

The logo consists of the letters 'SEK' in a bold, black, serif font, enclosed within a thin black rectangular border.

SEK

Sustainable Financial Solutions for Investment's in District Heating Infrastructure and Energy Efficiency in Russian Cities

Recent cases studies from Russia, Ukraine, Romania, Riga, Helsinki and Stockholm

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Swedish Export Credit Corporation - SEK

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SEK Advisory Services is principally focusing on providing financial advice with regard to arranging and structuring of corporate and project finance transactions. In addition to specialist corporate finance and project management skills, SEK Advisory Services possesses industry expertise in several areas such as power and energy, utilities, environment, transport, telecom, and pulp and paper.

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Financial analysis and financial modeling

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Arrangement of long-term project financing solutions

Advice in connection with bi- and multilateral funding, including European Commission (EC) instruments as Cohesion and Structural Funds

Institutional and organizational development regarding financial issues

Advice in connection with procurement

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1. Introduction

Central and regional governments in transition countries can secure substantial improvements in operational efficiencies, reduce energy costs for consumers and local businesses by rehabilitating District Heating (DH) and Combined Heat and Power (CHP) systems. These systems offer a cost-efficient and environmentally sustainable way of producing heat and electric power for urban areas, while integrating the energy supply and even using low-grade energy sources in an environmentally acceptable manner. Many examples of significant development programs in large DH systems can be found in both transition economies and in non-transition economies. Much can be learnt about best practices from their experiences.

These solutions have a substantial impact on the living standards of the citizens and businesses. A key issue for countries in transition is heat-related subsidies that are the single largest cost in the municipal budget. Reducing these costs increase funding available for education, other infrastructure and health care. Therefore, decisions on price regulation, collection and financing of operations should take local circumstances into account and should be made locally. However, if all decisions are made by local mayors it is unlikely that there will be any change. There must be federal regulation providing for arm length distance between the municipality and the Municipal Heating Enterprises (MHE) otherwise there will be political interference in every decision which prohibits long term planning and financing.

Subsidies in general are complex matter and under change here in Russia. The subsidies used to be channeled through the MHE. My understanding today is that more subsidies go directly to the beneficiary as social benefits who must then pay for the service. Another important “subsidy” (it is actually not a subsidy it is price regulation, but it already) is on fuel prices. This is a federal topic of importance because it now limits the access to gas for new installations It must also be covered in a tariff law.

Municipalities should always support the sustainable development of MHE. However, there are a number of institutional barriers to sustainable development of DH and CHP in municipalities. The local MHE has often difficulties in overcoming such barriers and private investors are still reluctant to enter DH/CHP projects. In order to alleviate barriers to CHP/DH, municipalities have a key role, by the following:

1. Encouraging planning for higher population density (high heat load density) which is an important factor for the economics of DH.
2. Connecting the building stock owned by the municipality to the DH system with the obligation to pay for the heat;
3. Setting strategic goals for the MHE regarding the quality and the costs of heating promoting metering practices in order to connect consumption and cost.
4. Securing the availability of correctly priced finance for MHE investments by guarantees or other means. Municipalities are financially weak. The Federation must

seek to strengthen the financial standing of the municipalities in order to attract the needed financing for investments in DH.

5. Supporting the MHE management by giving operational independence, supervising performance regularly and encouraging to co-operation with other MHEs, manufacturers and other stakeholders is an effective way to improve the managerial capacity.
6. Ensuring that the MHE has autonomous authority to set the heat tariff.

Municipal Heating Enterprise (MHE)

The MHE should be fully responsible for the investments, operation, maintenance, development, financial management, billing and collection related to the DH. They should also have the autonomous right to set tariffs to cover fixed and operating costs of the MHE. The City should only then be involved in changing the structure of the tariff and not the tariff levels. This solution allows the company to establish long-term planning and creates a management efficiency which is based upon real responsibility. The MHE management, although responsible in accordance with Russian law, have no chance to perform their duties if the most important factor, the tariffs, are decided by the City. It has been seen too often that the City wants to control the tariff for their own political reasons, like for instance, decreasing it prior to elections.

The tariff is the single most important factor for the company and for the city since all investments decisions and creditworthiness will be based on the company's cash generation capacity.

The revenues should be sufficient to cover fixed and operating costs as well as development costs with a reasonable profit. The perception of what is the correct tariff level has to change. The current way of calculating the tariff level in Russia is not based on the cash flow. In many cases it excludes bad debts, interest and any allowances for debt repayments (that is why everybody wants leasing arrangements).

Management need to be held responsible and be given incentives to improve efficiency while attaining strategic objectives. Performance must be assessed regularly by the municipal owners.

