

**WP 5** Financing

# Report on appropriate financing schemes for energy efficient urban development measures based on the concepts for the target areas

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## Introduction

This report is a result of the work conducted as a part of work package 5 (WP5) "Financial Instruments" of the project Urb.Energy.

The overall aim of this WP 5 is to improve mechanisms for providing financial means for integrated urban rehabilitation measures. The Target Areas shall get information about useful financing schemes that can be implemented locally, regionally and nationally and shall help to realize the elaborations from the WP3 and WP4 (urban development and energy in the respective neighbourhoods).

The "Report on financing sources for energy efficient refurbishment and integrated urban development measures" gives information about funding sources on national and EU level. Based on the analysis of the existing funding possibilities and the elaborations within the WP5 involving the TAs, appropriate funding instruments will be developed. Those financing instruments lead to an improved affordability of investments in energy efficient refurbishment (EER) of residential buildings and integrated urban development (IUD) measures.

The target groups for this report are the municipalities, local and central authorities and banks granting credits in Latvia, Lithuania, Estonia, Poland and Belarus.

The report focuses on the elaboration of financing strategies and instruments that are crucial for the implementation of energy efficient renovation of the building stock. It will show the current situation on that field and will enlarge on the problems and issues in the respective TA. The report will give some ideas and hints for the solution of those problems.

## Financing Mechanisms

In the relevant TA there are more or less financing instruments that fund EER and IUD measures. Unfortunately many of these funding options are not very suitable for those kinds of projects because of the funding conditions. Some probably are not sustainable because of the low volume they only have a low impact.

In the following there are descriptions of some so called traditional financing schemes and some innovative and more suitable funding models.

### Traditional financing instruments

This short passage will describe and assess different financing instruments not only for energy efficiency measures in buildings but also for urban development measures. A first part will cover traditional financing instruments like:

- Credit and Loan Financing,
- Grants (direct/partial) and
- Interest subsidies

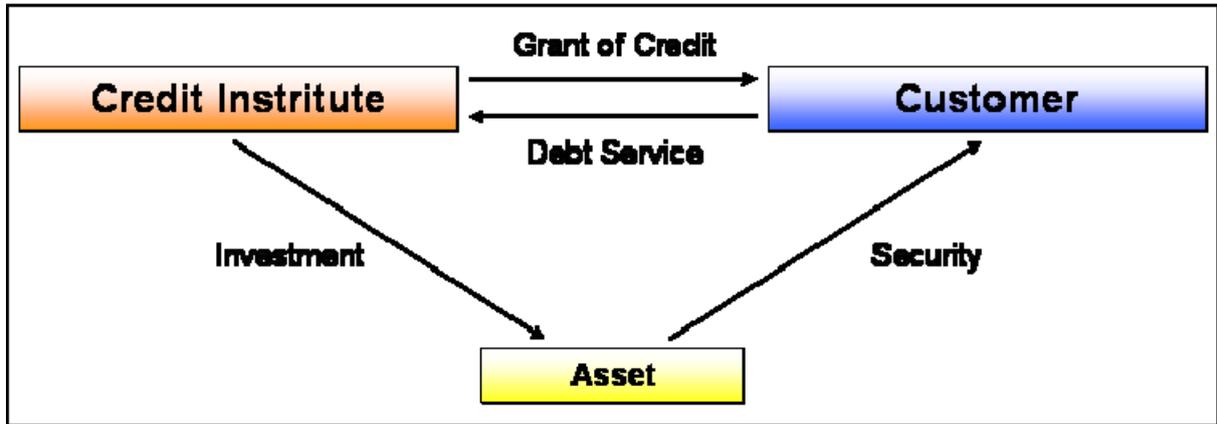
#### Credit / Loan Financing

##### Description

“Credit (or loan) financing means that a lender provides a borrower (customer) with capital for a defined purpose over a fixed period of time” (Graz Energy Agency 2008, 18). In the case of energy efficiency investments, borrowers can be building contractors / ESCOs or real estate owners. A credit is settled with fixed instalments over a defined contract period. The instalments cover the total credit amount including interests and other administrative fees. The borrower has to cover the lender’s risk for credit-financing through providing securities. Accordingly the borrower has to dispose over a minimum of equity capital or other assets.

With credit / loan financing, the borrower becomes both the economic and legal owner of the investment. In this case the debt is booked on the balance sheet of the borrower which, in return, reduces his equity share. As a negative effect of credit / loan financing, a reduced equity deteriorates the ability of the borrower to receive further credits. On the other hand, paid interest is tax-deductible from the borrower’s profits.

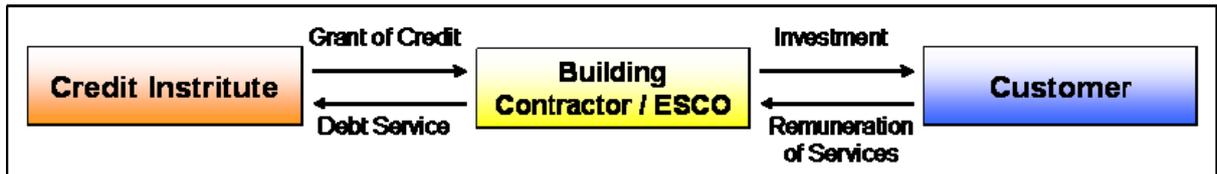
Figure 1: Credit / Loan Financing



Source: Investitionsbank Schleswig-Holstein, Energy Agency

Credits / loans can be used for financing energy efficiency investments in energy performance contracting projects. The investment can either be financed with a credit negotiated by a building contractor / ESCO or the customer. The following figure illustrates the traditional third-party financing model, when an EPC project is financed by a building contractor or ESCO.

Figure 2: Credit Financing for EPC by ESCO



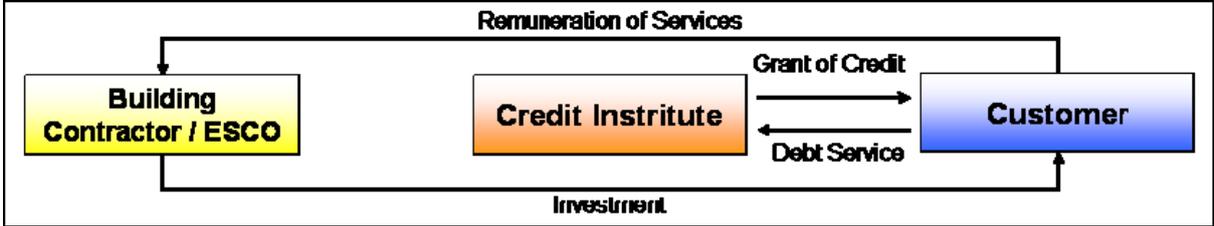
Source: Investitionsbank Schleswig-Holstein, Energy Agency

In this model, the building contractor / ESCO

- Refinances the investments for the energy efficiency measure from a credit line,
- Receives a contracting rate from the customer including a finance share, which is used for debt service (subject to the performance of the ESCO's saving guarantee),
- Can cede the finance share of the contracting rate to the credit institute, under this arrangement the customer repays directly the ESCOs debt.

