



# Heating in Transition

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# Foreword

Heating in Transition is the third in the 'Lessons for the Future/Monitoring and Evaluation Report Series'.<sup>1</sup> It presents the results of analytical work carried out in the transition economies of Europe and the Commonwealth of Independent States (CIS) through the Global Environment Facility (GEF) portfolio of the United Nations Development Programme (UNDP). The purpose of the series is to disseminate findings of studies based on experiences gained from UNDP-GEF's own projects and programmes, or from activities of our partners and other concerned organizations working in areas relevant to GEF operations. The publications have various objectives and target groups. First and foremost, it is our intention to make available lessons and good practices from past and ongoing operations to projects proponents, designers and implementers, the executing agencies of UNDP-GEF projects and UNDP staff. Second, the monitoring and evaluation series is aimed at highlighting key issues and results related to UNDP-GEF work for our principal constituencies, including the GEF Council and global environmental conventions. Finally, we hope that the publications will serve to spread the word of our work to other interested parties, including academic and research institutions, non-governmental organizations and civil society, and the public at large. The reports are published at irregular intervals when relevant materials and studies are completed and become available.

The third issue of this series focuses on heating. UNDP now has more than ten years' experience in developing and implementing projects that provide heat and often hot water (referred to as 'heating projects' in this report) to people in cold climates.

After more than a decade of activity in the transition economies of Europe and the CIS, there is a need to assess the performance of the portfolio. Because many of the projects are still in the early stages of implementation, successful techniques can still be used to improve ongoing projects.

Furthermore, heat remains a critical human security issue in the region, and efficient heating can bring environmental, economic and social benefits to local communities. Co-authors Susan Legro and Grant Ballard-Tremeer have designed this report to make lessons learned in the process available to governments and other donors, and to provide some thoughts about future activity in the region given the huge changes and ever-widening differences among countries in the region.

Particular issues in the study focus on the evolution of the barrier removal model for service delivery, emerging trends in project financing and management issues relevant to heating projects. The analysis refers primarily to the 20 heating projects in the UNDP-GEF portfolio and pipeline (14 in energy efficiency and six in renewable energy), although it also refers to other projects implemented by UNDP to support key findings.

This report springs from formal and informal stocktaking activities in the area of heating by UNDP-GEF over the past several years. These include a UNDP-GEF sponsored workshop, 'Heating and Hot Water Portfolio of the UNDP/GEF: Strategic Directions', held in Prague, Czech Republic, in February 2004. Representatives of 11 heat sector projects in the Eurasia region presented their findings, lessons learned and best practices. The participants also discussed the future of the heat sector portfolio with UNDP/GEF regional and global staff. The report also draws upon ongoing discussions with project personnel and UNDP country office staff and other key sectoral meetings. These include the February 2004 regional conference on district heating policy organized by the International Energy Agency (IEA), and work conducted by consultants to assess the UNDP-GEF portfolio of projects in the heat sector and compare them with similar projects outside of the UNDP portfolio.

Financial support for the 2004 workshop, the external study and this publication came from UNDP's Global Cooperation Framework, through the Sustainable Energy Programme of the UNDP Energy and Environment Group, as well as from UNDP-GEF. We gratefully acknowledge this support.

In addition, we would like to thank the 2004 workshop speakers and participants. Finally, special thanks go to the following reviewers, who provided numerous insights and helpful comments: Angela Morin Allen, Geordie Colville, Vladimir Litvak, Valya Peeva and Vesa Rutanen.

Your comments on the report, and on the 'Lessons for the Future/Monitoring & Evaluation Report Series' in general, will be most appreciated.



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Marcel Alers

<sup>1</sup> The first report, published in November 2003, was *Conserving Forest Biodiversity: Threat, Solutions and Experiences*. The second report, published in May 2004, was *Solar Photovoltaics in Africa: Experiences with Financing and Delivery Models*.

