



Final
Draft

ALLIANCE TO SAVE ENERGY

Municipal Network for Energy Efficiency

Urban Heating in Moldova:

Experience from the Transition and Future Directions



**ALLIANCE TO
SAVE ENERGY**

Creating an Energy-Efficient World

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List of Abbreviations

ANRE	National Agency for Energy Regulation
CHP	combined heat and power
DH	district heating
DHW	district heat and hot water
EBRD	European Board for Reconstruction and Development
EE	energy efficiency
ESCO	energy service company
EU	European Union
HCA	heat cost allocator
HMC	housing maintenance company
HOA	homeowner association
HOB	heat only boilers
IDA	International Development Agency
IFI	international financial institution
LIESAP	low-income energy and social assistance project
MDL	Moldovan Leu
MEPIU	Moldova Energy Project Implementation Unit
MUNEE	Municipal Network for Energy Efficiency
NGO	Non-governmental organization
NTC	nominated targeted system
NSIH	National Social Insurance House
PIU	project implementation unit
SIDA	Swedish International Development Agency
TRV	thermostatic regulating valve
USAID	United States Agency for International Development
USD	U.S. dollar
WB	World Bank

1 Background: Evolution of Heating as a New Market Sector – Assessing and Rising to the Challenge

Moldova is a small, landlocked country between Romania and Ukraine, with land area of 33,700 square kilometers and population of 4,02 million, with an urban population of 1,7 million. With rich soil and temperate climate, it relies mainly on agriculture and food processing industry. It has gone through a tumultuous economic and political period during the 1990's, which left the country divided along the Nistru river, with the Transnistria region on the left bank breaking away from the rest of the country.

Right bank Moldova has a population of 3,386 million, with an urban population of 1,308 million (Jan 1, 2005). Almost half (0,72 million) of the urban population lives in the municipality of Chisinau. Moldova is poorly endowed with energy resources, and it imports almost all of its primary energy. The country relies heavily on oil, gas and electricity imports. Gas is imported from Russia and is the main fuel for electricity generation and heating. Power plants on the right bank of the Nistru River cover presently only about 25 to 30% of the electricity consumption of that part of the country. The rest of the electricity supply is imported from Ukraine, Romania and Transnistria.

Natural gas is imported from Russia (Gazprom) and is the main fuel for local electricity generation in CHP plants, district heating, and heating from local boilers. The sole importer and domestic distributor is Moldovagaz and the present import price is 160 USD per 1000 m³.

The Republic of Moldova, as any other ex-socialist republic inherited a DH system, has many shortcomings: technical, managerial and financial. The supply driven DH system does not meet the changing requirements of the market, which demands metered and regulated heat consumption according to the needs and affordability of each separate consumer. The biggest challenge for DH system is the residential sector, where the multifamily building tenants are looking for a flexible heating option. This caused the numerous disconnections from the DH system in favor of other heating options largely comprising individual gas fired heating boilers.

Along with the political changes in the region, the economy adopted market principles bringing new relations, new prices, and new interests. Considering the major social impact of the utility sector, political and economic reasons slow down the reform in this sector. The restructuring of the DH systems requires massive financial assistance to DH companies that need to retrofit their systems to meet the new market requirements.

Still, the government had to take some steps toward reforming the sector and the first steps were the review of the tariff policy, restructure the heating companies, transferring of ownership of DH companies to municipalities, elaboration of strategies and programs related to DH sector restructuring. As a result of these steps, the heating sector had evolved differently in each city depending on the performance of local government.

1.1 RESTRUCTURING THE HEAT SECTOR

The restructuring and improvement of the heat utility operation was an economic necessity – the heating companies had to become cost-effective to survive, while the availability and quality of heat supply service has a direct impact on the quality of life of population and ultimately on the real estate price (example Ungheni). The first phase of restructuring of energy sector (including heating sector) was the institutional restructuring. The major step was the creation in 1997 of the National Agency for Energy Regulation (ANRE) – an independent agency that regulates the energy market, including the heat sector. The role of ANRE in the heat sector was to elaborate the methodology of heat tariff calculation and approving the heat tariff for CHP and to final consumers. In 1999, after a series of drastic increases of heat tariff from 70 MDL/Gcal to 233 MDL/Gcal within a short period of time, the right to approve heat tariffs was transferred to local Municipal Councils, which concurrently with the transfer of DH companies from government ownership to municipal ownership. Currently, the role of ANRE is to elaborate and approve heat tariff calculation methodology and to approve heat tariff for state owned companies (for example CHP).

Policy Frameworks: Laws, Regulations, Strategies and the Institutions Responsible for Them

This section provides a description of the institutional structure of the sector including policy-makers, regulators, producers, suppliers, consumers and owners.

The Role of Government and the Regulator

The Ministry of Energy (now reorganized in Ministry of Industry and Infrastructure) had elaborated in 2003 a Program for Heat Sector Decentralization, which was approved by the Government. The program was developed with assistance from specialized institutions of Moldova, and includes the technical and economical analysis of different options for decentralizing DH systems in 36 towns. It was approved in 2004 and does not have a mandatory character and is recommended to the local administrations for application, while it offers guidance to them in order to decide how the heat sector in their given town should be developed. Unfortunately, there is no financial mechanism that would ease the implementation of those projects that would be elaborated according to this Program. This is why the program has not been implemented.

ANRE is responsible for the elaboration of heat tariff calculation methodology and approves the tariffs for state-owned heat suppliers: CET-Nord, CET 1, CET 2. CET-Nord is situated in Balti and supplies heat to end consumers. CET 1 and CET 2 are situated in Chisinau, which are supplying heat to DH company Termocom. Termocom buys heat from these plants, transports and distributes heat to end consumers. The tariff for end consumers in Chisinau, like in all municipal owned DH companies, is approved by the Municipal Councils, using the calculation methodology elaborated by ANRE. The role of ANRE in heat sector is to elaborate tariff calculation methodology. The approval of heat tariff is restricted only to state owned enterprises: CET Nord, CHP 1, CHP 2.

Laws and Governmental Decisions regulating the heat sector and related sectors

The laws and bylaws governing the heat sector and related to the regulation of assets and premises relevant for heat supply include the following:

- Law on Energy
- Law on Utilities
- Condominium Law,
- Law of Local Governments,
- Government Decision no. 191 on Supply and Payment of communal and utility services provided in Housing Sector, Installation of Apartment Level water meters, Procedure of disconnection and connection to heat and water systems
- Government Decision no. 434 on Heat Supply and Consumption
- Government Decision no. 634 on Installation of Water and Heat Meters .
- National Agency for Territorial Development, which is responsible for the development of housing sector, is promoting a different approach of heat supply options.

According to the Director of National Agency for Territorial Development, "... the Agency has only few requirements toward developers of housing buildings: basement parking, not less than a certain number of levels and apartment level heating systems...".¹ This approach, which contravenes to Directive 2004/8/EC of the European Parliament and of the Council of 11 February 2004 on promotion of cogeneration based on a useful heat demand that clearly stimulates development of DH systems as most optional one, is hampering the proper heat sector development.

Transferring Heat Utilities to Local Governments

The transfer of ownership for the DH companies from the state to the municipal authorities also transferred the subsidy burden for DH companies—previously paid by the state budget—to the municipal budgets. As a result, with the exception of two largest cities, Chishiniau and Balti, within one to three years DH companies went bankrupt and had to cease operations. Due to a tariff that did not recover costs, the Chisinau DH company went bankrupt in November 2001 as well. Still, the evolution of heat companies in different cities clearly indicates the big influence that local administration has over heat sector development. The transfer to municipalities also raised a political issue related to the tariff approval process, which in most cases is a real problem for the heat suppliers.

Local government role in developing the heat sector

There used to be just two DH companies supplying Moldova: Termocomenergo ARP (the state company supplying heat to the whole country outside the capital) and Termocom S.A. (the DHC in Chisinau). In 1999, both were DHCs restructured such that their heating assets and liabilities were transferred to local governments, shifting all problems related to heat supply to local administrations. Unfortunately, most of these administrations had neither the financial resources nor the managerial skills necessary to ensure stable heat supply. Along with these problems, rising energy prices and inflation put DH systems in most of the towns in dire condition. During the period of 2000-2004, the number of

¹ Agency point of view on development of DH <http://www.vedomosti.md/index.asp?doc=2&nom=761>

operational DH companies decreased dramatically, leaving only 8 cities supplied fully or partially with heat by DH companies.

This difficult situation created a need for reviewing the problems of DH systems in each town to ensure heat supply to consumers. Some local administrations started to elaborate plans for restructuring the heat sector in their towns. Based on their findings, we can see the different approaches of local governments taken to find and implement options of DH restructuring and rehabilitate heat supply. The municipal authorities have mostly decided to decentralize the old DH systems, which were designed to supply heat to all sectors: residential, public, commercial and industrial. The decentralized systems fit the heat demands of the residential and public sectors, and rarely the commercial sector. The industrial sector, for the most part, disconnected from the DH system and installed their own heat sources.

According to the analysis of SwedPower and FVB District Heating experts done in 2002, “In the present situation, only the district heating systems in Chisinau and Balti have the possibility of producing low cost heat with CHP plants.”² DH systems (in their initial shape) survived only in Balti and Chisinau municipalities. There are several reasons why the system survived in these two municipalities and the most important are the following:

- The heat sources in both towns are CHP plants that produce power. Heat supply is crucial for the CHP, because elimination of DH revenues would automatically lead to bankruptcy of the CHP.
- Compared to other cities, Balti and Chshinau have higher percentage of residential, public and commercial consumers, then the industrial ones.
- The heat load density is higher in comparison with other cities.
- Household income level was higher than in other cities.

The strategies of both cities are to further develop the DH system or, at least, to maintain it as the best option of heat source for consumers.

A good DH restructuring example was registered in the case of **Ungheni Municipality**. The city administration faced big problems with DH system starting from 1999 when the utility was transferred to municipal ownership. Because of the inefficient equipment, huge losses, oversized system, etc. the DH system could no longer be operational. Hence, it was decided to decentralize the existing DH system into small-scale DH systems. This approach was applied with technical assistance from international financial organizations and proved successful. The results of the restructuring are encouraging:

- no residential or public building is deprived of heat supply;
- the local budget has no financial burden to support the heating company;
- the cost of energy dropped from 350 MDL/Gcal in 1999 to 287 MDL/Gcal in 2004;
- schools and kindergartens are not forced to increase the number of days for winter holidays;
- the number of ill pupils have decreased by 35% during heating season; and
- real estate prices went up by 300%.

² Strategic Heating Options for Moldova, SwedPower/FVB, Chisinau, 2001

Municipal Autonomy

Since 2000, all utilities have been transferred to local governments' ownership and administration. According to the Law on Local Public Administration No 186-XIV of 6 November 1998, the Municipal Councils in each city have the right and obligation to set the tariffs for utility services (except gas and electricity, as these are not municipal services) provided by municipal enterprises. According to the Law on Public Finances No.491-XIV, as of July 9, 1999, Municipal Councils are allowed to borrow within certain limits – the repayment pipeline for all credits should not exceed 20% of the total municipal budget revenues for the given year.

This allowed the municipalities to develop and implement projects by attracting commercial loans and there already are good examples of such projects (for example Ungheni and Floresti). Ungheni Municipality started the decentralization of the heat system after two years of no heat in the city. Local administration started the project by elaborating a plan on heat system decentralization which was used for future development of it.

