ 280,000)

Objectives:

- To demonstrate key heat recovery techniques;
- To disseminate information; and
- To prepare 50 similar projects for investment by others.

Description: This component addresses the large potential for heat recovery in industry. Heat recovery is a generic term that covers numerous technologies such as boiler flue heat recovery, process heat recovery through various types of heat exchangers, boiler blow-down heat recovery, ceramic recuperative burners, heat-pipe boiler economisers, building ventilation heat recovery, spray recuperators, and waste-heat boilers. Ceramic recuperative burners served as the subject of a large government programme between 1986 and 1989 aimed at saving 0.5 billion cm³ of natural gas. However, many of these installations are not performing at anything like the optimum level. An opportunity exists to examine these previous installations, rehabilitate non-functional installations and demonstrate and disseminate other heat recovery applications. The selection for particular technologies within this component will be driven by the results of energy management audits which will identify the major opportunities. Then the programme would:

- Select demonstration projects;
- Install pre-investment monitoring;
- Implement the projects;
- Carry out post investment monitoring;
- Disseminate the results in a manner aimed at getting maximum replication.

Transaction Barriers: Although many studies have shown a large potential for cost-effective heat recovery systems in industry, few investments in these technologies have been forthcoming. Non-price barriers to market penetration have slowed the deployment of these systems. These non-market barriers, particularly institutional obstacles, risk and information gaps, have slowed the deployment of these systems. In addition, the controlled energy prices, prevalent until recently, may have removed many incentives for these investments. Thus, non-market pricing policies may have contributed to the failure of earlier efforts in this area. The information barriers will be overcome by training and information dissemination. The risk and institutional objections to these investments will be surmounted through carefully monitored demonstrations, and metered billing will ensure that the incentives to use energy efficiently are present and that the investments do save energy.

Outcome:

- Implementation of key heat recovery techniques in the first Energy Action Areas; and
- Implementation of 50 similar projects in other Energy Action Areas.

Local partners: ARCE, local consultants, ICEMENERG

11(f). **Component 6: Electric motor controls (Total costs: US\$ 850 000;
Proposed GEF US\$ 150 000)**

Objectives:

- To identify industrial and municipal consumers within the first Energy Action Area with large electric motors;
- To provide technical assistance for rehabilitation of between 5 and 8 enterprises as a demonstration project;
- To demonstrate the cost-benefit of installing Variable Speed Drives (VSD) motor controls;
- To implement motor controllers in all viable sites within the first Energy Action Area;
- To implement motor controllers at all viable sites within the subsequent Energy Action Areas.

Description: Modern, variable speed electric motor load controllers can significantly improve the efficiency of large electric motors in industrial applications. These devices are technically feasible and cost-effective at today's energy prices in many applications. The application of motor controllers such as Variable Speed Drives can reduce the energy used by electric motors for pumps, fans, compressors and machinery by up to 50% by electronically adjusting power input to the required load. If implemented industry wide, this project alone could reduce the total electricity end-use by 5%. In OECD countries, motor controllers are now standard on large installations and beginning to spread into smaller motors. Expected paybacks are between 2 and 4 years. The Ministry of Industry is already promoting the use of VSDs across industry. This programme will enhance what is now a piece-meal approach. This component will assist 5-8 of the largest users of electric motor or water pump users to retrofit existing plants with variable

speed drives in order to demonstrate and gain experience with these devices.

Transaction Barriers: At present, variable speed controllers for electric motors are unfamiliar to Romanian industry. While they may appear to be good ideas on paper, the industrial engineering staff has little knowledge or experience with these controllers. This component will focus first on demonstrating that these devices work and are profitable in the first Energy Action Area before implementing a larger programme to disseminate them throughout other Energy Action Areas. A critical element to these efforts will be the training of staff in which types of controllers will work in which applications, and then how they can be financed effectively.

Outcome:

- All viable opportunities for motor controllers in Energy Action Area implemented; and
- Accelerated uptake of VSD technology nationwide.

Local partners: ARCE, ICEMENERG

11(g). Component 7: Efficient municipal lighting (Total costs: US\$ 650 000; proposed GEF funding: US\$ 100 000)

Objectives:

- To demonstrate the use of energy efficient municipal lighting;
- To replicate the technology in 50 other sites within 5 years;
- To contribute towards creating a market for locally produced energy efficient lighting; and
- To disseminate the results to all municipalities.