Another model for financing EPC projects with credits focuses on the customer as credit user. This model is to be favoured over the traditional third-party financing model, if the customer disposes over better financing conditions than the ESCO. This model can be interpreted as operation management EPC.

Figure 3: Credit Financing for EPC by customer



Source: Investitionsbank Schleswig-Holstein, Energy Agency

Under the second model, the ESCO receives financing from the customer and investments are either paid from the customer’s credit line. Credit financing can easily be combined with other forms of financing, e.g. subsidies / grants. In real life, a mixture between ESCO and customer finance is usual. Very often, the customer contributes with subsidies from other public support programs.<sup>1</sup>

**Assessment**

Credit financing implies several direct financing costs. The total amount of credit costs is depending on the risk the lender attributes to the credit. Some of the financing costs are negotiable, like interest rates, administrative fees and repayment period.<sup>2</sup>

A very important issue of credit financing is taxation. Related to credit payment, interest rates are usually tax-deductible. The same applies to the client’s payment of contracting rates: As operation expenses they are also tax deductible. On the other hand, the credit user is both the legal and economic owner of the investment. Therefore he has to account for the investment in his books and must depreciate it. Depreciations are charged with taxes and can thus reduce the beneficiaries’ income.

Securities for credit-financing are based on the credibility of the credit user and not on the project.<sup>3</sup> Usually a minimum equity of 20% of the investment is required. Financial institutions can require land property or personal liability as hard securities. In this context, two kinds of lending have to be differentiated: Cash-flow-related lending and balance-sheet-related lending.<sup>4</sup> EPC-projects are usually based on balance-sheet-related lending, thus referring back to the companies assets (valuables) for risk hedging. From the perspective of a financial institution, the most effective way is to win an ESCO for taking over the risk of credit financing.<sup>5</sup>

<sup>1</sup> A combination with subsidies reduces the required credit volume, thus also decreasing the interest rates and risk for the investor. Some public banks offer soft-loan programs with subsidized interest rates that are implemented by private financial institutions at the local/regional level.

<sup>2</sup> Direct financing costs as notary fees are usually not negotiable.

<sup>3</sup> Securities are based on company cash flow and economic key figures, and not on the project cash flow.

<sup>4</sup> Cash-flow-related lending is also called project finance. Under this kind of lending, required securities depend on the expected such flow of a project. The capital or assets of the company implementing a project are not decisive (“off-balance-sheet financing”). The main risk of a lender is the construction and operation risk.

<sup>5</sup> If an ESCO is taking over this risk, it can implement another promising financing strategy for energy efficiency investments, i.e. to cede his receivables from the contracting rate being paid by the customer to a financing institution. This financing approach, which is also called cession or forfeiting, will be described later (see page 26).

Related to balance and accounting issues, the following facts have to be considered in the case of credit financing. Due to being both the legal and economic owner, loans will negatively influence the balance-sheet of the investor (companies' ratio of equity capital). As a consequence and in the longer term, this will influence the credit lines and possibilities of an enterprise to get access to further capital.<sup>6</sup> Regarding public bodies as investing actors, credit financing has to be kept within the credit limits of the Maastricht criteria.

Finally, credit financing is characterized by specific administrative and management costs, which influence this kind of financing rather negatively. First of all, this kind of instrument often fails to ensure the one-face-to-the customer principle (especially if the building owner is credit taker). A second disadvantage is related to the fact that banks usually do not dispose over the relevant expertise to calculate adequately the cash-flow of energy efficiency investments over a longer time period (energy services are not a core competence of banks). However the following advantages of credit financing have to be considered:

- Flexibility to adapt financing conditions to market development during contract duration,
- At least some flexibility to negotiate precise credit conditions for investment project,
- Possibility for combination with other financing schemes.

The main disadvantages of credit financing can be summarized as follows:

- Due to a lack of expertise in financial institutes on energy technologies and related saving potentials, assistance of banks can be difficult to obtain especially in complex projects,
- Rather high administrative and management costs to process credits, also in relation to taxation issues,
- Negative influence on the balance sheet of investor, depreciations are charged with taxes.

## Grants

In general terms, a grant comprises a transfer of liquid cash, commodities or other services from a donor to a recipient. Whereas grants very often do not require any repayment, their permission for investments in public support programs usually comprise at least a partial or even total repayment. In building retrofitting two types of grants can be identified, i.e. direct grants and partial grants. In both cases, the net present value for financing is the same.<sup>7</sup>

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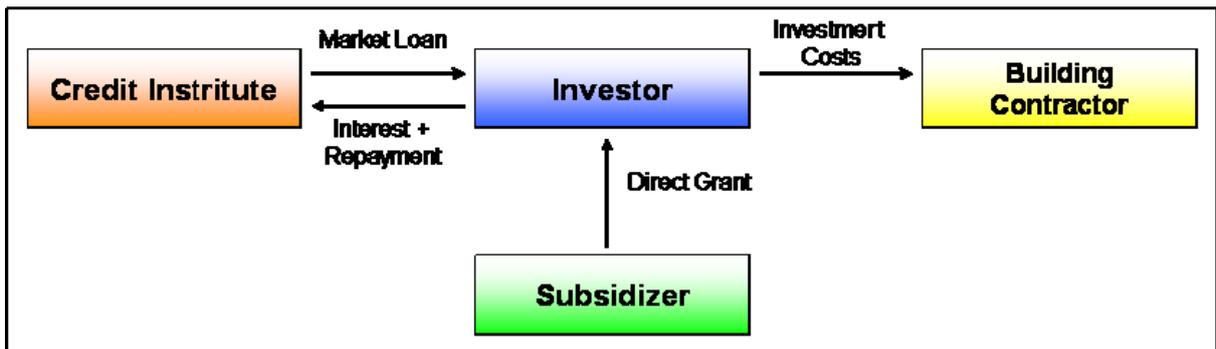
<sup>6</sup> Accordingly, economic ownership of equipment is decisive: If the equipment would be in ownership of an ESCO, it would have to depreciate related investments in his balances and the contracting client would only have to book the contracting rates as operation expenses. If the equipment is in the ownership of the contracting client, he would have them on his balance sheets. The ESCO would only have the contracting rates as balance-relevant income.

<sup>7</sup> The net present value is a standard method for the financial appraisal of long-term projects. Used for capital budgeting, it measures the excess and shortage of cash flows, in present value terms, once financing charges are met.