The MHE can be organized on the following corporate forms:

1. A company of limited liability owned 100% by a municipality as in Gothenburg, Sweden www.goteborgenergi.se.
2. It can be part of a municipal holding company as in Leipzig and Krakow where such companies are held by holding company - integrated gas, electricity, water, waste, district heating and public transport www.lvz.de www.krakow.pl
3. It can be wholly owned by third party as in Espoo, 100%, Stockholm, 100% and Poland's Dolnoslaski Zaklad Termoeenergetyczny (DZT), 70% owned by Fortum www.fortum.com, a Nordic stock exchange company with majority public ownership.
4. The assets of the DH could be leased to third parties as in Vilnius. The city receives and annual fee from Dalkia who runs the DH business efficiently www.dalkia.lt. Dalkia is a private company that has strong ties to the French State and EDF.
5. It can be a joint venture between municipalities as in the Copenhagen area www.veks.dk and www.ctr.dk, or

6. It can be a joint venture between municipal enterprises as in Lithuania in a company called NewHeat together with the Finnish Private Energy Market Fund www.newheat.lt and www.pemfund.com.
7. It can be a joint venture between the state and the municipality as in Riga where the City and the State each has 49.7% stakes <http://www.randburg.com/lv/heating.html>
8. It can also be a larger joint venture between public and private joint interests for coal, biomass, gas, hydro and nuclear plants in Finland under cooperative system producing at cost for shareholders – www.pvo.fi and www.tvo.fi. Here shareholders are energy intensive companies and producers like UPM, StoraEnso, Fortum, EON, etc and many municipal-owned energy companies from all over Finland.

3. Best practices and Institutional Capacity

The economic rate of return of a district heating rehabilitation project usually is well above 25%. Evidence shows that one quarter of the economic benefits of rehabilitation projects are the result of soft measures. The economic rate of return of the soft measures has been huge since only 5% of the total funds are normally used for soft measures and 95% for the investment.

The following best practices produce incentives for efficiency and good quality service for the MHE whatever its form:

- The MHE must own or control the heating network to ensure efficient maintenance and operation of the DH/CHP system.
- The CHP plant should set the supply temperature, but customers should define the water flow and the return temperature.
- A correct division of the CHP costs of heat and power is crucial for promoting CHP.
- Heat and, if applicable, hot water, meters should be owned and regulated by the MHE.
- Municipalities should encourage improvements in the institutional capacity of MHE:
 - Information technology;
 - Least-cost technology tools to improve economy and performance;
 - The installation of substations
 - Heat metering and tariffs as incentives for energy conservation;
 - Corporate restructuring as a tool for creating business type operation of the energy system;
 - Marketing and customer care as a tool to keep and extend the market share of DH under competitive conditions;
 - Cost analysis of the MHE to identify the reasons for cost leakage in the system, and to identify ways to reduce such leakage;
 - Economic analysis as a tool to assess the feasibility of investment options, identifying the priority and sustainability of the various options;
 - Modern preventive maintenance practices as a least cost measure to both reduce maintenance costs and avoid damages;
 - Advanced billing and collecting as a way to improve the financial sustainability of the DH services;
 - Corporate Social Responsibility Concept (CSRC) to monitor and improve performance of DH for economic, social and environmental sustainability;
 - Modern quality assurance (ISO 9000) to improve organization performance;
 - Modern environmental management (ISO 14000) as a way to improve environmental responsibility and sustainability.

4. Tariffs, price regulation, subsidies and financing

Proper price regulation and correctly based tariffs in conjunction with metering will result in reduced energy consumption, heat cost savings for many consumers, stable and predictable income for MHE and reduced expenditure for the municipality.

Heat tariffs

Heat tariffs should be based on the following six principles:

1. Full cost coverage in the way understood in Western economies
2. Cost structure reflective
3. Competitiveness
4. Incentive to cost reduction
5. Incentive to energy conservation
6. Simplicity

The tariffs should be based on heat metering and consist of two components:

1. A fixed charge covering costs of capital, permanent staff and part of maintenance, and
2. A variable charge covering the cost of fuel, water, electricity and heat purchase, temporary staff and remaining part of maintenance costs.

Price regulation

As mentioned above, the MHE should be responsible for setting tariff levels. In general, the heat and electricity prices should be regulated either by the national regulator or not regulated at all and allow the markets set the prices. In general, it is not recommended that the municipality should be both the owner of the MHE and the regulator. National regulators exist in most European countries who set clear regulations for calculating the maximum levels of fair tariffs.

Heat subsidies

Heat subsidies without heat meters and temperature control give no incentives or means for customers to save energy. Heat consumption is 2-3 times higher than it should be. In addition collection rates are often low – primarily since there is no way to determine whether a customer actually has received any heat. In Poland, heating costs were substantially reduced over seven years by targeting poor families through municipal support programs and by DH modernization programs. Similar results have been seen in Bulgaria and Romania.

