A Regional Review of Social Safety Net Approaches In Support of Energy Sector Reform

Synthesis Report

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Abstract

The energy sector reform process is occurring throughout the transition countries of Central and Eastern Europe (CEE) and Eurasia. The United States Agency for International Development (USAID) has supported this process in numerous countries. The electricity sector reform process generally involves establishing a modern legal and regulatory framework, unbundling the monopoly electric utility into separate generation, transmission and distribution companies, and creating a competitive electricity market and privatization. This process is leading to the introduction of transparent commercial operations, modern technology, and investment that is needed to provide reliable and economic service for the long run. The transition to this end goal includes increasing tariffs and the collection enforcement for the supplied electricity.

During the transition there will be some impact on vulnerable populations. To identify approaches that will ease the impact on these populations, a multi-country study was conducted to identify social safety net approaches in support of energy-sector reform. This report documents this activity's results. The study identifies and documents lessons learned and best practices to ease the transition impact of power sector reform.

The three approaches to helping low-income households afford energy are contrasted and compared. The approaches are: 1) subsidies and assistance payments; 2) energy-efficiency mechanisms; and 3) tariffs. Each mechanism's impact is analyzed using a matrix that compares a range of quantifiable evaluation criteria.

The country reports (appendices) review the mechanisms that Armenia,

Bulgaria, Hungary, Kazakhstan and Romania have used.

The results are available for government policymakers, international financial institutions, donors, and others interested in power sector reform and addressing the needs of vulnerable populations.

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Acronyms

ARD	Armenian *dram*
BGL	Bulgarian *leva*
CA	Condominium association
CEE	Central and Eastern Europe
CFL	Compact fluorescent lamp
CHF	Cooperative Housing Foundation
CIS	Confederation of Independent States
EU	European Union
GDP	Gross Domestic Product
HAB	Housing Allowance Benefit (Kazakhstan)
HAP	Heat Assistance Payments (Hungary and Romania)
HCA	Heat cost allocator
HUF	Hungarian *forint*
KSK	Cooperatives of apartment owners (Kazakhstan)
KWh	Kilowatt hour
MIG	Minimum income guarantee
MWh	Megawatt hour
NGO	Non-governmental organization
OA	Owners' association
PPP	Pilot Panel Program
ToD	Time of day
TRV	Thermostatic radiator valve
USAID	United States Agency for International Development

Executive Summary

The countries of the CEE and Eurasia have historically provided electricity to their populations at below-market prices. As these countries move toward rationalizing their electricity prices as part of power sector reform, they face a major issue: how to address the impact of the higher prices on low-income households. This report summarizes how five countries in the region— Armenia, Bulgaria, Hungary, Romania, and Kazakhstan— have addressed this issue. The five country appendices contain in-depth reports of each country's progress. The lessons learned from these countries will be helpful as other countries in the region initiate energy sector reforms and contemplate how to assist their low-income populations with energy costs. Given that electricity reforms including tariffs have advanced the furthest among infrastructure sectors, these lessons learned are also relevant for reforms in district heating, water and waste water.

The report examines three public policy approaches for helping low-income households with high energy costs: 1) providing fuel assistance payments, 2) making energy-efficiency improvements to low-income residences, and 3) enacting tariff mechanisms that charge a lesser amount for low electricity usage or usage at certain times of the day. The first and third approaches are common in the five countries, while providing household energy-efficiency assistance is very limited. The report analyzes specific policies associated with these approaches and ranks them using five separate criteria. It also provides a model of the potential importance of energy efficiency for improving the impact of existing energy payments to low-income households.

All five of the surveyed countries have raised, or are planning to raise, electricity tariffs to economic levels as part of their power sector reform, restructuring, and privatization efforts. Already energy costs are the highest monthly expense after food for most low-income households in the region. For the most part, government officials in the five countries are aware of the impact of the high prices on the poor, and most of the countries have energy social safety nets in place that consist mainly of fuel assistance payments and low electricity tariffs for low consumption levels (i.e., "lifeline" tariffs).

The survey results found that the most successful energy payment assistance programs are those that: provide a meaningful level of assistance to eligible households; are not "bundled" with other social programs, which can result in the payments being diverted to other uses; do not provide assistance in the form of cash or vouchers, but instead provide it in the form of transfer payments to fuel suppliers that then credit the households accordingly; and may rely on local governments to help administer the program but do not rely on them to financially contribute to it. Despite the obvious link between energy price increases and the need for fuel assistance, different ministries in each country typically administer the activities, and scheduled price increases do not necessarily result in concomitant increases in fuel assistance.

The most successful tariff mechanisms are those that enable households to pay less by changing their behavior and consuming less energy. The best lifeline tariffs are those that are not too difficult to qualify for in terms of quantity of electricity consumption, but that still encourage energy conservation; offer a rate low enough to provide a measure of relief, and, if feasible, are provided solely to means-tested, low-income households, not across the board to any household that uses a small amount of electricity. Lifeline electric tariffs that provide a low price for electricity consumed below a certain low monthly amount can provide some assistance to low-income households. The financial impact of lifeline tariffs can be high in countries where electric heating and cooking are common, but lower where lighting and television are the main electric applications.

Residential energy efficiency programs, including metering, can have a significant impact on reducing energy use, reduce household energy costs and increase comfort. The most successful programs will be those that: are coordinated with other social programs, particularly with an energy assistance program; focus on thermally sealing windows and doors as a first priority, perhaps along with reflective foil radiator sheets for district heated homes; and provide simple assistance in the form of free materials and labor as opposed to trying to apply more complex financing or perform contracting operations in poor households. Low income households can benefit through broader residential efficiency programs such as the Bulgaria metering program that included subsidies for vulnerable households.

A fourth approach to helping low-income households is to tolerate their nonpayment of energy bills and not disconnect them from the energy supply despite their arrears. This is not a formal public policy, but is nevertheless a common practice, particularly in district heating systems, where it is physically and legally difficult to disconnect individual apartments. Although toleration of nonpayment is perhaps the easiest way to provide assistance, it does not help only low-income households or even predominantly low-income households, so it represents a large revenue loss in exchange for a highly untargeted and expensive benefit for low-income households. Worse, it can have dire long-term consequences, such as the economic collapse of entire district heating systems.

In the final analysis, these approaches are evaluated in two ways. The first method is a static analysis of options that assigns a ranking to each mechanism on the basis of five criteria. The criteria used in this analysis include the impact of the mechanism on the energy sector's liberalization, coverage and targeting of the poor, annual relative costs, and any energy-efficiency properties associated with the mechanism. These rankings are then summed to produce an ordering of each mechanism across all criteria.

The second method uses a simple growth model to illustrate the financial and energy saving benefits of different energy-efficiency measures used to help the poor. This analysis shows that household energy efficiency can and ought to be an important element in helping poor households when utility costs to consumers increase. Energy-efficiency measures not only provide considerable cost savings to poor households, but also allow governments to maintain adequate existing energy assistance payments to the poor, while strengthening incentives to save energy during periods of price liberalization.

Chapter 1
Introduction

A. Background

Reforms in the power sector are underway that will bring significant benefits including investment, modern commercial practices, technology and improved reliability and quality of electricity supply. To achieve this it is necessary to have economic tariffs that allow for cost-recovery and investment. Along with tariff increases it is necessary to examine the impact on vulnerable households and identify and implement the approaches necessary to east the impact. This report summarizes the approaches that five countries in Central and Eastern Europe (CEE) and Eurasia—Armenia, Bulgaria, Hungary, Romania, and Kazakhstan—have used to assist low-income households with rising energy costs associated with power sector reform. Three main approaches are considered: 1) providing assistance payments; 2) making energy-efficiency improvements to low-income residences; and 3) enacting innovative tariff mechanisms. This report provides perspectives on the relative merit of each approach and suggests policy options for governments to consider when helping low-income households with energy costs.

1. Methodology

The research team for the main report and the five country reports conducted personal interviews with a wide range of social welfare and energy sector specialists in the five countries, telephone and email discussions with specialists in other countries and international development agencies, and literature searches and desktop research. Local researchers from each of the five countries provided additional research assistance. The missions to the five countries took place in the spring/summer 2002. Peer reviews of the country reports were conducted in the spring/summer 2003. The main report synthesizes the main findings and lessons learned from the five country reports and from secondary source material from other countries in the region.

USAID sponsored and funded the study, but the findings, conclusions, and recommendations are those of its authors and do not necessarily reflect USAID's views and/or policies.

B. Energy Sector Reform and Privatization

Prior to 1989, communist governments in the CEE and Eurasia made energy production and distribution decisions on the basis of socialist economic principles. As a result, energy tariffs to residential customers were set considerably lower than the supply cost, and the costs of electricity, gas, heat and water consumption were met through a complex network of cross-subsidies and barter arrangements between large industrial consumers, fuel suppliers, government budgets and, in the case of fuel and heavy equipment, transfers and exchanges with other communist states. Tariffs were further distorted through special discounts for political and social reasons to “privileged customers.”

As the communist era ended and the transition to a market economy began, the process changed. Energy supply costs began to be transferred from governments to consumers. Before the transition, energy companies charged residential customers using low social tariff rates (i.e., across-the-board low tariffs). Consumers had almost no idea of—and little interest in learning—the true costs of power, gas or water, or how much of these commodities they consumed.

As the transition period progressed, governments initiated structural reforms in the energy sector; they dismantled state companies, separated energy production, transmission and distribution, sold off state assets, and increased energy tariffs, including residential tariffs. Governments that had “inherited” across-the-board low tariffs quickly found the subsidy level required keep tariffs so low was an unacceptable budget strain. Initial efforts to raise tariffs were met with hostility by households—ranging from public demonstrations, to turning back electricity meters, or just a point-blank refusal to pay. The new governments had no experience and little knowledge of how to deal with these kinds of issues, so initially prices remained low. Some countries, such as Hungary and Poland, have implemented substantial reforms, and prices are now at or near cost recovery levels, so future price increases will be small. In others, such as in Eurasian countries, reform has progressed more slowly and substantial tariff increases are still needed.

1. Impact on the Poor

The social consequences of reform failures in the energy sector are already being felt throughout Eastern Europe and Eurasia, with the experience of two countries constituting a grave indicator of what can happen when reforms fail. In Armenia, 49 of 55 district heating systems (or 90%) have collapsed. Households have switched to electric space heating, a highly inefficient and costly alternative. Worse, many households across the country have switched to burning wood for their heat. Estimates suggest that about one-third of Armenian forests have been cut down during the last 11 years, creating a pressing environmental problem. Without policy changes, Romania will be on a similar path. By the 2001 heating season, 47 of its 251 heating systems had collapsed; 25 more are expected to collapse in the near future, due to poor collection, customer disconnection, and households' problems with payment.

2. Reforms in the Five Countries Surveyed

Three of the states in the survey—Bulgaria, Hungary and Romania—have aspirations to join the European Union (EU) and have been conducting fairly steady economic, political and administrative reforms related to future EU membership since the mid 1990s. Meeting the EU membership requirements has encouraged energy sector reform in these countries.

Hungary is the most advanced of the five countries surveyed in terms of reforms and privatization. Bulgaria and Romania are on the reform path and Kazakhstan and Armenia have made varying degrees of progress.

As one of the leaders in energy sector reform, Hungary illustrates some of the problems facing many post-communist countries interested in utility reform. Privatization of the energy utilities is at an advanced stage, and the privatization of the power and natural gas sectors was described by a World Bank study as "well planned, well managed, orderly, competitive, transparent and generally regarded to be free of corruption."[1] During 1990-2000, Hungary attracted $11.9 billion in privatization revenue, equivalent to

27 percent of GDP.[2] Hungary also has improved capacity to regulate utilities and has noticeably increased local energy-efficiency awareness. Yet these gains have neither translated into fully liberalized pricing for energy nor resulted in restructuring the energy sector in ways that better help the poor. For example, the Hungarian gas monopoly, MOL, continues to subsidize all residential gas customers. This represents an untargeted subsidy to all gas-connected households, rich and poor alike. Hence, in terms of both coverage and targeting, the subsidy is not directed towards the poor.

In Romania, natural gas is subsidized as it is in Hungary. District heating companies are subsidized to keep tariffs low for all households. There are also a number of targeted subsidies, such as payments to low-income households that use natural gas, heat and solid fuels, and cross-subsidies that enable utilities to operate lifeline tariffs for electricity and natural gas.

In Bulgaria, power sector privatization is proceeding with distribution companies first. Electricity tariffs have been raised twice in two years and are on course for being fully unsubsidized in 2003 or 2004. State-owned Bulgargaz continues to conduct all import, transmission, and storage of natural gas. Gas distribution is limited and new franchises for development will be done by private companies. District heating is state-owned in Sofia and by the municipalities elsewhere and remains subsidized.

Kazakhstan has substantially privatized thermal generation in a way that a World Bank report described as “unplanned, rushed, opaque with little competition, and thus subject to allegations of corruption.”[3] A handful of the many power distribution networks were sold to major international power companies, which began to implement substantial reforms, but have encountered regulatory problems including inadequate tariffs.. Power transmission remains state-owned, but the company, KEGOC, has been successfully commercialized and is profitable. KEGOC “polices” the market for bulk power,

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[1] The World Bank, “Privatization of the Power and Natural Gas Industries in Hungary and Kazakhstan, World Bank Report WTP451” (Washington, D.C., December 1999).

[2] The European Bank for Reconstruction and Development, “Transition Report 2001: Energy in Transition” (London, 2001), 154.

