

Energy Performance Contracting for Small and Medium-Sized Municipalities: Guidelines for Success

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**Energy Performance
Contracting
for Small and Medium Sized
Municipalities:
Guidelines for Success**

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How this Guide Can Help You

This guide will be of interest for you if

your municipality administrates public buildings such as the town council office, schools, kindergartens, event centres, indoor swimming pools, etc. and if the costs for operation and maintenance of these buildings constitute a considerable burden upon the local government budget.

one or several buildings have, over a longer period of time, been in urgent need of maintenance measures – if the lighting system or the boiler need to be replaced, for example –, but the necessary funds cannot be provided from the municipal budget.

your municipality wishes to set an example in the field of environmental and climate protection, but is still looking for ways to finance energy-saving investments.

This guide provides information on one possible solution for these problems:

Energy Performance Contracting

According to the principles of energy performance contracting, a company – the so-called "contractor" or TPF (third party financing) company – **identifies, plans and implements energy-saving measures** for your buildings. The technical facilities in the respective buildings are modernised, operation costs are reduced and a contribution is made to environmental protection.

No costs will be accrued for your municipality: The TPF company's expenses will be paid from the energy cost savings.

You can choose!

You either decide to implement only such measures – or optimised measurement packages – that guarantee that expenses can be paid for entirely from the energy cost savings.

Or you choose the possibility of combining energy performance contracting with a complete renovation of your building(s). So you will get a completely renovated building and all you have to pay is a contribution towards the investment costs. All the remaining expenses will be covered by what is saved in terms of energy costs.

You will also find examples of implemented projects and progress reports in this guide.

Sounds interesting? The following pages will tell you more!

On the Contents of this Guide

This energy performance contracting guide focuses on four key topics:

The first section, (Chapter 1, p.1 ff) deals with **energy contracting in general**. Two ideal TPF variations, namely heat delivery contracting and energy performance contracting, are introduced and their respective functions are explained. The focus of this guide is on energy performance contracting.

Remarks, ideas and tips regarding the **implementation of a concrete energy performance contracting project** can be found in the following section (Chapter 1, as of p. 5).

At the beginning of each individual sub-chapter, you will find brief information on the contents of the respective section:

- Determination of suitable buildings (Chapter 2.1, p. 5 ff)
- Identification of targets, general conditions and priorities (Chapter 2.2, p. 11 ff)
- Awarding energy performance contracts (Chapter 2.3, p. 16 ff)
- The energy performance contract (Chapter 2.4, p. 22 f)
- After conclusion of contract (Chapter 2.5, p. 24 ff)

Especially in Germany, but also in Austria, a whole series of energy performance contracting projects have already been implemented in the field of public administration. The valuable **experience** gained during the course of these projects will be made available to you in this guide. You will find details on this topic in the third main section (Chapter 3, p. 29 ff).

In the **Service Section** (Chapter 4, p. 37 ff), you will find information on further literature and selected model forms you can use during the implementation of your own project.

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1 HOW DOES THIRD PARTY FINANCING WORK?

Normally, the local government purchases e.g. natural gas, heating oil or electricity to provide space heating and hot water for the buildings owned by the municipality. Along with the respective building, the municipality also owns the heating system. So in fact, it is the local government that is in charge of operation and maintenance.

1.1 Heat Delivery Contracting

In **heat delivery contracting**, a so-called energy service company (ESCO) invests in facilities used for energy conversion at the client's. For example: The ESCO installs a combined heating and power system in a municipality building, e.g. an indoor swimming pool, and acts as the local government's heating and energy supplier which means the ESCO provides the necessary fuels. In addition, the services provided by the TPF company also comprise the operation and maintenance of the installed systems. The settlement of accounts is based on the delivered heat and electricity volumes. Local governments will be particularly interested in an out-sourcing of energy supplying services, if this turns out to be a way to reduce building management costs.