The idea of the plan was to have 14 new HOB that would supply heat to residential, public and commercial consumers in the town. The project started with construction of eight HOBs where city hall succeeded to attract commercial bank loan from a local commercial bank. After the implementation of this step, local administration applied for WB loan under Energy II Project and succeeded to get a loan which was used for construction of another four HOBs. After this restructuring, the system became efficient from the technical and economic point of view which did not require financial assistance/subsidies from the local budget. The last 2 HOBs were constructed using local budget money only which demonstrates an improvement of the financial situation of the town, as well. The best indices of the restructuring plan are the cost of heat and payment rate. Thus the cost of 1Gcal dropped from 350 MDL (28,78 USD) to 287 MDL (21,56USD) while payment rate increased from 35% to 80%.

Budgetary incentives

The current budgetary regulations should be improved to give more incentives to local councils to manage their budgets rationally. The limits imposed by the central authorities on the budget expenses do not encourage local governments to develop and implement different projects that would result in reduction of costs for municipal services, including heat. Under the current itemized budget allocation system, municipal budget saving in any expenditure category will result in a reduced allocation from the central budget in the following year. For example, if a municipality would implement an energy efficiency project in schools and thus would reduce the fuel consumption by 20%, next year central authority will cut those 20% (money equivalent) from the local budget and local budget will get no savings out of the project and cannot use saved money to implement other projects or to improve the quality of services in public buildings, etc.

The legislation does not give incentives to local governments and public institutions to save energy. This, according to mayors, principles, directors of public institutions, is the main impediment why energy efficiency projects are not implemented in these given institutions. Mayors of municipalities have addressed the problem of budget creation problem, but no real improvements have been carried out until now.

Restructuring Examples in Other Cities

Other cities took a different approach to the problem. After ending DH supply, heat supply from newly constructed heat-only boilers (HOBs) was provided for public buildings (e.g. Nisporeni, Cantemir, Falesti), while the residential and commercial sectors were not given an alternative and had to solve their problems on their own. The above-mentioned municipalities do not have a development strategy or a program that would take into consideration the needs of all consumers of the given town.

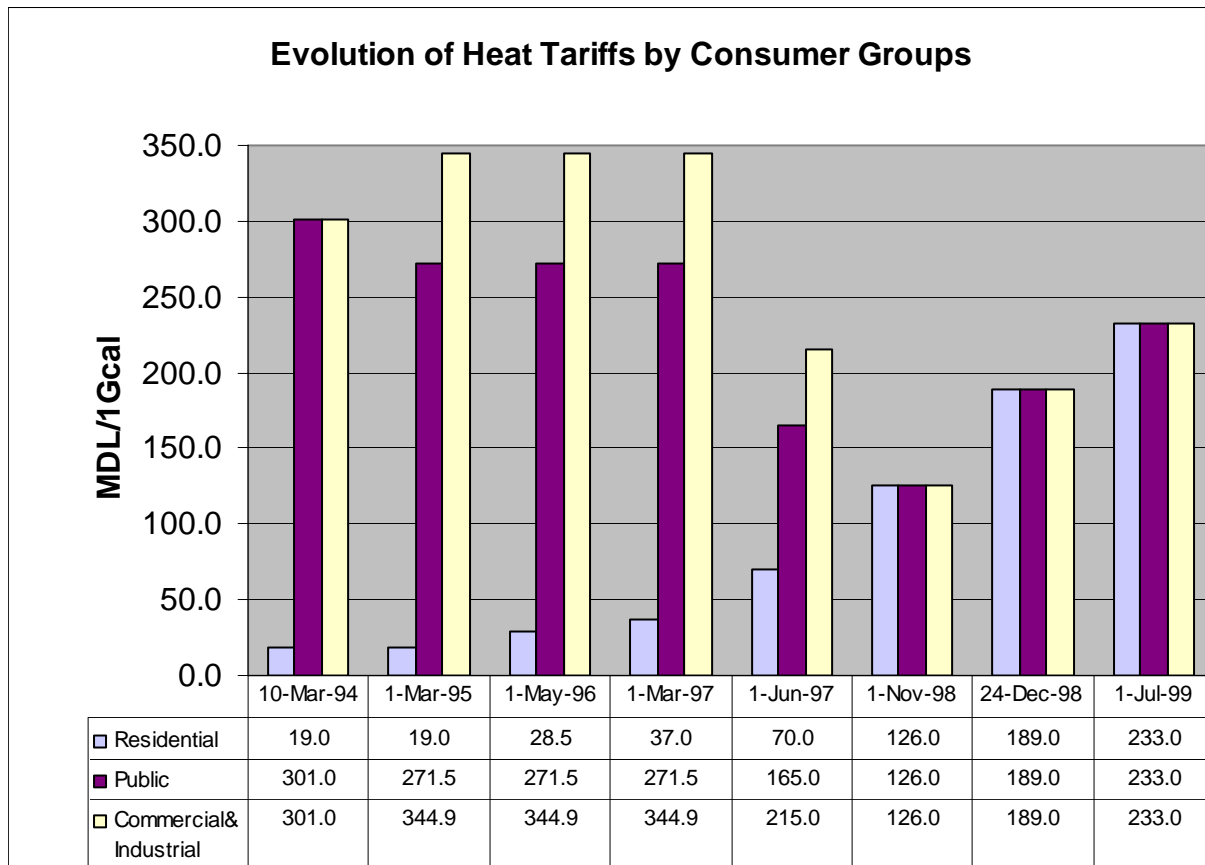


Figure 1. Dynamics of Heat and Hot Water Tariffs for 1994-1999 (in MDL/1 Gcal)
(Source: Termocom SA)

Residential Sector

One of the greatest challenges for the heat sector in Moldova is that the residential sector represents the biggest consumer, around 70% of heat supplied by DH. This complicated sector has to be adjusted to the new realities imposed by the development of the heat market. The centralized heating and hot water (DHW) systems need urgent supply- and demand-side retrofit measures in order to keep the DH system as the cleanest, cheapest and reliable heat supply option. To keep DH system as the most attractive heating option, the internal building heating infrastructure and DHW systems should be replaced by new equipment that would allow metering and regulating heat consumption on the apartment level. The old soviet vertical heating system complicates the regulation and metering on the apartment level. Though the building-level metering is on an advanced level (more than

80% of residential buildings are metered) the households do not have an incentive to weatherize their apartments or implement any other demand-side energy efficiency measures to lower their utility bills in the absence of apartment-level metering and regulation. Aside from the commercialization of end-use consumption, the DHW internal and external networks are also in advanced state of depreciation with large losses the current share of pipes that have not been replaced for over 30-40 (under proper conditions, their maximum lifetime is only 25 years). Moldova's urban heat sector will be described in two main aspects: institutional and socio-economic. The institutional issues are summarized in Box 1.

Observing Energy Sector Trends

The market-based economy reacts quite rapidly to any changes in the sector. Thus, due to poor quality/no of heat supply, market offered alternative heat sources (apartment-level gas-fired heat-only boilers, electric heaters, gas-fired hot water boilers, etc). As a result, the annual sales of autonomous heat systems accounted for several million USD. The unsatisfactory operation of the DH system in different cities represents an obstacle for the development of CHP. According to the Governmental strategy, small and medium scale CHP should be the main sources of heat in big cities. However, due to market conditions and other reasons, expansion of CHP in the heat supply market has not developed in Moldova.

Box 1. Institutional Issues of Moldova Urban Heat Sector

Local governments

Local governments are the owners of heat utilities. Just a few municipalities have elaborated their strategies on heat sector development. Few municipalities have managed to ensure a secure heat supply to consumers.

National governments

The Ministry of Industry and Infrastructure is responsible for elaborating the policies and strategies for heat sector development. In 2003 was approved the Strategy for Heat Sector Development (elaborated by Alliance to Save Energy under USAID project). Also, the Ministry of Energy had elaborated a Program for Decentralizing the Heat Sector that does not have a mandatory character. This program includes the analysis of different options for decentralize the DH system in each city (36 cities), based on which local governments may decide which would be the most appropriate.

Regulatory agencies

The Statute of National Agency for Energy Regulation stipulates that the Agency is independent, has its own budget and the purpose is to regulate the activity of energy companies on the market.

There is no total independence of the Agency, though there is no objective proves to that. The only proves (subjective) is the fact that the Directors of the Agency are replaced as soon as the Agency raises tariffs (there were several cases when the dismissal coincided with the tariff increase)

Legal institutions

Consumer rights protection associations (3-4) usually represent the rights of tenants and apartment owners in court. Usually, homeowner associations (HOAs) and condominiums

are representing themselves in the court in trials, as well as the suppliers.

Housing institutions

The housing sector started to be privatized in 1993 based on the Law on privatizing dwellings. At the time being 95% of apartments are privatized. According to the same Law, HOAs have to be created in multifamily buildings. Later, in 1998 was elaborated and approved the Law on Condominium (to which currently changes are to be made). Thus, up to the moment there are 1090 HOAs and 40 Condominiums. Unfortunately, HOAs and condominiums are not properly developed – they can rarely design or implement projects on energy efficiency or repairs, or alternative heat source. The reason is a lack of any financial mechanism that would enable HOAs to implement such projects.

Lending institutions

Local commercial banks are not active in DH sector due to few simple reasons:

- no mechanism to reimburse the loans from beneficiaries (HOAs). Or in case of DH companies, Termocom is bankrupted.
- The loans granted on the market is maximum for 5 years, while a DH project has a longer period of return

EBRD implemented a technical rehabilitation project at Termocom during 1997-1999. The World Bank is implementing projects on installation of HOBs for public buildings.

Consumer organizations

There are several NGOs in Moldova that protect the consumer rights. They are very active and participate at seminars, conferences or roundtable meetings on heat sector problems and legal reform discussions, as well as in various media events discussing consumer rights.

Availability of energy efficiency products and services

The range of energy efficiency products is quite large and can satisfy the needs of local market. The list of products starts from efficient windows and doors, pre-insulated pipes and goes to burners, regulators, meters, etc. A number of products are produced and available locally: burners, boilers, different fittings.

Social safety net

The social safety net is covering utilities costs for 11 categories of consumers. Heat is covered in the range of 50% for some categories. Total amount of subsidies paid for heat and DHW consumption in 2005 was 21884 thousand MDL.

Depreciation of DH network assets

All DH systems were constructed during the Soviet era with the exception of the recent decentralization projects where old system was replaced with new ones.

The DH systems of Chisinau and Balti are still operational, but all of the equipment is outdated and in advanced state of depreciation, including boilers, heat transportation and distribution networks. Most of the equipment was installed during 1960s, with some in 1970s. The transportation and distribution networks are over 30 years old and need total replacement.

The latest approach of the Chisinau Heat Supply Company "Termocom" is to modernize the system according to the western model where consumers have the possibility to regulate and meter their consumption. This requires a lot of investments. The Alliance and the

Swedish International Development Agency (SIDA) took the first step by developing a demonstration project where internal heating system in multifamily residential buildings would be replaced and individual heating point installed. This would allow each apartment household to regulate and to meter its consumption, at the same time allowing the manager or supplier to disconnect the non-payers without having disturbed other apartments and without entering the apartment (which sometimes is a real problem).

Gas Sector

Republic of Moldova is importing 100% of natural gas from Gazprom. The price for gas was modified twice during 2006 and reached 160 USD/1000 m³. Still, Government is decided to develop the gas sector both distribution and transportation network, where proposals for investments were made to Gasprom. According to the Gas Sector Development Program, the gas network is expected to develop and by 2010 all settlements have to be connected to the gas network. In 2005, Government had allocated more than 500 million MDL (US\$ 40 million) for the development of the network, which would also allow connecting small and medium scale CHP. Gas consumption is increasing year by year after a decline during 1990s.