## Direct Grant

If repayment is not required, the public subsidy is a direct grant. In building refurbishment, direct grants can be used by investors to reduce total costs of investment: The allowed grant minimizes the financial burden originating from the private market credit to finance the whole project.

Figure 4: Direct Grant Financing

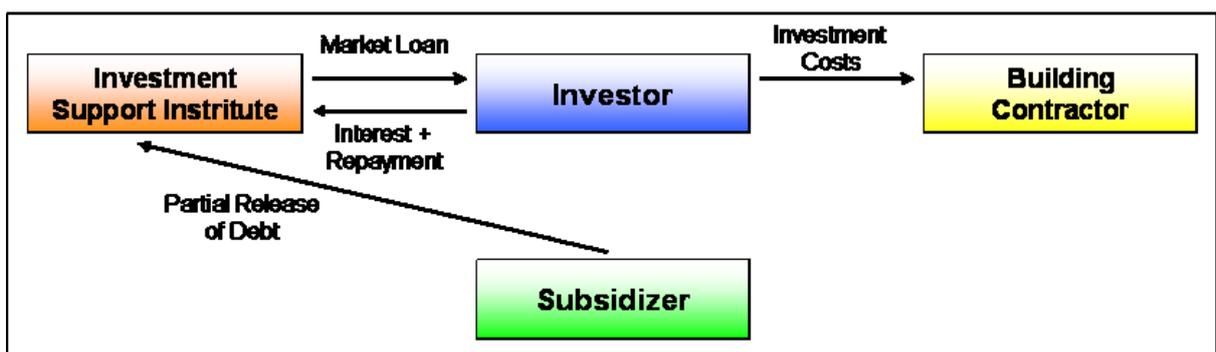


Source: Investitionsbank Schleswig-Holstein, Energy Agency

## Partial Grant

Another form to subsidize building refurbishment is the permission of a grant that allows for the partial release of debt, i.e. partial grant. In this case, the financing institute (investment support institute) renounces a part of the repayment and the payment of interest of the total credit sum for investment, thus reducing the investment burden of the investor. The partial release of debt offered by the financing institute is refunded by the subsidizer (usually a public body, ministry, etc.). The scheme of partial grants is only useful in cases where the subsidizing body is dealing with a very limited number of financial institutes. Otherwise the transaction costs to administrate the repayment conditions for the grants with different financiers would be too high. As illustrated in figure 5, one main advantage of partial grants is related to the fact that the investor only has to conclude one contractual relationship. In this case the subsidy of reduced interest and payment is refunded by the subsidizer to the financing institute, which is passing on the benefit to the investor.

Figure 5: Partial Grant Financing



Source: Investitionsbank Schleswig-Holstein, Energy Agency

## Assessment

Due to not differing basically in their financing mechanism, the pros and cons for grant financing are summarized as follows. The main advantages of grants are:

- The management of grants can be simple for the subsidizer, nevertheless from a building contractor / ESCOs view, the management costs to apply for grant financing depend on the single program and number of institutions being involved (“principle of one-face-to-the customer” is improving attractiveness of grant financing)
- In case of a low number of recipients/investments, management of direct grants can be quite simple due to comparatively low administrative costs,
- In comparison to other financing instruments grants do only require a lower level of risk hedging.

Possible disadvantages of grants are:

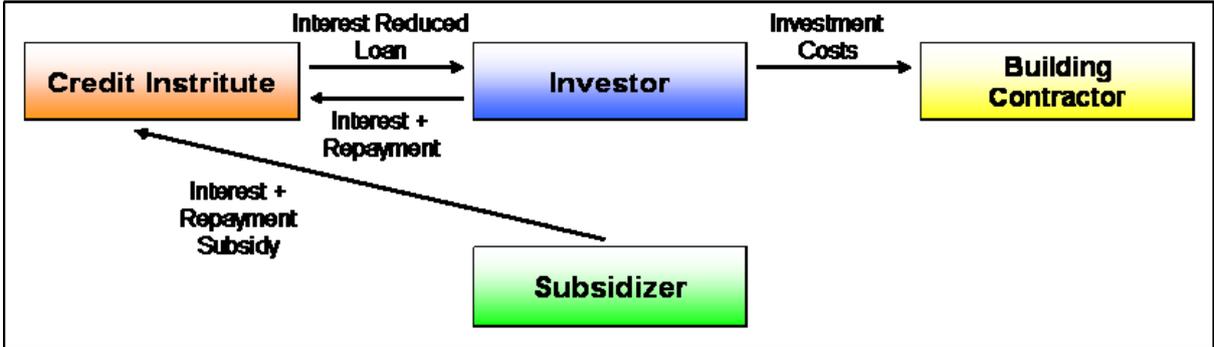
- Promise of direct and partial grants is connected to the compliance with specific objectives of the respective donor program. Accordingly, public subsidizers usually require some minimum accounting and reporting activities.
- Grants are usually financed through public budgets. Accordingly their financial configuration depends strongly on political decision-making, respective policy-election-cycles and regulations of budget laws (restriction for projects with long repayment periods, e.g. energy performance).
- In cases of direct grants two contractual relationships have to be concluded for project financing. One relation is his credit contract with the private bank. The other contract is his grant agreement with the subsidizer. Accordingly, partial grant financing reduces transaction costs, but is only useful with a limited number of banks. In cases of grant programs to improve energy efficiency, an institute under public law would be useful for program administration.

## Interest Subsidy

### Description

Beside the option to reduce the amount, which an investor has to borrow for financing an energy efficient investment through grant subsidization, another approach to alleviate the investor from financing costs is to reduce interest and repayment for available credits/loans. To this objective, the subsidizing actor is continuously awarding the financing institute with an interest and repayment subsidy to facilitate improved financing conditions (e.g. for a private financing institute). This subsidization approach can be applied over the total credit duration or a partial time period of the credit contract. In the case of subsidization over the total credit period, the subsidizer will usually award the subsidy in monthly payments. The following figure is illustrating the structure of this kind of financing mechanism.

**Figure 6: Interest Subsidy**



Source: Investitionsbank Schleswig-Holstein, Energy Agency

In the case of an interest subsidy over the total duration of credit, subsidy payments are distributed as constant amounts over the entire financing period. Due to future payments that have to be made over the entire financing period, the total net present value in this financing scheme is lower than the sum of payments. This kind of subsidization over the total credit duration causes processing expenses, which usually make this kind of subsidy only suitable for larger investment volumes. Through stretching the subsidy, the debit against a support program can be distributed over a much longer financial term. As a consequence, the annual debit for the investor can be reduced, but on the other the debit is stretched over future financial years. As with grants, this kind of subsidy should be managed in cooperation with a bank under public law. The hedge of the interest-reduced loan must be saved as for any other loan.

