

UN Economic Commission for Europe

Energy Efficiency Demonstration Zone
– Case Study of Bulgaria

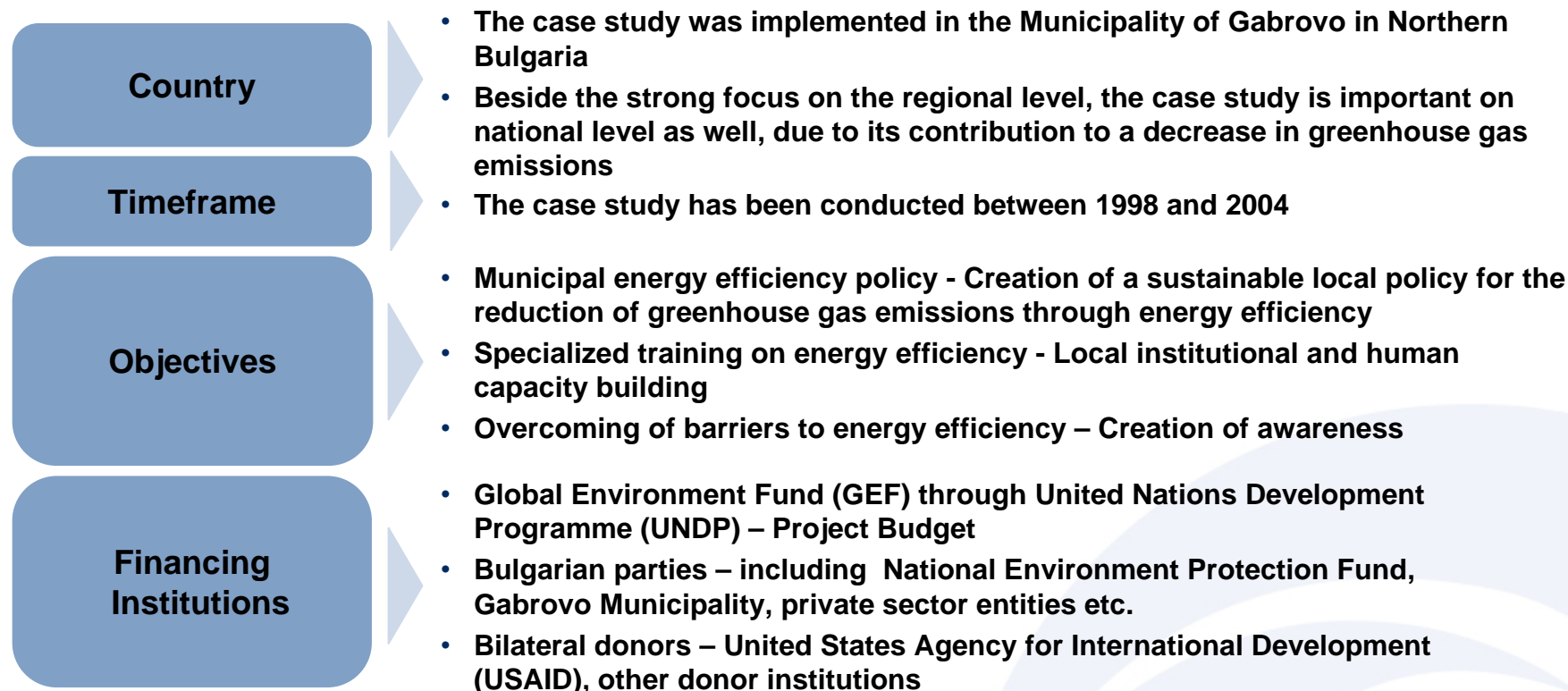
Workshop on Case Studies on overcoming barriers to
investments in energy efficiency and renewable energy
projects through policy reforms

Kiev, November 10.-11., 2009

General description of the case study

The core of the project is institutional capacity building with the aim of development of policies and practices for energy efficiency improvement in Bulgarian municipalities

- The case study aims at introduction and development of policies and practices for energy efficiency improvement and reduction of greenhouse gases in Bulgarian municipalities
- The case study uses demonstration projects in the Municipality of Gabrovo (North-Bulgaria)



Removed barriers to investments in EE and RES

The Case Studies contributes in removing financial barriers and strengthening financial capabilities of municipalities

Kazakhstan

- The Law on Energy Savings of 1997 has not been set into force in Kazakhstan and there is lack of targets or action plans for energy efficiency and the huge availability of natural resources and fossil fuel prevented the relevant stakeholders to develop an awareness regarding energy efficiency
- The concept presented contributes to overcome such barriers, since the knowledge is spread and the awareness is increased by widely accepted trainers rather than official representatives of the government.