Table 1. Natural gas supplied and procured, 2001-2005

Indicies	Unit	2001	2002	2003	2004	2005
Natural gas procured	million m ³	1127,0	1145,3	1238,1	1263,0	1418,6
	million lei	1131,8	1221,5	1227,5	1160,2	1364,9
	million USD	87,7	90,4	90,9	95,9	109,2
Natural gas supplied	million m ³	1108,5	1117,6	1129,9	1141,4	1315,0
	million lei	1004,0	1000,6	1158,7	1330,6	1555,2
	million USD	78,4	74,1	85,8	109,9	124,4

Source: ANRE

Power

There are five Power Distribution Grids (PDGs) in Moldova. Union Fenosa (UF), a Spanish company, had privatized three PDGs, while two PDGs in the Northern part of Moldova are still state-owned. PDGs are not mandated to buy power from newly built CHP plants, as they are currently free to choose power suppliers at their discretion. There is only one power seller in the market – Energocom, a state-owned company. Currently, only 10% or the power market is liberalized, while According to the Law on Electricity, it had to be fully completed by 2005, which did not happen due to technical reasons, and the deadline for liberalization was postponed for another two years. There are several reasons for postponing the electricity market liberalization:

- a) Elaboration and approval of differentiated power tariffs
- b) Limited number of power supply units
- c) Technical (metering)

In the last semester of 2005 the power production increased by 11% in comparison with the same period of 2004 due to growing demand (see Figure 2). Power tariffs had also increased constantly until 2003, when the tariff was set at 6,08 US cents/kWh for Union

Fenosa and 5,46 US cents/kWh for RED Nord and RED Nord-Vest. The import of electricity in 2004, also increased by 4.4% compared with 2003. Recent increase of gas price from 80

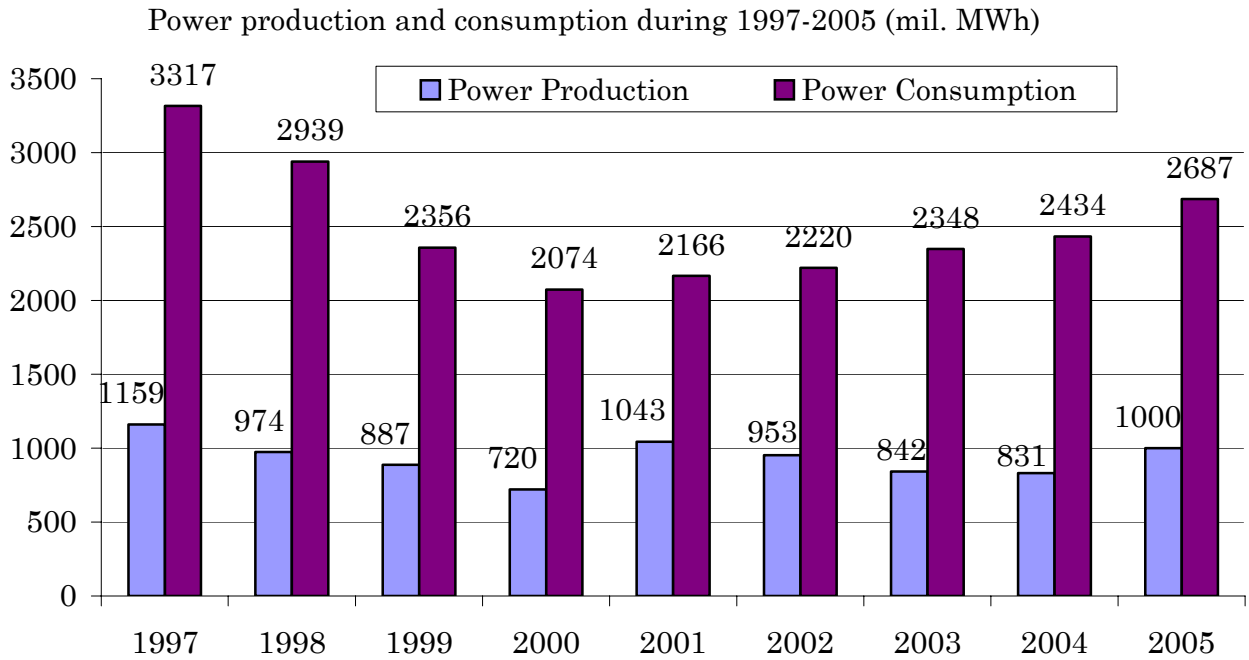


Figure 2. The production and consumption of energy from 1997 through 2005 (Source: ANRE)

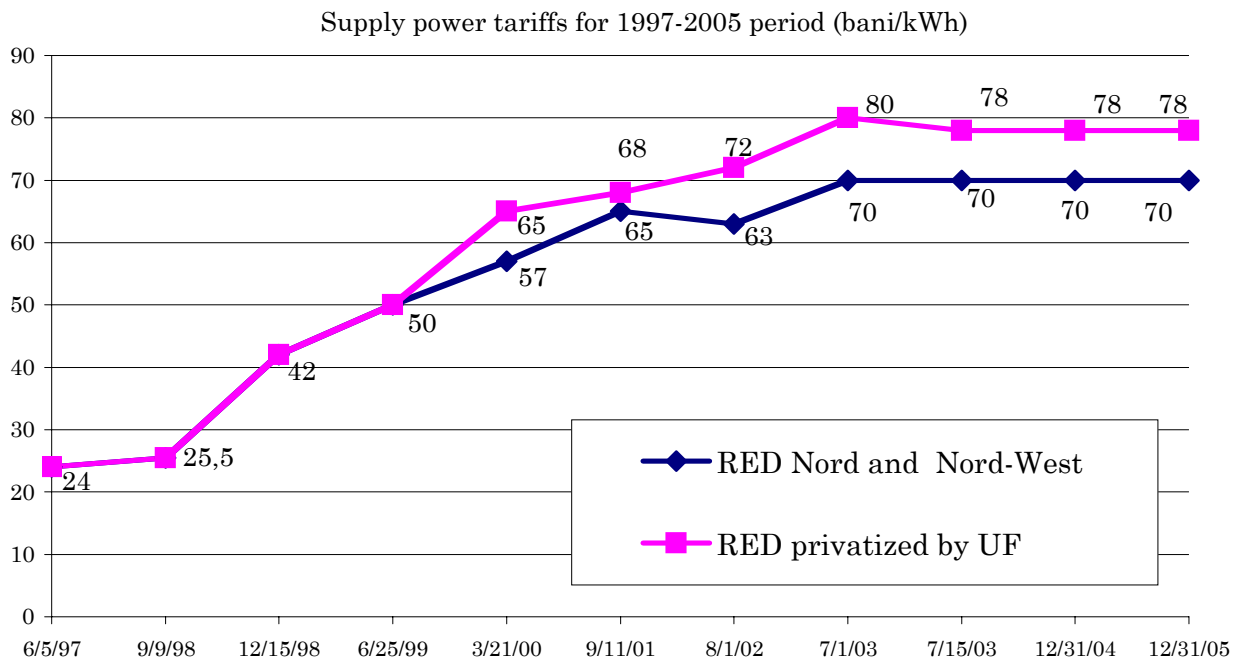


Figure 3. Power tariffs from 1997 through 2005 (Source: ANRE)

to 110 (January 2006) and ultimately to 160 USD per 1000m³ (July 2006) had a big impact on the increase of power tariff for internal power producers (Figure 3):

- CET 1 from 43,68 to 81,17 bani/kWh (3,3 to 6,1 US cents/kWh)
- CET 2 from 37,50 to 69,17 bani/kWh (2,8 to 5,2 US cents/kWh)
- CET Nord from 40,37 to 64,26 bani/kWh (3.03 to 4,8 US cents/kWh)

Renewable energy sources

With the exception of the small share of hydropower of 0.2% out of the total energy balance, renewable sources are not used. At the same time, the efforts to promote the use of renewable energy sources are mainly implemented by international organizations, foreign governmental agencies and IFIs. The market conditions were not appropriate for the development of renewable energy sources use due to the very long payback period. The new conditions of the market, characterized by the increase of gas price (from 80\$/1000m³ to 160 \$/1000m³), make the conditions more attractive compared to the previous period. At the same time, the Government of Moldova created in 2005 a Committee on promotion of renewable energy sources. This committee is working on elaborating a Strategy for Renewable Energy Sources and a Law on Renewables.

According to the Energy Law, the heat supplier has to install the meters. Still it is not specified who should buy it, since there is no cost for meter installation included in the tariff. This raises big disputes between consumers and the supplier. At the same time, consumers demand their money back for the procured meters.

1.2 REFORMING ENERGY REGULATION

The heat sector is not heavily regulated—unlike other such as electricity and gas—which has a direct impact on the development of the heat sector. Examples of ways the heat sector is related to other energy sub-sectors include the following:

- The deficit of power generation in the country stimulates construction of new power generation capacities. To accelerate the CHP development, the Moldovan Government developed a framework to stimulate the CHP plants defined in the Heat Sector Development Strategy and the Draft Heat Law, thus meeting the needs for heat and power. At the same time, the incomplete liberalization of the power market impedes the construction and entrance of new CHP plants into the power market. Hence, a proper legal improvement should be introduced in order to stimulate the CHP construction;
- Differentiated gas tariffs for different types of consumers based on consumption levels are set by the regulator. The intention is to stimulate the construction of DH systems using CHP instead of individual heating/apartment level systems. Thus, the tariffs approved in June 2006 are the following (per 1000 m³):
 1. Natural gas supplied to CHP 1745 MDL (132.2USD)
 2. Natural gas supplied to HOBs connected to DH systems 2057 MDL (155.8USD)
 3. Natural gas supplied to residential consumers up to 30 m³ per month 2196 MDL (166.4USD)
 4. Natural gas supplied to residential consumers with 2812 MDL (213USD)

more than 30 m³ per month

According to the Heat Strategy, CHP must play a role in the energy security of the state and should be supported. Ultimately, DH systems have to be maintained and developed in the future in order to ensure good economic indices of CHP. The differentiation of gas tariffs having the lowest for CHP gives a real incentive for their development. HOB connected to DH systems also have low gas tariff, which indicate a direct support for DH systems.

Support for the projects that have the purpose to demonstrate the benefits of renewable energy use. However, since in urban multi-apartment buildings renewable energy cannot be widely applied for apartment-level heat and hot water preparation (for example, via solar water heaters or biogas), stimulating DH as a supply option.

The direct and cross subsidies were present in Moldova after 1991 and continued until 1999 when the reform of subsidy structures was implemented. Utility companies did have a direct support from the central budget for their activity and at the same time, population was subsidized by the industry and public sector, which had higher heat tariffs. The abolition of direct subsidies and approval of the same heat tariff for all consumers had a big impact on the DH companies since they were no longer subsidized from the central or local budget and had to deal with the financial problems arising from the social state of the consumers on their own. This brought most of the DH companies in the cities to collapse, where the systems were inefficient, the tariffs – too high the consumers socially vulnerable.

Introduction of mandatory heat metering on the building level stimulated the installation of such meters in all residential buildings due to the financial incentive to reduce the heat bills by 30 to 50%. The heat meters are acquired at consumers' expense, however installed by the heat supplier (as demanded by the Energy Law). However, the transfer of the money spent by consumers on meters acquisition to the consumers is still a big problem and raises a lot of discussions and difficulties in the supplier-consumer relation.

Apartment-level heat meters are mostly used for some new constructed residential buildings, with the exception of many new buildings which have apartment level heating devices. The installation of thermostatic regulating valves (TRVs) is mandatory according to building construction norms.