Description: This component aims to demonstrate the application of modern energy-efficient lighting in the municipal lighting sector. A number of municipalities, including Hunedoara County, Mare Mures County and Targu Mures County have expressed an interest in investing in energy-efficient lighting during the refurbishment of existing schemes but additional costs are a constraint. This component will select one of the schemes already identified in the first Energy Action Area and provide additional funding from within this project so as to allow the use of energy-efficient lamps and lighting controls. Following the implementation stage, a project officer will be appointed to disseminate information and project manage further installations in other areas, and design financial schemes to enable municipalities to finance these initiatives. Such projects are likely to be attractive to lenders because the savings are very predictable. The component will also examine ways in which the uptake of energy efficient lighting can be accelerated, e.g. with shared savings contracts and revolving funds.

Transaction Barriers: There are two types of transaction barriers preventing widespread use of

more efficient municipal lighting. The first has to do with the lack of familiarity with the alternative lighting options, which have never been demonstrated in Romania. The second has to do with the difficulties which municipalities face in financing those lighting investments. This component will immediately help overcome this first obstacle in the Energy Action Area by demonstrating the more efficient lighting element. To overcome the larger barrier to implementation, that of the inability of municipalities to finance these investments, project analysts will focus attention on different financing alternatives for municipalities, whether through specific lines of credit, national or internationally-seeded revolving funds, or the issuing of municipal bonds. Thus, both obstacles to the widespread implementation of this option will be overcome through this project component.

Outcome:

- One demonstration project in pilot Energy Action Area; and
- 50 similar schemes formulated and presented to lenders for financing (longer term).

Local partners: RENEL, ARCE, ICEMENERG

11(h). Component 8: District heating systems and buildings insulation
Total costs: US\$ 1,530,000; proposed GEF funding: US\$ 130 000

Objectives:

- To demonstrate an original approach for the thermal rehabilitation of a district heating network and the end-user dwelling;
- To improve the comfort and the living conditions of the end-user customers of the heating network;
- To replicate the approach in other Energy Action Areas; and
- Prepare and distribute a training manual on district heating management to all municipalities targeting mayors and local counsellors.

Description: A large proportion of the energy losses in Romania are concerned with the provision of heat to buildings and industry from district heating networks operated by RADETs, local district heating companies owned by the local authorities. Some of the heat delivered by the networks comes from power stations, some from industry and some from Heat Only Boilers. In all cases the systems are very inefficient because of:

- Large transmission and distribution losses caused by long distances involved and poor or absent insulation of pipe work;
- Old and inefficient boilers and heat exchangers;
- Corrosion and fouling due to lack of water treatment;

- Water losses from primary and secondary loops;
- Poor thermal structure of buildings leading to high end-user consumption;
- Problems with fuel supply, particularly with gas pressure in winter; and
- Lack of modern control systems and management techniques.

As well as high energy use, this leads to lack of comfort for the end-users and the need to spend a high proportion of income on purchasing heat. Many of the district heating networks cannot provide heat or domestic hot water constantly throughout the winter and supply is often limited to ten or twelve hours a day. This leads to very low temperatures (as low as -10°C) inside dwellings at times of extreme ambient conditions.

The project will demonstrate an integrated approach to reducing energy losses in district heating schemes. The selected approach will improve both the system efficiency and the end-user efficiency through better insulation and controlling ventilation, as well as training of residents. The emphasis will be on lower cost solutions that will be more accessible to other RADETS and communities. A number of institutional issues, such as the inability of RADETS to invest in privately owned apartments, will also need to be addressed.

Transaction Barriers: The transaction barriers in the case of improving district heating can be seen as a lack of familiarity with newer, more efficient approaches to the supply of heat to district networks, risk associated with these technologies never having been demonstrated locally, and a difficulty of RADET's to finance such innovative investments. By focusing on demonstrating the new techniques, this component will provide a basis for widespread local demonstration which can serve as the basis for training. Project analysts will then begin to address the financing bottle necks in help RADETS obtain adequate financing to replicate the demonstration investments.

Outcome:

- A demonstration project within the first Energy Action Area with clearly monitored results; and
- A programme to disseminate the project results and assist other RADETS to design and implement similar projects.

Local partners: TIDCEM, other NGOs, RADETS, ARCE, municipalities of the ORASE-ENERGIE network, local consultants.

11(i). Component 9: Project Management and Coordination
Total costs: US\$ 985,000; Proposed GEF funding: US\$ 585,000)

The successful implementation will require strengthening of ARCE with the recruitment of staff dedicated to this project. A chief project manager will be recruited internationally. Initially, the Chief Project Manager will work with experts experienced in managing large, integrated energy

management programmes and associated activities. Individual components of the project will have their own project officers whose responsibilities will include day-to-day management of the implementation of their component, and subsequent replication. Emphasis in the first year will be on training local staff so that foreign involvement may be reduced over the duration of the project. It is proposed that a chief project manager will be appointed. He will draw up Terms of Reference for international and local staff to manage each component of the overall workplan. Each component shall have a project manager and team leader reporting to the chief project manager. Management consultants, with extensive experience of managing large energy projects with the emphasis on quantifiable results will be appointed to draw up a detailed programme for each component, and then manage the implementation of that programme. Within each component, the project manager shall be expected to achieve explicit targets for the replication of projects. Each component's international consultancy team shall also be expected to train local consultants (as well as ARCE and other staff) in order to build a self-sustaining capacity to run the project. The Chief Project Manager will focus his efforts in obtaining concrete replicable results. The component managers will be hired on performance-based contracts in order to achieve this goal.