The former Yugoslav Republic of Macedonia

- The build-up of capacities and awareness regarding energy efficiency measures and energy efficiency projects is necessary in all sectors in the former Yugoslav Republic of Macedonia
- Therefore an implementation of the concepts presented is recommended but should be accompanied by measures to shorten the timeframe of the implementation to avoid the transition between election phases, which in the past has led to political instability

Ukraine

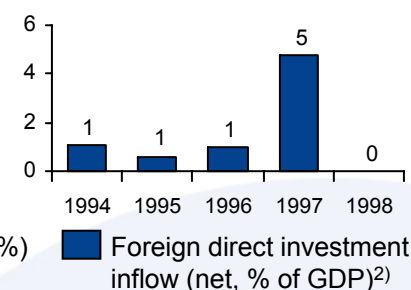
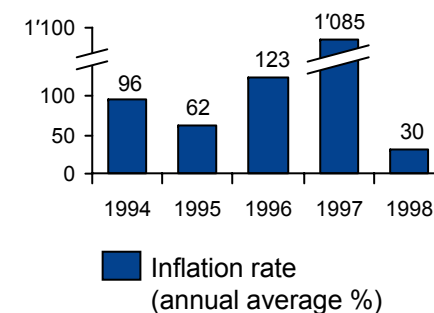
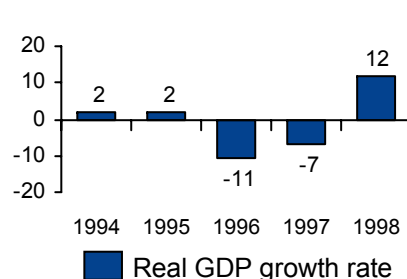
- In Ukraine the access to credit resources is difficult due to banks' reluctance to provide loans for investments with a payback period of over one to three years
- Ukraine is facing a lack of awareness and of human capacities in terms of technical capabilities and professional skills
- When implementing such a project, it is recommended to put special emphasis on the transfer of financial knowledge and include as many representatives of the national banking sectors as possible in the project to increase awareness on the business opportunities in energy efficiency measures in the national finance sector

Background to the case study

Due to a severe economic crisis before 1998, Bulgaria's municipalities experienced high barriers for any kind of energy efficiency improvements

- The implementation of the Case Study started in 1998, immediately after a severe economic crisis in Bulgaria
- In this period, municipalities experienced the following issues: shortage of adequate experience and skills, financial restrictions with respect to investments, absence of mechanisms for an exchange of information
- Energy efficiency structures and specific regulatory framework were missing.
- One of the main reasons why existing energy efficiency potentials in the Bulgarian municipalities could not be realized was the lack of trained experts in the field of energy efficiency
- Furthermore, there were no methodological guidelines or guides in Bulgarian language on how to develop energy efficiency projects and programmes
- Another significant barrier was the absence of knowledge regarding financing mechanism and funding for such projects.

Main economic trends in Bulgaria 1994-1998¹⁾



1) Source: Bulgaria Progress Report 1998; 2) No figures available for 1998

Key players involved in the implementation of the case study

The implementation involved the Municipality of Gabrovo, international programmes (UNDP), and national associations (EnEffect, EcoEnergy)

Key Player	Description	Role
Gabrovo	The Municipality of Gabrovo	Main project partner and host of the project
UNDP	The Representative Office of the United Nations Development Programme (UNDP) in Sofia	Executive agency authorized by the Executive Office of the Global Environment Facility (GEF), performing governing and control on project implementation and quality control
EnEffect	The Center for Energy Efficiency	Responsible for practical implementation of the project, the organisational part of the project implementation is based on UNDP rules and procedures, providing personnel as trainers
EcoEnergy	Municipal Energy Efficiency Network	Distribution of the project results, in the beginning of 2004 EcoEnergy comprised 54 municipalities and 6 regional associations of municipalities and was therefore able to reach 68% of the population, providing personnel as trainers
Steering Committee	Representatives of the main financing institutions, governmental bodies, local authorities, and international organizations	Responsible for the project coordination during the implementation of the project