The use of heat cost allocators (HCAs) and apartment-level heat meters requires financing. The lack of financial mechanisms for residential buildings (home-owner associations and

**Box 2. TARIFF FOR CENTRAL HEATING
IN CHISINAU WILL BE INCREASED
FROM 233 TO 540,82 LEI PER Gcal**

Such decision was taken in time of the extraordinary meeting of Chisinau municipal council held in Chisinau on Thursday. In spite of the tariff's increase, the population will pay the former sum of 233 lei/Gcal. The difference in 307,82 lei will be covered from the budget. A tariff of 233 lei/Gcal was confirmed on July 1, 1999. At the present time, it covers 40 to 45% from real expenses of heat provider-“Termocom”. As the result, annual losses are 130 to 150 million lei. According to the calculation of SC “Termocom”, if the present tariff remains, losses will be 450 million lei in 2007.

Source: InfoMarket, 25.01.2007

condominiums) represents a major impediment to such development of demand-side management and conservation in the heat sector. The relations between the suppliers-consumers-local government have changed due to the appearance of new institutions on the market – homeowner associations (HOAs) and condominiums. Different organizations were created and represent their interests while DH companies started to be more client-oriented (example of Balti and Chisinau).

Tariff Reform

Up until 1998, heat tariffs were equal for all cities in Moldova, while differentiation of tariffs was used for different consumer groups:

- ❑ The households had the lowest tariff of 19 MDL(4,2USD)/Gcal in 1995;
- ❑ Economic entities paid 344,9 MDL(76,6USD)/Gcal; and
- ❑ Public consumers (public entities) paid 301 MDL (66,9USD)/Gcal.

As a result of restructuring the only heat supplier – ‘Termocomenergo’, local municipal councils (local governments) took over the ownership of all heat supply utilities. Since then, the heat tariffs are approved by the municipal council of the given city using the methodology elaborated by National Agency for Energy Regulation (ANRE). The only exception is observed in the city of Balti where CET Nord operates a state-owned enterprise, while the tariff is approved by ANRE.

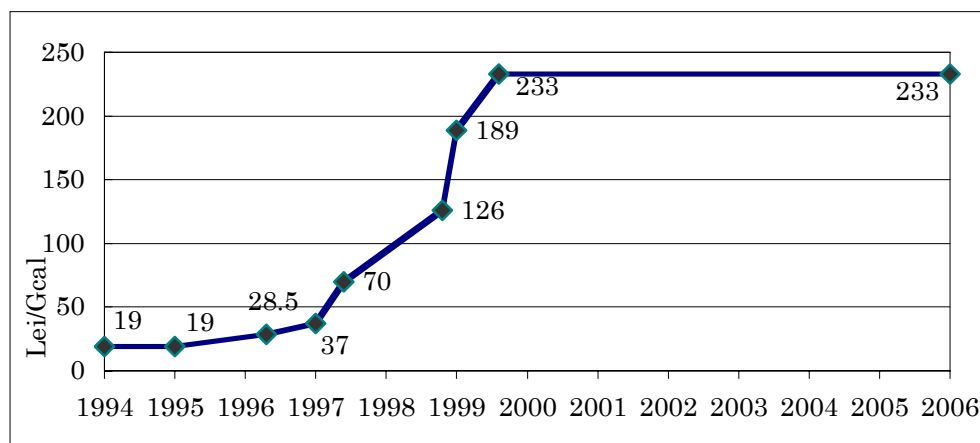


Figure 4. Heat tariffs dynamics at "Termocom" (1994-2006)

The biggest problem in the tariff approval procedure is the political factor involved in the tariff approval process, which frequently results in setting tariffs at below cost recovery levels, while there are no subsidies to suppliers to cover the difference in operation costs and collected payments. For example, in Chisinau tariffs have not changed since 1999 when they were raised by ANRE to 233 Lei/Gcal (see Figure 4). A proper reform should allow approval of cost-recovery tariffs, at the same time enforcing a strategy for assisting low-income people in order to mitigate the burden of tariff increase. At the same time, the World Bank experts support the idea of individual tariff approvals for each city by ANRE. This, according to WB experts, would avoid political influence on tariff approval procedure.³

³ Mr. Dejan Ostojic, energy specialist of WB, Chisinau, WB office, June 2006

Box 2. World Bank Energy II Project

This project is funded by a soft loan offered to the Government of Moldova for a period of 20 years with a grace period of 5 years, interest rate 0.75%. It has three components:

1) Project Management and Administration is the responsibility of the Consolidated Energy Projects Implementation Unit (MEPIU), created by the project beneficiaries specifically for implementation of this project, and operating currently under supervision of the Ministry of Industry and Infrastructure.

2) Power component provides for assisting power transportation company Moldelectrica in improving dispatching and metering as well as reducing losses in the transportation grids.

3) Heating Supply and Efficiency Improvement component provides for improvements in heat supply and consumption in selected public buildings (schools, hospitals, and residential buildings for disabled and other vulnerable groups). Pilot schemes may be involved for residential buildings, once the legal, regulatory and institutional framework is sufficiently advanced. Technical assistance will be provided for development of least-cost options for improving heat supply and consumption.

The first heating package, a pilot project for rehabilitation of heating boilers and pipes in Ungheni was successfully completed in February 2003.

The second package for supply and installation of gas-fired boilers and distribution pipes for schools and kindergartens in four towns (Floresti, Falesti, Straseni and Cantemir) is completed. The heating systems installed under this component are operational and helped improve heating service to schools and hospitals. Minor rehabilitation works required for the energy efficiency improvements in schools in Straseni and Cantemir were implemented under this procurement package. The third procurement package consists of: (i) supply and installation of heating systems in Leova and Nisporeni districts, and (ii) supply and installation of heating systems in Briceni, Falesti, and Ialoveni districts. The heating equipment was already operational at the beginning of 2005/2006 heating season.

Procurement has been launched for the rehabilitation and modernization of heating systems, including internal systems and minor energy efficiency activities, under the Ministry of Education and the Ministry of Heat and Social Protection. It includes steam boiler plants for the Republican Hospital, the Oncological Institute (including internal heating systems and minor rehabilitation works), and the heating system in the Center for Disabled Children. The PIU and its consultants funded by SIDA completed the feasibility study for rehabilitation of heating systems in the main medical buildings in Chisinau.

The project does not address DH systems. The main scope of the project is to solve heat supply problem by constructing HOBs and rehabilitating internal heating systems, where necessary. Although the project does not solve the heat supply problem for other consumers (residential, commercial, industrial), the results of the implemented projects are as following:

- improved quality of heat supply (usually, the indoor temperature increased from 13-15C to 18-20C)
- reduced cost for heat supply by 30-50%
- reduced emissions (a big reduction of emissions was obtained as a result of shifting coal burning boilers to gas burning boilers)

The project is to be finalized by 2007.

SIDA has provided technical assistance to the Project since preparation stage. This support has been extremely valuable and has significantly contributed to the timely start-up of the heating component of the Energy II Project, and its implementation.

Subsidies

Moldova inherited the ex-Soviet cross-subsidizing and direct subsidizing for the energy consumption. Usually, industrial and public consumers would be heavily subsidizing residential consumers, making all utilities easily affordable for households, including heat services. By the end of 1998, according to decision of ANRE, heat tariffs were equalized for all consumer categories.

This decision eliminated cross-subsidies for heat. At the same time heat suppliers still received direct subsidies from the State Budget. Due to the economic difficulties and the transfer of utilities to local governments, no subsidies from central budget have been paid since 2000. This had a harsh impact on heat suppliers in most of cities throughout Moldova. As a result, only 13 cities out of 45 where DH was operational previously are now able to continue operating their heating systems, at least partially. The rest of companies went bankrupt and stopped their activity due to the decision of the Government to stop direct subsidizing, which was heavily supported by IFIs including the World Bank and IMF.

The Government, however, preserves nominal, targeted subsidies for district heat and hot water, provided to 11 categories of socially vulnerable consumers. In 2005, the total heat and hot water subsidies were 18.513,7 thousand MDL and 3.370,0 thousand MDL, respectively (see Table 2).

Table 2. Information on NTC For Energy Bills Paid From State Budget in 2005 and 2006 (thousand MDL)

Service	2005				2006 (January, February)			
	Compensation size		Total for heat and DHW	% of total compensation	Compensation size		Total for heat and DHW	% of total compensation
	50 %	25%			50%	25%		
Heat	11,215	7,300	18,514	8.4	4,117	2,672	6,788.4	21.1
Hot Water	2,040	1,330	3,370	1.5	751.1	488	1,238.8	3.8

Source: National Social Insurance House

According to Government Decision No. 761 of 31 June 2000, nominal compensations have been introduced for 11 categories of population. Thus, according to this decision, the sizes of compensations are decided as follows:

1) the share of 50% of household heat and hot water bills for:

- People with 1st and 2nd degree disability, as exception is the category specified in b);
- Second world war participants and theirs spouses;
- Families with members with health damages from elimination of Chernobyl Nuclear Power Plant explosion;
- Families with four and more children;
- Afghanistan war participants and others

2) In the share of 25% of household heat and hot water bills for:

- People with 2nd degree disability ;
- Victims of political repressions from 1917-1990;
- Active service military personnel.

Nevertheless, cross subsidizing is still preserved, according to energy experts, between power production and heat production within CHP plants. In this case, power production is subsidized by the heat production to make CHP electricity competitive.

1.3 PRIVATE SECTOR PARTICIPATION

Due to the restructuring of the heating sector, many cities adopted the strategy of decentralizing their heat supply sector, thus opening the market for private and other types of investments. This opportunity is not fully used by the private companies, because of the low payment capacity of tenants, and private companies limit themselves to only participating in different outsourced competitive tenders for installation of heat-only boilers (HOBs) and networks for different consumers (mainly under the WB Energy 2 project).

There is a good example of private sector participation in retrofitting of existing HOBs owned by Termocom through performance contracts, where the investments are paid back by Termocom from the savings achieved within few years. This is the possibility used by Termocom to make investments and due to savings to pay back the investments.

Also, private sector efforts accelerate dissemination of individual heating systems (on apartment level), which are used by a large number of tenants in all cities. In Chisinau, almost 5 % of residential consumers that were once connected to DH have disconnected already. Their number is expected to increase even further, but due to certain impediments, such as the technical capacity of the gas supply network, place certain limitations on the installation of autonomous heating systems. Hence, the real number of disconnections is decreasing.

In general, the main directions of investments and private sector participation in the heat supply sector are as follows:

- a) installation of heating boilers on a building level: more frequently used for newly constructed multifamily residential buildings;
- b) installation of individual heating systems (boilers) on apartment level;
- c) installation of HOBs and CHP only for industrial units; and
- d) installation of CHP for industrial, public and residential consumers.

Housing Management and Maintenance

The privatization of Moldovan housing sector started from 1994 and currently 95% of the housing stock has already been privatized. Currently, there are 675 HOAs, 43 Condominiums and 312 Cooperatives of Apartments Constructions.

There are two laws that regulate the creation of HOAs and Condominiums and administration within the housing sector: Law on Housing Stock Privatization (1993) and Condominium Law (2000). According to the National Agency for Construction and

Territorial Development, creation of HOAs represents a step toward creation of Condominiums, which according to the Law on Condominium should replace all other forms of ownership and administration.

HOAs represent a form of administration of ownership (apartments) where flat owners give the right to HOA to represent them in relation with suppliers, in courts, etc.

Cooperatives of Apartment Construction started to be created during soviet times and is characterized by the fact that members of Cooperative invest their money for the building construction and become owners of apartments when the building is commissioned. Also, CAC have in their property, unlike HOA, the whole building (including roof, basement, etc) and associated land.