Financing

The size and long term nature of heat and energy investments mean that a MHE must seek long-term financing for rehabilitation and new investments. Well managed funding strategies can produce significant cost savings for investments in new equipment and rehabilitation. Funding can come from various sources, depending on the ownership and creditworthiness of the MHE. In nearly all non transition OECD countries, municipal funding agencies, banks and the bond markets are the main sources at costs which are close to that of their respective governments.

In Russia and other transition countries, these sources do not always exist at competitive rates. **Regional government, cities and municipalities should seek to establish as a top priority local government owned funding agencies.** The Moscow Debt Office is an important example of such a funding agency. Creating such an agency for other cities, regions and municipalities will take several years, but they have important long term benefits for establishing better financial management of municipalities and reducing funding costs. This is

seen in the Nordic countries during the last three decades and is widely understood in the global capital markets..

Other sources are already available to countries in transition. Such solutions are also used in OECD countries although they are relatively marginal in nature:

1. Export Credit Agencies for projects when foreign producers supply heat equipment.
2. International multilateral finance institutions IBRD, EIB, EBRD, NIB and NEFCO are providing finance and various forms of financial support.
3. Joint ventures with the private sector owners like Fortum, EON, Vattenfall and EDF have their own developed sources of funding..
4. Using Kyoto mechanisms like carbon trading certificates. Part of the cost of a new biomass plant in Estonia purchased from Wärtsilä Biopower was covered using carbon emission reduction payments in an agreement with the Finnish Government.

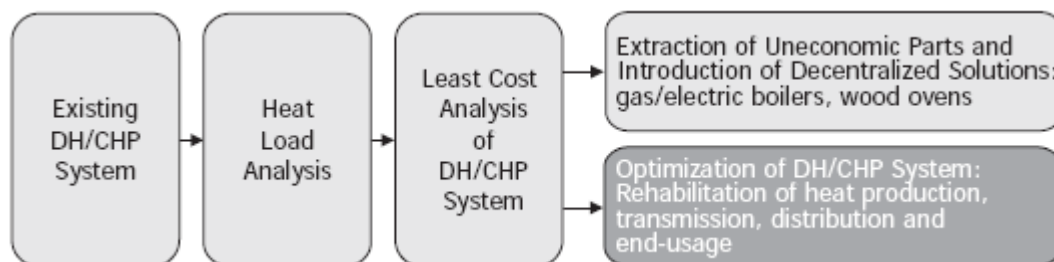
5. Rehabilitation and modernization

There is a huge potential for energy conservation, which, however, materializes slowly:

1. Energy use in existing buildings is typically 2-3 times higher than in modern buildings in market economies.
2. Energy consumption of new industry is more efficient
3. Integration of DH with CHP will reduce energy consumption.

Steam distribution networks used to be typical in many transition countries. These networks have been phased out in many cities in Poland and Germany because they are inefficient.

It is estimated that rehabilitation will result in 50% fall in fuel consumption. This is a major saving for the municipality (subsidies), the MHE (fuel costs) and their clients (tariff).



The process to rehabilitate the existing heating system can be divided into three phases as above. The heat load analysis reviews the current and the predicted heat load to see what impact rehabilitation may have on the heat needs. A social study is usually needed to review the affordability and willingness to pay for the heating services, which may well have impact on designing, prioritizing and quantifying the rehabilitation measures. This work is executed with a two part least-cost analysis:

1. An Economic Analysis of the project that considers the results of the project for the community level
2. A Financial Analysis considers the project on the company level

This cash flow analysis is made for 10 to 20 years ahead for two cases: first the business “without” and second “with” the project. The difference in cash flows between the two will be composed of differences in resource components such as the costs of staff, in heat transmission and distribution losses, in electricity and water consumption, in combustion efficiency, and in emissions. This analytical process will result in efficiencies that benefit the municipality, the MHE and most important the clients. But the work does not stop here and will move on to higher levels of efficiency and benefits.

Here are two examples of continuing improvements from Finland and Sweden:
Helsinki Energy, the profitable CHP/DH enterprise solely owned by Helsinki municipality with population of 500 000 and operating on open electricity and heat market, has been requested and been able to pay more than €80 million, about 20% of the turnover, to the municipality budget every year in terms of various fees. This has been possible, because the highly integrated CHP/DH system operates efficiently at low costs www.helsinginenergia.fi.

Gothenburg, Sweden, with population of 474 000 has replaced fossil fuel consumption with a variety of waste heat sources in the city in order to supply sustainable DH to the customers. In 1979 oil accounted for about 90% of the fuel mix, but oil use has practically vanished (about 1% in year 2003). Simultaneously, the share of heat received from heat pumps and four industrial plants has increased to cover 69%, bio fuels 5% and natural gas 25% of the fuel mix of DH production in year 2003. This has had a substantial impact on air quality and energy efficiency in the region www.goteborgenergi.se.

References:

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