[3] The World Bank, “Privatization of the Power and Natural Gas Industries in Hungary and Kazakhstan, World Bank Report WTP451” (Washington, D.C., December 1999)

disconnecting (or shedding load) from large consumers, including power distribution companies, if they do not pay. In 1997, Kazakhstan sold its natural gas transmission operations to a major international energy company, Tractebel, but the company withdrew from Kazakhstan in 2000, and a local company, Kazmunaigaz, now owns the assets. Gas distribution has not been privatized. District heating remains in government hands, but the systems were transferred to local governments in 1996.

Armenia privatized its gas company to Gazprom of Russia and recently sold its power distribution company to a group of private investors, who, in turn, have entered into a management contract with a Korean company. The power company was sold in a state of crisis—approximately one-third of billings were uncollected—and it remains to be seen whether the new management will be able to turn around the company's fortunes. Of the 55 district heating companies, 49 have collapsed, and the remaining companies are in massive debt and are technically decrepit. Substantial international assistance is being directed to solving Armenia's heating crisis.

C. Existing Energy Social Safety Nets

Social protection programs were introduced in all the countries surveyed in response to low-income households facing greater fiscal pressures from reduced or eliminated price subsidies. Most governments had only limited success in establishing the programs during the 1990s, and although all countries surveyed have experimented with various forms of social assistance for energy, many factors are limiting their effectiveness. In most of the countries, the real value of social assistance for the poor declined throughout the 1990s.

Energy assistance payments to low-income households do not cover many poor households, and social assistance payments to the poor are frequently not delivered to eligible households. This is particularly the case in countries that require local governments to distribute national social assistance payments or contribute a share of the social payments themselves. In Romania, local governments have been unable to fund social assistance benefits or have restricted access to social assistance benefits;

the result has been that households receive smaller benefits or none at all.[4] In Hungary, instead of spending national poverty prevention funds for their intended purpose, local governments often use the funds for other local needs. In both Bulgaria and Hungary, decentralization of the social protection responsibility has meant that cash-strapped local governments have been unable to provide sufficient assistance, thereby effectively decreasing the value and availability of social protection programs.

Residential electricity and gas tariffs in four of the five countries surveyed do not target the poor or help them cope with price increases. Romania and Bulgaria use lifeline tariffs, although some of the other countries, including Armenia, have experimented with them. All the countries surveyed continue to provide untargeted energy subsidies to their energy supply institutions, allowing tariffs to be kept at sub-economic levels.

Where they exist, energy-efficiency programs have not been aimed at poor households to help them control their energy consumption and costs. None of the countries surveyed have established energy-efficiency programs for the poor, and none are seriously considering doing so. As a result, most low-income households continue to have very limited abilities to improve the efficiency of their energy consumption in response to energy price increases.

Improving the effectiveness of energy assistance programs, or creating new ones, will require a major increase in political will in all the countries surveyed. Funding is a significant barrier to improving existing social safety nets as well as administration and targeting. Most of the assistance payment programs reviewed provide a very low level of assistance per household. Enacting energy-efficiency assistance programs will necessitate overcoming a lack of awareness by government and utility officials about such programs. In addition, energy efficiency assistance falls into an institutional vacuum—social assistance officials say it should be an energy issue, while some energy officials, including regulators, say it should be under social services.

[4] "Romania Local Social Services Delivery Study, Volume I" (World Bank, Washington, D.C., 2002), 11.

1. Key Findings

Both fuel assistance payment programs and tariff adjustments are used extensively in the five countries surveyed, but their impact on low-income households has been mixed. There are examples of well-designed, cost-effective programs that provide timely and adequate assistance to the poor. There are also examples of poorly designed or poorly administered programs that provide inadequate assistance to the poor, or do not even reach the poor, or reach the poor but at an excessive cost to the government per household assisted. In the case of tariff mechanisms, there are some that are so poorly designed that they are contributing to, not alleviating, poverty.

While most of the countries in the region have energy-efficiency programs, these generally target the industrial sector or government/institutional buildings, which represent the greatest energy-saving opportunities. Very few countries have residential energy-efficiency programs—Hungary is the only one of the five focus countries with one—and none of the countries have residential energy-efficiency programs specifically designed to help low-income households. Government officials typically view energy efficiency as a vehicle to deliver economic benefits or, to a lesser extent, environmental benefits, not as a vehicle to deliver social assistance.

- A common, though unofficial, practice that helps low-income households with energy costs is to tolerate their nonpayment of energy bills. When non-paying households do not have their energy supplies disconnected, it is a de facto form of assistance. Toleration of nonpayment is especially common in district heating systems because it is physically and legally difficult to remove a single apartment from a hot water loop. Toleration of nonpayment is usually not a formal public policy, but instead is a passive response by governments and energy suppliers to a problem that they do not have the knowledge, capability, or political will to address in a more constructive manner. Not only is it an imperfect form of social assistance, but also the practice has detrimental financial impacts on energy utilities. The problem is compounded by the fact that it is often the non-poor that are nonpaying. In Armenia, one-third of electricity billings and up to two-thirds of heat billings are uncollected. In Romania,

state-owned enterprises have accumulated large arrears to the major state-owned power companies. In Bulgaria, arrears and defaults have been increasing among all groups, but the especially among the poor.[5]

- When compared to assistance payments and tariff mechanisms, low-income energy efficiency assistance offers certain advantages, chief among them being that a one-time government expenditure for energy-efficiency improvements in a given household can reduce the need for (or size of) assistance payments or tariff subsidies to that household year after year. The pros and cons of each approach are summed up in the matrix, below, (see Chapter Five).

- Assistance to the poor to meet energy costs is most effective when it targets the form of energy used for space heating, which represents the largest financial burden. This remains true even in cases where heating fuels are still government-subsidized. A minority of low-income households in the five countries heat with electricity, an inefficient and expensive fuel for space heating. The urban poor use district heat and, to a lesser extent, natural gas, while the rural poor use traditional fuels like wood and, in some countries, coal briquettes. Armenia is the main exception, where, as a result of the decline of the urban district heating systems, most urban low-income households heat with electricity, although many have turned to wood.

- As electricity is not the dominant heating fuel for low-income households in some countries, the financial impact of rationalized (raised) electricity tariffs on low-income households will not be as great as tariff increases for district heating. Where electricity tariff reforms are politically sensitive, it may be possible to search the financial impact on low-income households by providing energy efficiency assistance to reduce household heat consumption and costs. Because of the frequency of dual use of both electricity and heat from other sources, a broader approach may be considered.

[5] The World Bank, Human Development Sector Unit, Europe and Central Asia Region, "Bulgaria Poverty Assessment, World Bank Report No. 25416-BG," (Washington, D.C., June 26, 2002).

Chapter 2
Energy Payment Assistance Programs

Energy payment assistance programs provide cash payments or transfers from a government, usually on a means-tested basis, to low-income recipients to reduce household energy bills. Payments are typically coordinated with other social services in terms of uniform eligibility requirements. Sometimes, as in Armenia or Hungary, energy assistance is bundled with other social services in a single payment that can be allocated by the low-income household as it sees fit. But more typically, energy assistance payments are discrete payments that are separate from other social payments. The payments are typically designed to help pay only for heating costs and are thus only paid out during the winter heating months.

Bulgaria and Romania operate conventional energy assistance programs. In addition, Hungary and Armenia have each conducted short-term energy assistance initiatives to overcome the "price shock" at times of substantial and rapid energy price increases. Kazakhstan had a program that helped pay for all housing costs, including energy and water utilities, rent, and repairs. The nationally funded Kazakh program was withdrawn recently, but some of the more affluent *oblasts* (provinces) continue to operate the program with local government funding.

These programs can be compared in terms of how they define eligibility and target beneficiaries, their payment administration and size, coverage, and cost to the government.

A. Defining Eligibility and Targeting Beneficiaries

Bulgaria's Winter Supplement Program provides assistance to households making less than the guaranteed minimum wage, which was 110 BGL (approximately $55 per month) in May 2002. In addition, households that qualify for the minimum social pension or social assistance automatically qualify for the maximum energy assistance payment. Hungary conducts means testing to assess low-income household utility and other housing-related benefits. However, local governments determine the specific eligibility

criteria and payment levels, with considerable variability in the provision of benefits. In Romania, a household must qualify for general social assistance under the Minimum Income Guarantee (MIG) Program to receive a Heat Assistance Payment (HAP). Kazakhstan's system allows any household that pays more than 30 percent of household income on utilities, rent, and housing repairs to qualify for energy assistance.

B. Payment Administration and Size

For the most part, energy assistance programs make payments to utilities that supply the heat, not to households. The households are then credited for the payments. Initially, some programs provided households with cash payments, but they found that the cash was not being spent on heating, but on other needs such as food or medicine. Cash payments (or in some cases, vouchers) are still used for traditional fuels like coal briquettes, where there are too many retailers to allow for a crediting system. There is no information on the degree to which households divert these cash payments to other uses. Kazakhstan provided cash payments that were payable in arrears upon documentary evidence (payment receipts) that the utility bill had already been paid. This may be the only model of a cash-based payment that worked well.

Armenia still provides cash for utility-supplied heating, and that is one of the problems with the program. The Armenian Poverty Family Benefit Program's cash payments are intended to cover a number of needs, including heating. Because the size of the payments is inadequate for all of the needs—$14 per month in 2002—inevitably the cash is not applied to heating bills.

In Bulgaria, qualifying households receive the difference between their actual household income and the guaranteed minimum wage, up to a maximum monthly payment of 37.33 BGL ($18.50) or essentially up to $93 per heating season. Winter Supplement Program payments are made to either the district heating company or the electricity company on the household's behalf. In the case of solid fuels (mainly coal briquettes), cash payments are made directly to the households. In Hungary, cash payments are made either to households heating with natural gas, or via direct payment to district heating companies, or as in-kind benefits for solid fuels (i.e., free wood or free coal).

The housing assistance average payment in Hungary is 4,304 HUF ($15.04). The government links its assistance to contributions by the local governments through the "normative grant system." This system allows the local government to allocate national funds to a wide range of local needs, with energy assistance being only one of a number of uses for the funds.

In Romania, heat assistance payments are either made directly to the district heating or natural gas utility or as cash payments to households heating with fuels such as wood, coal, or bottled gas. In 2002, the average payment for a household heating with solid fuels was $12.30, but average payments for those heating with district heating and natural gas were only $7.35 and $3.88, respectively.[6]

Although the Ministry of Labor and Social Protection determines HAP eligibility, municipalities perform program administration including eligibility determinations. The apartment building owners associations (OAs) collect information about low-income households in a building and provide this information to the municipal government. The OA provides the information in the form of an administrative document known as a "coupon." The OA calculates the balance of the heat or gas bill that remains payable by each beneficiary household after the building subsidy (i.e., a deduction from the heating or gas bill) is taken into account.

Kazakhstan's approach to determining the size of the heat assistance benefit was based on a formula rather than a fixed sum. If the combined total of all utility and housing bills (electricity, gas, water, rent, and repairs) exceeded 30 percent of household income, the household received a cash payment of the difference between 30 percent of income and the sum that they had actually paid. To receive the benefit, the household first had to prove that bills were paid up, using receipts, so as to overcome the 'leakage' problem, which is normally associated with cash-based assistance payments. The program was administered using earmarked national funds

[6] The Romanian Energy Policy Association, "The Weight of the Energy Bill in the Low Income Family Budget," Alliance to Save Energy and USAID. Washington, D.C., 2003.

through local housing allowance centers. When government funding was withdrawn at the end of 2001, the programs in most oblasts came to a halt.

Programs that bundle energy assistance with other social assistance needs, such as the Armenian program or the new program for social assistance in Kazakhstan, usually provide only very limited funding for all social needs. By contrast, programs that earmark energy assistance for low-income households, such as the programs in Bulgaria, Hungary, and Romania, usually do much better, meeting between 30 to 40 percent of energy consumption costs.

C. Coverage and Cost of Energy Assistance Programs

Bulgaria's Winter Supplement Program reaches almost 20 percent of all households. The number of households receiving energy assistance payments has increased since the program's inception in 1998. Hungary's Housing Maintenance Program is considerably smaller than that of both Bulgaria and Romania**,** serving only 5 percent of all households and approximately 35 percent of all poor households. Romania's program is the largest, dispersing $88 million to over two million households, representing some 28 percent of Romania's 7.1 million households during the 2001-2002 heating season, with the average household benefit for the winter being $44, or $8.80 per month for the five winter months. Kazakhstan's Housing Allowance Benefit (HAB) Program was introduced as a pilot in one region in 1996, and introduced nationally in 1998, when 150,000 households, representing 3.7 percent of the 4.1 million households, received the benefit. In 2002, national HAB funding was withdrawn, but three regions retained it and funded it through local budgets, while a fourth retained it for the winter months only. The general cash-based Social Assistance Payment Program, a general social assistance program that only nominally includes utilities, replaced the nationally funded HAB in January 2002.

D. National Versus Local Funding

An important factor for governments is the extent to which any responsibility for raising money to fund energy assistance programs can be passed to local governments. Three

of the four countries that manage regular energy assistance programs have adopted various mixtures of national versus local government financing.

Bulgaria is the only country that continues to fully finance energy assistance at the national level. Local governments had previously been required to pay a share of the assistance, but this was phased out because the local governments had difficulty coming up with their share. The result was that many eligible households did not receive assistance. Hungary has moved in the opposite direction, reducing national contributions from 100 to 70 percent.

Romania fully financed HAP at the national level, but in 2002, responsibility for 45 percent of funding was passed to local governments. As mentioned above, Kazakhstan eliminated all national HAB funding at the end of 2001, effectively ending the program in the country except for the four regions that raised local funds for program administration.