A condominium represents a form of ownership, where members have the ownership of apartments, building as a whole and associated land. The administration of such Condominium could be performed either by Association of Owners in Condominium, either by other form of administration (including private companies). Still, more than 7000 multifamily residential buildings are administered by Housing Maintenance Companies (HMC), old JEKs. Due to the fact that HOAs were not created in all residential buildings, HMCs are still preserved as the administrators of such. This demonstrates that HOAs do not attract flat owners and there a several factors that influence this:

- a) **mentality** – people like to think that state should take care of everything (HMC are municipal owned enterprises);
- b) **maintaining tariffs** – HMC have the lowest maintaining tariffs of (19 bani/m² – 1,4cents/m²) which does not allow HOAs which use the same tariff to develop and properly maintain the housing stock. Even if HOAs can increase maintaining tariff, this is not competitive with lower HMC tariff, and thus HOAs managers are reluctant toward tariff increase;
- c) HMCs are supported directly by the Municipality, which creates unfair competition between HMCs and HOAs/Condominiums.

The managers of HOAs and Association of Condominiums have little or no capacity on how to manage such an organization, which not only requires general administration and financial management, but also economic activities related to building maintenance, procurement and service delivery. The managers of HOAs and Associations of Condominium are elected by the tenants/members of the given building. The representatives of the Union of HOAs of Moldova, which includes HOA chairpersons throughout Moldova, have stressed on numerous occasions that the managers lack capacity to perform their functions appropriately. To open this job market for skilled labor, there should be private housing managers that would be certified by a state or other type of commission.

ESCO Development

The market conditions were not favorable for the development of energy service companies (ESCOs) in Moldova until now. One of the main reasons of this is that energy prices are too low, which does not allow energy savings as a result of energy efficiency projects to compete with other types of investments, for example in commercial sector. In this way, private investment and commercial loans are not attracted by energy efficiency projects. Another

reason is that there are legislative impediments in the public sector, such as budgetary proceedings, which represent another big impediment for such projects to be implemented in public sector.

Lack of financing limits the demand for energy services. No real ESCO have been created but there are engineering companies that have worked on donor-financed turn-key contracts in the range of US\$50,000 to \$150,000. For example, companies involved in the World Bank Energy II project (see Box 2) are the RomanyGazGrup SRL, IncorGaz SA, Horos SA, Ravelon Prim SRL, and RomEnerg SA. Since the conditions in the market are changing, there are premises for their development. The recent rise in energy prices had increased the share of energy costs in the industry which made it more important to the managers of the respective entities. New energy efficient technologies are increasingly available on the market, which are offered using financial instruments – for example leasing.

1.4 TECHNOLOGY CONVERSION

Demand-Side

New technologies are entering the heat end-use. Due to the collapse of DH systems in most cities, consumers have found alternative options to provide for heat, through electric heaters or solid fuel stoves.

In those cities where DH systems were preserved in their initial shape (Chisinau and Balti), during 2000-2002 the quality of heating services was poor and many consumers tried to improve their comfort through installation of individual heating systems or devices. Nevertheless, this tendency is slowing down due to the gradual improvement of the heat service quality during the last years.

The problem of domestic hot water supply still remains. Not all consumers are currently supplied with hot water, while in some districts hot water is supplied by an hourly schedule. As a result, consumers are forced to install alternative hot water supply devices. Usually, these are electric hot water boilers, which are imported from Italy (comprising over 80% of the market). Alternatively, hot water can be prepared with the gas-fired boilers where the cost of hot water produced by such is less than for the electrical boiler option. However, this option could not be used by any consumer due to gas supply network restrictions, administrative barriers that every beneficiary that intends to install such a boiler has to overcome (mainly approval of gas supply company), as well as the larger initial capital investments required.

The old vertical heat distribution system which is in place in all building complicates individual apartment-level metering and control. This, in turn, affects the heat quality, payment rate, impossibility to disconnect non-payers, etc.

There are initiatives that are aimed at allowing each apartment to have the metering and regulation. The first and best option, according to heat supplier and consumer, is the replacement of old vertical system by a new horizontal one, which would allow each consumer to regulate the consumption and would have metering on apartment level. Another reason for promoting this option is that most internal heating systems are over 30 years old and should be replaced anyway.

The second option of heat consumption and metering involves the installation of thermostatic valves and heat cost allocators (HCAs) on each radiator. This option has a number of deficiencies:

- no disconnection possible
- possibility that consumers will defraud the HCA readings
- complications and lack of transparency in interpreting consumption readings of HCAs
- regular need to rebalance the heating system to allow for even distribution of the heat energy throughout the building.

New buildings use new technologies where metering and control is on the apartment level. Some buildings have 100% individual heating systems in each apartment, while some of new buildings have building level heating boilers and regulation on the apartment level (usually with a horizontal distribution system). According to developers, the second option is more cost effective (by 40%) from the investment point of view.

Supply-Side

The supply driven management of district heating does not meet the requirements of the demand side: regulation of heat consumption according to consumer needs. The initiative of the Chisinau DH company Termocom, for example, is planning to restructure the system to allow the consumers to regulate the heat consumption. Thus, Termocom intends to stop using Central Heating Points⁴ and install Individual Heating Points⁵, which would allow consumers to have possibility to regulate their consumption, at the same time avoiding losses in the grids (instead of 4 pipe system there will be a 2 pipe system). There will be metering at the apartment level, so each household can regulate its consumption and pay accordingly. Another initiative is to have more efficient boilers installed at HOB houses in order to reduce gas consumption. The age of the boilers in the existing boiler houses is over 30 years.

Termocom is also undergoing an internal energy management improvement program. The first step taken by the company management was introduction of an electronic system that shows the situation in the whole DH system in real time (quantity supplied, losses, temperature of heat carrier, etc). This enables the management to detect the inefficiencies and losses in heat supply (including thefts).

Introduction of CHP

In 2003 the Moldovan Government approved a “Program on CHP development in Moldova” which indicated that CHP should be constructed in most urban cities as an efficiency improvement and energy security measure that would provide for local power sources.

⁴ Central Heating Points are connected to the DH station and are used for preparation of DHW and heating for more than one building, which are connected through four pipe system (two for DHW and two for heating)

⁵ Individual Heating Points are installed on the building or staircase level to prepare DHW and heat, regulate consumption according to indoor and outdoor temperature, and regulate flow in the internal system.

Thus, several projects on CHP construction have been approved by the Government but none of them has yet been implemented.

The best example is in Balti where a Swiss company “Universal Engineering Establishment” expressed an intention to finance construction of a new 87 MW CHP plant. Although a preliminary agreement was signed between this company and the Moldovan Government in 2004 according to which the CHP plant should have been commissioned by the end of 2006, there has been no development in this project and no final agreement signed.

Another new project pending implementation intends to increase the installed power generation capacity of the existing “CHP 2” (Chisinau) by another 200 MWh electricity. The Czech Skoda-Praga company is to provide 200 million Euro in investment. In this case, “CHP 2” company would cover some 30% of the internal power consumption. Construction of small CHP plants represents the core of the “Program on CHP development”. CHP should be constructed in cities where DH was once operational. First attempt already started in Edinet. A 6 MW CHP plant construction started in 2005 by a local company Proenergo-Grup Ltd and has not finished yet.

The construction of small CHP should lead to rehabilitation of DH networks in the cities, although big investments are required to rehabilitate and improve DH networks. Still, according to EU Directive on CHP development⁶, DH systems represent the best option from the economic, environment and security standpoints.

1.5 ENVIRONMENTAL COMPLIANCE

The import of fuel in 2004 was 2,549,000 tons, two times less than in 1995 (5109000 tons). According to Ministry of Ecology and National Ecology Institute, during the last years, the share of natural gas has increased while liquid fuel and solid fuel has decreased, leading to a reduction in emissions. CHP-2, CHP-1, Termocom and CHP-Nord are the biggest consumers of energy sources in Moldova. All these companies are supplying heat (along with power in case of CHP) to DH systems.

During 2004, consumption of energy sources by energy enterprises was as follows: 45,498,000 m³ natural gas, 288 tons of mazut, 544 tons of coal. Emissions from these companies during 2004 totaled 1719 tons (see Figure 5). The dynamics of emissions during the last years has a diminishing trend and this is partly to the reduction of energy consumption and partly to change in consumption structure (no use of mazut).

Environmental politics are stipulated in a number of laws and strategies, for example the Law on Environment Protection (1995), Concept on Environment Policies (2002), and Strategic National Action Program on Environment Protection (1995). During 2004, governmental institutions have improved the legal framework in order to be in compliance with international standards, thus having improved the Law on Payment for Environment

⁶ Directive 2004/8/EC of The European Parliament and of the Council of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/42/EEC

Pollution, Code on Administrative Offenses, etc. The instructions on evaluation of damages caused to the environment. The political course of Republic of Moldova to join the European Union implies the alignment of legal framework to the European one, including the legislation related to environment protection. Today, there are 33 Laws and 348 standards related to environmental protection.

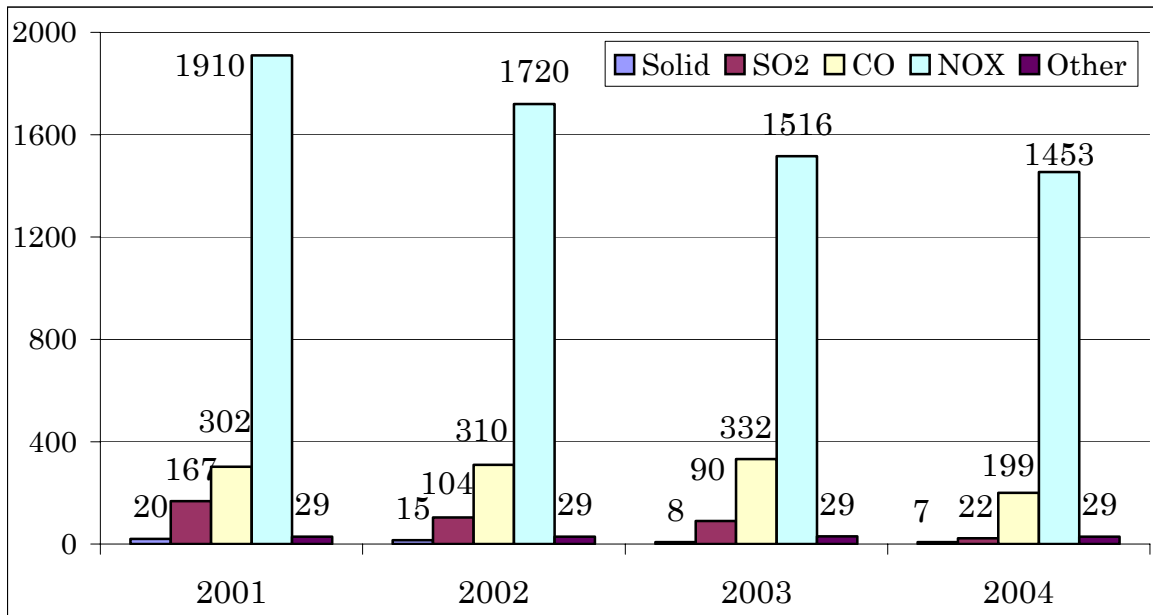


Figure 5. Emissions of energy enterprises (tons)

(Source: 'Environment situation in Republic of Moldova in 2004', National Report)

1.6 FINANCING EFFICIENCY

While the need for heat sector needs restructuring and large retrofits is known, the sector saw limited investments. Under Energy II Project, World Bank launched a financing mechanism under which during 2001-2005 period, invested more than 6 million USD in loans to the local administrations for construction of HOBs and replacement/improvement of heating systems for public buildings. The loan is disbursed at 5% annual interest rate with a 3 years grace period.