# List of Abbreviations

<b>CO<sub>2</sub></b>	Carbon dioxide
<b>EBRD</b>	European Bank for Reconstruction and Development
<b>ESCO</b>	Energy Service Company
<b>EU</b>	European Union
<b>GDP</b>	Gross domestic product
<b>GEF</b>	Global Environment Facility
<b>IBRD</b>	International Bank for Reconstruction and Development
<b>IEA</b>	International Energy Agency
<b>IFC</b>	International Finance Corporation
<b>M&amp;E</b>	Monitoring and Evaluation
<b>NGO</b>	Non-governmental organization
<b>NO<sub>x</sub></b>	Nitrous oxide
<b>ODA</b>	Official Development Assistance
<b>PDF</b>	Project Development Facility
<b>PHARE</b>	Poland and Hungary: Assistance for the Reconstruction of the Economy
<b>PPF</b>	Project Preparation Fund
<b>RBEC</b>	Regional Bureau for Europe and the CIS
<b>SAVE</b>	A multi-year programme for the promotion of energy efficiency in the European Community administered through the Directorate General for Transport and Energy. SAVE II encompasses activities during the 1998-2002 period.
<b>SO<sub>2</sub></b>	Sulphur dioxide
<b>SPPD</b>	Support for Policy and Programme Development
<b>UNDP</b>	United Nations Development Programme
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>UNOPS</b>	United Nations Office for Project Services

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# Executive Summary

## INTRODUCTION

**T**he 20 heating sector projects discussed in this report are located in a region with long, cold winters. Though the challenges of heating in the transition economies of Europe and the Commonwealth of Independent States (CIS) are vastly different from those of most developing countries, heating is still a key development issue. For some, it can also be matter of life and death.

At the most basic level, heating projects that improve end-use energy efficiency can dramatically increase comfort and health for people in their homes, in schools, in hospitals and in other buildings. But the benefits can also include a broader range of social, environmental and economic issues. In addition to reducing pollution levels and greenhouse gas emissions, such projects can create new jobs and reduce the need for energy imports, freeing up funds for urgently needed social programmes.

Some of the wide-ranging benefits of energy-saving projects can be seen in the UNDP-GEF heating projects discussed in this report:

- Nearly 70 percent of Bulgarian municipalities are now reached by the EcoEnergy network, which is providing expertise on designing and carrying out municipal energy-saving projects. Participating municipalities have already funded and completed a number of energy-efficient heating projects.
- Three cities in the Czech Republic are building low-cost, energy-efficient housing for their citizens. Architects trained through the project are now using their skills to design efficient single-family homes as well.
- Residents in the Russian city of Vladimir who received little or no heat during the winter are now warm and comfortable thanks to new building-level boilers.
- Air pollution will be reduced around schools in north-west Slovakia as they convert their boilers from dirty-burning coal to modern biomass. The construction of a new biomass pellet plant will also create jobs in a region with the highest unemployment in the country.

The key challenge for development assistance in the heating sector is to determine the point at which reforms

are viable. Good training can overcome significant barriers, such as the shortage of capital and creditworthiness, as long as a clear client and a market for heating services are present.

## Types of Interventions

The work of UNDP-GEF in the heating sector in the early 1990s took a 'pilot' approach in which demonstration projects were expected to lead to replication. In the mid-1990s, the GEF introduced the 'barrier removal' approach to project design, against the backdrop of growing divergence in the pace of political reforms and economic restructuring in the region. The GEF has now shifted to a system of strategic priorities and project development that will highlight market transformation, in the face of even more extreme differences in the economic status of countries in the region.

Policy interventions in UNDP-GEF heating projects have tended to focus directly on heat (and/or biomass) legislation, since project personnel found it difficult to influence high-level fiscal policies with an impact on the heating sector. Education and outreach activities that focus on key municipal officials appear to be very effective in terms of the investment and satisfaction that results. Trends in interventions include capacity-development, the establishment of networks, working with municipalities as partners, and cultivating partners in 'social' ministries.

## Financing Mechanisms

Real and perceived risk and low project profitability have meant that countries in the region require a combination of traditional commercial financing approaches and targeted policy measures to overcome financing barriers for heating projects. Commercial sources include equity, performance contracting, debt financing, lease financing and carbon financing.

Among non-commercial sources of financing, Official Development Assistance (ODA) has been a significant form of co-financing for UNDP-GEF projects. Other possible non-commercial sources identified include: research, development and demonstration support; investment subsidies, such as risk guarantees and loans; production tax credits for renewable energy producers;

feed-in tariffs; bidding (or tendering) procedures; and a quota system based on a renewable portfolio standard.

### Management Issues

- Potential partner programmes for 'mainstreaming' GEF concepts include rural development and post-conflict programmes, the Public-Private Partnerships for Urban Environment programme, and the Energy and Environment Thematic Trust Fund.
- There appears to be a correlation between project success and the capacity and support of the UNDP country office.
- Adequate support for monitoring and evaluation should be included in UNDP-GEF projects, with successful approaches and data shared across projects.
- It is difficult to draw conclusions about the correlation between levels of co-financing and project replication or sustainability in the portfolio.
- Capacity development measures for project experts and project trainees have become an important phenomenon in the portfolio over time.