In addition, the project management team will include a financial/economic analyst whose prime responsibility will be to focus on the "bankability" of the follow-on investment projects (the position is funded in the budget for 2 years). It is vital that the chief project managers work to motivate the end-users to invest. This may be done in a number of ways; fiscal means, subsidised or free equipment for a period e.g. low energy lamps, publicity, awards, league tables of performance, and legal and regulatory requirements e.g. minimum standards of efficiency. It is essential that the overall project managers work with ARCE and other institutions (e.g. research institutes, RENEL, ROMGAZ as well as the EU PHARE energy PMU), to put in place an appropriate framework of incentives to ensure project success.

UNOPS will be responsible for the selection of foreign assistance in collaboration with ARCE. Office space for project activities will be contributed by the Ministry of Industries (MoI) through ARCE and its Regional Branches.

Much of the project management at a local level will be carried out by existing Romanian organisations such as the local Energy Service Companies (ESCOs) and TIDCEM. TIDCEM will have overall responsibility for all training issues. The co-operating agency will be UNOPS (Office for Project Services).

INSTITUTIONAL FRAMEWORK AND PROJECT IMPLEMENTATION

12. The Romanian Agency for Energy Conservation (ARCE) will be the executing agency for the project with responsibility for project management, under the auspices of the Ministry of Industries. Funding partners will meet in a Financing Sub-Group where they will be informed of project progress by the Ministry of Industries and will make overall project management decisions.

13. A National Steering Group will be established to oversee the whole project and will include representatives from institutions such as the Ministry of Industry, State Secretariat for Economic Reform, General Directorate for Energy, Petroleum and Gas, Romanian Energy, Conservation Agency, Ministry of Finance, Ministry of Public Works and Territory, Planning, Ministry of Environment, Water and Forestry, RENEL, ROMGAZ, State, Ownership Fund, Association of Industrial Energy Consumers, TIDCEM, UNDP, European Union, the French GEF, the European Bank for Reconstruction and Development and the World Bank.

14. In the future, each Energy Action Area will also have a local Steering Group to ensure local management and involvement. This will likely be made up of representatives from the municipality involved, local industry, trade unions, NGOs, the local ARCE Branch and TIDCEM. (See Component 9 above for details.)

CONSULTATIVE AND PARTICIPATORY PROCESSES

15. In 1993, a UNDDSMS Adviser produced a first study on Energy Efficiency in Romania and gave advice on the areas in which opportunities for energy conservation could be found. As a continuation of this evaluation, in May 1994, at the request of MoI, the same expert produced advice for the formulation of a project to be submitted to the GEF and prepared a draft project brief in collaboration with ARCE. In July 1994, \$400,000 were granted to UNDP by the GEF Executive Council as a Project Preparation Facility (pilot phase) for the preparation of an energy efficiency strategy. This funding facility was partially used for Romania in order to further develop this project. A first mission took place in March 1995. It was followed by regular discussions between the UNDP, the national authorities, various stakeholders (NGOs) and potential funders.

NGOs consultation:

16. The International Institute for Energy Conservation (Eastern Europe office in London) The Ecologist Youth of Romania (Bucharest), the Climate Action Network Central and Eastern Europe (Zagreb), the European Association for the Conservation of Energy (London) and the International Institute for Energy Conservation (London) were consulted on the first version of this project and will be involved in the future, in particular in component 3 under Information Dissemination.

LESSONS LEARNED AND TECHNICAL REVIEWS

17. In October 1994, the Ministry of Industry forwarded its approval of the concept paper based on the draft project brief. This version is a revised and re-worked version of the original draft. During its preparation, consultation meetings have been held with ARCE, RENEL, the Ministry of the Environment, ICEMENERG, TIDCEM, the World Bank, EBRD, the EU/PHARE unit in Bucharest, the Caisse Française de Développement/Fonds Français pour

l'Environnement Mondial and several NGOs. Their views are fully reflected in this new proposal as well as the comments made by the STAP Technical Reviewers in December 1994 and in July 1995.