EBRD also used a loan investment mechanism for public owned DH companies, under which there were allocated about 20 million USD. Until now, there was no specialized Fund that would address the needs of the heat sector, except the Energy Saving Fund, which has very limited financing (for year of 2005 there was only 280000 MDL (22000 USD) allocated from the central budget). The Fund is administered by a Board which includes representatives of most Ministries. The manager of the Fund is the Agency for Energy Conservation which elaborates the plan of activity, organizes the gathering and selection of those projects that could be financed by this Fund. The range of project ideas varies from scientific theoretical research projects and technical innovations to installation of energy efficient equipment. The submission of proposals is open for any stakeholders regardless of activity domain and type of ownership. Commercial banks started to finance equipment

purchasing using leasing, at the same time companies that are financially strong, may offer vendor credits to beneficiaries.

1.7 POLITICAL ASPECTS OF HEAT SECTOR DEVELOPMENT

The political factors probably have the largest role in the promotion or stagnation of the development in the heat sector. Heat sector development strategies need political support in order to make them viable. The social nature of the heat supply, as well as the utility services in general, makes political interference even stronger. Often, heat sector is used as a political tool for achieving certain goals. The heat tariff approval (water tariff, as well) procedure can serve as a good example. According to the Energy Law, the calculation methodology is approved by ANRE, while tariffs calculated based on this methodology are approved by local Municipal Councils. Usually, heat tariffs are set below cost-recover levels thus placing the supplier in dire financial situation.

Another example of political interference is the promotion of non-district heating systems by Governmental Agencies in the areas where DH is operating. As a prove to this is the statement of the Director of National Agency for Regional Development, Mr. Semenovcher who stated in his speech "... the only requirement toward builders is the existence of parking places, minimum number of stores and autonomous heating".⁷ Hence, the lack of coordinated planning in the heat sector may affect the sustainability of DH sector. To partially mitigate the political influence in the heat sector, the right to approve heat tariffs should be assigned to ANRE, which according to the status is an independent agency.

1.8 ENERGY EFFICIENCY IN RESIDENTIAL AND MUNICIPAL BUILDINGS: BARRIERS AND POTENTIAL REMEDIES

The latest developments in the energy sector, particularly the recent increase of gas price from 80 USD/1000m³ to 110 USD and ultimately to 160USD, reemphasized the need for state involvement in promoting energy efficiency. This issue is heavily discussed by the Government, and a State Committee was set up for the promotion of renewable energy sources and energy efficiency.

According to energy experts, the demand-side energy efficiency has about 20-60% potential to reduce the energy end-use. This encompasses low- to no-cost measures such as energy management in public buildings and basic technical measures like insulation, installation of regulation and metering for heat consumption.

The residential sector is characterized by a broad range of inefficiencies starting from large commercial heat and hot water losses (thefts and leakages) in the systems, to wasteful end use in dwellings that are not weatherized. This creates a real problem for the supplier, since the installed capacity (in addition to the advanced state of depreciation) is not sufficient to satisfy the consumption load (especially during very cold days). In such a situation, not only the potential for heat consumption reduction is quite high, but utilizing

⁷ Source: 'Logoss Press' newspaper as of December 2, 2005, no. 44

this potential is also in the interest of the supplier. However, energy efficiency projects in the residential sector are not implemented with the exception of donor-assisted demonstration projects or some weak attempts by certain building administrators.

The main barriers to development of energy efficiency in the residential sector are the following:

- Low awareness of residents on demand side energy efficiency.
- Weak institutional framework.
- Low purchasing power of households.
- Shortcomings of housing sector legislation (inability of HOAs to borrow).
- 'Old style' mentality of a large number of the households, who do not realize that they are supposed to be responsible for the building and apartment maintenance and utility payments.
- Lack of effective financing and incentive mechanisms aimed at assisting in the improvement of energy efficiency in residential sector which was declared in strategies (Concept on Housing sector development in Chisinau, approved in 2002 by Municipal Council).
- Lack of governmental projects and programs that would have real objectives, solid implementation mechanisms and would obtain real results;
- Poor managerial and financial capacities of the main actors in the residential sector, including HOAs, condominiums, and municipal housing maintenance companies.

According to international experience in the residential sector, the potential of heat consumption reduction due to energy efficiency and conservation varies from 15 to 40% which ultimately reduces the needs of heat production/supply. Measures implemented on the demand side vary depending on the object and money available and include the following:

- wall insulation;
- roof insulation;
- replacement/caulking of windows and entrance doors;
- replacement of internal heat and hot water system;
- installation of thermostat valves on radiators;
- installation of individual heating points in buildings⁸

At the same time, due to the unsatisfactory quality of heat supply, many consumers disconnect from the DH systems, thus the demand for heat reduced significantly, consequently affecting the efficiency of generation. As a result the DH system has to be redesigned according to the new realities and market requirements such as the reduced heat load, necessity to provide the consumer with control and metering tools, transparency of billing, supervision of service quality, flexibility to connect/disconnect consumers, etc. which will also create supply-side incentives for energy efficiency.

⁸ The case studies are available on <http://www.munee.org/go.idecs?c=53>.

DH restructuring has to start from the evaluation of the real consumption and effective heat demand and end-use. While there have been some projects aimed at improving efficiency of energy use on the supply side, the absence of demand-side regulation and measurement in the old heating systems provides no incentives for energy efficiency. At the same time, the supplier's revenues do not depend on supplied heat parameters (regime), and the consumers (residential, commercial, industrial and public) totally depend on the supplier (its supply regime).

Similar to residential sector, in the public sector as well there are no incentives for energy efficiency. Similar to municipal budgets discussed earlier, if a municipality or school saves money as a result of energy efficiency measures, the next year's budget allocation for energy needs will be reduced by the amount saved in the previous year. The savings cannot be used for alternative needs in the public entity (for example buy new books in the school).

There is no operational financial mechanism to address EE in residential sector due to the legal gaps in the residential sector (Condominium Law). No financial institution shall lend to Condominiums because the legislation does not provide for safeguard mechanisms guaranteeing repayment of funds.

The private housing sector is still developing, and there are no private maintenance companies. As far as the municipal maintenance companies are concerned (the zheks), the municipal housing maintenance fees are low and the funds are usually insufficient to implement major repairs or renovations. The zheks are also not in position to borrow, as, since they are owned by the municipality, the municipal budget will be held accountable for the loan repayment. Given the small maintenance fees and low collection rates, the municipality does not allow zheks borrowing.

2 The Impact of International Aid on District Heating

Donor-funded technical assistance and investment programs have sought to encourage policy reforms and appropriate investments that will place communal infrastructure on a sustainable path in an increasingly market-oriented world. One of the greatest challenges to reaching that sustainable path has been improving the commercial viability of district heating in a way that is affordable. This is why the donors and IFIs involved in sectoral reform programs, which started from earlier involvement from EBRD financing modernization at the DH companies, and continued by legal reform efforts by USAID, and boiler construction and system restructuring supported by the World Bank and SIDA.

The efforts of donors and IFIs for the reform in the heat sector started with EBRD credit loan for biggest heat supplier Termocom SA for infrastructure development. At the same time, USAID launched the project on energy regulation (Energy Sector Restructuring Project) since 1998 when National Agency for Energy Regulation was created. Thus, heat tariffs became equal for all consumers avoiding cross-subsidizing of heat consumption. Having eliminating cross-subsidizing and transferring heat utilities to local governments, and having the situation when heat utilities started to face problems with disconnection of

industrial sector and raising costs for heat, World Bank together with SIDA elaborated two reports in 2001 for the preparation of Energy II Project:

- a) Strategic Heating Options for Moldova, and
- b) Pilot Projects for Improved Heating of Public and Residential Buildings.

The conclusions of reports could be summarized as follows ⁹:

- Centralized heating in district heating systems has an affordability and willingness to pay problem resulting in low collection rates. The problem has both an institutional and a technical background. These problems must be solved if any district or semi-centralized heating system in Moldova shall survive.
- Decentralized heating (building or apartment boilers) mostly find the equilibrium between affordability and thermal comfort with respect to indoor temperatures, since this is an individual choice for each user. Hereby, decentralized heating does not have the institutional problem that district heating or semi-centralized systems have. However, the total investment costs for such system is much higher than for the suggested semi-centralized systems.
- In the present situation, only the district heating systems in Chisinau and Balti has the possibility of producing low cost heat with CHP plants.

Based on the findings of the reports, World Bank had elaborated a program for construction of HOBs for public buildings in those cities where DH is not cost effective, with some exception for both Balti and Chisinau, where boilers have been installed for a number of hospitals.

The heat sector development in Moldova has followed a quite unstructured. Not every city has a strategy (or a policy) of the heat sector development in the given locality. Most municipalities try to solve the heating problems only for the public buildings, while the residential consumers have to come up with their own, alternative solutions after the collapse or degradation of the DH service. Nevertheless, some municipal leaders have adopted a more complex view on the heat sector development and have made encouraging efforts to revitalize and optimize the heat supply in their cities. Ungheni, for example, the municipality took a holistic approach to the heat issue. The old DH system was replaced with fourteen small HOBs which supply heat not only to public buildings, but also to residential buildings. This even allowed preserving some parts of the DH system and continuing smaller-scale, yet centralized heat supply to the city. The technical assistance for the implementation of this project was provided by Local Government Reform Project/USAID project while World Bank had provided financial assistance through Energy II Project.

The assistance provided by different donors and IFIs, had significantly contributed to perception of reform needs by the local leaders and awareness on successful restructuring models applicable to Moldova's realities. The institutional reform started with the creation of an independent regulator - ANRE – which allowed making energy regulation more

⁹ Strategic Heating Options for Moldova, SwedPower/FVB District Heating, 2001

independent and politically-neutral, and continued to the development of Government priorities and strategies outlining the current needs for improvement, while through committing to IFI lending mechanisms, the Government also committed to accelerating the energy sector reform in general, and the heat sector, in particular. The international technical assistance also increased the awareness of the Government and municipal officers, suppliers and consumers on common heat sector problems and best practices to solve them.

Training of municipal representatives significantly contributed to the understanding of the heat sector issues among the municipalities like Ungheni, Floresti, and Chisinau. The trainings on energy planning and business plan development gave them bases for elaboration of their local development plans (see example of Ungheni) and attract financing based on the designed energy plans and business plans .

However,, DH companies and municipalities face major financial constraints, which hampers their ability to retrofit and commercialize the heat supply service, regardless of the fact that technical aspects for such restructuring are well known. Nowadays, in order to maintain the DH systems, municipalities have to fundamentally retrofit and continually invest large funds for technical improvements of the DH, to make DH with the other emerging heating options.

Specific donor assistance programs are discussed below and summarized in Table 4.

1.1 EBRD

The EBRD project was launched in 1995 by signing the credit agreement with Termocom SA, under governmental guarantee. Total sum of the loan was 20 million USD and was focused on improving of Termocom SA infrastructure (DH Company) through the following measures:

- a) replacing old pipes with new pre-insulated pipes
- b) replacing old pumps with new efficient ones
- c) installation of heat exchanges in central heating points
- d) installation of heat meters on the demand side

During two years of implementation, from 1997 to 1999, the EBRD project implemented the measures listed in Table 3. The project was terminated by EBRD in 1999.

Table 3. Efficiency measures implemented by EBRD from 1997 to 1999

Item list	Accomplished	Planned
Replacement of heating networks using pre-insulated pipes	15 km	390 km
Pumps in pumping stations and in CSPs'	38 units	57 units
Heat exchangers for heating and DHW in CSPs'	977 units	925 units
Heat meters	463 units	457 units
Customer installations	0	925

1.2 USAID

had launched in 2002 a project on **Heat Sector Development**, through partnership with the Alliance to Save Energy and the Ministry of Energy. The project aimed at creating *an attractive environment for investments (including private) in the heat sector*.