E. Short-Term or "One-Off" Programs to Cope with Price Shocks

In addition to the program described above, Hungary implemented a short-term energy assistance program that was designed to help the poor with rapid price increases for residential gas and electricity. A fund of 1.4 billion HUF[7] ($9 million), capitalized with funds from both government and industry, was disbursed at the time of a planned "price shock" from 1997 through early 1998.

The Hungarian short-term program is among the most innovative approaches to an assistance payment program for the poor in Eastern Europe for two reasons. First, it predicted and dealt with a planned price shock at times when the drive towards pricing reform resulted in large energy price increases over a short time period, and second, unlike all other assistance programs in post-communist countries, it used financial contributions from private companies to fund assistance payments for low-income households.

[7] From interviews with the Energy Consumers Association, May 2002.

The fund was established as a private non-commercial entity through financial contributions from energy companies. The power producers and distributors provided initial monies to the fund (472 million HUF or $2.5 million). Later that year the government agreed to provide public monies (1 billion HUF or $5.35 million).[8] The Associations of Municipalities and representatives of employers and consumers' interests also contributed to the fund. The fund's board of directors included a government commissioner, the Hungarian Energy Office (*Magyar Energia Hivatal*), and a Ministry for Social Welfare official. In the fourth quarter of 1997, 1.3 billion HUF ($6.6 million) was offered to the fund for compensation for gas price increases. This included 700 million HUF ($3.57 million) from the government and 350 million HUF ($1.8 million) from the MOL. Gas distribution companies later contributed 241 million HUF ($1.2 million).

Fund contributions from both the government and industry totaled approximately 2.8 billion HUF ($13 million). The type of energy assistance provided to the poor from this program came in the form of cash payments for gas heat, direct payment to district heating companies, or in-kind benefits for wood or coal.

In Armenia in 1999 and again in 2000, cash payments were made to households to help pay electricity bills. Otherwise, Armenian low-income households rely on the Poverty Family Benefit of around $14 per household per month in 2002, which nominally includes a utility component and is paid in cash to some 25 percent of households.

F. Lessons Learned from Reviewing Energy Assistance Programs

1. If Energy Assistance Programs are to Support Energy Sector Reforms, They Must Provide Meaningful Assistance

Determining exactly how much a government should help each low-income household with its energy bill is a challenge in every country. The best energy assistance programs provide enough assistance so that they help low-income households transition through tariff increases associated with energy sector reform. A number of energy assistance

[8] *Governmental Resolution No. 1032 of 1997*, March 19, 1997.

programs do not provide sufficient assistance. This increases the likelihood that further tariff increases could stimulate increased nonpayment along with curtailment of energy services. One obvious approach is to utilize existing resources better through improved targeting of payments to low-income households. This move away from categories of people to a needs based approach is critical given tight public budgets.

2. Local Government Involvement in Energy Safety Net Programs Can Be Both Beneficial and Problematic

Some countries in the region rely on local governments to contribute to the funding and/or administration of low-income energy assistance programs. In general, decentralizing government power in post-communist countries has been a priority for bilateral agencies such as USAID. However, decentralizing government power in several countries is creating new and unanticipated problems in the funding and execution of social assistance programs in the energy sector.

In Bulgaria and Romania, local governments frequently do not contribute their required budgetary allocation to energy assistance payments. For this reason, Bulgaria has phased out its local funding requirement. In Bulgaria, although decentralization has not conflicted with energy assistance programs, it has influenced the local government's overall ability to finance needs associated with poverty. There were cases in Bulgaria where low-income households moved to a more affluent county because social assistance was not paid out by their local government.

In Hungary, the local government allocated central government funds according to local fiscal priorities, not necessarily national poverty goals, thereby defeating the program aims.

In Kazakhstan, the withdrawal of national funding for housing assistance programs resulted in the programs being stopped in many oblasts.

The issue of how to handle decentralization of authority and budgetary power from national governments to local governments is beyond the scope of this report. The problem is not limited to social assistance; for example, when responsibility for decision-making on energy-efficiency and tariff issues was devolved to local governments,

decisions were frequently sub-optimal, ill-informed, and, in some cases, driven by local political self-interest rather than considerations of social welfare policy or energy policy. On the other hand, some local governments—particularly richer and better-informed local governments—made robust decisions that created local conditions that are substantially better than those envisaged by national policies and laws.

3. There is a Strong Case for Unbundling Fuel Assistance from General Assistance

The main problem with bundling fuel assistance with general social assistance is that there is not enough money in the general payment to cover the low-income family's expenses. The payments are used for more pressing needs like food or medicine, while the energy bills tend to go unpaid. Unbundling fuel assistance from general social assistance can help ensure that low-income energy bills are paid.

Another problem with bundling is that it obscures the actual need that low-income families have for fuel assistance and the actual amount of money that is needed to help them. Unbundling allows for better targeting of fuel assistance to those low-income households that are in greatest need of the payments, not just those that already qualify for the bundled payment.

Disadvantages of unbundling for the government are that it requires a separate disbursement and management mechanism, thereby adding administrative costs. It also makes more transparent the fact that the nominal fuel assistance component of general assistance programs is under-funded and that households in need are not receiving adequate assistance.

4. Pay Cash-in-Arrears or Pay Utilities, but Not Vouchers and Not Cash in Advance

In Kazakhstan, funds were paid in cash to households that could demonstrate—with receipts—that they had already paid the utility bills. This worked well (but the costly program has been discontinued in most of Kazakhstan).

In Bulgaria and Romania, funds for network energy sources are transferred direct to the utilities on the behalf of specific households, following a paperwork transaction involving the municipality, the utility, and the low-income household (or, in the case of Romania, a group of low-income households represented by the housing association). This also works well.

In principle, there is no reason why funds should not be paid in cash for customers who use non-network fuels such as coal, wood and bottled gas. However, problems emerged in both Bulgaria and Romania.

- In Bulgaria, the problem with solid fuels payments was political; the government intended social assistance for solid fuels to be used to buy coal briquettes that are manufactured by the single, state-owned, coal briquette factory. However, households were choosing to keep warm in other ways. Recently, Bulgaria was considering re-introducing a voucher system, despite having had a bad experience with voucher systems in the past, primarily to support the briquette factory.
- In Romania, some households living in communally heated buildings were choosing a lower, cash-based payment (nominally for solid fuels) rather than the higher payment that would go to the gas or heat utility. They then simply did not pay the gas or heating bill, which, in some cases, has led to the collapse of heating systems for entire buildings or, in some cases, entire towns. Bucharest city does not permit this practice, but it is common in some other municipalities.

In Armenia, general social assistance payments that nominally include a component for utilities are made in cash. This encourages households to use the very cheapest form of heating, which is wood, rather than contribute their share to communal heating systems. As a result of this, (and a large number of other factors), nonpayment for utilities is widespread, most of the heating networks have collapsed, and deforestation has become a major concern.

Voucher systems are generally considered to be a mistake of the past.

G. Tolerating Nonpayment of Utilities as a Form of Subsidy

In well-managed power systems, nonpayment of utility bills is not tolerated. When a consumer does not pay their bill, their energy service is disconnected. When they pay their arrears, the service is reconnected. But in some countries in the region, nonpayment is a major problem, and it is tolerated in the sense that the non-paying consumers are not disconnected. Toleration of nonpayment is not an official public policy, but because the non-payers are not disconnected, it is a policy by default.

While an analysis of nonpayment causes and remedies is beyond the scope of this study, toleration of nonpayment is relevant when it involves low-income households because it is tantamount to a form of government-sanctioned relief from high energy bills.[9] Some forms of nonpayment are *not* tolerated. In countries where nonpayment of electric bills was due to illegal tampering of electric meters, the meters have been moved from within apartments to locked boxes in the street or into communal hallways or lobbies, where attempts at tampering will be more likely to be noticed and reported. In countries where nonpayment is due to meter readers/bill collectors being bribed to record a lower reading, the two functions of meter reading and bill collecting have been separated. Social pressure can also help reduce the nonpayment problem. In Romania, cooking gas is supplied to apartments and is metered at the building level, not the household level. To prevent the entire building from being disconnected for nonpayment, neighbors must absorb the payment arrears of other households. This situation puts pressure on all households to pay their share.

Toleration of nonpayment by households is mainly associated with district heating. This is because it is physically difficult and expensive to disconnect a household that does not pay. In a typical housing block in the region, an apartment's radiators are not connected to each other. Rather, each radiator is connected through a vertical hot water loop to similarly positioned radiators in the apartments on the floors above and below. Therefore, cutting off the hot water to an apartment's radiators will cut the loop leading

[9] It should be noted that low-income households are not necessarily the largest component of the nonpayment problem. In many countries, it is affluent households, industries, and government agencies that are the worst offenders.

to other apartments. So disconnection involves entering an apartment and physically installing a bypass pipe around each radiator. This time-consuming procedure may lead to confrontations. Consequently, district heating companies might not pursue it. There are also legal barriers. For example, in Romania, it is the building, not the household, that is the district heating company's customer. Since the company has no legal relationship with an individual apartment, it has no right to disconnect it. The recourse some district heating companies have chosen is to disconnect entire buildings where there are high percentages of nonpaying households. But this is not a perfect solution. The company may hope that the disconnection will cause the households to pay the arrears to get the building reconnected. If households are unable to raise the money, the company ends up losing even more revenue because the previously paying households in the building no longer pay once their building is disconnected.

A low-income household's nonpayment of communal district heating bills can have a positive impact in the short-term because it represents relief from energy expenses. But it is not a sustainable practice and can ultimately be disastrous for the low-income households when their buildings are disconnected and the entire district heating system suffers an economic collapse as a result of endemic nonpayments. When communal systems collapse, low-income households typically resort to burning wood or coal in their apartments, as in Armenia, or natural gas, if it is available. There are many examples of communal systems that have collapsed, ranging from single buildings to entire towns. They all result from high levels of nonpayments and building disconnections. The extreme examples are Armenia and Romania, where 49 of 55 district heating systems and 47 of 251 systems have collapsed, respectively.

Overcoming nonpayment is a matter of political will. Armenian utilities demand a 30 percent down payment at the beginning of the winter but typically collect little more thereafter. Bulgaria has introduced technologies for autonomous control of household heating costs, hence solving the root of the nonpayment problem. Hungary applies tough legal sanctions for nonpayment, and utilities have active legal departments. Romania has a confusing and ineffective approach, neither applying Bulgaria's strict national technical requirements nor Hungary's tough national nonpayment sanctions.

Instead, Romania's program devolves responsibility to ill-informed and under-funded local governments. This may be contributing to the collapse of the Romanian networks.

Kazakhstan demonstrated one of the most innovative methods for dealing with nonpayment. District heated buildings were disconnected for nonpayment, but the utility provided paying households with free electric resistance heaters along with an offer to pay their additional electricity costs. This created an incentive for the defaulting households to rapidly pay up. This solution may only be possible where the same company owns the power and heat networks, so it is probably not a practical regional solution.

Chapter 3
Energy Efficiency

A. Residential Sector Overview

Improving the energy efficiency of low-income households, particularly their thermal efficiency, can substantially reduce energy bills. From a government's viewpoint, it has the advantage of being a one-time outlay, unlike energy assistance payments, which must be paid out each year that a household qualifies. In addition, by reducing bills, energy-efficiency improvements allow a lower energy assistance payment to a household.

Despite its many advantages, none of the five countries has established low-income energy-efficiency programs and none is seriously considering doing so. This is not unusual for countries in transition, but it means that, in the absence of governmental assistance, energy-efficiency actions are left to individual households, which face an insurmountable capital investment barrier, as many have extremely low incomes. Even low-cost weatherization measures, such as the thermal sealing of windows and doors with caulk or weather-stripping, are not commonly implemented, according to energy-efficiency professionals in the five countries. This too is not unusual for countries in transition.

1. National Governments' Residential Energy-Efficiency Initiatives

All the countries except Kazakhstan have undertaken some form of government-sponsored energy-efficiency effort. As these efforts have been undertaken for economic and environmental reasons, not social ones, they have focused on the larger and relatively easier opportunities for energy-efficiency improvements, such as commercial/industrial and government/institutional buildings and facilities. The residential sector has not been a priority for energy-efficiency programs.

Although some countries such as Bulgaria, Hungary, and Romania have laws requiring energy-efficient construction materials for new buildings, there appears to be widespread non-compliance and little or no government enforcement effort of these laws. There are neither training programs for builders nor financial assistance funds

available to them to cover the extra materials and labor costs to construct more energy-efficient buildings.

Some countries have adopted energy-efficiency plans or strategies that call for energy-efficiency improvements in the residential sector, energy-efficiency labeling and standards for household appliances, and the establishment of funds to invest in energy-efficiency improvements in residential buildings. Bulgaria's Energy and Energy-Efficiency Strategy even mentions the need to provide energy-saving measures to low-income households. However, implementation of these measures is weak with the exception of the countries on track for EU accession, which have adopted labeling of household appliances for energy efficiency but little else.

The lack of a residential sector focus i unfortunate because there is generally poor energy efficiency in the housing stock in all five countries. Apartment buildings typically have no thermal insulation in the walls, roof, or basement. They generally use inefficient incandescent lighting in apartments and public areas. Energy-efficient appliances, which are available in the EU accession countries, are beginning to penetrate the residential sector, but are unaffordable for low-income households. Poorly fitting window and doorframes usually lack caulking or weather-stripping and thus leak heat from the apartments. Based on a number of donor-supported engineering studies of housing blocks in countries in the region, cost-effective, energy-efficiency improvements could yield 20 to 40 percent energy savings or more in typical apartment buildings.