MONITORING AND EVALUATION:

18. A system of tri-partite reviews will take place according to UNDP rules to which a technical expert will be added. In addition, the first Energy Action Area will be fully evaluated after 18 months by an Independent Group of Technical Experts. The recommendations made by the experts will be communicated immediately and project activities will be adjusted accordingly. A budget line of US\$ 75,000 has been added to the project to compensate for these costs.

SUSTAINABILITY OF PROJECT BENEFITS:

Financial sustainability:

19. Some components of the project will become self-supporting, namely the combustion analysis service and the building of energy management capacity. Energy prices in Romania have been raised to market levels (see Section 12) and so there is considerable financial advantage in organisations implementing energy management and energy conservation investment programmes. The project aims to significantly improve the capacity of Romanian organisations to undertake sustainable energy efficiency programmes, as well as to make a significant direct impact on energy efficiency and hence reduction of GHG emissions. Finally, the most significant of the recent developments for the success of this GEF project is the creation of an Energy Efficiency Tax on (heat and electricity) by the Ministry of Industry. It is expected to provide US\$ 7 million per year for infrastructure investment in energy project, out of which 5% will be available to finance energy efficiency investments. An Ordinance has now been passed which will establish this funding facility in August 1995. This will provide an important additional source of finance for viable energy efficiency projects identified and evaluated through the GEF project activities.

Funding Partners Activities:

20. Bilateral and multilateral donor activities in the field of energy efficiency started in Romania in 1990. Bilateral co-operation with France started in 1990. Discussions between the Bucharest Polytechnic University and the Romanian MoI, together with their counterparts in France, ADEME and Ecole des Mines, led to the creation of ARCE in 1991. USAID started work in Romania in 1991 under its emergency energy saving programme which was applied to several countries in Eastern and Central Europe. The PHARE programme of the European Union has established an Energy Project management Unit within the MoI. This has funded an energy efficiency strategy which made recommendations regarding institutional, regulatory and financing issues as well as a number of energy saving projects in the industrial and building sectors. Another important PHARE project on twinning is foreseen to be implemented during 1995 with the objective of strengthening co-operation between a) executives and officials of the

administration b) energy agencies in the EU and c) energy service companies. The GEF project proposals were discussed with the PHARE Energy PMU at all stages of formulation and close links have been maintained. The PHARE programme has agreed to contribute to 6 components of the overall project, namely components 1, 2, 6, 7, 8 and 9.

21. The European Bank of Reconstruction and Development (EBRD) has carried out a study on the feasibility of creating a financing scheme specially dedicated to financing energy efficiency projects in industry. EBRD is also undertaking work in the district heating sector. Discussions were held with EBRD during the formulation of this GEF project proposal. It is expected that the GEF project will act as catalyst to create a stream of bankable projects that will be of interest to EBRD and other financial institutions.

22. The World Bank is preparing a major programme for the Rehabilitation and Modernisation of the Power Sector. This includes improvements of energy efficiency through the improvement of fuel utilisation in power plants. The GEF project will focus on end use efficiency outside the power plants and so the GEF project is seen as complementary by the Romanian authorities.

23. Following agreement between the Ministry of Finance and the European Investment Bank, a credit line has been established for projects aimed at increasing the competitiveness of Romanian industry. Energy efficiency projects are eligible for support under this credit line. The GEF project will catalyse a stream of projects for possible support under this scheme.

24. Other bilateral co-operation programmes have been undertaken e.g. the Japanese Agency JICA has provided assistance in energy efficiency in the main iron and steel complex, SIDEX.

Incentive and Regulatory System:

25. Romania was the first Central and Eastern European country to designate a specialised institution dedicated to energy conservation. The Romanian Energy Conservation Agency (ARCE) was created in April 1991, under the umbrella of the MoI, with the objective of assisting consumers in their efforts to reduce energy consumption and improve energy efficiency. The main advantage of ARCE is its regional structure with 16 branches.

26. A Law on Energy Efficiency is in the process of passing through parliament. Its principal objective is to give a legal framework to a national energy conservation policy and the strategy produced by ARCE. The Law addresses the following issues: the establishment of an energy efficiency fund, the definition of the duties and responsibilities of the various ministries, consumers and energy industries. Some provisions under this Law will be beneficial to the development of this project such as the institutionalisation of energy efficiency at the national level through the creation of a National Energy Efficiency Council and the strengthening of ARCE in terms of independence, flexibility and expertise;

Stakeholder commitments:

27. A Training Information and Dissemination Centre on Energy Management (TIDCEM) has been established with funding from UNDP and foreign utilities. This Centre is based within the Bucharest Polytechnic University. It is designed to improve the capacity of decision-makers at different levels, making them more sensitive to energy conservation, efficiency and environmental protection. The Project is co-operating closely with the UNESCO Chair in Energy Efficiency and Environment at the Bucharest Polytechnic University. The GEF project is supported by TIDCEM and will use TIDCEM for many training and information activities. This Centre is financed through UNDP with Dutch and recent French co-financing (Project ROM/94/002).