The project had four phases to be implemented, each of them being a precondition for implementation of the following one, which referred to the following:

1. elaboration of legal framework for heat sector, namely Draft Heat Law and Draft Strategy on Heat Sector Development
2. elaboration of secondary legislation
3. elaboration of programs and plans for restructuring of DH systems in cities
4. attraction of investments for respective projects

As a result of the work conducted by the Alliance to Save Energy, two legal acts were elaborated: Draft Heat Law and Draft Strategy on Heat Sector Development. The Strategy on Heat Sector Development was approved and adopted by the Government in February 2003 and represents a background for elaborating the Program of Restructuring of DH systems in cities elaborated by the Ministry of Energy in 2003.¹⁰ This Program presents a short analysis of the situation in each city and proposes different options recommended for restructuring the heating system in each city.

The second legislative document – the draft Heat Law – was elaborated by Alliance to Save Energy and submitted to the Ministry of Energy in September 2002. This act was approved by the Government and passed the first hearings in the Parliament. After that, it was returned back to the Government for improvements. However, the energy policy priorities have shifted and due to staff changes at the Ministry of Energy, followed by complete elimination of this Ministry have significantly slowed down the heat sector reform process and lost its champion. At the moment Ministry of Industry and Infrastructure, which inherited the energy sector policy role, is working on new comments provided by different stakeholders to re-submit it for approval to the Parliament. Due to the fact that 1st phase of the project was not completed, USAID did not proceed to implementation of the following phases.

A USAID project implemented by Advanced Engineering Associations Inc. (AEAI) implemented several pilot projects aimed at insulation of public buildings, mainly caulking of windows and doors, resulting in 2-5°C indoor air temperature increase. Also under USAID funding, the Alliance to Save Energy implemented three demonstration projects on installation of regulation and metering equipment in public buildings (schools) and replacing old windows with new efficient ones. The project resulted in 20-27% reduction of heat consumption with simple payback periods between 2,5 to 4 years. Impediments for development of energy efficiency projects in public buildings were revealed to be:

- low awareness of consumers on energy efficiency;
- no programs on EE projects elaboration and implementation; and
- no incentives for administrators of public buildings to implement EE measures.

At the same time, local governments do not have financial incentives to implement EE measures in public buildings.

¹⁰ For more information, see http://www.edwg.md/english/en_docs/hsconcept.pdf.

Box 3. Objectives of the USAID Heat Strategy

The main goals of the strategy are:

- promote the establishment of sustainable heating systems
- allow affordable heating bills for the vast majority of the inhabitants
- implement social assistance programs for the socially most vulnerable groups enabling them a paid minimum heating service
- improve the energy efficiency and thus reduce the losses in the heating systems
- improve the financial, operational and managerial performance of heat supply companies, especially of the district heating companies
- reduce environmental strains by using cleaner fuels,
- reduce imports and the import dependency on fuels
- support the security of energy supplies

These goals should be achieved by the following objectives

- reduce heat consumption on the demand side by a more rational use of heat energy
- increase the share of cleaner fuels
- reduce fuel consumption by modern control and regulation equipment
- reduce heat consumption through improving weatherization
- decentralize, downsize and rationalize existing district heating systems if viable
- install decentralized heating systems if viable
- install control and regulation devices on the demand side (e.g. thermostatic valves)
- introduce proper price and tariff systems (two-tier tariffs and consumption based billing for flats)
- increase cost covering tariffs but improve the social assistance systems
- improve the billing and collection procedures
- create the proper legal and political environment to foster private sector participation
- increasing the understanding of the regulatory authorities on the need for tariff increases, improved collections, and consumption-based billing
- establishing more efficient ownership and management structures

Promoting private sector participation is seen as an essential means to achieve means. This requires creating the right conditions for such activities leaving them as much freedom for their commercial activities as possible. On the side, to a certain extend regulation will be needed if companies operate in areas being natural monopolies. This situation requires:

- to balance the legitimate request for regulating business activities undertaken in areas being natural monopolies;
- to balance the costs and benefits of regulation: regulation may prevent or restrict private sector participation, if the benefits do not exceed costs.

1.3 WORLD BANK/IDA PROJECT

This represents a soft loan offered to Government of Moldova from the International Development Agency (IDA) for a period of 20 years with a grace period of 10 years, 40 year

maturity, and interest rate 0.75%. The program started in November 2003.¹¹ The project components are:

- 1) electricity system upgrade;
- 2) heating supply and efficiency improvement;
- 3) technical assistance for project implementation, and energy sector reforms; and,
- 4) project management through a Project Implementation Unit (MEPIU), which was created at the Ministry of Energy.

In 2005, there was a reorganization of the Government and Ministry of Energy merged with Ministry of Industry, which ultimately created Ministry of Industry and Infrastructure. Currently, MEPIU is subordinated to Ministry of Industry and Infrastructure.

Through this project, out of the US\$ 35 million IDA loan with 10-year grace period, the PIU has invested more than 6 million USD in heat sector, focusing on the public consumers (schools, hospitals, kindergartens, etc). The project does not aim at addressing the problems of DH. The main scope of the project is to solve heat supply problem by constructing HOBs and rehabilitating internal heating systems, where necessary.

Although the project does not solve the heat supply problem for other consumers (residential, commercial, industrial), the results of the implemented projects are as following:

- improved quality of heat supply (usually, the indoor temperature increased from 13-15C to 18-20C)
- reduced cost for heat supply by 30-50%
- reduced emissions (a big reduction of emissions was obtained as a result of shifting coal burning boilers to gas burning boilers)

According to the implementation contract, the project has to be finalized by 2008.¹²

1.4 SIDA

SIDA's cooperation with Moldova within the energy sector commenced in 2000, when the World Bank started to prepare the ENERGY II project (started later in 2003). SIDA provided 600,000 USD in program support including financing a study, by fjärrvärmebyrån AB (FVB) and Swedpower (about 3MSEK), determining the strategic options for restructuring of urban heating systems. The Strategic Heating Options and Pilot Projects for Public and Residential Buildings Reports were elaborated in 2000-2001, which came earlier than ASE Heat Strategy. The reports reached essentially the same conclusions:

¹¹ More available on the project: http://www-wds.worldbank.org/external/default/main?pagePK=64193027&piPK=64187937&theSitePK=523679&menuPK=64187510&searchMenuPK=64187511&siteName=WDS&entityID=000012009_20040722104411

¹² The Project Appraisal Document is available at: http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2004/07/22/000012009_20040722104411/Rendered/INDEX/242020rev.txt

- not all DH systems should be kept (Swedes said there should be left only 2 – Chisinau and Balti – while Mr. Bernd Kalkum – ASE consultant -nominated 6).
- Even more, as a basis for decision on keeping DH should be used indices (Swedes use ‘heat linear density’, Mr. Bernd Kalkum uses ‘heat load density’).
- Both experts are backing the idea of preserving and developing CHP.

The recommendations were not immediately accepted by the Government but today the understanding has increased and it is now recognized that the cooperation with the Swedish experts has had a considerable influence on Moldovan policy and decision makers. Currently experts from FVB are providing technical assistance for the implementation of the WB Energy II project.

As a response to the interest expressed by Moldovan officials¹³ in 2004, FVB, conducted a study of the heat sector particularly focusing on District Heating. The report presented a list of 11 projects for possible implementation, which were also endorsed by Moldovan counterparts. The report was distributed to relevant Ministries and Utilities in Moldova and was discussed with the MoE in Chisinau and a number of other stakeholders in November 2004. Six of those were prioritized and submitted to SIDA for financing.

The potential development of SIDA assistance to Moldova heat sector could resume in the following areas:

- a) continuation of technical assistance to WB Energy II Project
- b) technical assistance to ANRE
- c) demonstration project on elimination of central heating points and replacement of old vertical internal heating system by a horizontal one in multifamily buildings
- d) demonstration project on biomass use (forest waste) for heating purposes

SIDA also intends to elaborate and implement an Action Plan aiming at assisting the management and owners of Chisinau DH company Termocom to make the company financially self-sufficient and competitive.

1.5 COORDINATION OF EFFORTS IN HEAT SECTOR DEVELOPMENT

Based on the Alliance initiative, there were a number of round table meetings conducted where partners¹⁴ could share information and express their views and comments to different donors’ or Government’ initiatives related to heat sector. The three Donor Round Table Meetings were held during 2003 – 2004 period where different priority issues were discussed and important documents reviewed, including a multi-stakeholder review of the Concept of power plants development until 2010 elaborated by Ministry of Energy. With the financial support of USAID, a web page of the Energy Donors Working Group has been created and maintained by Alliance (www.edwg.md).

Ultimately, the Alliance started to organize round table meetings with local stakeholders where question related to the energy sector are discussed. This Energy Forum has a great

¹³ Strategy Mission held in Chisinau in November 2003 INEC/IF.

¹⁴ includes donors, governmental institutions, local institutions, project beneficiaries, etc.

success among local stakeholders and helps them to have constructive discussions on different issues. The topics for discussion at these informal meetings focus on those energy related problems that Government, society, suppliers or regulator are facing at a certain period of time. The list, but not limited, of topics of discussion is as follows:

1. Role of the central government in the energy sector

Current situation: central government started to reform the energy sector, namely by reforming the power sector through separating the generation, transportation, and distribution and privatizing some state owned enterprises; tariff reform; elaboration of laws and strategies for energy sector. Still, the reform stopped at a given point, after privatization of 3 out of 5 distribution networks. At the same time, the heating companies which were state owned were transferred to municipalities and no further measure is undertaken to develop those companies.

The tariff reform was conducted by giving the tariffs approval right to independent agency, ANRE, having eliminating direct subsidizing in the energy sector and approving cost-recovery tariffs.

Issues faced by the central government:

- social assistance for low-income people;
- concession of public utilities;
- need of investments in existent power generation stations, construction of new power transportation lines, gas transportation pipes.

Recommendations: cost recovery tariffs for all utilities, liberalize power market, create incentives for new power generations plants.

2. Need of changes to the policy and legal framework, aimed to improving heat sector development and EE implementation for different sectors

Current situation: There is no specific law that would regulate the heat sector (Draft Heat Law is still in the Government), while the existing legislative acts are controversial and not addressing the issues of heat sector.

Law on Energy Savings is generic and declarative and no real incentives for energy efficiency are provided by this Law. Laws regulating the administration and ownership of public and housing sector do not include clear provisions that would promote implementation of energy efficiency projects in these sectors.

No clear policy exists on the housing sector development.

Issues: Need of investments in public and housing sector; elaboration of necessary legislation that would allow and promote implementation of energy efficiency projects

Recommendations:

- Working on legislation by attracting social society and experts in the field
- Working on creation of financial mechanisms that would facilitate the implementation of energy efficiency projects as in public sector as in housing sector

3. Promotion of energy efficiency

Current situation: Energy efficiency became a top interest for the central Government and there are some efforts related to promotion of energy efficiency including creation of National Committee on Renewables and Energy Efficiency. Local governments usually

do not have programs for energy efficiency for public sector. As concerns residential sector, there are norms related to energy efficiency of residential buildings, which relate to new constructed buildings only.

Issues: There is no awareness campaigns supported by central or local governments, there is need for legal framework improving.

Recommendations:

- Analysis of impediments for energy efficiency projects implementations;
- Modification of legal framework in order to create incentives for energy efficiency projects implementations;
- Creation of financial mechanisms required for projects implementations

4. Promotion of different heat supply options to municipalities and condominiums/HOAs according to the Heat Sector Development Strategy.

Current situation: DH systems in most urban settlements are not operating any more. The Ministry of Energy worked with the Alliance to Save Energy a Strategy on Heat Sector Development and elaborated a Program for Heat Sector Decentralization, which include analysis and proposal of different options for heat supply in each city.