The model of interest subsidies can also be applied over a part time of a credit contract. After the completion of the regular subsidy, the investor would then have to carry the complete interest and repayment. A part-time solution can be useful, if an improving financing situation of an investor enables him to carry the non-subsidized debits of interest and repayment.

**Assessment**

Following characteristic of interest subsidies as financing schemes have to be regarded:

- The investor is only having one contractual relationship with the credit institute, this reduces the administrative (transaction) costs concerning subsidy management
- The interest subsidy over a partial duration is to be preferred to subsidization over the entire duration since the debit is significantly lower.

**Public-Private-Partnership Financing**

Next to the traditional financing solutions for energy performance investments, other innovative financing solutions are possible. These solutions are more complex than direct financing between a client, his financial institute and other third subsidizer. Basically three strategies will be introduced subsequently. All of them can be characterized as specific types of public-private partnerships<sup>8</sup>:

<sup>8</sup> Public-private partnership (PPP) describes a government service or private business venture which is funded and operated through a partnership of government and one or more private sector companies.

- Revolving Fund (interest-reduced loans from a fund)
- Energy Supply Contracting/Energy Performance Contracting

## Revolving Fund (Interest Reduced Loans from a Fund)

### Description

One main barrier for investments in energy efficiency projects is their long repayment period, although they often imply a constant cash flow. Related to this, the borrower usually lacks respective collaterals to get access to financing. Without public-sector invention, this usually leads to no availability of funding at all, or loans at increased interest rates, making cost-effective investments unattractive. To overcome this barrier, the establishment of revolving funds is a promising strategy. A revolving fund is a self-sustaining financing scheme that mainly requires a one-time initial investment. Revolving funds only support specific activities that are clearly defined by the investors and owners of the fund. With regard to funding for energy efficiency, a revolving fund accumulates savings from EE projects for self-perpetuating investments in more and later EE projects. If it is managed properly, the operation of the funds accumulates adequate savings over time, sustaining future financing. However revolving funds can also be replenished through charges made for goods or services that were offered by the fund.

In the area of energy efficiency, a revolving fund could perform subsequent functions (Klinckenberg Consultants 2006, 6):

- Combine public-sector grants for building and adequate financing structure for energy efficiency funding
- Provision of loan guarantees to cover the default risks related to energy efficiency investments
- Provision of private sector loans in an adequate size

According to Klinckenberg Consultants, other tasks are conceivable for a revolving fund (Klinckenberg Consultants 2006, 6):<sup>9</sup>

- Cooperation with local financing institutions on provision of loan guarantees, leasing and forfeiting,
- Conception and preparation of loan products,
- Marketing of the financial institution's services,
- Training of financial institutions' staff (e.g. on financing of EE projects),
- Searching for bankable projects,
- Assisting ESCOs and end-users to prepare projects.

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<sup>9</sup> The typical procedure for financing an energy efficiency project under the revolving fund mechanism would involve the following steps: 1) Project developer identifies, develops and contracts a project with a project owner, 2) The Funds reviews and approves the project and disburses to a pre-qualified bank, 3) Pre-selected supplier and installer (S&I) provides and installs the improvements, 4) After monitoring of performance, the bank disburses to the S&I, 5) Bank collects payment from the project owner in the agreed time period, 6) Project developer evaluates and communicates the results to the bank and the Fund, 7) Bank repays the Fund, completion payment to the S&I and evaluation payment to the developer (Klinckenberg Consultants 2006).

In order to reap the maximum benefits from the savings obtained through investments of the revolving fund, an adequate and systematic metering and monitoring of energy savings is required. For achieving this task, all relevant energy-consuming entities should be equipped with metering devices.

Revolving funds can be applied on different political levels, i.e. national, regional or local. At the local level, a municipality can establish its own energy efficiency revolving fund, or apply to participate in an existing one being owned by a variety of entities such as private companies, non-profit organizations or governmental bodies. One precondition for an effective operation of revolving funds is the opportunity for municipalities to retain directly the savings from energy saving projects for future investments (Alliance to Save Energy 2007, 13-14).

**Assessment**

Revolving Funds offer following advantages for the financing of energy efficiency investments:

- Revolving funds do not depend fully on external investors or on municipalities credit rating
- If they are operated effectively, revolving fund can contribute to a permanent financing structure for energy efficiency investments, which is separate from political influence

Typical disadvantages for using revolving funds in energy efficiency are:

- Requires substantial upfront investment
- Can be cumbersome and expensive to administer
- Legislative and institutional barrier may prevent municipalities from accruing savings

**Energy Supply Contracting and Energy Performance Contracting**

Whereas the long-term establishment of revolving funds for energy efficiency projects is a demanding task requiring substantial equity and powerful political will, rather pragmatic solutions will be required for direct financing of local and regional energy performance projects. To this target, several types of energy contracting can contribute to the financing of such projects. Two types of energy contracting will be illustrated in the following, i.e. energy supply contracting and Energy Performance Contracting (EPC). Related to one main focus of the project, i.e. the refurbishment of residential buildings, it must be stressed in advance that the second type of contracting, i.e. EPC is rather difficult to apply. Efforts in the TA should therefore concentrate on the implementation of energy supply contracting, if possible in combination with some guarantee elements.

**Energy Supply Contracting**

Energy supply contracting (also called facility contracting or delivery of useful energy) deals with the operation of a power generation plant at the contractor's own risk on the basis of long-term agreements. The main object of agreement between the contractor and the client is the supply with energy in a specified quality and over a defined contract period. The aim is to employ optimisation processes to achieve considerable economic and ecological advantages. Performance components of the contractor can include financing,

planning, installation, operation and optimization of the power generation plant. Services include maintenance and operation management, fuel procurement and selling of useful energy. The remuneration for the services consists of the payment for the useful energy supplied, the provision of the power generation plant and the settlement. Fields of application include existing and new buildings of any kind.

The typical area for supply contracting is supply with heat and domestic hot water. Germany offers many effective contracting examples for residential buildings that have already been implemented between contractors and home owner’s associations (ASUE 2007).<sup>10</sup> In these projects the HOA is concluding a contract with an external contractor, which is very often a subsidiary of a German utility to plan, modernize, install and operate new heating systems. The following models for heating contracting exist:

- Investment model: The contractor is taking over responsibility to finance a new heating system. Under this model, the liquidity and balance of the client will not be burdened. Possible services usually comprise heat supply or heat and hot water supply.<sup>11</sup> Under this model the contractor will be the owner of respective installations, but will only be responsible for maintenance of installation within clearly defined limits (property line problem).
- Management and service contract model: The building owner is responsible for investment into new installations, a contracting partner will only be charged for operating, maintenance and optimisation of installations.