### Conclusion

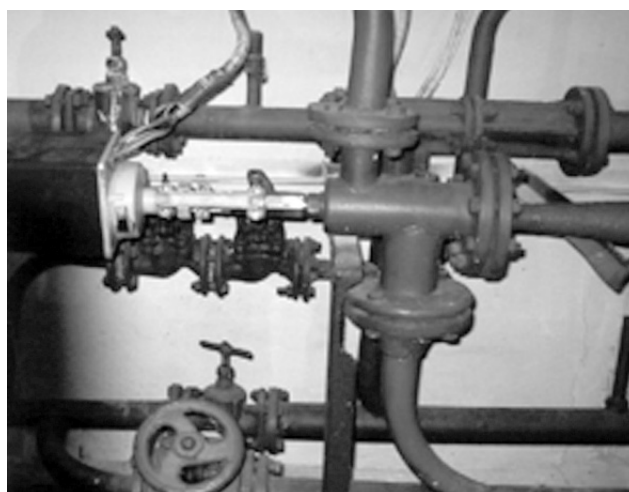
The pivotal role of heat in economic development, environmental quality and human security in the transition economies of Europe and the CIS argues for a strong role for heating projects at UNDP and within new GEF priorities. Future 'best practice' heating projects should

be treated as human security initiatives within UNDP that can produce substantial benefits for the environment, economic development and governance, while improving standards of living. They would involve efficiency in supply and end-use (district heating, building efficiency) or efficiency combined with renewable energy (biomass) and would draw upon a master energy plan that evaluated the financial and environmental implications of various strategies. They would focus on building capacity to identify, prioritize, and finance investments in heating rather than developing or promoting a specific financial mechanism. They would also include continued networking across projects in the portfolio to spread successful mechanisms and develop capacity across the region.

The many reforms that the Europe and CIS region have witnessed over the past 15 years have not reduced the need for an affordable and reliable supply of heat. However, they have increased the opportunity to address the issues related to heating projects in new and creative ways and to share these approaches openly.



*Kazakhstan: Smog over Almaty in winter season*



*Typical heat substation with hydroelevator as a heat control at building level.*

# Chapter 1

## INTRODUCTION

UNDP has already marked its tenth year of work in Europe and the Commonwealth of Independent States (CIS)<sup>2</sup> in the heating sector. The portfolio consists of 20 heating sector projects under development and implementation, co-financed by the Global Environment Facility (GEF) (see Annex 2 for a complete list of projects). These projects cover a broad range of areas, including heat supply (efficiency and renewable sources), distribution (upgrading of district heating networks and improved balance between heat networks and building-level heating), and use (improved thermal performance of buildings, metering and control) for both heat and hot water. As a portfolio, they form an important part of UNDP's work in economies in transition, representing a total of more than \$30 million in GEF funds, and leveraging well over \$100 million in local co-financing<sup>3</sup>.

The Europe and the CIS region, which is characterized by countries transitioning from centrally planned to market economies, presents significant opportunities for improvements in environmental performance in almost all sectors as well as in social conditions. In general, centrally planned economies sent the wrong signals to consumers and planners. This resulted in decisions that did not reflect the choices that would have been made if the actual costs and competing demands for resources were known. With economic transition came the collapse of highly centralized and inefficient production and distribution networks, with long time lags in reallocating resources to more efficient uses in a decentralized market system. Standards of living registered a catastrophic drop

Reliable and affordable heating - in the home, at work and in recreational areas - is thus a fundamental need. The Russian Federation, for example, which is the world's largest country in terms of area, is characterized by a consistently cold climate with mean annual temperatures of less than 5° Centigrade across most of the country. This severe climate necessitates special requirements regarding the energy resource costs for heating and creating acceptable living conditions. Central heating is thus a major factor in the Russian Federation's energy balance, and the heating supply market represents almost \$30 billion in sales, making it one of the biggest national markets (Bashmakov, 2004). The financial flows into the heating systems around Europe and the CIS are enormous. The heating sector has become not only a burden to end-users and to governments, but also a challenge to policies promoting privatization and market reforms.

Improving the efficiency of heating - both through large, centralized district heating systems and decentralized boilers on the supply side, and through more efficient buildings on the demand side - is a domain that fits well within the GEF mandate to reduce greenhouse gas emissions. National governments consistently identify this sector as a prime source of opportunities for reducing greenhouse gas emissions. Energy efficiency improvements also contribute to the Millennium Development Goals for human security and sustainable development.

At the broadest level, the environmental sustainability of heating projects - based on energy efficiency, renewable energy or a combination of both - supports Millennium

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