Approach for case study implementation

Between 1998 and 2004 three partly overlapping project phases were carried out, resulting in the build up of capacity in the participating municipalities and the setup of distinct demonstration projects in Gabrovo

Phases	Phase 1	Phase 2	Phase 3
Timescale	1998-1999	1999-2003	until 2004
Milestones	Definition of certified teams of trainers	Trained municipal officials and specialists	Implementation of demonstrations in Gabrovo
Responsible Key Player	<ul style="list-style-type: none"> • UNDP • EcoEnergy / EnEffect-members 	<ul style="list-style-type: none"> • EcoEnergy / EnEffect-trainers • Senior municipal officials and experts from 39 EcoEnergy member municipalities 	The Municipality of Gabrovo
Results	<ul style="list-style-type: none"> • 24 trainers on energy planning and management have been awarded international certificates issued by the UNDP • The UNDP-Team was composed of experts from the Netherlands Agency on Energy and Environment (Novem) 	<ul style="list-style-type: none"> • The 24 trainers educated during Phase 1 conducted 5 training courses of 6-8 months duration • Participants of the training courses were 124 senior municipal officials • The training courses imparted the following knowledge <ul style="list-style-type: none"> • Development of municipal energy programmes • Identification of investment projects • Energy expertise and how to conduct energy audits • Project financing and development of bankable project proposals • An investment guide