28. The newly created Energy City network: ORASE-ENERGIE will serve as a very important tool for the dissemination in Romania of the approach and project results. More than 40 municipalities have already agreed to take part in this network in which the main objective is to exchange information and experience. Dissemination to other Eastern and Central European countries will be possible through the regional programmes of PHARE and through the Energy Efficiency 2000 programme of the United Nations ECE. Each component of the project is detailed in the following section.

RATIONALE FOR GEF SUPPORT

29. This project is fully consistent with two sections of the "Guidance for Programming GEF Resources in 1995 adopted by the GEF Council in November 1995. Section 16 on Technology Transfer has particular relevance to the components 4, 5, 6, 7 and 8. Components 1, 2 and 3 are particularly relevant for section 20 on Energy Conservation and Energy Efficiency.

30. The GEF contribution requested is \$US 2,268,000. The project funds are primarily devoted to the enhancement of the Governmental effort in favour of energy efficiency with particular emphasis on capacity building to overcome techno-economic and managerial barriers and creating self-supporting activities. The project will create greater energy efficiency and facilitate measurable reductions of GHG emissions. The project is a national priority within the context of restructuring and privatisation of the industrial sector. The institutional and technological assistance provided by the project will be an important step toward creating an attractive climate for future investments in the Romanian economy. The project itself will lead to investment in energy efficiency projects by other institutions.

31. A similar investment for global benefits cannot be justified in the current economic context by the Government of Romania. Through the GEF funding, combined with the Governmental and other donors involvement, Romania will benefit from lower energy intensity, improved environment - including bringing a substantial contribution to the implementation of the FCCC -and a more productive and competitive industrial sector. The proposed project also meets the following development criteria, in addition to falling within the global environmental protection priority area. The GEF project:

- contributes to human welfare through sustainable development
- is innovative and internationally replicable
- is financially sustainable after initial GEF support with involvement of local financial institutions, international financial institutions and other donors
- gives a new dynamic and environmental dimension to the on-going Romanian schemes
- develops institutional capability and trains personnel
- has a firm scientific and technical basis
- fits within the context of existing national and regional programmes
- involves local participation and collaboration
- includes studies that will lead to a better understanding of energy use patterns in Romania
- will have quantifiable result within the project timetable

INCREMENTAL COSTS

32. In the absence of GEF support, ARCE's programme would continue much as it has over the past three years. ARCE would not support the kind of capacity building activity outlined above in the absence of GEF funding. The wide spread dissemination of practical energy efficiency information would diffuse Romania energy users at a much slower rate without these activities. However, ARCE would continue to operate and energy savings could be assumed to occur, albeit at a slower rate than over the past three years when the most productive efficiency investments were made. These activities are assigned no quantitative figures, and are briefly described here. But, the transition to these "horizontal" activities, which are considered critical to the commercialization of energy efficiency in Romania would not be financed by the Romanian Government acting alone. Disseminating these techniques throughout the economy, would occur only very slowly. All the components are to be carried out in one Energy Action Area so that they can interact synergistically, eg general information campaign (component 3) will also contribute to raising the understanding and likelihood of effective action of energy management of senior managers, the issue being addressed by Component 1. (See Annex 4).

ISSUES, ACTIONS AND RISKS

33. The MoF aims to ensure that end-use prices are close to reference market prices at official exchange rates. In April 1992, energy prices were raised to the reference market levels. Energy prices are calculated according to the interbank exchange rate. Consumers subsidies were eliminated in mid 1993, as scheduled under agreement with the IMF and World Bank. The exception is heating for the residential sector where a small subsidy remains. Current energy prices for industrial consumers are US\$ 80/toe for natural gas and US\$ 0.065/kWh for electricity, remaining slightly below the average for OECD countries. Further increases are expected in 1995.

34. A Law for Electric and Heat Energy Use is in preparation with the main objective being to regulate this sector. It should include the establishment of a regulatory body in charge of pricing, regulating relationships between RENEL, the State and potential new independent

producers, as well as the development of programmes such as Demand Side Management. Other specific laws are in preparation for the oil and mining sectors. These legislative acts, including the Energy Efficiency Law, together with other new regulations on thermal efficiency of buildings, energy efficiency standards and norms, and energy metering, should result in a coherent framework policy.