2. Donor-Supported Energy-Efficiency Demonstration Projects

A variety of donor-supported projects have demonstrated the scope for improving energy efficiency in residential buildings. The projects provide useful information on costs and projected energy savings, but monitoring of actual energy savings has been lacking in most cases. More significantly, the demonstration projects have not demonstrated (and did not seek to demonstrate) financial or institutional sustainability. They were "one-off" projects that neither sought to establish an ongoing residential energy-efficiency program nor sought to transform the market to allow private

companies to make a profit selling energy-efficiency products and services in the residential sector.

3. Summary: There is No Interest in Promoting Low-Income Energy Efficiency and Little Government Funding for Household Energy-Efficiency Programs

There is no evidence of governmental interest in promoting low-income energy efficiency in any of the countries studied. EU accession countries have adopted EU appliance labeling system, and some have issued declarative energy-efficiency legislation, but with the notable exception of Hungary, there is little government financing for household energy-efficiency programs.

B. Household Weatherization

1. Hungary Has the Only Major Weatherization Program in the Countries Surveyed

Hungary stands alone among the five countries in terms of providing financial assistance to the residential sector for energy-efficiency improvements. As part of the Szechenyi Plan for Modernization, the government pays households 30 percent of the cost of their weatherization, insulation, and other energy-efficiency measures. Although local governments typically help cover some of the remaining 70 percent, the bulk of the expense falls on homeowners. Since low-income families are unable to come up with such a large payment, the program is essentially for middle- or upper-income households. Approximately $6.5 million is available for the program, which began in 1999.[10] The Szechenyi Plan's housing renovation program gives special priority to buildings built in the 1960s and 1970s, "where energy-saving investments are long overdue," according to the government.[11]

[10] Dr. Laszlo Molnar, "Economy, Energy, and Mitigation of Emissions in Hungary: An Overview," Hungary Energy Centre, (paper presented at the Workshop on Good Practices in Policies and Measures, Copenhagen, Denmark, October 2001).

[11] "Szechenyi Plan to get HUF 295.9bn this year, HUF 330.8bn in 2002," *Econews*, (January 2, 2001). Available at: www.gm.hu/kulfold/econews/e1/eco001.htm

In 1996, a Hungarian foundation launched the Pilot Panel Program (PPP) to improve the thermal insulation of residential buildings. The PPP's first phase focused on improving the thermal performance of almost 5,000 apartment blocks. The Central Environmental Fund gave grants to upgrade the insulation of each dwelling.[12]

2. Summary: Most Countries Do Not Have Weatherization Budgets

Other countries in the CEE region, such as Poland, Lithuania, and the Czech Republic, have addressed residential energy efficiency, but of the five countries surveyed, only Hungary has created a meaningful weatherization budget. However, it is not aimed at low-income households.

C. Household Metering and Controls

1. Metering

Although the relationship between the price signal and energy conservation is well understood, it is often forgotten that metering and control are the essential practical links that make the relationship work. Without metering and control, households cannot respond to the price signal by reducing consumption.

At present, electricity metering is extremely widespread in the CEE region and Eurasia, but some meters are easy to tamper with so fraud or theft can be a problem. Time-of-day meters are in use, but are not sufficiently widespread. Incidence of natural gas, district heating and water metering varies widely from country to country. Some buildings have no form of metering, others have one meter for the whole building, while others have individual household metering.

This legacy of the absence of metering has complicated reform efforts. Preparation for privatization and partial privatization has led to continued calls by international financial organizations for increased tariffs, but consumers in post-communist states have responded skeptically, claiming that utility bills are already too high.

[12] "Report to IEA," Energy Center, Balazs Medgyedy, (July 2001), 41-59.

The five-country survey found overwhelming evidence that low-income households can and do reduce their energy consumption when provided with an individual financial incentive to do so, and that they do not bother to attempt to reduce energy consumption if the savings do not result in a clear financial benefit to the household.

a. Electricity Metering

In the power sector, legislation allowing disconnection for nonpayment was introduced and enforced to varying degrees across the region. Most households already had consumption meters, and where they did not, power companies installed them. Where simple mechanical meters that were easy to turn back (i.e., cheat) were present, they could be physically relocated into locked steel boxes in the street or, in the case of apartment buildings, in the communal entrance hall. Where corrupt meter readers/payment collectors were willing to record smaller consumption in return for a bribe, the meter reading and bill collection functions were separated. Where illegal connections had been made (i.e., theft of power through connections that avoid the meter), tough sanctions could be introduced and the household disconnected.

b. Natural Gas Metering

The gas sector was more problematic, as gas metering was not as widespread as electricity metering. The least-cost technique for gas companies was to meter whole apartment buildings instead of individual apartments or, in some cases, meter a village, then use the threat of disconnection of the entire building/village to get households to pay. This approach, which still persists in some countries, is sub-optimal, as it does not deal with the problem of the dissenting household that refuses to pay. It also fails to send the price signal to individual households.

c. District Heat Metering

The district heating sector was and, in most cases, still is the hardest sector to address. There was no metering of any kind in 1989, and there is still no metering in many countries. Substantial barriers to metering persist; the main barrier is that household heat metering does not measure actual consumption but a household's share of heat consumption relative to all other households in the building. So household heat

metering requires the participation of all households in an apartment building. As a result, a single household opting out can essentially veto household metering for the entire building. Bulgaria is the most advanced country in the region, where both basement-level (master) metering and household metering are mandatory, and where both kinds of metering have been successfully implemented in nearly all apartment buildings in the country.

2. The Importance of Heat Metering

The majority of low-income consumers living in district-heated apartment buildings in the five countries cannot lower their basic heat bills by weatherizing. The absence of household metering and unreformed billing practices means that there is no economic incentive to install or use equipment to regulate heat consumption, so the most popular form of regulating temperature remains opening and closing windows. Weatherization can increase comfort levels, but this is not always the case. In some buildings and areas, heating systems are poorly controlled so that some households nearest the boiler plant receive too much heat on warmer winter days, and those further away never receive enough heat. For those receiving too little heat, weatherization would increase comfort levels on cold days when the system cannot cope. However, there is no evidence that weatherization is a common practice in such situations.

3. The Bulgarian Model

Bulgaria requires district heated apartments to have heat meters and, under the management of the district heating companies, private companies are installing heat cost allocators (to measure the heat) and thermostatic radiator valves (to adjust the heat output) in all apartments. These private companies will measure heat consumption and bill customers. Payments will be made directly to banks or the heating company thereby minimizing the risk of corruption. Each household must pay for its allocators and valves, and there is an installment plan that can ease the financial burden on low-income households. Unfortunately, installment financing is limited to these technologies and is not available for complimentary energy efficiency measure such as foil radiator sheets. Many households, including the low-income ones, still need financial

assistance to implement the measures. Nevertheless, because they now are charged for heat based on their consumption, households now have an incentive to conserve heat and not open windows. They will also have an incentive to participate in a weatherization program if and when one is established. Early results indicate 13 to 20% reduction in energy use which has eased the impact of heat tariff increases and increased household comfort—an important result.

Installing heat metering on the radiators of households in other countries is certainly possible, but without a government requirement to do so, it can only work if all households in an apartment building give their approval, something that is nearly impossible to achieve. Given heat metering technology, which measures proportional consumption, not actual consumption, one holdout household can essentially veto the installation for the entire building.

4. Summary

Bulgaria has successfully demonstrated that household level heat metering and reduced energy use can be accomplished without government subsidies as long as appropriate legislation, including provisions for installment financing, is in place. But other countries are far behind in this respect and are not moving to replicate the Bulgaria program. Hungary has demonstrated that, without appropriate tariff mechanisms to stimulate the introduction of household metering, basement metering achieves little.

D. Building Efficiency

1. Residential Buildings and the Importance of Housing Associations

Energy-efficiency programs are most effective when they address the entire building envelope, not just individual households. But retrofitting housing blocks with wall, ceiling and basement insulation is expensive. Given this, housing associations or “condominium associations” in some cases can become important energy-efficiency stakeholders, implementing, overseeing, or arranging for weatherization, metering, and other energy-efficiency improvements in communal buildings on the residents’ behalf.

Associations can also help establish (or re-establish) and maintain a payment culture for utility services, where such services are payable communally.

One barrier to improved residential energy efficiency in the five countries is the weakness of these associations, although the nature of the problem varies both from country to country and within countries. Legal standing for building associations is an issue in some countries. Without standing, the associations cannot borrow funds for energy-efficiency measures or other improvements. Even with the legal authority, financial institutions still may not lend to them. In the absence of collateral or some other method of securing a loan, financial institutions usually consider it too risky to lend to housing associations, particularly if the associations contain too many low-income households that may have difficulty making their contributions to the monthly loan payments.

There are some successes in financing through building associations, however. Under Hungary's Széchenyi Plan, condominium associations may apply for interest support to renovate their common areas if they have kept a renovation fund for at least four years. The government subsidizes 70 percent of the loan costs for the first five years and 35 percent for the next five years.

In Armenia, the recently-established condominium associations (CAs) are considered potential vehicles for re-establishing a payment culture for energy and other communal services. A USAID-funded program that the Urban Institute is administering is designed to stimulate this culture change and persuade a sometimes hesitant and suspicious public to buy into the idea of empowered CAs.[13] Although the CAs have legal standing on paper, it is extremely unlikely that any bank would lend to one, and equally unlikely that the CA would even consider approaching a local commercial bank as interest rates are prohibitively high. Another problem is that the CAs were created top-down rather than bottom-up, i.e., the *Condominium Act* was the driver rather than stemming from a perceived need by households. As a result, Armenian households tend to be suspicious

[13] About 42 percent of all buildings in Armenia have been formed into 630 CAs (as of May 2002), with the number of buildings in each varying widely from a single building to as many as 60.

about making communal payments and conducting communal activities such as energy-efficiency improvements. While a handful of CAs are functioning well, the majority exist in name only and have few or no real activities.

In Kazakhstan, there appears to be practical problem with some of the cooperatives of apartment owners, known as KSKs. When KSKs were set up, households were persuaded to sign to vote for the new administration and now they cannot get rid of them. This is a corruption issue affecting low-income and other households; the sums collected to pay for utilities can exceed the actual utility payments. There is uncertainty about the extent and impact of this issue, but it does not create a climate of goodwill on the part of households to contribute funds for energy efficiency or building improvements.

Romanian housing associations are relatively strong and well organized and have legal standing. They collect funds from residents for communal services, heat, water, and cooking gas, and for managing building repairs. The USAID-funded Cooperative Housing Foundation (CHF) is implementing a program to strengthen micro-credit organizations that lend money for energy efficiency and other activities in the Romanian city of Timisoara. CHF now plans to expand its activities throughout the west of Romania, having demonstrated the effectiveness of step-by-step financing, and is considering extending the activities to include ownership associations and energy-efficiency initiatives.

A “School for Building Administrators” was established in Bucharest as a joint venture between Bucharest City Hall and a non-governmental organization (NGO). The school offers a certificate course that seeks to raise the profile of the people running ownership associations, who can sometimes be held in low regard by the households that they represent, and to provide them with new skills. The course covers a wide range of topics including the potential to lower costs using weatherization, metering and control at the building and household level, and practical advice on how to finance and implement such projects. Although there is no requirement to hold such a certificate, the initiative has proved to be popular with some administrators, as the burden and

complexity of responsibility for running a building as well as the sums of money involved have increased progressively during the last decade.

In Bulgaria, there are no building associations. Residents sometimes organize themselves on an ad hoc basis, but they are not officially recognized and cannot borrow funds for energy-efficiency improvements.

2. Energy-Efficiency Labeling for Buildings

In addition to empowering building organizations to pursue energy-efficiency investments, another approach to improve the energy efficiency of residential buildings is for the government to rate them on the basis of their energy efficiency according to a scale and then to label them in the same way that appliances or cars are rated for their energy efficiency. Energy-efficiency labeling of buildings will be introduced in Romania in 2005. The labeling system will be based on the appliance labeling system and will rate buildings between “A” (most efficient) and “J” (least efficient). In other countries, such ratings are used on single-family homes and can influence the purchasing decision of homebuyers, which, in turn, influences the sellers to improve the home’s energy efficiency. It is not clear how this will work in apartment buildings, where decisions on building retrofits must be made collectively; there is also a financial hurdle to be overcome, and the issue of the building association’s role, responsibility, and credibility resurfaces.

Even if the barriers to implementing labeling in apartment buildings can be overcome, it will not help low-income households with their energy costs. This is because the purpose of labeling programs is to influence homebuyers to select more energy-efficient homes, which then influences builders to supply more energy-efficient homes. Unless there is a special subsidized housing program for them, low-income families will not be the ones moving into the new energy-efficient homes. Over the longer term, as the building stock is turned over and the general energy-efficiency level of homes improves, low-income families will presumably start to benefit from the labeling program.