for municipal decision-makers 	<ul style="list-style-type: none"> • Demonstration projects for energy efficiency were setup in buildings in Gabrovo • Energy efficiency measures were implemented for <ul style="list-style-type: none"> • street lighting • district heating system • hospital building
End result	Capacity regarding energy efficiency projects built / Demonstration projects setup		

Impact of case study implementation

The most important impact beside the financial savings is the human and institutional capacity building for energy efficiency improvements

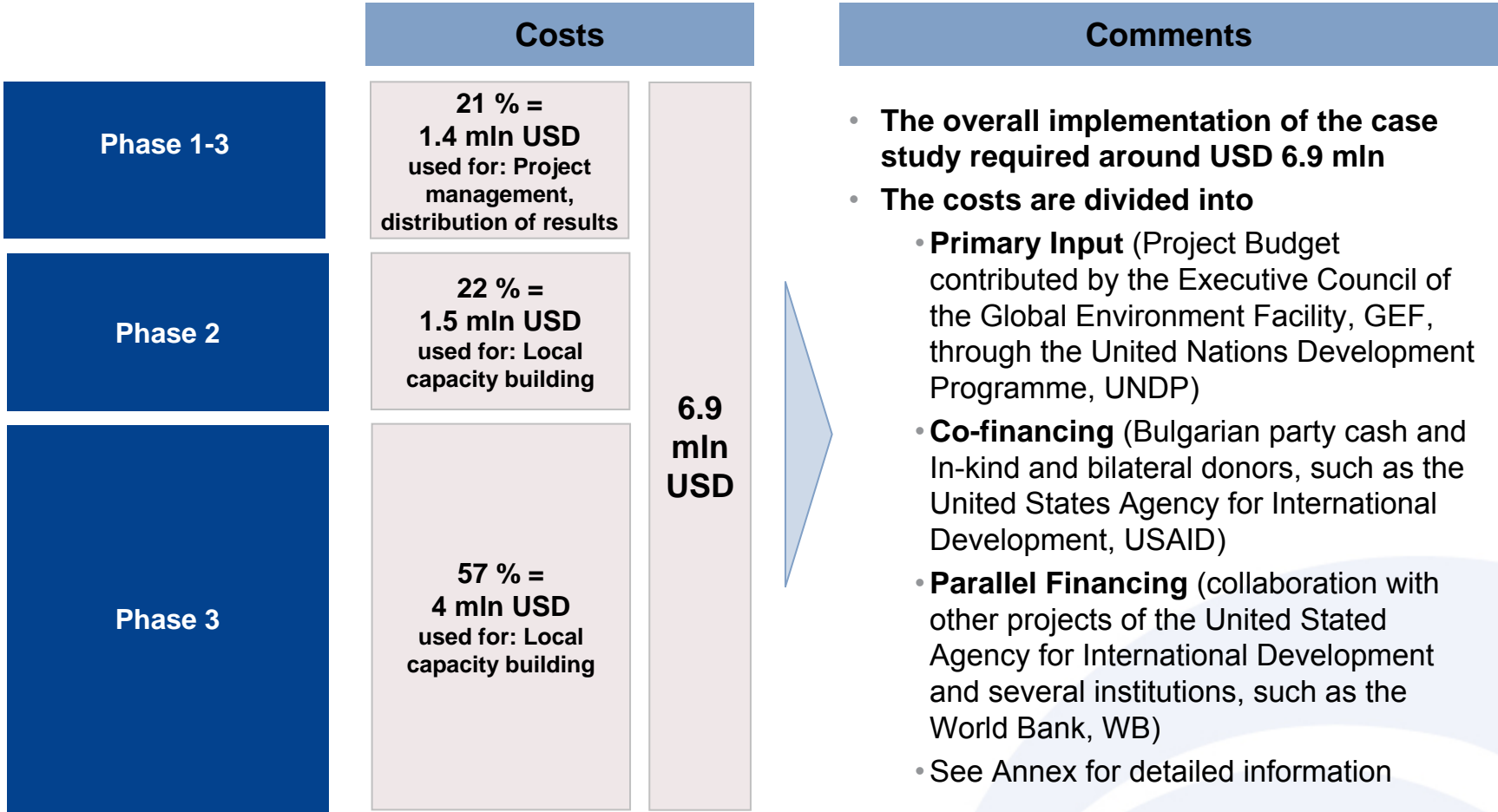
Economical Impact	Environmental Impact	Social impact
<ul style="list-style-type: none">• Significant cost savings through realization of energy savings in Gabrovo (demonstration projects)• For the city of Gabrovo, a net annual cost saving of USD 99'000 was reported• See Annex for a more detailed breakdown of net annual cost savings	<ul style="list-style-type: none">• Significant savings in energy consumption through the demonstration projects in Gabrovo• A significant reduction in the emission of greenhouse gases was reported for the city of Gabrovo (1'445 t of CO₂ emissions per year)	<ul style="list-style-type: none">• The implementation of the project created employment for high-skilled experts and technical personnel from small and medium-size local companies• More than 1'300 man/months of employment for high-skilled personnel directly employed by the Project Executing Agency have been