35. One major risk which was confirmed to the UNDP team in early March by the Ministry of Energy, is that due to the slow Parliamentary process, it may take several months before these drafts laws are adopted. However, as mentioned under the chapter "Sustainability", the Ordinance which will enter into force during the summer of 1995 will provide a strong incentive at an earlier stage.

PROJECT FINANCING AND BUDGET

36. The indicative total cost of the project is US\$ 6,368,000. The contributions of the Government of Romania and Donors are estimated at US\$ 1,160,000 and US\$ 1,850,000 respectively. The Government of Romania will allocate US\$ 1,050,000 in direct support (\$200,000 for combustion efficiency service), \$400,000 for industrial heat recovery, \$350,000 for electric motor controls, \$100,000 for energy efficient municipal lighting and \$200,000 for modernisation of district heating systems and \$110,000 in kind. Parallel financing and cost-sharing from the PHARE programme has been assumed in budgeting the proposed programme and commitments on these contributions have already been obtained. In addition, a commitment of US\$ 200,000 from RENEL has been obtained for investment in energy efficient municipal lighting.

37. Building energy management capacity will lead to preparation of projects for financing by outside sources such as EBRD which is also fully supportive of this project.

Annex 1:**INDICATIVE BUDGET - CONTRIBUTIONS GEF, ROMANIA AND OTHER DONORS**

Component Task	GEF	Romania	Cost-Sharing		Parallel Financing		Total
			PHARE	RENEL	PHARE	FRENCH*	
1. Improving energy management capacity	320				100		420
2. Capacity development of local energy strategies					350		350
3. General training and information dissemination	400						400
4. Combustion efficiency service	60	200					260
5. Heat recovery in industry	280	400					680
6. Electric motor controls	150	200	500				850
7. Energy efficient municipal lighting	100		350	200			650
8. Modernisation of district heating systems and building insulation	130	250			150	1,000	1,530
9. Project management and coordination	585		400				985
Monitoring and Evaluation	75						75
Support, administrative costs	168	110					278
GRAND TOTAL	2,268	1,160	1,250	200	600	1,000	6,478

Figures are in US\$ 000s

Figures represent budgetary totals for the entire 5-year period

Figure of \$110,000 for GoR contribution is in kind

Support and administrative costs from the Romanian side are in kind contribution

* This allocation has been authorized by the FFEM Steering Committee. The Steering Committee has proposed that priority be given to Component 8. However, a final decision on fund allocation will take place in September.

Annex 1 cont'd:

INDICATIVE BUDGET - CONTRIBUTIONS GEF ROMANIA, OTHER DONORS AND ONGOING ACTIVITIES

COMPONENT TASK	GEF	Romania	Cost Sharing		Parallel Financing		Total 1 (GEF Project)			Ongoing activities in the energy sector related to this project			Total 2 (Ongoing activities)	Overall Total (1 + 2)
			PHARE	RENEL	PHARE	FRENCH*	PHARE	USAID	EBRD	PHARE	USAID	EBRD		
1. Improving Energy Management Capacity	320				100		420	185			300	485	905	
2. Capacity Development of Local Energy Strategies					350		350						350	
3. General training and information dissemination	400						400	185				185	585	
4. Combustion efficiency service	60	200					260	90				90	350	
5. Heat recovery in industry	280	400					680	90				90	770	
6. Electric motor controls	150	200	500				850		200			200	1,050	
7. Energy efficient municipal lighting	100		350	200			650		50			50	700	
8. Modernisation of district heating systems & buildings insulation	130	250			150	1,000	1,530	280		400		680	2,210	
9. Project management and coordination	585		400				985						985	
Monitoring and evaluation	75						75						75	
Support, administrative costs	168	110					278						278	
GRAND TOTAL	2,268	1,160	1,250	200	600	1,000	6,478	830	250	700	1,780	8,258		

Figures are in US Dollars

Figures represent budgetary totals for the entire 5-year period.

Support and administrative costs from the Romanian side are in-kind contribution.

* This allocation has been authorized by the FEM Steering Committee. The Steering Committee has proposed that priority be given to Component 8. However, a final decision on fund allocation will take place in September.

ANNEX 3:**COMMENTS ON THE GEF PROJECT "ROMANIA -- CAPACITY BUILDING FOR GHG EMISSION REDUCTION THROUGH ENERGY EFFICIENCY"**

July 28, 1995

This is a highly relevant project to greenhouse gas emissions reduction and the mission of the GEF. Increasing energy efficiency is a key strategy for reducing carbon emissions as well as revitalizing the economies of former communist nations such as Romania. The objectives of this project, namely to increase energy efficiency on a wide scale and build institutional capability for supporting energy efficiency improvements, are sound. The project appears to be well-designed. And the political, economic, and institutional conditions in Romania (e.g., energy price and legislative developments) suggest that the project should be successful. I strongly recommend GEF funding for this project.