3. Social Institutions

Although not directly benefiting low-income families, there have been efforts in most of the five countries to improve energy efficiency in hospitals, orphanages, and other institutional buildings that provide services for the poor. For example:

- In Armenia, USAID supported a study to replace 53 inefficient school boilers and supported the use of energy service companies to improve energy efficiency in four schools. The intent is for the latter program to be expanded to the residential sector.
- In Hungary, the Ministry of Economics is administering a program that provides grants and interest-free loans to hospitals, municipalities, and other public institutions for the identification of energy-efficiency projects and preparation of project feasibility studies. The Global Environment Facility ($ 4.2 million), the UNDP ($ 400,000), and the Hungarian government ($ 2.8 million) fund the program.[14]
- In Romania, the EU's PHARE Programme conducted a number of projects to improve the energy efficiency of schools, hospitals and orphanages. The national electric utility conducted a compact fluorescent lamp (CFL) installation program in social buildings in 1998 (see section 3.E.1, below).
- In Bulgaria, there has been considerable work on social facilities through assistance to municipalities, which own most of the hospitals in the country. USAID supported demonstration boiler retrofits in municipal buildings. USAID's Municipal Energy Efficiency Project helps Bulgarian municipalities and companies identify energy-efficiency project opportunities, develop bankable projects, and raise capital for them. Under a Development Credit Authority agreement with the United Bulgarian Bank, the U.S. government guarantees up to 50 percent of energy-efficiency loans.[15]

[14] Alliance to Save Energy, "Funds for Energy Efficiency Projects," (Washington, D.C., April 2002), 20.
[15] USAID mission, Sofia, http://www.ee-environment.net/docs/bulgaria.shtml, and Electroteck, http://www.electrotek.com/meep/eng/Successstoriesfiles/Succstrs/10eng.pdf

4. Summary: Residential Energy Efficiency Programs To Date Are Limited; Metering Success is Significant

Housing associations are effective in facilitating energy efficiency in Hungary and are developing well in Romania, but are of little impact or not present elsewhere. Romania has an innovative building-labeling program planned. Weatherization and rehabilitation of social buildings are commonplace, but mainly at the international community's initiative rather than that of governmental stakeholders. Residential energy efficiency programs have not been a priority in the five countries surveyed. The Bulgaria metering experience is the most significant in its initial results and potential for replication elsewhere.

E. Household Lighting and Appliances

1. Compact Fluorescent Lamps

Compact fluorescent lamps (CFLs) were barely known in the CEE countries in the early 1990s, and only a few households owned a CFL even in the mid-1990s. However, by 1997, 19 percent of all households in Hungary had a least one CFL, which ranked Hungary in the top eight countries in Europe with respect to CFL penetration (and thus probably in the top dozen world-wide).[16] Even among the poorest 35 percent of the population, 14 percent have at least one CFL. Roughly 200,000 CFLs have been given to low-income households through a foundation program.[17]

Bulgaria conducted a one-time distribution of CFLs to households that qualified for social assistance. Significantly, it was not donor-sponsored or -funded but was a Ministry of Labor and Social Policy initiative. Unfortunately, there is almost no documentation on this activity, such as how the lamps were distributed, whether low-income families actually received them, whether they were installed and used, whether

[16] J. Palmer, J. and B. Boardman, "Domestic Energy Efficient Lighting (DELight)" (Environmental Change Unit, Oxford, 1998).

[17] This was cited in Diana Ürge-Vorsatz and J. Hauff, "Drivers of Market Transformation: Analysis of The Hungarian Lighting Success Story," *Energy Efficiency in Household Appliances and Lighting*, eds. P. Bertoldi et al. (Springer, 2000) 287-298, in a conversation with N. Bacso in 1999.

they performed as designed, whether they performed to the users' satisfaction, how much energy or money they saved, and whether they stimulated any additional CFL sales.

Romania's national power distribution monopoly conducted a program entitled "Installing CFLs in Budgetary Institutions—a DSM Action" in 1998 that the utility funded from its own resources. Following a public tender, 100,000 Osram 21 watt CFLs were installed in schools, hospitals, orphanages, old folks' homes and other social institutions, replacing 100-watt incandescent lamps. Monitoring concluded that 88,500 of the lamps had been mounted effectively. According to a highly detailed technical paper[18] on this action's impact, the results for consumers were maintained (but not improved) visual comfort levels and reduced lighting costs representing a combined total of 13,500 MWh per year. For the power company, the benefits were a fuel cost reduction of US$ 1.5 million per year, a reduction of 7MW from peak demand, and an improvement in its public image.

While well intentioned, give-away programs cannot be said to have a long-term impact on the CFL market in these countries because they do not lower the high cost of the lamps, which was the main barrier to their purchase in the first place. Programs that provide rebates or installment loans on utility bills for CFL purchases are more effective, especially when combined with promotional campaigns, in increasing the long-term CFL market penetration. However, giveaways can serve as a precedent for targeting energy-efficiency measures to low-income households.

2. Household Appliances

Of the five countries under review, Hungary has done the most to address energy efficiency in household appliances. As it will join the EU in 2004, it has recently established a set of energy-efficiency standards for appliances. In Romania, a government decision on the labeling of appliances was taken in 1996, and, as a result, energy-efficiency labeling of appliances is now standard practice.

[18] Camelia Burlacu, "Montarea de LFC La Unii Consumatori Bugetari - O Actiune DSM" (SC Electrica SA, Bucharest, Romania, 1998).

Standards and labels apply only to new appliances, so they do not make a rapid impact on electricity bills of low-income households. However, the impact will percolate down to the used appliance market over time, eventually benefiting low-income households.

3. Compact Fluorescent Lamps (CFLs)

Capital cost is a barrier to wider use of CFLs, including by low-income households, and energy-efficiency programs have not focused on providing financing or financial incentives to help households, low-income or not, buy them.

Chapter 4
Tariff Mechanisms

A. Lifeline Tariffs

Governments and utilities use a lifeline tariff system mainly to provide assistance to low-income households. The lifeline tariff allows households to pay at a lower rate for a certain monthly energy consumption level. If the household consumes more than the lifeline amount or "block" of energy, they pay for the extra amount at a higher rate. Since the lifeline block is usually a below-market rate, that is, it costs more to provide that electricity to the household than the household is paying for it, then other consumers typically end up paying a slightly higher, above-market rate for their electricity. Which consumers will pay to subsidize the lifeline block is an issue that all countries face.

Lifeline tariffs are typically part of an "inverted block system" in which each additional amount or "block" of energy consumption is charged at a progressively higher rate. Of the five countries studied, Armenia has experimented with two inverted block tariffs in the past and found the design unsatisfactory, but may re-introduce one in the future. Bulgaria is planning one but is still at the design stage. Hungary has not used the technique, while Kazakhstan has below-market power prices for all household consumers across the board. Romania has inverted block tariffs for both electricity and natural gas.

Of the countries studied, only Armenia and Romania introduced lifeline tariffs and found that they often do not work well. Armenia had to implement several corrective measures to try to get its lifeline tariff for electricity to work, but it still proved to be ineffective, expensive and easy to cheat. Romania has a relatively well-designed lifeline tariff for electricity—to which 44 percent of households subscribe—but is finding it to be incompatible with the recent introduction of the program to read meters every six months. Romania's lifeline tariff for natural gas has a fundamentally poor design.

A key finding from a comparison of the region's tariff systems is that the design of a good lifeline tariff is complex and easy to get wrong. Also, like other social safety net mechanisms, targeting of vulnerable households so that benefits remain focused on those with need is an issue.

Other findings are as follows:

- Allowing low-income consumers to “self-target” by creating tariff options, as is the practice in Romania, can be very effective.
- Targeting lifeline tariffs by “piggybacking” on other programs that identify low-income consumers is possible and desirable.
- A well-designed lifeline tariff can provide a strong economic incentive for households taking aggressive steps to become more energy efficient.
- A poorly designed lifeline tariff can discourage energy efficiency.
- When households use an energy source with a lifeline tariff for heating, different rules can be applied for summer and winter consumption.
- Lifeline tariffs are most effective if meters are read on a monthly basis.
- Well-designed lifeline tariffs can be relatively low cost whereas poorly designed lifeline tariffs can be high cost.
- Although it is widely accepted that governments “should” reimburse energy utilities for the costs of operating lifeline tariffs, they normally do not, so in this respect targeted, limited and self-financing mechanisms are desirable and untargeted, unlimited, and loss-making mechanisms are not.

B. Time-of-Day (ToD) Tariffs

Time-of day (ToD) tariffs for households are electricity tariffs that are typically higher in the daytime and lower at night, reflecting the cost of providing the electric service at different times. Sometimes there is also a “peak” rate at lunchtime or early evening. Special time-of-day or time-of-use meters are required to implement such rates for consumers.

1. Impact on Low-Income Households and Power System Costs

ToD tariffs can help low-income consumers to some extent, but not as much as they help higher-income consumers. Appliances whose operation can be shifted to evening hours from daytime hours, such as washing machines, clothes dryers, and dishwashers are features of rich households. Electric storage heaters that heat up during the night

and release heat during the day are generally not available in the countries studied for this report.

Despite the above, ToD tariffs can be worthwhile as they can represent a “no-cost” measure for the power sector as a whole. Savings from moving expensive daytime peak load to nighttime can often repay the cost of a ToD meter quickly. Armenia recognized this feature and used social assistance funding to provide “free” ToD meters to low-income households.

2. Some Utilities Are Reluctant to Set ToD Tariffs or Set Inappropriate Tariffs

ToD tariff-setting is an area where regulators should study the load profile of regulated utilities, the design and uptake of any existing ToD tariff options, and the incidence and cost of installing ToD meters. Unless there is a serious problem of under-capacity and a lack of financing, as in Armenia, power utilities can be reluctant to promote tariffs that reduce their gross revenues, as the long-term benefits of a flatter demand profile are offset by an unwelcome capital investment in meters. In this respect, the initiative to install ToD meters and create attractive ToD tariffs should come from regulators.

Regulators should also consider whether power utilities offer ToD tariffs that are sufficiently attractive to encourage households to install a ToD meter and subscribe to the ToD tariff. Armenian householders pay 15 ARD/kWh (2.6 US cents) at night and 25 ARD (4.3 US cents) during the day, representing a considerable savings potential on the standard all-day tariff of 25 ARD. So Armenians subscribe to the ToD tariff, despite their having to pay for the meter (albeit in a two-year installment plan). At the other extreme, the Romanian ToD is unattractive—a 20 percent discount on consumption at night is offset by a 20 percent premium on daytime consumption. Unsurprisingly, only 0.2 percent of Romanian households subscribe to the ToD tariff, even though meters are installed free of charge.

3. Summary: Why Policymakers Should Usually Promote ToD Tariffs

ToD tariffs can make only a small contribution to helping poor households afford energy, but they are often a good idea as they lower overall system costs. Utilities are unlikely to set attractive ToD tariffs unless governments or regulators force them to do so.

C. Across-the-Board Low Tariffs

1. The Transition from Subsidized to Economic Tariffs

As broad economic, political and social reforms progressed through the 1990s, energy utilities needed to raise substantially more revenue to meet rising operating costs, particularly fuel and labor costs. Utility tariffs were far too low to meet this need with sales revenue, so government subsidies were often provided to keep the utilities afloat. Subsidies began to represent a major economic drain on governments, which faced a difficult dilemma—raise prices or keep them low—as summarized below:

Table 1: The Pricing Dilemma for Energy Utilities in New Market Economies

	Advantages	Disadvantages
Keep prices low • An unsustainable solution	Affordable for all, including low-income customers Politically popular; everybody likes low prices.	A very, very expensive practice as utility subsidy needs can undermine national economic recovery. As funds are limited and there is little investment money, the quality of utility service declines and costs rise. Richer customers become “free riders,” benefiting from state subsidies that they do not need.
Raise prices to market levels • A sustainable solution	A much lower cost solution for the government as low-income (targeted) subsides are much cheaper than general (untargeted) subsidies.	Low-income households need assistance, so targeted subsidies are required for the first time in countries without any experience in targeting subsidies to the poor. Politically difficult—nobody likes price increases. A nonpayment problem can emerge if targeted subsidies are badly designed, targeted, or timed.

2. Economic, Social, Ethical and Environmental Reasons to Raise Energy Prices

From an economic viewpoint, across-the-board low tariffs are a recipe for economic disaster. A dollar spent on providing low-income households with “free energy” is matched by several dollars spent providing “free energy” for richer households for their washing machines, dryers, air conditioners, computers, multiple televisions, etc. As middle-income and wealthy sectors of society grow, the subsidy’s cost also grows.

From a social viewpoint, however, it is often argued that across-the-board low energy prices protect the poor. And they do. However, the costs for governments are so huge that they can undermine national economic recovery, contributing to poor nations remaining poor, rather than growing richer. More often than not, the subsidies are not provided by the government to the utility. The most common source of the subsidies are the utilities themselves which receive inadequate income, cannot finance maintenance and investment and slowly decapitalize the system. These tariffs are not in the long-term interest of the poor who will likely suffer most when systems collapse.

From an ethical perspective, any low-income subsidy that goes primarily to the rich is not well designed.

From an environmental perspective, artificially low energy prices send the wrong price signal to households, encouraging them to consume more energy rather than conserve.

3. The Varying Pace of Tariff Reform

Although most countries have recognized that across-the-board low tariffs are unsustainable in a market economy, the pace of tariff reform has varied from country to country. At one end of the spectrum are Hungary and, more recently, Romania, which now have achieved cost recovery in the power sector, (although both countries continue to sell natural gas at prices that are well below cost-recovery levels). Armenia continues to struggle to raise tariffs to cost-recovery levels. Bulgaria is on a reform path for both electricity and district heating. At the other end of the spectrum is Kazakhstan, where all energy prices remain extremely low in many oblasts.

4. Why Tariff Reform is Difficult

There are a number of reasons why tariff reform can be extremely difficult. For example, the extent to which low-income households rely on a particular form of energy for essential needs (such as cooking, heating and hot water) is an important factor. Many Hungarians and Romanians cook and heat with natural gas, hence the reluctance of successive governments to raise prices to market levels. Armenians and Bulgarians use more electric cooking and heating, so raising power tariffs is more difficult in these countries.

Nonpayment, theft and fraud undermine attempts to raise prices in some countries. The vicious circle of non-payment, disconnection, rising costs, and declining utility revenues leads to disinvestment and deteriorating service which makes customers increasingly resistant to tariff increases.

Higher energy prices are politically non-palatable. For several countries, it is possible to construct graphs that show an energy price decline leading up to election years. The historical legacy of low electricity prices remains a political burden. Electricity price increases introduced gradually can have negligible impact on inflation and acceptable impact on household budgets (with the exception of low-income households in some countries).