Overall impact

- The implementation of the case study had an impact at municipal level, experts from 39 EcoEnergy member municipalities received specialized training
- Since the according municipalities are widespread and cover 60% of Bulgaria, the indirect impact of the Case Study is on a national level
- Local human and institutional capacity building for energy efficiency improvements constitute the key impact of the case study
- The impressive educational effect in so far that it shapes a new type of behaviour with respect to energy use. This is particularly true when schools, kindergartens and residential buildings are taken into account.

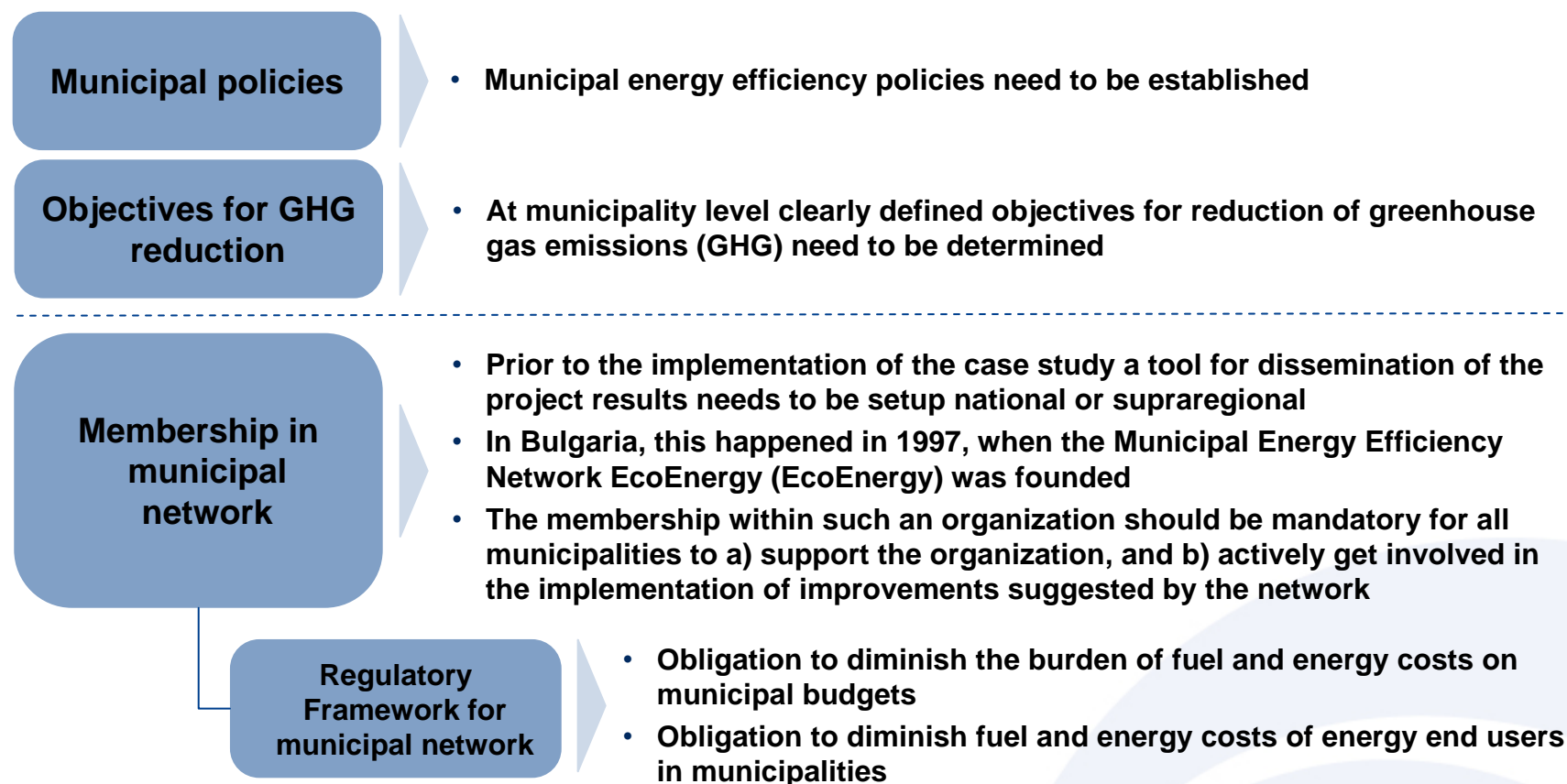
Costs of case study implementation

For implementation of the case study 6.9 mln USD were required, the major part has been used for the local capacity building



Regulatory preconditions

Energy efficiency policies, GHG objectives, and a membership in a supra-regional municipal network should be defined within a regulatory framework for the municipalities



Critical success factors

A proper knowledge transfer and the support of municipalities' decision-makers appear to be the most important success factors

	<i>Description</i>	<i>Comment</i>
Knowledge transfer	Choice of well experienced team of trainers is of high relevancy, since they forward and transfer the knowledge to the municipalities	Trainers need to have background knowledge and be able to properly communicate to support the knowledge transfer
Decision-makers	<ul style="list-style-type: none"> • Awareness of decision-makers regarding the potential of energy efficiency projects (possibly gained by membership in an organization like the Municipal Energy Efficiency Network EcoEnergy, EcoEnergy) • Ensuring the support of the management bodies of concerned municipalities by consulting them rather than imposing distinct measures without their consent 	<p>Energy efficiency improvements and implementation of according projects need to be placed on top of decision maker's agendas</p> <p>Political resistance of management bodies should be avoided by consulting municipalities whenever possible</p>
Industry involvement	Do not hesitate to involve utilities in workshops / seminars, close collaboration with energy utilities, energy agencies etc. helps to transfer theoretical knowledge into practice	Utilizing the experience of utilities can be very helpful for definition of distinct projects
New approach	Pioneering new approaches to energy efficiency in municipalities should have priority on the agenda	New approaches should be preferred, since they allow a gradual accumulation of project experience and capacity buildup

Knowledge transfer within and between municipalities will ensure efficient capacity building and enhanced development rate of bankable project proposals

Risks

Main risks to the successful implementation lie within the long duration of training courses, the transfer of knowledge, and the proper choice of demonstration projects