Issues: New heating systems should be developed; financial sources should be identified and attract

Recommendations: Municipalities representatives should be informed on the options of heat supply and on the possibilities to attract required financial resources

5. Heat tariff regulation: social impact and creation of attractive conditions for private sector involvement

Current situation: Heat tariffs for consumers are approved by the Municipal Councils, except city of Balti. Heat tariffs are not at cost recovery level and do not allow for heating companies a proper development.¹⁵ The only exception is the recent approval of cost recovery heat tariff by Chisinau Municipal Council. Still, this took 8 years to achieve a cost recovery tariff.

Issues: The government must support low-income people so they can afford increased tariffs for heat. Heat tariffs should be cost recovery in order to allow proper development of heating companies and attract new investments

Recommendations: the social assistance system should be based on real needs of consumers; tariff approval should be transferred to independent agency (ANRE)

6. Attract EE investments in the residential sector

Current situation: The potential for energy consumption reduction in the housing sector is about 40%. No energy efficiency project investments have been made until now in Moldova.

Issues: No legal framework and institutional framework developed required for attracting investments for energy efficiency projects.

¹⁵ The Moldova Affordability paper elaborates on the details of the utility affordability and energy efficiency issues in Moldova.

Recommendations: Improve legal and institutional frameworks (for example property issues), and create financial mechanisms to address housing sector problems.

7. Need for and promotion of energy management on different levels

Current situation: There is little knowledge and expertise on energy management for public and residential buildings. There are no trainings on energy planning and energy efficiency for managers of residential buildings or administrators of public buildings.

Recommendations:

- introduction of energy passports for buildings;
- organization of specialized trainings for energy planners and energy efficiency specialists;
- strengthening of institutional framework within the residential sector which would allow contracting of professional assistance of such specialists.

The initiator of round table meetings on energy sector, Alliance to Save Energy, is closely collaborating with different stakeholders like ANRE, Ministry of Industry and Infrastructure, Agency for Regional Development, Termocom DH Company, CET Nord DH company, Union of HOAs of Moldova, Utility Suppliers Union, etc. As a result of round table meetings, there were initiated discussions within the Agency for Territorial Development and later the Parliament referring to housing sector development.

Currently, there are modifications to the Law on Condominium submitted to the Parliament by the Government. The Parliament Commission for Public Administration, Environment and Territorial Development had organized hearings on the submitted modifications where Alliance took part. As a result of the hearings, it was decided to create a Working Group that would examine the modifications and proposal submitted by different organizations including Alliance to Save Energy. The Alliance to Save Energy is a member of the Working Group and promotes the creation of proper conditions for energy efficiency project implementation in the residential sector. Another result is the fact that with the common effort of different donors and IFIs, Government decided to transfer the right of tariff approval to ANRE. The draft modifications were submitted to the Parliament and are expected to be examined under the first hearings.

Table 4. Donor and government programs on heat supply

Issue	USAID	World Bank Project	EBRD	SIDA	Government Program
Policy Frameworks					
lack of clear legislation for DH	Heat Sector development Project: Elaboration of Draft Heat Law (pending); Elaboration of Heat Sector Development Strategy (approved)				Elaboration of Heat Sector Decentralization Program (approved)
Institutional capacity – state & local levels	The Alliance to Save Energy Municipal Network for Energy Efficiency (MUNEE) program: training on energy planning and business plan elaboration for energy efficiency projects			Organization of study tour for representatives of central and local government, suppliers and consumers	
Affordability					Review and improvement of social assistance system
Heating Infrastructure					
Generation capacity inadequate		Installation of HOBs and replacement of internal heating systems for public buildings		Improvement of internal heating system in residential building (demo project)	
Transmission and distribution (T&D) network			Project for improvement of T&D		

obsolete and inoperable			network at Termocom		
End-Use Consumption					
Lack of consumer awareness about EE	MUNEE: Media campaign on EE awareness				
No incentives for end-use EE	MUNEE: Improvement of legal and institutional framework				
Tariff calculation transparency					Transfer of tariff calculation and approval to ANRE

3 Heating Infrastructure: Technical Capacity of District Heating Supply and Demand

With the old supply-oriented DH systems, heat was supplied during the whole heating period according to accepted norms, and no disconnection or regulation on the demand side was ever used. The equipment serving the DH system was not designed to have a flexible operational regime and it cannot meet changing demand (decreasing or increasing) for heat. Thus, the consumer did not have the possibility to regulate and meter their heat consumption and to pay accordingly. This status quo continues most of DH systems.

A good step forward is the building level metering of heat consumption, which at the beginning (in 1995-97) had a tremendous financial incentive for the homeowners of given building – cutting around 50% of the bill and guaranteeing the payback for heat meter in 1 year/heating season. Although, according to the law, the installation of meters has to be done by the heat suppliers, tenants installed most heat meters and this was done on a sporadic basis, and the state or local governments provided no real assistance. Still, as a result, more than 80% of residential buildings are currently metered in Chisinau, while in other cities the process is still underway.

Even if the heat meter is installed on the building level, it still does not solve the problem related to the regulation of heat consumption and metering on the apartment level. Even if different apartments in the same building have different indoor temperatures, they still have to pay the same tariff for the heat consumed, because the bill is calculated based on the heated surface area method. This raises complaints and creates tension among the tenants and ultimately to the refusal to pay for the heat consumed by the building (HOA, Condominium) due to the lack of transparency and failure provide consumption-based billing service.

That is why, the metering and regulation on the apartment level would solve a number of problems including the payment rate, affordability, improved efficiency and rational use, tensions among tenants of the same HOA/Condominium (which has a direct impact on the strengthening of such institutions).

Due to the efforts of different technical assistance programs, the management of DH companies and representatives of municipalities changed their approach in addressing heat sector restructuring needs. The major problem they would like to solve is the retrofit of DH system to meet the needs of the end-users, allowing for the possibility to regulate and meter the heat consumption.

According to the Termocom (Chisinau DH Company) management, the company intends to implement the following measures aimed at improving the efficiency of their systems, including the following:

- Decentralize the existing system where needed. They have replaced boilers in 4 HOB stations in the suburbs thus reducing the costs per GCal from 1000 MDL to 200 MDL in that given area due to more efficient boilers with optimal capacity.
- Eliminate *central* heating points and install *individual* heating points in buildings, allowing the regulation of heat consumption according to outdoor temperature, and hot water to be prepared according to demand.
- Eliminate hot water pipes in the intra-district pipeline network used to connect the central heating points with each building: *from Central Heating Point (to which are connected buildings) one or two pipes for hot water and two pipes for heat are coming to each building in the elevator point.*
- Replace old heat mains and distribution pipelines with new pre-insulated pipes, which would allow the reduction of heat losses, which currently account for 22%.

The fact that heat tariff is approved by Municipal Councils, which are elected by citizens, politicians use heat tariff (along with others) as a tool for political activity. Both suppliers and consumers are trapped by this situation and no real development can accrue once this situation is preserved. Real steps to improve the system and allow consumers to regulate their consumption were not taken. Thus, the DH systems have been under a permanent state of degradation, which leads to worsening of heat services.

The heat sector problems in Moldova, as anywhere else, are split between the supply and demand sides. Large investments are needed on the both sides. Still, the complexity of financing approach differs for each of them.

The purpose of the technical improvements is to have a demand-oriented heat supply system, by allowing the consumers to regulate and meter their consumption according to their needs and possibilities, while making sufficient upgrades on the supply side allowing efficient generation and delivery of heat energy to the consumers. The suppliers also need to fully re-think their customer service practices, which are hardly in place, and financial management procedures.

While lending institutions can gradually open the financial markets for heat sector lending, the most difficult shall remain the financing in the residential sector. The improper legislation makes borrowing by residential entities difficult and until the residential sector legislation is not reformed and flexible financing mechanisms are set up, little or no retrofits will happen in residential heat end-use.

A problem that was not resolved yet is the subsidy system that addresses the needs of low-income people to deal with high heat bills. According to findings of USAID project Moldova Low-Income Energy and Social Assistance Project (LIESAP), the system does not cover the households truly in need. The Nominated Targeted System (NTC) used currently is based on the categories that do not fully reflect the social specifics of the low-income families. According to the conclusions of LIESAP, 'category-based system of NTC rendering that has been existing in the Republic of Moldova since 2000 needs to be improved further and targeted better at social groups that really require state assistance.'

In 2005, the number of beneficiaries of nominative compensations was 263.786 persons, including 95.561 in urban area. The total amount of nominative compensations was 219.651,3 thousand MDL, which represents an average of 833 MDL (63USD) per person. This would make a 70 MDL (5.25 USD) per month per person while the average dwelling and utilities bill expenses are 14% out of the monthly disposable incomes of households (in 2004 – 491 MDL (39.6USD)).¹⁶ Social payments within the disposable income structure was 12.4% in 2004 for urban area and 18.0% for rural area. Disposable income per household member was 491 MDL (39.6 USD). The switch to a different subsidy system is caused by a number of problems, one of them being that it is difficult to identify truly low-income households, which requires a permanent update.

4 Future Directions: Summary of Recommendations

To pursue the unfinished heat sector reform in Moldova, the following priority actions must be taken:

Mobilize political will to drive reform on the local and central level

In order to reform this sector, the Government should be aware of the state-of-the-art restructuring techniques, recognize their benefits and accept them. Until now, the basic document that would regulate the heat sector – the Heat Law – was not approved by the Parliament. The fact, that such Law is not in place, represents an impediment to the development of the heating sector and namely of DH systems, which presume use of HOB and CHP that are more favorable energy sources than those decentralized, autonomous heating options gradually conquering the market.

Ensure understanding and support for heat sector reform on both the demand side (working with consumers) and the supply side (DH companies)

The reforms of the heat sector are focused equally on the supply side and the demand side. There is still a lot of work to be done on both sides, especially on the demand side, where the situation is further complicated with the poor state of residential multi-apartment building management and maintenance, where the reform started since 1992 and unfortunately still has a lot of deficiencies.

Promote adoption of local heat sector development plans

Although the Government of Moldova (Ministry of Energy) elaborated and published the Program on decentralizing the heating system for each city of the country, where different options are presented with detailed technical and economical analysis, yet most municipalities do not have a strategy or program on heat sector development approved by Municipal Councils. The heat sector still is developing on a sporadic basis, which result in a sub-optimal situation for the community.

Managerial, administrative, and financial reform of heat suppliers

¹⁶ Statistical Yearbook of the Republic of Moldova, 2005

The biggest deficiency of the DH companies is the poor relations with consumers, which sometimes turn into public battles. The management of DH companies have to take a different approach toward their consumers by building a dialogue and good cooperation with consumers, including their associations (HOAs, Condominiums). The internal restructuring of the heating enterprises would have to focus on improving the transparency of their costs and transition to commercialized, consumption-based billing. This would allow gaining the trust of consumers and improve the collection rates. This will, however, have to be combined with technical upgrade, which would allow them to reduce the heat losses in the network, because in a metered billing system these losses will also be a financial loss.

Promote DSM measures (metering and control)

The improvements of the system on the demand side, which would allow consumers to regulate and meter their consumption, would have the following positive results:

1. improved payment for heat consumed
2. low-income people will have the possibility to regulate the consumption according to their possibilities (subsidies)
3. the discrepancies among the tenants would disappear
4. there will be incentives for tenants to improve the energy savings

Develop financial schemes

All technical improvements need financial assistance, both supply- and demand-side. Creation of revolving funds, involvement of governmental funds for guaranties or other purposes would give a push to the implementation of energy efficiency projects, retrofitting and improving of DH systems.

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