In the following we will focus on the investment model. From the perspective of the HOA, the following advantages have to be highlighted in favour of applying this model for financing a modernization of energy installations:

- One contact person related to all issues in heating,
- Contractor/ ESCO is constantly involved in local network of planning offices, architects and local trade,
- Contractor / ESCO is specialized on several financing sources,
- If modernization / refurbishment is financed by contractor / ESCO,
- Professional operational management 24 hours a day (to be specified in contract),
- Contractor / ESCO is taking over heat billing according to agreed standard,
- If contractor / ESCO is responsible for a pool of heating power stations, it can equip them with similar technologies, thus ensuring same supply quality to residential buildings and reducing maintenance and operation costs,

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<sup>10</sup> The cited brochure describes several examples of successful energy supply contracting for residential buildings. It is only available in German [http://www.asue.de/images/veroeff\\_pdf/contracting\\_mieter\\_07.pdf](http://www.asue.de/images/veroeff_pdf/contracting_mieter_07.pdf)

<sup>11</sup> Specific issues which have to be regulated in the contract relate to following issues: Minimum temperature levels of heating and domestic hot water, position of metering systems, clear borders for handing over commodities, etc.

- Successive projects can be planned and financed to improving conditions due to learning effects of contractor / ESCO in earlier projects,
- Improved satisfaction of tenants and flat owners -> Increased value of building.

Possible disadvantages of energy supply contracting concern the following issues:

- Long contracting periods may result in dependency on contractor,
- Transaction costs for specifying the contract (principal-agent problem, e.g. with regard to operating figures of consumption), and
- Decreasing transparency of actual costs.

Contracting for related buildings → If fundamental renovation of existing buildings is required, contracting can only be successfully applied in the case of integral planning between planners and owners, especially because renovation measures usually cannot be refinanced out of payments for energy supplies or energy cost savings. Related contracting projects deal with additional measures for renovation of the building shell (e.g. heat insulation, heat protection glazing) or secondary systems (e.g. replacement of radiators in the building, insulation of the piping). Mainly two problems relate to this kind of contracting (sic!):

- The property line problem requires separate contract designs to regulate the safeguarding of the installations, risk assumption, maintenance and rights of use and access.<sup>12</sup>
- The refinancing of renovations requires the payment of building subsidies by the client or complete assumption of the financing of the renovation measures by the client.<sup>13</sup>

## Energy Performance Contracting

Energy performance contracting (also called energy saving contracting) deals with the optimisation across trades of automation installations in buildings and building operation by a contractor in the form of a co-operation based on partnership. The main object of agreement between the contractor and the client is the implementation of investments to modernize and refurbish buildings in order to realize energy savings. The aim is to achieve the guaranteed objectives in particular with regard to economic efficiency, energy saving, net asset value of the buildings and building conditioning. The main distinguishing feature is the financing of the investments via the guaranteed cost savings achieved through improved energy efficiency within the terms of the contract. Performance components of the contractor are financing, planning and installation of components for energy generation, distribution and usage as well as their operation and maintenance. Integration

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<sup>12</sup> In the case of delivery contracting usually the delivery border between heat generation plant and secondary system is the property boundary. The client remains the owner of the building and the secondary system.

<sup>13</sup> In the case of performance contracting usually the energy cost savings are not sufficient to refinance the renovation measures or would result in very long contract periods. In the case of facility contracting the base price for the supply of energy would increase accordingly.

and training of the users are usually part of performance contracting. The remuneration for services corresponds to the savings achieved.

The differences between both types of contracting are illustrated in the following figure.

**Figure 7: Energy Supply and Energy Performance Contracting**

	Energy Supply Contracting	Energy Performance Contracting
<b>Application</b>	New, replacement and/or supplementing investments in power supply plants	Rationalisation investments in the entire field of energy utilisation (provision and demand)
<b>Contracting service</b>	Financing, planning, installation and operation of power supply plants (media supply)	Financing, planning, installation and support of specific energy saving measures
<b>Contracting rate (financing)</b>	Fee for energy supply (heat, electricity, cooling)	User fee as contractor's remuneration for the energy and operating cost savings achieved
<b>Advantages</b>	Market advantages of the contractor lead to favourable purchasing terms and conditions for the useful energy provided; efficiency increases through investment into new installations	Know-how advantages of the contractor lead to high and guaranteed energy cost savings over the entire contract period and possibly to attractive bonus provisions with additional financial incentives
<b>Features or contract principles</b>	<ul style="list-style-type: none"> <li>• Subject matter of contract:</li> <li>• Provision of heat, electricity or cooling (media supply)</li> <li>• Risk distribution</li> <li>• Duration</li> <li>• Definition of the demand for supply with media</li> <li>• Definition of the delivery borders or interface</li> </ul>	<ul style="list-style-type: none"> <li>• Subject matter of contract: Guaranteed energy and operating cost savings</li> <li>• Risk distribution</li> <li>• Duration</li> <li>• Allocation of the savings achieved</li> <li>• Definition of an energy costs baseline</li> </ul>

Performance contracting is a third-party financing model, i.e. an external company pre-finances the investments and amortises them through its participation in the energy supply cost savings. Typically, performance contracting is applied by public administrations. The investments for this type of contracting are financed out of the budget estimate for operating costs which due to the difficult financial situation of public authorities is usually not subject to the general reduction requirements. All other public financing models require that the relevant budget estimate be increased or new budget items be established.

In so far, performance contracting is not a typical alternative form of financing such as payment plan agreements or leasing, as the performance features of performance contracting always include the business risk. In other words, in the case of leasing or payment plan agreements the third party's periodic remuneration is determined beforehand for the duration of the contract. In the case of performance contracting, however, the remuneration depends on the actual achievement of the contractually defined energy cost savings.

Risk distribution, which is a key matter of the guarantee and, above all, the advantage or risk-free pre-financing by the contractor are thus decisive features of performance contracting. Contract principles such as duration, allocation of the savings and determination of the energy costs baseline determine the handling of the contractual relationship as regards commercial matters.

**Other Contracting-Models**

The following figure provides for an overview of further variations of contracting models.

**Figure 8: Variations of Contracting**

Type of Contracting	Description
Financing Contracting (3rd-party leasing)	Contractor only undertakes investment incl. planning and financing services of specific technical facilities or installations, services are refinanced by leasehold, rental or instalment payments effected by the building owner -> Aim is the optimisation of the investment. Decisive: Contractor operates installations at his own risk.
Operator Company	Building owner and contractor set up a corporation which undertakes the financing, planning and operation of the installation.
Facility Management	Contractor not only provides specific energy services (e.g. energy saving and supply services), but complete building management
Solar Contracting	Solar plants (photovoltaic and/or solar heating) are used in the context of facility contracting and, to a certain degree, performance contracting (e.g. for indoor and outdoor swimming pools).
Additional Contribution Model	The client contributes to the planned measures, i.e. such payments are building subsidies paid to the contractor who may use the funds either to shorten amortisation time or to realise additional measures, e.g. renovation. Building subsidies make sense if the client can obtain more favourable terms of financing or if the attainable savings do not completely cover the contractor's expenses within the desired contract period.  A special case is the complete financing of all the contractor's investments by the client who in return for this receives guaranteed services over the contract period.
Combined Energy Saving and Supply Contracting	In this hybrid form the energy management (provision of heat or other media) including support and maintenance of the installations installed by the contractor is combined with measures for the guaranteed reduction of the energy costs (example: Hagen Budget Model).