Unstable national currencies also undermine efforts to raise tariffs. Armenian household electricity tariffs remained constant at 25 ARD/kWh from January 1999 to May 2002, but in dollar terms this was US$.047 per kWh, rising to US$.048 per kWh by the end of 1999, and falling to US$.043 per kWh by May 2002. Romania also suffered from successive efforts to raise power tariffs that were being undermined by a progressive decline in the value of the Romanian *lei* against the dollar.

5. Key Steps for Energy Tariff Reform without Losing the Payment Culture

Whatever the pace of reform, prices need to reach cost recovery levels and targeted social safety net approaches must accompany increases to ease the impact.

Table 2: A Blueprint for Energy Tariff Reform without Losing the Payment Culture

	Essential steps	Complementary steps
Electricity	Simple meters that cannot be tampered with easily; If meters can and are being tampered with, remove them from households and place them in an external environment. Withdraw service for nonpayment. Separate metering, billing and collection functions in the utilities.	Availability of efficient electrical appliances Time-of-day meters and tariffs Other low-income tariffs which are limited and optional Use easy payment plans and energy-efficiency awareness programs for customers who can't pay, but display a willingness to pay. Regulate these, but do not leave them solely to the discretion of the utilities. Prepayment meters as an optional alternative to disconnection for non-payment
Natural gas	Meters Withdrawal of service for nonpayment	Energy-efficiency awareness Help with weatherization Low-income tariffs
District heating	Basement heat meters Tariffs that are based mainly or solely on metered consumption Enabling legal environment for heat cost allocators and tariff mechanisms that promote their use. (Financing with supplier credits is easy when an enabling legal environment is in place.) Enforceable legal sanctions for nonpayment	12-month payment smoothing to lower the monthly burden of winter heating (but without removing the price signal) Information on heat cost allocators (HCAs), thermostatic radiator valves, and energy efficiency Coordination between the government and billing companies will prevent poor households being excluded if the neighbors install HCAs. Help with weatherization
Water	Basement water meters Tariff mechanisms that provide a strong economic incentive to install individual water meters	Assistance with the capital cost of installing individual water meters for low-income consumers Awareness initiatives. Low-flow showerheads and simple plugs[19]
Whatever fuel is used for heating	Narrowly targeted, well-designed mechanisms to help low-income consumers pay for winter heating	

[19] In some CEE and Eurasian countries, the habit of plugging sinks has been lost, so hot water can run constantly while washing. “Free” plugs, low-flow showerheads and awareness materials can make a substantial impact in this sector.

6. Summary: Remove Across-the-Board Low Tariffs and Introduce Market Pricing

Across-the-board low tariffs are a costly and unsustainable way of helping low-income households afford energy. There are compelling economic, social, ethical, and environmental reasons to raise energy prices to market levels. The key step is to rapidly start to extract larger sums (market prices) from households that can afford to pay and smaller sums (market prices offset by targeted subsidies) from low-income households that cannot afford to pay.

Price increases should be:

- Programmed to rise gradually to cost of recovery over a well-defined period and not in a single step.
- Fully coordinated with social safety net approaches to ease the impact on vulnerable households such as assistance payments (see the models in the appendices); tariff design and energy efficiency measures.
- Indexed to hard currency to prevent a decline in the value of local currency from undermining the pace of tariff reform.

D. Rational Heat Tariffs

1. The Importance of Tariff Design for Low-Income Households

Chapter 3 includes a section on technologies that enable households to reduce their energy consumption by choosing the amount of heat that they will use. Installing such technologies achieves nothing if consumers do not use them. Therefore, it is important to create tariffs that provide an incentive to use these technologies.

Most district heating companies in the CEE and Eurasia operate tariff mechanisms that, at best, minimize and, at worst, completely undermine the potential benefits of individual autonomous control of heat consumption.

There is substantial evidence that low-income households respond positively to the opportunity to save money. Savings from better-designed heat tariffs can move households from below to above the poverty line in some cases.

2. Defining "Consumption-Based," "Fixed," "Minimum," and "Mandatory" Charges

In researching this report, the analysts found that there were many ways in which stakeholders understand a "fixed charge." The expression can be defined as follows:

- **A consumption-based charge** is defined by the reading on a basement heat meter. It is shared between apartments based on readings from HCAs. It sends a "perfect" price signal.
- **A fixed charge** is completely unrelated to heat consumption. It is usually based on the size of a building or an apartment and is common where basement meters have not been installed.
- **A minimum charge** can be set at a level below which a household's monthly heating bill may not fall. Whether this represents an incentive or disincentive to energy efficiency depends upon the level at which the charge is set (see below).
- **A mandatory charge** is not a stand-alone concept. It reflects the principle that households must remain connected to, or at least pay for, district heating, even if they choose to use another form of heating. Hence, it is possible to talk about a mandatory consumption-based charge, a mandatory fixed charge, and a mandatory minimum charge.
- An **optional charge**, for the purpose of this report, is any form of charge applied to households that have the right to choose to disconnect from a communal heating systems if they wish.

3. Finding the Optimal Tariff Mechanism for District Heating

- **An optional, fully-consumption-based tariff** is a sustainable tariff mechanism that promotes energy efficiency and protects low-income households. This tariff mechanism is optimal for countries where it is impossible to limit the right of households to disconnect as (together with other measures) it removes the incentive to disconnect.

- **A mandatory, fully-consumption-based tariff** is a sustainable tariff mechanism that is slightly more popular with district heating companies than the tariff above, as households are “captive customers” that are not permitted to use another form of heating. The only flaw with this tariff mechanism is that apartments that are empty and use no heat generate no revenue at all for the district heating company and so do not contribute to the cost of having heat available to use if they need it. This is a minor flaw as there are few empty apartments.

- **An optional fully fixed tariff** is an unsustainable tariff mechanism that fully removes the economic incentive for households to save energy and fully promotes the incentive for households to disconnect from district heating. This tariff mechanism is the most commonly used in CEE and Eurasia and has been directly responsible for the collapse of many district-heating networks. It represents the problem, not a solution.

- A **mandatory fully fixed tariff** is an unsustainable tariff mechanism that wastes energy and represents a considerable financial burden for low-income households or for the governments that have to pay subsidies to meet the otherwise unaffordable and uncontrollable heating costs of low-income and other households.

- **An optional consumption-based tariff with a fixed charge** is a sub-optimal tariff mechanism that reduces, but does not remove the incentive for households to disconnect from the heat network and provides a sub-optimal incentive to save energy.

- **A mandatory consumption-based tariff with a fixed charge** is a sub-optimal tariff mechanism that provides limited potential for low-income households to reduce heat consumption and consume within their budget, so governments still need to provide subsidies to make heating affordable to low-income households.

- **An optional consumption-based tariff with a minimum charge** is a sustainable option. If the minimum charge is set at around 30 percent of a typical household bill, this tariff substantially reduces the incentive to disconnect, fully-optimizes the incentive for occupied households to save energy/money (as it is not realistic for an

occupied household to reduce consumption by more than 70 percent), and generates income from unoccupied apartments.

- **A mandatory consumption-based tariff with a minimum charge** is the optimal solution for countries where mandatory district heating is acceptable, providing that the minimum charge is set at around 30 percent of a typical household bill. This tariff fully overcomes the problem of disconnection from the system, maximizes the heat load (for which there is real demand) for the district heating utility, provides a perfect incentive for households to save money and energy, and generates revenue from unoccupied apartments.

4. Complex District Heating Charges Are Not Necessary

The household district heating charge levied by Fotav (the Budapest district heating company) is an example of the worst type of administrative tariff mechanism; it is an entire page of complex calculations to justify the price. It is a clear form of monopoly abuse. A simple tariff of *x* HUF/Gcal subject to a minimum charge of *y* HUF would be far better.

Examples of tariffs from selected countries are:

Armenia: Uses an Optional Fully-Fixed Tariff (the worst model)

Bulgaria: uses an Optional Consumption-Based Tariff with a Fixed Charge, which is a sub-optimal model but which works pretty well for three reasons: (1) the Fixed Charge is quite low: (2) individual metering and control is a legal requirement, so people can actually benefit from the tariff; and (3) gas networks are underdeveloped and elecgtricity is expensive, so there is no real competition.

Hungary (Fotav): uses a Mandatory Consumption-Based Tariff with a Fixed Charge, but the Fixed Charge are so high that the economics of installing individual metering and control are unattractive, so the incentive to save is removed and households continue to split costs based on the size of apartments. Customer dissatisfaction may be high

because the charge is mandatory and households are not allowed to disconnect from the central heat network and install a gas boiler.

Kazakhstan: uses a Fully-Fixed Tariff (the worst model)

Romania: offers Ooptional Fully Consumption Based Tariffs (one of the best models) but due to inadequate metering, heat is normally supplied using Fully-Fixed Tariffs (the worst model). As district heating is optional and gas is widely available, household choose to disconnect from district heating in favor of gas.

5. Summary: The Optimal Tariff Mechanism for District Heating

Four important points for policymakers are:

1) The optimal solution for district heating is a consumption-based tariff with a minimum charge of around 30 percent of a typical household bill.

2) It is extremely important to understand the difference between a consumption-based tariff with a fixed charge, which is a sub-optimal tariff mechanism, and a consumption-based tariff with minimum charge, the optimal tariff mechanism. This subtle but important difference is often poorly understood.

3) Tariff reform is optimized if buildings and households are metered.

4) Do not allow district heating companies or their municipal owners to define the tariff mechanism (as in the case of Fotav, above). There is a case for allowing tariffs to be set locally, but not the tariff mechanism, which should be kept simple.

Chapter 5
Comparing and Evaluating the Main Approaches

A. Two Methods of Comparison

Each country surveyed approached the problem of helping the poor differently, based on its specific economic and political history during the transition period. As illustrated throughout this report, the success or failure of different mechanisms to help low-income households better cope with increasing energy costs depends on many factors, conditions, and circumstances in each country. This report and the appended country reports illustrate important variations in these conditions and circumstances both within and between countries, making cross-country comparisons difficult. Given these variations, how can different approaches to helping the poor across these countries and similar countries best be compared?

To accomplish such a comparison, the first step is to simplify the different strategies and approaches outlined in this report to focus only on several generic mechanisms in three categories of approaches. Many innovative approaches discussed in the country reports are not included in this analysis, although they are discussed in the country reports. Instead the focus is on several generic, well-known approaches to help the poor (table 3). Then these approaches are analyzed using two different methodologies.

Table 3: Approach vs. Mechanisms

Approach	Mechanism
Subsidies and assistance payments	1. Across-the-board price subsidies for utilities
	2. Energy assistance payments (earmarked)
	3. Social assistance payments (non-earmarked)
Energy efficiency	1. No energy-efficiency measures
	2. Low-cost household energy efficiency
	3. High-cost building efficiency

Tariff mechanisms	1. Lifeline tariffs
	2. ToD tariffs (day-night meters)

The first method is a static analysis of options that assigns a ranking to each mechanism on the basis of well-known criteria. The criteria used in this analysis include the impact of the mechanism on liberalization of the energy sector, coverage and targeting of the poor, annual relative costs, and any energy-efficiency properties associated with the mechanism. The selection of these criteria is intended to highlight critical aspects of each option using well-known properties that policymakers demand for different policy options. However, the selection of these criteria was also guided by considering only those indicators that could be evaluated empirically. These rankings were then summed to produce an ordering of each mechanism across all criteria.

Like other similar analyses, (such as Lovei et al., 2000), the exercise is intended to provide policymakers with a general framework to evaluate different mechanisms to help poor and low-income households. However, an important limitation of this type of analysis is that it cannot show the influence of different energy-efficiency measures on household or government expenditures, nor can it show the benefits of these measures over time or the interaction of such measures on other approaches and options. To overcome these limitations and evaluate different sets of strategies for helping the poor, a simple growth model is estimated that illustrates trade-offs between different factors over time. The growth model results are then reported using a simple static framework.

This analysis shows that household energy efficiency can and ought to be an important element in helping poor households when utility costs to consumers increase. Energy-efficiency measures not only provide considerable cost savings to poor households, but also allow governments to maintain the adequacy of existing energy assistance payments to the poor, while strengthening incentives to save energy during periods of price liberalization. Governments that implement energy-efficiency measures for low-income households have the opportunity, in the long run, to save money, yet still meet their obligations to low-income households during periods of liberalization.

B. Evaluating Options

The first analysis considers five separate mechanisms or options that are used to help poor and low-income households throughout the region. These options are ranked according to five different properties or criteria. The analysis assumes that the relative value of each option is independent of other options. This means that the implementation of one or all options is possible and that any interaction between options does not influence their relative appeal across criteria.

For the purposes of this first analysis, energy-efficiency measures are intentionally omitted as a policy option and instead energy efficiency is used as an evaluative criterion. As will be seen, energy efficiency can have varying relative influences on each option over time, depending on the type of energy efficiency implemented. However, in this first analysis an option is considered only if it has some (or no) energy-efficiency properties, not the magnitude of the efficiencies produced.

1. Evaluative Criteria to Rank Options

a. Impact on Liberalization

Any mechanism to help the poor may somewhat distort utility prices or may influence the ability of firms to recover the costs of residential utility services.