Risk factors	Risks	Possible effects	Comments / Recommendations
Training duration	<ul style="list-style-type: none"> The timeperiod needed for training sessions might be too long for people to attend Political changes happening during the timeperiod needed for training sessions 	<ul style="list-style-type: none"> Knowledge transfer is incomplete Change of decision-makers within municipalities and discontinuation of support 	<ul style="list-style-type: none"> Split the training courses into different topics, which will be held in subsequent years Make the energy efficiency improvements a general obligation to any decision-maker within the municipality
Capacity building process	<ul style="list-style-type: none"> Capacity building is limited to certain geographic areas or regions Knowledge is not used or transferred into projects due to heavy workload of participants 	<ul style="list-style-type: none"> Knowledge is limited to privileged municipalities Knowledge is lost because it is not applied in due time 	<ul style="list-style-type: none"> Make the knowledge exchange and the participation of municipalities from each region mandatory for financing the project Make the application in at least 1 demonstration project an obligation
Choice of demonstration projects	<ul style="list-style-type: none"> Increased competition might lead to cannibalising of projects or project financing between municipalities Incorrect basis of decisions regarding projects leads to the choice of inappropriate demonstration projects 	<ul style="list-style-type: none"> Projects are not properly implemented due to incomplete financing Demonstration projects are not representative or do not help to improve energy efficiency 	<ul style="list-style-type: none"> Limit the number of parallel projects and setup a committee for choosing appropriate projects Consult experts from the industry sector before making project decisions

General recommendations for replication

When replicating the case study, it should be kept in mind that capacity building involves human beings and therefore has to be carried out in a flexible way, reacting to different situations and people involved

- A pragmatic approach towards energy efficiency measures should be created by carefully selected trainers
- Since capacity building involves human beings, the trainers for the training session conducted throughout the host country have to be carefully chosen. They should possess a natural feeling for respect and diplomacy in transferring knowledge as well as giving examples for implementation.
- Since the implementation of the case study takes large amounts of resources in terms of financing and time, the political stability in the host country is crucial for an efficient setup and should be considered prior to the implementation

Recommendations for replication: concrete actions

Concrete recommendations for replication include the setup of preconditions, setup of the trainings, and setup of the demonstration projects

	Recommendation
Precondition	1 Build a municipal network with mandatory membership for municipalities
	2 Setup a regulatory framework for municipal network incl. objectives (e.g. diminishing of municipal energy costs, dissemination of knowledge)
	3 Define and establish municipal energy efficiency policies and objectives for reduction of GHG
	4 Organize financing of the case study's implementation (e.g. supported by municipal network and international organizations)
Recommendation for implementation	5 Before the training: Setup a committee to select trainers on energy planning and management
	6 Before the training: Select 20-30 trainers on energy planning from the fields of architecture, engineering, and economy
	7 Before the training: Find experts to „train the trainers“ (e.g. consultants from international organizations), setup training schedules
	8 Held up „train the trainers“ training sessions
	9 Setup training schedules and training agendas for the representatives of the municipalities and prepare training documentation
	10 Select participants for the trainings and convince municipalities to send people, who will later on implement demonstration projects
	11 Invite participants from municipalities to training sessions held by the trainers
	12 After the training: Have participants setup demonstration projects in their municipalities (depending on individual situation)
	13 After the training: Municipal network to monitor and support demonstration projects set up in municipalities
	14 After the training: Municipal network to collect and disseminate data and know-how gathered during setup of demonstration projects

Conclusions

A widespread transfer of project financing knowledge and technical knowledge for energy efficiency measures to municipalities is supported by the concept presented

- **In general the case study presents an approach to overcome the lack of energy efficiency measures in public or institutional facilities, which are mostly related to barriers caused by the lack of knowledge and capacity regarding the practical implementation of energy efficiency measures as well as financing of such projects**
- **By applying the discussed method of train-the-trainers and afterwards conducting several training sessions for a widespread transfer of knowledge the following topics are approached in an efficient and pragmatic way**
 - **Theoretical knowledge is built within the municipalities in scope**
 - **Knowledge about the financing of projects is transferred to the municipalities**
- **By implementation of energy efficiency measures in demonstration projects the theoretical knowledge gained during training sessions is transferred into distinct technical knowledge**
- **Lessons learned from the implementation of the case study are the importance of**
 - **An existing energy efficiency improvement potential (e.g. inefficient street lighting systems)**
 - **The importance of transferring the responsibility for the demonstration projects to the municipalities to get them involved as much as possible**
 - **Local capacity building being a permanent priority for decision makers within municipalities**

Pöyry Energy Consulting

Claudio Waldburger

Managing Director

Phone: +41 (0) 44 288 90 84

Claudio.Waldburger@poyry.com

Dr. Francesca Paoletti

Senior Consultant

Phone: +41 (0) 44 288 90 86

Francesca.Paoletti@poyry.com

Pöyry Energy Consulting (Schweiz) AG

Hardturmstrasse 185

CH-8005 Zurich

Switzerland

The background of the slide features a close-up, artistic photograph of a green plant stem with a small globe of the Earth resting on it. The lighting is dramatic, highlighting the textures of the plant and the globe. At the bottom of the slide, the word "PÖYRY" is written in a large, bold, light-colored sans-serif font, with a double slash symbol above the 'Y'.