Another relevant differentiation between existing performance contracting types relates to the kind and extent of the contractor's responsibility. If, for instance, only the replacement or optimisation of lighting installations is contracted then this is measure-based performance contracting. This type is suitable in particular for clearly defined single measures and fields of application which the building owner determines beforehand.

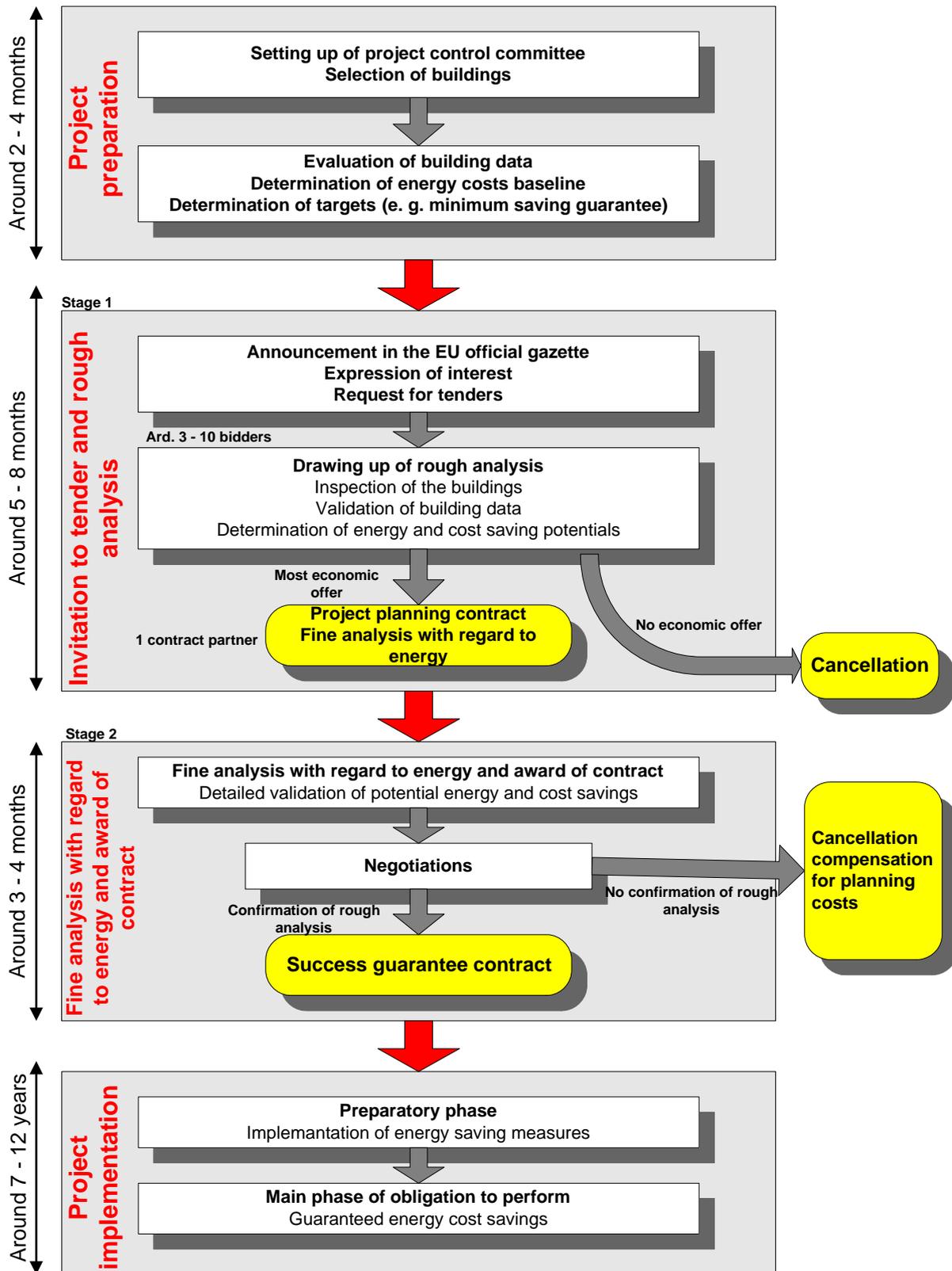
In contrast, the so-called potential-based performance contracting is applied in cases of complex buildings or pools of buildings or highly mechanised buildings such as hospitals and indoor swimming pools. The contractor assumes overall responsibility with regard to the building's energy management, and other operating costs (e.g. water/sewage) may be included. He realises the potential savings across different crafts for the entire building or building pool.<sup>14</sup> Due to relatively high investments, the resulting contract periods are usually between ten and twelve years. In addition to building automation measures, measures concerning the building shell can be integrated into this model. The latter can very rarely be financed solely out of the energy cost savings.

Especially in cases of complex buildings, the project development of performance contracting is to be conducted in two stages, which is illustrated in the following figure:

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<sup>14</sup> As model, the Energy Saving Partnerships Berlin has been successfully applied to 22 pools with a total of more than 1,300 public buildings. Annual energy cost savings are approx. € 10.7 million and around 65,000 t CO<sub>2</sub> less are emitted. Several buildings with different levels of energy costs may be combined in order to reach the required size for contracting. Furthermore, requirements such as the renovation of the building shell are to be included in dependence on own available resources.

Figure 9: Project Development of Performance Contracting for Complex Buildings



Source: Umweltbundesamt 2000 (Federal Environmental Agency)

In case of the duration model, the contractor is entitled to the total energy cost savings being achieved during the obligation period in order to reduce the repayment period as fast as possible. The client pays contracting rates which correspond to the saved energy costs. The contractor uses the rates to cover all his expenses, in particular his investment costs plus a reasonable return. Thus, the client can actually enjoy the cost savings only after the end of the contract period. On the other hand, the expiration of the contract will be realized faster than in the other contracting model, i.e. the participation model. In contrast to the duration model, the client participates in the energy cost savings with the commencement of the obligation period. The amount of the client's participation is to be stipulated in the contract. Usually it is at least 10% of the savings being achieved with the commencement of the obligation period. Due to lower revenues for the contractor, the contract durations are longer than in the duration model. On the other hand the client's budget is immediately unburdened during the phase of the main obligation to perform.