The approach spelled out in the proposal is clearly defined and appears to be reasonable. The concept of demonstrating energy efficiency improvements in a few buildings and facilities, accompanied by evaluation, training and education campaigns in order to promote replication on a wide scale, should be viable. Capacity building is also emphasized, which is critical. And the creation of a revolving loan fund for financing major investments in energy efficiency (mentioned in section 5) will also be helpful.

I have the following suggestions as to how to possibly increase the effectiveness of individual project components:

In the area of local energy strategies (component 2), it might be useful to link key Romanian cities with the Urban CO₂ Reduction Project of the International Council for Local Environmental Initiatives (ICLEI) based in Toronto. They have formed a network and facilitate information exchanges among cities worldwide (Contact: Phil Jessup - 416/392-1462). Another suggestion is to hold competitions and give out awards to the cities/towns in Romania that achieve the greatest energy savings or implement especially innovative projects.

In the industry demonstration and support areas (components 4-6), the activities could be expanded to include providing direct technical assistance to industries that are in the process of modernizing or simply interested in making minor energy efficiency improvements. This can be done by having experts on staff at ARCE or hiring consultants with expertise in particular areas. Technical experts could make recommendations regarding how to maximize energy efficiency at the time of major renovation or replacement of energy-intensive industrial combustion efficiency, reducing steam leaks, and the like. Direct technical assistance to industries and commercial building owners has

been a successful DSM strategy in the United States and elsewhere.

In the district heating system renovation area (component 8), in addition to conducting a demonstration project and disseminating information, it might be useful to provide technical assistance to local district heating utilities for the purpose of evaluating and designing retrofit projects, as well as providing limited assistance during project implementation (e.g., help with the identification and evaluation of reliable engineering contractors). Also, it might be helpful to link up with other former communist nations where similar district heating system renovation is underway.

Annex 4:**INDICATIVE GEF BUDGET, INCLUDING INCREMENTAL COST SUMMARY**

COMPONENT	Staff Costs	Training Costs	Equipment Costs	Travel Costs	TOTAL COSTS	Transaction Barrier to Implementation	LIKELY INCREMENTAL COSTS	REPLICATION/ DISSEMINATION
1. <u>Improve Energy Management Capacity</u>						Lack of MIS's. Lack of know- how, specially in preparation of project proposals.	Positive.	Consultancy assistance & operational managers available; information and training.
Total Funds needed (Requested from GEF)	250 150	150 150	0 0	20 20	420 (320)			
2. <u>Development of Local Energy Strategy</u>						Lack of local skill & knowledge of Energy and IRP.	Incremental costs unlikely.	Replicable training packages
Total Funds Needed (Requested from GEF)	150 0	150 0	30 0	20 0	350 (0)			
3. <u>General Information Dissemination</u>						Inadequate information & Awareness re Energy Efficiency (rationing)	Positive.	Project officer for dissemination; information campaigns for technical and non technical audience
Total Funds Needed (Requested from GEF)	60 60	300 300	20 20	20 20	400 (400)			
4. <u>Combustion Efficient Service</u>						Lack of skills and modern equipment.	Negative with initial learning costs.	Pre- and post- investments monitoring for results dissemination.
Total Funds Needed (Requested from GEF)	50	50 50	150	10 10	260 (60)			
5. <u>Heat Recovery in Industry</u>						Institutional obstacles; Information and finance gaps.	Negative with initial learning costs.	Information strategy & formulation of financing schemes for replication.
Total Funds Needed (Requested from GEF)	120 120	120 120	400 0	40 40	680 (280)			
6. <u>Electric Motor Controls</u>						Lack of information skills, and financing for VSD's.	Negative with initial learning costs.	Information strategy & formulation of financing schemes for replication.
Total Funds Needed (Requested from GEF)	260 40	160 90	390 0	40 20	850 (150)			

COMPONENT	Staff Costs	Training Costs	Equipment Costs	Travel Costs	TOTAL COSTS	Transaction Barrier to Implementation	LIKELY INCREMENTAL COSTS	REPLICATION/ DISSEMINATION
<u>7. Efficient Municipal Lighting</u> Total Funds Needed (Requested from GEF)	150 30	100 50	350 0	50 20	650 (100)	Lack of local demonstration and financial schemes.	Negative with financial and demonstration needs.	Information strategy & formulation of financing schemes for replication.
<u>8. District Heating/Buildings</u> Total Funds Needed (Requested from GEF)	150 0	330 130	1,000 0	50 0	1,530 (130)	No skills for rehabilitation; no local demonstration.	Negative with initial learning costs.	Dissemination of project results/design of similar projects.
<u>9. Project Management and Coordination</u> Total Funds Needed (Requested from GEF)	925 525	0 0	30 30	30 30	985 (585)	Lack of project management capabilities.	Positive	Highly skilled staff to assess replication potential/select technology/host sites/put forward case for internal & external funding.
Monitoring				0	(75)			
Support Costs (@ 8% of GEF Contribution)				0	(168)			
TOTAL PROJECT BUDGET					6,368			
TOTAL GEF REQUEST					2,268			