- Mechanisms that greatly distort the effective unit price of service, such as across-the-board subsidies, or make it difficult for firms to recover the costs of residential services they provide, such as a policy of no disconnection for nonpayment, are assigned a negative score of one.
- Mechanisms that have some or no distortion receive a score of zero.
- Mechanisms that increase the expected value of residential payment receive a positive score of one.

b. Coverage of the Poor

Coverage refers to total poor households that qualify for and receive a social benefit, divided by the total number of poor. Coverage ratios below 33 percent were given a

score of zero, those between 33 percent and 66 percent was given a score of one, and those greater than 66 percent given a score of two. ToD tariffs were given a score of zero to one since several countries in our survey did not have these tariffs for the residential sector.

c. Targeting of the Poor

Targeting refers to the benefit amount received by poor households divided by the total program budget. A score of zero was assigned to programs that do not target the poor. A one was assigned to programs that are pro-poor, that is, programs that provided greater than 50 percent of program resources to the poor. A score of two was given to programs that have 70 percent or more of their resources going to the poor.

Energy assistance and social assistance payments received a range of scores since targeting varied by country and program-to-program. The targeting of lifeline line tariffs depended on their exact design, with some countries providing well-targeted tariffs for the poor.

d. Annual Relative Costs

Options are ranked on this criterion not in terms of absolute sums, but rather relative to each option. Options that incur the greatest expenses per year receive a negative one, while options that are the least costly receive a positive two. Lifeline tariffs are assigned a value of zero to one, since some countries had well-designed tariffs that were inexpensive to operate and were well targeted to the poor.

e. Energy-Efficiency Properties

This criterion ranks an option according to whether or not the option encourages consumers to use less energy.

2. Mechanisms to Help Low-Income Households

a. Across-the-Board Price Subsidies for Utilities

Across-the-board price subsidies for utilities are low tariffs to residential customers and represent the most expensive of all mechanisms used to help the poor to afford energy.

According to the survey, undercharging households for energy is a widespread practice in the region. It is expensive on the basis of cost per household and extremely expensive on the basis of cost per low-income household. Typically, for every dollar spent on keeping energy prices low for the poor, at least several dollars are spent on keeping prices low for non-low income households.

Coverage applies only to households that are connected to the utility operating the low tariffs, discriminating against the poorest households. Of course this mechanism does not target the poor at all. It is an unsustainable practice that encourages incremental energy consumption over energy savings and prevents utilities from generating enough revenue to modernize. However, across-the-board low tariffs are a simple option for governments—often a popular measure that is easy to administrate.

b. Energy Assistance Payments (Earmarked)

Households can use energy assistance payments only for energy consumption. In most cases, these payments go directly to utility distributors on behalf of low-income customers. This means the potential impact on both utility companies and price liberalization is very good. Utility companies get paid for their services, even if they are supplying to households that otherwise would find such services unaffordable. Coverage is reasonably good, but depends on the state's overall capacity to provide benefits. Targeting is more variable than coverage, since it depends on both the program design and state's capacity to administer to poor households.

The relative cost of energy assistance payments is higher than many options, although its benefit tends to be concentrated on low-income households. One drawback is that it has recurring costs to the government. There are no energy-efficiency benefits. In fact, it could be argued that it encourages households to choose incremental energy use over energy saving.

c. Social Assistance Payments (Non-earmarked)

Social assistance payments are different from energy assistance payments in that they can be used for any type of household consumption. Payments go directly households and not to utility distributors on behalf of low-income customers. This means the

potential impact on utility companies and price liberalization will depend on other factors such as disconnection rates and tariff rates. A potential weakness of earmarked systems is “leakage”, i.e., money that is nominally paid to help low-income energy consumers pay their utility bills but does not reach utility companies because households spend it on other essential consumption. Coverage and targeting, like energy assistance programs, depends on the state’s capacity and administration to identify the poor.

In practice, governments bundle utility and non-utility social assistance together to disguise the fact that the overall social assistance level is inadequate to meet basic needs. So assessing annual costs is difficult. However, administrative costs are usually lower than for earmarked energy payments, since it is possible to “piggyback” onto ***existing*** social assistance payment systems.

d. Lifeline Tariffs

A lifeline tariff helps the poor by charging them less for energy up to a specific consumption threshold. These tariffs often have a negative impact on utilities, which are forced by governments to bear the costs of operating the tariffs, passing on part of the cost of social protection from the government to the utility. The administrative burden may be higher, as consumption must be read monthly for this tariff to work. This suggests that the influence on price liberalization is not very good.

Coverage and targeting depend on the tariff’s design. Costs per household are not necessarily large, but costs per low-income household can be much larger, reflecting the fact that low-income households are not always targeted as part of the tariff design, although they can be in some cases. There can be positive benefits for energy efficiency if the tariff is designed to provide a strong economic incentive for households, not to exceed the monthly consumption threshold, but this is not always the case. Politically, governments can use lifeline tariffs to pass the costs of social assistance to the utilities. This makes it a highly attractive feature to some governments and unacceptable to others.

e. ToD Tariffs (Day/Night Meters)

ToD tariffs are a low-cost option when considered over time, although the initial cost of installing meters is expensive. There is potentially useful impact on price liberalization, but the impact on low-income households is limited. This option may even generate positive revenues if it is offset against power system savings that result from lower peak load demand. The coverage for low-income households is limited however, because households typically do not own large appliances (such as washing machines and dishwashers) that may be used during the night. This limits its overall usefulness as an option to help low-income households. Despite this, there are no barriers to targeting low-income households and providing them with day-night meters.

Of all the measures evaluated, the ToD tariffs offer a high potential for improving energy efficiency (especially its impact on the power system). Administratively, beneficiaries have to be identified and meters installed and read, but this is day-to-day work for electric power companies. Although this option appears attractive, it is not often used in practice, particularly in systems where the economic rent attributable to lower peak load does not go directly to the power distribution company. The power distribution company may benefit from the savings, but also has to bear the meter installation cost and lower customer revenues. In this respect, the decision to create attractive ToD tariffs and/or to support the installation of ToD meters for low-income households can be a matter of politics rather than economics.

3. Comparing and Summarizing Results of First Analysis

The results of the first analysis show that across-the-board price subsidies for utilities are the least preferred policy to help low-income households. The best policies are energy assistance payments and ToD tariffs (see table 4).

Table 4: Results of the First Analysis					
Criteria/Policies	**Across-the-Board Price Subsidies for Utilities**	**Energy Assistance Payments (Earmarked)**	**Social Assistance Payments (Non-earmarked)**	**Lifeline Tariff**	**ToD Tariff**
Impact	-1	1	0	2	-1
Coverage	2	1	1	1-2	0
Targeting	0	1-2	1-2	1-2	1
Annual Costs	-1	1	1	0-1	2
Energy Efficiency	0	0	0	1	1
Total	**0**	**4-5**	**3-4**	**5-8**	**3**

Energy assistance payments are among the most preferred policy options, but this mechanism depends heavily on state capacity and finances. Running an earmarked energy payments system involves a more complex administrative burden, as it is necessary to design systems to identify low-income households and match their energy bills to utility payments. This is not a practical solution for some countries since the overall cost and persuading municipalities to contribute a share and making targeting and administration work well can prove too difficult to manage for some transitioning states.

The evaluation of lifeline tariff mechanisms differs from other mechanisms ranked because of the considerable variations in tariff design. The final evaluation of this option shows that lifeline tariffs can be designed in such a way to help low-income households with energy costs in ways that are attractive to policymakers. The final evaluation reflects these variations and shows that a general analysis of lifeline tariffs depends on very specific design features. Nevertheless, the country reports demonstrate that it is extremely difficult to design a good lifeline tariff. Most fail to achieve an appropriate balance of cost, targeting, and administration.

C. Evaluating Strategies

The previous analysis illustrates general properties associated with specific mechanisms that are often used to help the poor with energy. Aggregate results demonstrate how well policy mechanisms fare across these properties. However, this analysis does not show the influence of different energy-efficiency measures on household or government expenditures, nor does it show the benefits of these measures over time, or the interaction of such measures on other approaches and options. To correct these limitations, a simple growth model was designed to demonstrate the potential benefits and trade-offs associated with the different policy options.

Unlike the previous analysis, this method evaluates sets of strategies used to help the poor over time. This analysis assumes that countries provide energy assistance payments to low-income households and need to increase utility rates for electricity, gas, hot water or district heating.

1. Assumptions of the Growth Model

The results of this model, reported below, are limited by assumptions specific to three countries used in the analysis: Bulgaria, Hungary and Romania. In addition to this, there are more general numerical assumptions that constrain the conclusions. These assumptions include constant yearly real price growth to achieve liberal prices,[20] a constant number of poor households within a country, and constant real price increases in energy assistance to keep the percentage of payments to low-income households constant.

The time horizon in this model is five years plus the status quo. Therefore, conclusions from this model are constrained by this time horizon. The model also assumes that gains from energy-efficiency investments are divided between poor households and the government. Once an energy-efficiency measure is implemented, energy assistance

[20] This is defined as a utility's long-range marginal cost.

payments are lowered to account for a proportion of anticipated annual average household savings.

2. Elements of the Model

The four inputs are the:

1) Number of low-income households receiving energy assistance payments and its cost.
2) Average utility cost to low-income households with yearly price increases.
3) Number of households receiving energy-efficiency measures and its cost.
4) Type of energy-efficiency measure and its rate of return in savings.

Using this model, four different policy scenarios are evaluated that involve the pricing of utilities and the poor. Three of the four scenarios involve price liberalization. Two of the three involve the implementation of some type of energy-efficiency measures. One important assumption associated with energy-efficiency options involves residential metering. Without metering, many gains associated with these measures cannot be realized. Therefore, conclusions derived from this analysis presuppose that countries have some degree of household metering for utilities.

The four different policy scenarios have different assumptions associated with them, as follows:

- **No energy efficiency with price subsidies:** This is the current status quo in most transitioning countries. It is the null case included in the analysis to demonstrate what failing to liberalize prices and deciding not to pursue energy efficiency does for low-income households. This does not mean that households have no energy-efficiency properties, but rather that the government does not include this as an element in its energy policies.
- **No energy efficiency with price liberalization:** Few transitioning countries have been able to attain full price liberalization for energy. This case looks at how price

liberalization will affect the average cost of utilities to low-income households over time with no energy-efficiency measures in place for low-income households. It also looks at the growth of energy assistance payments to the government.

- **Low-cost energy efficiency:** To evaluate this case, it is assumed that household weatherization involves only window and door sealing and no interior wall insulation; in the case of a building with central heating, foil radiator sheets may also be installed only to households already receiving energy assistance payments. It is also assumed that the total weatherization cost, including installation, is $75.00. For the purpose of this analysis, it is also assumed that weatherization investment will have a payback in roughly one heating season, which translates into 16 percent energy savings per year per household for most households. This also includes price increases.
- **High-cost energy efficiency:** To evaluate this case, it is assumed that high-cost energy efficiency includes the above low-cost measures plus the installation of half-inch thick insulation on the interior of external walls. It is assumed that the apartments are heated with either district heat or other centrally supplied heating, and that HCAs and TRVs are installed on all radiators (usually no more than five). This case assumes that costs, including installation, are $300.00. It is also assumed that households are careful to turn down (or off) heat whenever they can. Heat tariffs, in this scenario, are based on average costs, not long-run marginal costs. It assumes that the average energy bill savings are approximately $100 per year per household or an energy savings of approximately 22 percent per household.

3. Comparing and Summarizing Results

Table 5 summarizes the results from the growth model in a way that makes this partially comparable to the first analysis. Unlike the previous analysis, the table ranks each scenario according to results derived from the growth model—not independent criteria. The results from the model are summarized using five different categories:

1) *Impact* is comparable to the earlier analysis, but here refers specifically to the existence of price or rate increases for energy. This category received double weights.

2) *Investment cost* refers to the yearly investment costs for implementing some energy-efficiency measure. Only energy-efficiency policies for the poor incurred these costs. This cost is assumed to be a government expenditure.

3) *Annual costs* refer to total annual government expenditures for energy assistance or energy assistance plus energy efficiency.

4) *Affordability* refers to the total cost of utility expenditures to poor households minus any energy assistance payments they receive.

5) *Savings* refers to the amount of household and government savings from some set of policies. These savings are counterfactual savings from energy costs or government expenditures.

Table 5: Matrix of Results

Results/Policies	No Energy Efficiency with Price Subsidies	No Energy Efficiency with Price Increases	Low-Cost Energy Efficiency	High-Cost Energy Efficiency
Impact	-2	2	2	2
Investment Cost	0	0	-1	-1
Annual Costs	0	-2	-1	-1
Affordability	1	-1	0	0
Savings	0	0	2	1
Total	**-1**	**-1**	**2**	**1**

For the three countries with energy assistance programs, the analysis shows that low-cost energy efficiency could have a substantial positive impact on both government and household expenditures (see Appendix 1: Additional Country Data). With a relatively small investment spaced out over five years, governments could expect to achieve

paybacks between six and eight years for the low-cost energy-efficiency measures that they provide to a proportion of low-income households receiving energy assistance payments.

The household savings are considerable, keeping energy payments affordable even during periods of price increases. Moreover, as the model illustrates, energy-efficiency measures allow a household to consume less energy, thereby allowing governments to keep the total costs of energy assistance payments flat during price increases.

High-cost energy-efficiency measures apply to a smaller group of low-income households—only those in apartments with district heating or in a centrally heated building. The model shows that payback periods are longer—between 9 and 10 years. And again, household savings are considerable with average total government expenditures on energy assistance payments remaining the same.

The two scenarios without energy-efficiency measures are ranked equally, each below the scenarios with energy efficiency. Although the scenario with price increases may be preferable to policymakers interested in promoting energy sector development, this analysis illustrates that it is equally (or less attractive) to domestic policymakers. Without energy-efficiency measures, government expenditures on energy assistance payments and household expenditures on energy can be expected to increase.