The benefits of Energy Performance Contracting are as follows:

- Safeguarding of the energy services by contract,
- Transfer of responsibility to third-party,
- Guaranteed sustained reduction of annual costs of media supply,
- Financial incentives for additional reduction of media supply costs,
- Reduction of energy consumption, CO2 emissions and possibly water consumption,
- Contractually guaranteed conservation of value and possibly value enhancement of the buildings, introduction of innovative technologies,
- Relief of the client's budget
- Advantages the contractor has with regard to financing terms and conditions, know-how, market access are made use of for the project, and
- Additional services such as user motivation and training measures may be stipulated in the contract.

Fields of application for Energy Performance Contracting are exclusively objects of existing buildings excluding residential buildings. Several buildings may be combined into a building pool.

# Tasks in the Target Areas

In the following there will be a short description of the current status in the particular TA and an evaluation of the deficits and problems that occur surrounding that matter. The report further contains suggestions for solving those problems.

## Siaulai

### Current Situation

Within the Urb.Energy project, Siaulai City prepares integrated development concepts for two target areas. Those projects can partly be financed by already existing funding sources. There are two support programs that are most important. One is set up on municipal and the other on national level.

The Community Support Fund is available on municipal level for home owner associations. This Fund covers the start up expenses. It e.g. supports the execution of repairs (roofs, technical building equipment, windows and doors) and covers parts of the implementation of energy-saving measures by subsidize the investments.

Another support program is available not only on municipal but also on national level. It supports modernization projects in multi-apartment buildings. It is available in different ways. For refurbishment projects within TA's it can be used as interest subsidies, direct grants and bank guarantees.

### Deficits/ Problems

Siaulai is mainly supplied by district heating structures. One big challenge that the TA is facing is that there is currently no support program for the development of efficient energy infrastructure. The energy grid for example is technically not state of the art and causes a lot of energy losses. That means that the costs for the energy supply need to cover those losses and that the costs are accordingly high. An energy supply structure that is more efficient would not only save resources and reduce CO2 emissions but it would also save costs.

But this seems not yet to be in people's minds. Many of them still do not recognize the necessity of saving energy. Many people not only within the TAs rely on the government and its measures. The residents are more interested not only in the multi-apartment house renovation, but also in measures for the improvement of the entire urban infrastructure. But due to lack of funding in this field, this process is moving slowly.

### Appropriate Financing Scheme

Since there already are support programs available for refurbishment measures in the building sector one big challenge remains: There is no support for the renewal of the public heat grid. There is an urgent demand of modernization, because of its age and its bad condition.

Even if energy and cost savings are to be expected, the implementation of those measures will need high investments. One way out of this situation could be to integrate private investors. The so called public-private-partnership works the way as it is mentioned above.

For the renewal of an energy grid one would need an investor who is willing to invest into the energy supply system and to run it for a fixed time. That could perhaps mean that the Investor doesn't refurbish the existing systems, but implements new structures (perhaps smaller and decentralized generation). The investor/ESCO is responsible for the implementation and the maintenance of the system and for the delivery of heat energy. He carries the risk and gets his money back by selling the energy.

Often enough it is not easy to find investors who are motivated to undertake such tasks. One way of giving potential investors a strong impetus could be to offer subsidized financing programs for such operations. Even the investor is dependent on appropriate financing conditions. A good solution is to implement a revolving fund which could be composed of money from EU structural funds, national money and capital from the money market.

## Grodno

### Current Situation

The situation in the Grodno region and in Belarus is slightly different than in other European countries. The average flat owner in Belarus is only responsible for his own apartment (the windows belong to the apartment). Home owner associations and cooperatives are widely unknown. The energy market benefits from the subsidized import of natural gas from Russia. Therefore energy in Belarus still is quite cheap by comparison. That causes a lack of motivation to invest in energy efficiency.

The building envelope, the technical equipment and the public parts of most the buildings are under public competence. That means that the municipality is responsible for repairs and maintenance of those parts of the buildings and for the residential environment. Residents pay a monthly fee in a public fund that is for the financing of those measures. But still 90% of the refurbishment costs are covered by state budget. Special support programs for EER or IUD are not available.

### Deficits/ Problems

Since there are no special support programs available people need to get loans on the money market. The conditions of those loans are rather poor. Short terms and high interest rates make it difficult for many people to get money for building projects.

Generally people don't feel responsibility for the energy efficiency of their homes. Most of them relay on their government and as long as the energy is as cheap as it is at the moment there seems to be no need for investments in building insulation and efficient technical equipment.

Another barrier for the quick implementation of measures is the high amount of construction objects and urban spaces that is administrated by the building authorities. It is very difficult to manage area-wide sustainable projects in a centralized structure.

Even if EER were economically, there wouldn't be a payback from the realized savings. The position that invests in building measures doesn't benefit from it. Those who can profit from the measures are the residents. That means that there won't be a circular flow of money in this system.

**Appropriate Financing Scheme**

First of all one should think about the existing ownership structures. Examples from other countries show that there is a lot more movement in the building sector if people can act autonomously. That means that first of all one should try to get to the bottom of that system. In some neighbourhoods owner associations are developing.

For those associations it would be helpful to have access to loans with reasonable conditions. It is hardly possible to finance building measures under the current conditions. The terms need to be longer (like 15-25 years) and the interest rates need to be more decent. Otherwise larger investments end up in debts that are not sustainable.

Those enterprises need to be supported. One option to do that is to grant EER measures. As one can see above a more efficient and sustainable way of support relevant projects is to implement a revolving fund. Possible sources of money for that fund can be public capital (e.g. taxes, trade with CO2 certificates) and capital from the money market.

**Riga**

**Current Situation**

Currently there are some funds available for the building sector. The aims of those programs are improvement of energy efficiency in multi-apartment buildings and the building of social multi-apartment buildings. The funds are available to apartment owners (up to 50% co-financing). One fund is a bit more specialized. It supports the improvement of energy efficiency for centralized heating systems. Apparently the funds are successful. Quite a number of approved projects show that there is a large demand for that kind of support. Some projects are even finished already.

The sources of the funding are realized by using the European Regional Development Fund and Cohesion Fund. A part of the capital is obtained by selling greenhouse gas emission quotas.

But what is still missing is a support program for the elaboration of Integrated Urban Development measures. Measures for the improvement of neighbourhoods are mainly funded by public capital.

**Deficits/ Problems**

The experiences with the current support programs generally are very positive. The offers of financial support are in great demand. That shows that the programs should continue. To increase the success of the funding it should be more publicized. One should probably make more advertisement for energy efficiency and sensitize the public for that concern.

But there is still a lack of support for IUD. A concept for the improvement of neighbourhoods and particular support programs are missing.

## Appropriate Financing Scheme

Most urban development measures in Germany for example are funded partly by the federal state, by the state and by the municipality. This is mainly done by direct grants. In most municipalities the residents are to acquire an interest in measures in their street for example. Most of the IUD measures are unprofitable what makes it difficult to find investors for that.