Figures are in US\$ 000s

Figures represent budgetary totals for the entire 5-year period

Annex 5:

The potential sites to establish Energy Action Area are: part of Bucharest, Ploiesti, Targe Mures County, Hunedoara County and Baia Mare. All of these areas cover industrial and residential sectors. Sites have been ranked according to population (with about 500 to 700,000 inhabitants considered ideal), the range of industrial sectors, the likely environmental impact from energy saving measures (higher in coal fired areas) and the degree of support from the Council and the RADET (heating company). This approach has been combined with discussions with ARCE to select Targe-Mures and Hunedoara County as suitable sites for the first Energy Action Area. This information relates to counties. In each county approximately 50% of the population, industry and local budget is concentrated in the main city, named in brackets. 1992 information is quoted as more recent information is not available.

Targu Mures County (Targu Mures)

Area: 6714 sq. km.

Population: 610,053

Energy & mineral resources: natural gas, oil, mineral water, clay.

Industry : 1992 GDP \$US565M

Main industries:

- . gas exploitation
- . chemicals
- . building materials
- . wood processing
- . glass
- . food processing

Local budget: \$US17.8 in 1992.

Bucharest City

Area: 1821 sq. km.

Population: 2,343,105

Energy & mineral resources: geothermal water

Industry: 1992 GDP \$US2770M

Main industries:

- . machine building
- . metallurgy
- . glass
- . electronics
- . electric motors
- . chemicals (drugs, tires, dyes)
- . food processing

. textiles

Local budget: \$US143 in 1992

NB: A section of Bucharest only would be chosen as an Energy Action Area.

Hunedoara County (The Jiu Valley and Deva)

Area: 701,601 sq. km.

Population: 549,432

Energy & mineral resources: coal (hard, brown), ferrous minerals

Industry: 1992 GDP \$US549M

Main industries:

- . coal mining
- . steel
- . cement
- . textiles
- . electricity generation

Local budget: 1992 \$US12

Mara Mures Country (Baia Maria)

Area: 6,304 sq. km.

Population: 540,099

Energy & mineral resources: non-ferrous minerals

Industry: 1992 GDP \$US318M

Main industries:

- . mineral exploitation
- . non-ferrous metallurgy
- . wood processing
- . textiles

Local budget: 1992 \$US17

Ploesti County (Ploesti)

Area: 4,716 sq. km.

Population: 525,715

Energy & mineral resources: natural gas, oil, lignite, minerals

Industry; 1992 GDP \$US2,016M

Main industries:

- . oil processing
- . drilling equipment
- . building materials
- . paper and board

- . glass
- . food
- . textiles

Local budget: \$US23M

Criteria for selection:

	POINT	NOTES
	< 400 or >700,000=1	optimum
Spread of industry	1 for each sector	
Environmental impact	1-3	3 for coal fired areas
Cooperation	3-5	5 highest co-operation

AREA	POPULATION	INDUSTRY	ENVIRONMENT	CO-OPERATION	TOTAL
Targu Mures	3	6	2	5	16
Bucharest	1	8	2	3	14
Hunedoara	3	4	3	5	15
Ploesti	1	7	2	3	13
Mare Mures	3	4	2	3	12

Recommendations:

Targu Mures and Hunedoara Counties were visited in the last two months as part of an EU mission. The best choice could be Targu Mures on the grounds of:

- well organised RADET
- well organised Council
- close links between the two bodies (not true in other cases)
- reasonable infra-structure
- Hunedoara county is very reliant on the extractive industries, notably coal. This is good in the sense that any energy efficiency improvements will lead to a proportionately larger reduction in carbon dioxide emissions, but it may mean that there are fewer industrial energy saving opportunities, and hence it may be less effective as a demonstration project.

Conditions under which the fewer selection of Hunedoara County would be preferable include the cooperation of the Council on each component, and not only the project of Deva (rehabilitation of district heating). The latter should be re-evaluated in comparison to lower

cost options and possible decentralisation with local boilers (possibly using oil or coal in Atmospheric Fluidised Bed Units). Iunedoara could be considered as a prime candidate as second Energy Action Area.