D. A Discussion of Policy Recommendations

Table 6: A Comparison of Approaches: Subsidies/Payments, Energy Efficiency and Tariff Mechanisms

	Recommended Approaches For Policymakers		
		Recommendation	**Most important features**
	Subsidies/ Payments		
1	Across-the-board price subsidies	No	Prohibitively expensive, undermines utility reform and national economic recovery
2	Low-income utility payments - earmarked	Yes	Timely targeted support for low-income households and energy utilities
3	Low-income utility payments – non-earmarked	No	Insufficient help for low-income households and money does not reach utilities

4	Toleration of nonpayment	No	Helps rich more than poor, damages utilities and can lead to their collapse

	Energy Efficiency		
1	Low-cost household energy efficiency	Yes	Can pick “low-hanging fruit” first for least cost and greatest impact
2	Household metering and controls	Yes	Substantial benefit to low-income households and utilities become sustainable
3	High-cost building efficiency	Yes	Effective if focus on poor areas and social institutions
4	Household lighting	Yes	Small but positive benefit for low-income households, low cost and highly visible
	Tariff Mechanisms		
1	Lifeline tariffs	With caution	Similar to low-income utility payments, but a high risk of failure
2	Time-of-day tariffs (ToD meters)	Yes	Minimal impact on low-income households, but low or negative cost and power system benefits

E. Summary of Approaches and Measures

1. Subsidies and Assistance Payments

a. Direct Subsidies for Utilities

Some governments pay direct subsidies for utilities year-after-year. The assumption that 90 percent of the benefit goes to the poor is calculated based on two broad assumptions; namely that 20 percent of households are poor and non-poor households consume twice as much energy as poor households. (These are very broad assumptions as poverty rates and consumption profiles vary widely from country-to-country, but they are useful indicators for all countries, including those with a higher or lower proportion of low-income households). The impact on utilities depends on how wisely the money is used. Some utilities received subsidies for years and nevertheless collapsed. It is not possible to achieve good coverage or to target the poor with this mechanism.

It is a no-effort, no-cost mechanism to administer—simply disburse the money. There is a questionable impact on low-income households. There is certainly some impact when subsidies are nominally paid to utilities to keep household prices low, but this encourages utilities to become complacent and postpone essential reforms.

b. Low-Income Energy Assistance (Earmarked)

Low-income energy assistance (earmarked) is usually a recurring cost, although some countries have also used a one-off approach to help low-income households during times of steep price increases. It is a costly yet effective solution that provides timely assistance to help low-income households afford energy. It is of medium difficulty to design and administer, particularly when it is first introduced, but, if well designed, this mechanism can achieve high coverage and close targeting. It has the advantage that the social assistance funding can all end up with the utility, so it is a good example of social and energy policies harmonizing. It can also be designed in a way to further stimulate payments by making receipt of social assistance dependent on utility bills being fully paid-up. The impact on low-income household budgets is high, and it is recommended as the best of the four forms of subsidies/utility payments.

c. Low Income Energy Assistance (Non-earmarked)

Low-income energy assistance (non-earmarked) is a less effective way of helping low-income households afford energy. The survey results showed that general social assistance payments that nominally included a utility component are usually under-funded, and that households do not actually use the money to pay utility bills. Governments sometimes find this solution more attractive as it is easier and lower cost to administer than earmarked utility assistance and can be used to mask the fact that there is an inadequate utility component in the social assistance budget.

d. Toleration of Nonpayment

Toleration of nonpayment can be a recurring cost, as households continue to fail to pay year after year. At its extreme, nonpayment can (and does) result in the complete loss of a heating system—whether for a building or a town—when it loses its financial viability as a result of nonpayment. The cost of losing an entire communal heating

system for all households connected to a communal system is estimated as having a replacement cost of $1,500 per household. Of course, low-income households cannot afford this, so they typically resort to using inappropriate heating solutions, such as high-cost electric resistance heating that they can ill-afford or more commonly, burning wood or coal in apartments.

Coverage is limited to households that happen to be connected to utilities that tolerate nonpayment. Targeting is, at best, the 20 percent of households that are poor, but this analysis lowered this to 10 percent to reflect the finding that the poor are generally better payers than the rich. Toleration of nonpayment is a no-cost way of seeking to help low-income households. The financial benefits range from negative (the cost of finding an alternative if the system collapses), to zero for low-income households that pay, to very high for low-income households that do not pay.

2. Energy Efficiency

Energy-efficiency investments are one-off costs to reduce or remove the affordability problem. They contribute to utility payment discipline by helping low-income households consume energy within their budgets.

a. Household Weatherization

The cost of measures to reduce thermal losses in an apartment can vary widely, from only a few dollars to thousands of dollars. Programs can be designed to meet available budgets. A feature of household weatherization is the “low-hanging fruit effect,” which is that low-cost and no-cost actions, such as sealing windows and doors, caulking around windows, installing thicker curtains, cleaning the insides of radiators, placing thermal reflective sheets behind radiators, and moving furniture away from radiators, can yield relatively greater cost savings per dollar invested than high-cost measures such as insulating walls with limited capital costs.

Weatherization can be targeted effectively to low-income households. But it is not possible to achieve a high coverage level in a single year because the scale of the task—sending someone to each low-income apartment to install the measures—is too large to achieve in a short time period. The costs and difficulty of managing a low-

income weatherization program can be high, at least initially, particularly if conducted by a government agency that lacks the requisite knowledge and management skills. An approach to consider for ease of administration is to target whole buildings based upon the estimated occupancy by low-income households.

b. Household Metering and Controls

Installing meters and controls is a relatively low-cost activity that can help low-income consumers take control of their energy consumption and expenditures. For electricity and natural gas, measures include timers and thermostatic controls. For communal heating, it means heat cost allocators and radiator valves. Households that pay in installments through supplier credits, as is done in Bulgaria, can meet the costs of these measures. Also, it is a reasonable application of government subsidies for low-income households. Providing or financing (and installing) these measures could be a component of a low-income energy-efficiency program. For low-income households with low heating requirements that can save aggressively, this is a cost effective mechanism as shown in the matrix. The initial results of the Bulgaria metering and controls indicated 13-20 percent savings in energy and energy costs. Comfort levels, very important for households, also increased. .As with low-cost weatherization, this solution need not be administratively expensive, but it can be complex and difficult to implement without determined political support.

c. Building Efficiency

Basic improvements to apartment buildings, such as replacing missing roof tiles, mending broken windows, and installing automatic door closing devices, can be done at very low cost, although the costs rise if the building is in poor condition. The number of apartment buildings is low when compared to the number of individual apartments, so relatively high coverage is possible. However, it is difficult to target “low-income buildings” because apartment buildings in the CEE and Eurasia tend to be mixed income.

d. Household Lighting-Compact Fluorescent Lamps (CFLs)

Providing energy-efficient CFLs to low-income households is a simple action that has been performed by many Western utilities under demand-side management programs. There are no installation costs and the households require almost no explanation on how to use them. They are relatively low-cost, simple, and highly visible energy-efficiency technologies that can yield clear energy and cost savings in households that use conventional incandescent lamps. However, getting CFLs into low-income households can represent a substantial administrative burden.

Although the impact of CFLs on the household lighting bill can be high, the share of lighting in the household budget is low, so the overall economic impact is low. The impact of CFLs is most noticeable in the case of very low-income households that use little electricity anyway, such as only for lighting. The very limited experience in the region indicates that sustainability to date has not been demonstrated.

3. Tariff Mechanisms

a. Lifeline Tariffs

The lifeline tariffs line in the matrix is characterized by uncertainty. Although the general assumption in all other cases is that mechanisms will be of an adequate design, the country appendices demonstrate that designing a good lifeline tariff may not happen in the first case. Most lifeline tariffs fail to achieve an appropriate balance of cost, targeting, and administration on the initial effort. A well-designed lifeline tariff is similar to or even superior to earmarked low-income utility assistance payments in providing timely, appropriate, and well-targeted assistance to low-income households at a reasonable cost, but the risk of failure is far greater. Lifeline tariffs also suffer from the disadvantage (which is perceived as an advantage in some circles) that it is easy for governments to pass the costs of social assistance to the utilities with this tariff mechanism. Well designed, the costs can be distributed among the households and leave the utility without harm. Such tariffs should be limited in application and time they are put in use to minimize distortions and misuse of the tariff mechanism.

b. Time-of-Day Tariffs (Including Installation of Day-Night Meters)

ToD tariffs have limited use and experience in the region. There is a modest impact for low-income households, as these households do not own washing machines and dishwashers that may be used during the night.

c. Across-the-Board Low Tariffs

Across-the-board low tariffs are common and represent the most expensive and worst design of all tariff mechanisms that are ostensibly used to help the poor afford energy. Typically, for every dollar spent on keeping energy prices low for the poor, 10 dollars is spent on keeping prices low for the non-poor. (Using the assumptions that 20 percent of households are poor, and the non-poor consume twice as much energy as the poor). There are huge costs, particularly when expressed per poor household over five years. This mechanism fundamentally undermines utility reform, discourages energy saving, and cannot be targeted to low-income households. However, across-the-board low tariffs are an “easy option” for governments. They are politically popular and successfully keep the share of the utility bill in the household budget affordable for low-income households but at an unnecessarily high cost.

d. Rational Heat Tariffs

The optimal tariff solution for district heating is a consumption-based tariff with a minimum charge that represents around 30 percent of a typical household bill. Implementation of this tariff mechanism is a no-cost measure that encourages all households to save energy, by creating a perfect one-to-one ratio between energy consumption and the energy bill for occupied houses (as it is not realistically possible for an occupied household to reduce its consumption by 70 percent and be required to pay only the minimum charge). It also protects the providers of communal heating solutions from receiving no income at all from households that disconnect or are unoccupied. Low-income households save the most; they have the greatest economic incentive to seize the opportunity to save energy through this tariff mechanism.

Appendices

Appendix 1: Additional Country Data

Hungary

Years	2004	2005	2006	2007	2008	2009	Totals
	0	1	2	3	4	5	
Number of low-income households receiving energy assistance payments							**197,000**
Average utility cost to low-income households with yearly price increases	$443.64	$463.16	$482.68	$502.20	$521.72	$541.24	
Total Government Expenditure on EAP (cumulative)							**$82,528,536**
Low Cost Energy Efficiency (LCEE)							
Total number of households to receive LCEE							**197,000**
Average utility cost to low-income households with LCEE	$443.64	$384.42	$400.62	$416.83	$433.03	$449.23	
Total savings to low-income households (cumulative)							**$51,763,543**
Total Government Expenditure on LCEE (cumulative)							**$14,775,000**
Total savings to Government on EAP payments (cumulative)							**$7,349,649.22**
Total Government Expenditure on LCEE and EAP (Cumulative)							**$89,953,887**
Total Government Expenditure on EAP wo/ LCEE (Cumulative)							**$82,528,536**
as difference between spending w & wo LCEE							**($7,425,351)**
Savings to government per year (after five years)							**$2,568,329**
Additional years for government to break even							**3**
Total years for government to break even							**8**
High Cost Energy Efficiency (HCEE)							
Total number of households to receive HCEE							**32422**
Total savings to low-income households (cumulative)							**$11,274,684**
Total Government Expenditure on HCEE (cumulative)							**$9,726,000**
Total savings to Government on EAP payments (cumulative)							**$1,557,013**
Total Government Expenditure on HCEE and EAP (Cumulative)							**90,697,523**
Total Government Expenditure on EAP wo/ HCEE (Cumulative)							**$82,528,536**
as difference between spending w & wo HCEE							**($8,168,987)**
Savings to government per year (after five years)							**$1,557,013**
Additional years for government to break even							**5.25**
Total years for government to break even							**10.25**

Bulgaria

Years	2004	2005	2006	2007	2008	2009	Totals
	0	1	2	3	4	5	
Number of low-income households receiving energy assistance payments							575,802
Average utility cost to low-income households with yearly price increases	$329.04	$343.52	$358.00	$372.47	$386.95	$401.43	
Total Government Expenditure on EAP (cumulative)							**$207,547,845**
Low Cost Energy Efficiency (LCEE)							
Total number of households to receive LCEE							**197,000**
Average utility cost to low-income households with LCEE	$329.04	$285.12	$297.14	$309.15	$321.17	$333.19	
Total savings to low-income households (cumulative)							**38,392,111**
Total Government Expenditure on LCEE (cumulative)							**14,775,000**
Total savings to Government on EAP payments (cumulative)							**10,566,897**
Total Government Expenditure on LCEE and EAP (Cumulative)							**211,755,947**
Total Government Expenditure on EAP wo/ LCEE (Cumulative)							**207,547,845**
as difference between spending w & wo LCEE							**(4,208,103)**
Savings to government per year (after five years)							**3,699,786**
Additional years for government to break even							**1**
Total years for government to break even							**6**
High Cost Energy Efficiency (HCEE)							
Total number of households to receive HCEE							**170000**
Total savings to low-income households (cumulative)							**43,848,858**
Total Government Expenditure on HCEE (Cumulative)							**51,000,000**
Total savings to Government on EAP payments (cumulative)							**10,638,541**
Total Government Expenditure on HCEE and EAP (Cumulative)							**247,909,304**
Total Government Expenditure on EAP wo/ HCEE (Cumulative)							**207,547,945**
as difference between spending w & wo HCEE							**(40,366,459)**
Savings to government per year (after five years)							**10,638,541**
Additional years for government to break even							**3.8**
Total years for government to break even							**8.8**

(In separate volumes)

Appendix 2: Energy Reform and Social Protection in Armenia

Appendix 3: Energy Reform and Social Protection in Bulgaria

Appendix 4: Energy Reform and Social Protection in Hungary

Appendix 5: Energy Reform and Social Protection in Kazakhstan

Appendix 6: Energy Reform and Social Protection in Romania