As a solution one can try to combine profitable and unprofitable measures for at least having a little cash flow. One can install energy efficient street lighting and redeposit the cost savings in a fund. This fund can be used for the support of IUD measures. Another option is to install solar panels and sell the electricity to the grid. The profit can be used for the same purpose.

## Jelgava

### Current Situation

At present there are funds available for energy efficiency in multi-apartment buildings. Additionally there are programs for social multi-apartment buildings. The beneficiaries of those programs are the apartment owners. They get an amount of up to 50% co-financing. This entitlement is disbursed as a grant.

There is a green investment fund that was established under the Kyoto protocol. This scheme is among others used for the financing of refurbishment measures of public buildings. Renovations of seven school buildings recently were realized with the support of this fund. The green investment fund is provided with means from the European Regional Development Fund (ERDF), the Cohesion Fund and finances obtained by selling greenhouse gas emission quotas.

Funding from ERDF is also used for measures for different projects concerning public properties. Reconstruction of streets and development of tourism and cultural educational centres are only a few examples for the range of measures that are supported by ERDF means. Two power plants provide the district heating grid in the city with heat energy. The majority of the inhabitants (65%) are connected to this grid. During the last years approx. 70% of this energy net has been renovated.

### Deficits/ Problems

There is still a high demand for further funding from ERDF resources. Especially the planned measures for the next periods rely on apportionments of funds from these sources.

There still are a lot of complex building structures that have complex issues that need to be solved. It is a challenge to refurbish those buildings in a sustainable way. There also is a demand for the support of those renovation measures.

Also, there is a lack of regulatory frameworks for the integration of cogeneration stations. There neither is a regulation that requires the integration of combined heat and power units (CHP) nor a prescription that describes the way it is implemented.

## Appropriate Financing Scheme

The European Commission and the European Investment Bank have established the ELENA technical assistance facility (European Local ENergy Assistance) to facilitate the mobilization of funds for investments in sustainable energy at local level. ELENA is financed through the Intelligent Energy-Europe program and covers a share of the cost for technical support that is necessary to prepare, implement and finance the investment program, such as feasibility and market studies, structuring of programs, business plans, energy audits, preparation for tendering procedures. This could be an appropriate source of support of the development of measures for complex building structures.

CHP systems prevailingly are very energy efficient. Many different systems are available that use different kinds of fuels like natural gas, oil, wood chips or pellets. It is a disadvantage that those systems are much more expensive than the standard units. A reasonable way of promoting the installation of CHP units is to establish sustainable financing schemes that support this measure. The revolving funds scheme (mentioned above) is the most suitable model for this purpose. It can be fed by money from European, national and regional money and money from the money market. This allows issuing loans with improved conditions. These conditions can specially be designed for its purpose. In most cases it is useful for building and refurbishment measures to have long credit terms and low interest rates. It even is possible to improve the results by improving the conditions the more efficient the realized measures are.

## Rakvere

### Current Situation

The municipality provides with a program that supports the implementation of energy audits on local level. The Estonian Climate and Energy Agency offers a support program for supporting the compilation of construction documents for energy efficient refurbishment and renewable energy measures. This program is available on national level since 1998.

Another program is provided by KredEx and supports a compilation of energy audits, construction documents and construction process supervision. These funds contain resources from selling CO2 quotas, EU structural funding, state funding and municipal funding. KredEx offers a revolving fund which allows a long-term support by using a limited budget.

### Deficits/ Problems

In spite of the fact that there are some very interesting and economical offers the programs are not in great demand. A reason for this could be that people don't realize the necessity of energy efficient refurbishment measures. They are not motivated to invest in their properties.

On the other hand many people cannot afford large loans. One long term loan scheme is already available since 1998, but many owners cannot apply due to poor credit rankings. The conditions for appliances are quite tough. Renovation of heating systems and insulation of the facades are minimum requirements. This means a lot of measures and a high investment at once. For many apartment owners this is more than they can afford.

### Appropriate Financing Scheme

Since it is too expensive for many residents to invest in broad packages of measures it seems to be worthwhile to adjust the existing program or issue a new one. It is to allow the support of single energy efficient measures like the change of windows, the insulation of facades or the change of heating systems. That allows the apartment owners to split measures and to spread investments over longer terms. It is broadly accepted that it is most sustainable to implement complex packages of measures, but it is better to implement only some few measures than doing nothing.

**Piaseczno**

**Current Situation**

The buildings actually are in a shape that partly is unacceptable any more. Most of the houses need broad refurbishment and some even are to demolish. A high amount of investment is needed. Beside the constructional measures it is intended to implement centralized hot water systems in the TA. There are support programs that subsidize energy efficient measures in the building sector. They are available for the apartment owners and investors as subsidized loans on national level. Another program supports energy efficient refurbishment in the public building sector. There is a program for the support of high efficient cogeneration units.

The origin of the money taken for those programs is partly taken from public means but also from the trade in the polish "green certificate scheme". Additional sources that are directly used are EU structural funds. The JESSICA instrument that is offered by the European Investment Bank is available in some Voivodships in Poland but not in the TA.

There actually are no financial support programs for the development of outdoor areas of the neighbourhoods available in the TA. Neither public nor privately owned spaces are subsidized with support programs.

**Deficits/ Problems**

The financial support for energy efficient refurbishment measures is comparatively decent. It is run by a private bank and the conditions are as follows: long term and low by comparison. Actually at least 25% of savings is a precondition for receiving the loan, and also the renovation of heating system and the insulation of façades is a minimum requirement. As a rule this causes a high amount of investment at once.

In the TA there is a great demand for urban development measures. Among others waste management, traffic and green spaces need to be developed. That requires money, but there currently are no support programs available for public spaces in the neighbourhood. People already plant trees and embellish the area between the houses themselves, but this is no real concept and sometimes causes problems e.g. when water pipes are demolished by those trees.

**Appropriate Financing Scheme**

In the TA there are already financing programs available for the realization of building measures. Some amendments to the existing loan schemes can help to make it more attractive to people who only can afford smaller loans. This can be realized by funding single measures too.

The more pressing issue is the lack of financial support of urban development measures. It is helpful to use JESSICA funds in the Masovian Voivodship too. This money in combination with money from investors (public or private), funds from financing institutions and the support of cities can be used for an urban development fund. This Fund can be taken as investments in terms of equity, loans (as a revolving fund) or guarantees.

Unfortunately urban development measures often are not profitable. So it won't be easy to generate payback out of respective actions. But some measures do have the potential to create a cash flow. One could think of highly efficient street lighting for example that saves not only energy, but also money that can be used as a repayment into the fund for the support of further measures. Another option of generating cash flow is the installation of solar cells or the commercial operation of a CHP unit in the neighbourhood.

## Imprint

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