PÖYRY

Annex: Sources

List of sources used for case study elaboration

- **Center for Energy Efficiency EnEffect. (n.d.). Retrieved September 11, 2009 from <http://www.managenergy.net/actors/A2001.htm>**
- **United Nations Development Programme (UNDP). (2004, April). Energy Efficiency Strategy to Mitigate Greenhouse Gas Emissions. Energy Efficiency Demonstration Zone in Gabrovo: Project Factsheet. Retrieved September 11, 2009, from http://www.undp.bg/file_dl.php?url=uploads/images/962_en.pdf**
- **Center for Energy Efficiency EnEffect. (2004). Energy Efficiency for Sustainable Development of Municipalities. Energy Efficiency Strategy to Mitigate GHG Emissions. Energy Efficiency Demonstration Zone in the city of Gabrovo, Republic of Bulgaria: Final report on the results from project implementation (1998-2004). Retrieved September 11, 2009 from http://base.china-europa-forum.net/rsc/docs/doc_751.pdf**
- **Center for Energy Efficiency EnEffect. (2004). EcoEnergy Municipal Energy Efficiency Network: Review of activities during the period 1997-2003. Retrieved September 11, 2009, from http://base.china-europa-forum.net/rsc/docs/doc_749.pdf**

Annex: Impact of case study implementation

Key benefits from the Case Studies' demonstration projects in the city of Gabrovo

Key results ¹⁾	Unit	Hospital	School	Residential Building	Industrial building	Administrative buildings of the municipality	Total
Net annual cost savings	USD	46'690	22'661	5'595	6'903	16'650	98'099
Annual heat savings	MWh/year	2'310	557	245	133	318	3'563
Annual electricity savings	MWh/year		38.6	21	15	10	85
Economic life-cycle of the project	Years	5	10	10	10	10	10
Payback period	Years	2.2	2.5	3.4	1.6	2.5	2.3
Investments total for energy efficiency	USD	103'060	56'003	18'960	11'099	41'357	230'479
Co-financing by the municipality / others	USD	4'000	12'705	590	4'900	29'236	51'431
Internal Rate of Return	%	35	43	24	61	39	
Annual savings from reduced CO2 emissions	t/year	717.8	388.9	177.7	62.6	96.4	1'445.4

1) Source: EnEffect. (2004), Energy Efficiency for Sustainable Development of Municipalities

Annex: Costs of case study implementation

Costs and cost bearers of the Case Studies' demonstration projects in the city of Gabrovo

Title of the institution		Proposed financing	Actual financing
		USD	USD
A. Primary Input			
Project Budget	GEF through UNDP	2'575'000	2'575'000
B. Cofinancing			
Bulgarian party (cash)	Incl. NEPF ¹⁾ , Gabrovo Municipality, Committee of Energy, Elektroazpredelienie Gabrovo Branch, Toplofikatsiya Gabrovo SPSCo, private sector entities	2'256'000	847'000
Bulgarian party (in-kind)	Incl. Gaborovo Municipality, EcoEnergy member - municipalities, the Government and governmental institutions	1'705'000	1'710'000
Bilaterall donor	USAID – for the hospital in Gabrovo	900'000	900'000
C. Parallel Financing			
Bilateral donors ²⁾	USAID – other projects, UNECE, Japan, the Netherlands, Norway, miscellaneous donors ³⁾		861'000
Financing, total (A+B+C)		7'436'000	6'893'000

1) National Environmental Protection Fund

2) The table does not comprise the amounts spent directly by the leading foreign contractors

3) The Regional Environmental Centre (REC), the World Resources Institute (WRI), the Organisation for Economic Co-operation and Development (OECD), the World Bank (WB), the European Commission (EC), Canada.the European Commission (EC), Canada.