1.2 Energy Performance Contracting

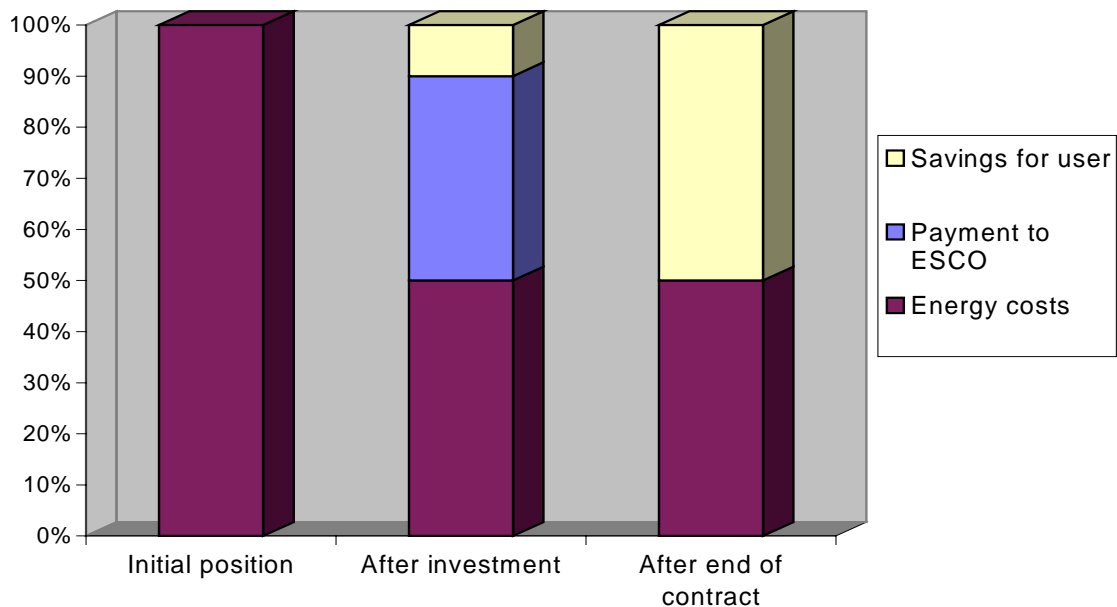
While in heat delivery contracting, the focus is on energy *supply*, during an **energy performance contracting** project, the ESCO aims to *reduce energy requirements*. Such a reduction can be realised by all kinds of methods to increase efficiency. In energy performance contracting, the contractor's remuneration is based on the cost savings achieved.

Theoretically, any measures can be implemented that produce enough in terms of savings to refinance the investment expenses for the installed facilities and components within their technical life span.

Throughout the course of the energy performance contracting project, energy management costs are made up of

- (reduced) costs for energy supply and
- the TPF rate.

Figure 1-1: Functioning and Effects of Energy Performance Contracting



Upon the conclusion of the contractual relation, the TPF rate ceases to apply. The client then profits fully from the cost savings achieved. It can be agreed that the municipality already receives a share in cost savings during the term of contract (see Figure 1-1).

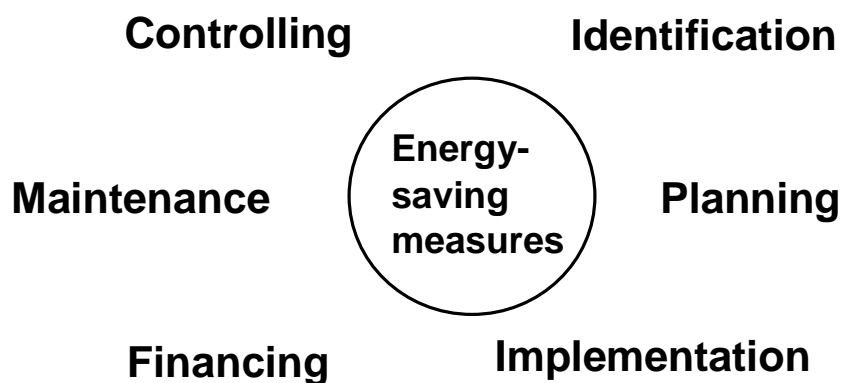
In order to reach a maximum reduction of the energy management costs for municipality buildings, it is recommended that the energy performance contracting partner is chosen by means of a tendering procedure. This is the only way to guarantee that the client will be able to profit from the advantages of a competition of prices and ideas.

An energy performance contracting project has numerous advantages for the municipal authorities:

- There are no capital requirements for the client. Energy performance contracting can therefore be a solution in those cases where no capital is available for the implementation of energy efficiency measures.
- Besides the planning, implementation and financing of energy-saving measures, the range of services offered by a TPF company comprises operation and maintenance, among other things. For all these services, the authorities now have one and the same contact partner.

- The reduction of energy management costs eases the burden on the municipal budget.
- The contractor's remuneration is calculated on the basis of actually achieved savings. Thus, the energy service company will assume responsibility for unforeseeable events in the areas of technology and financing.








Figure 1-2: Range of Services Offered by a TPF Company



There's no joy without at least a little sorrow:

- In many countries, the application of the energy performance contracting model in financing energy-saving measures is not (yet) very widespread. The introduction of new procedures often requires both contracting parties to make increased efforts in terms of organisation.
- The phrasing and handling of the contract are relatively demanding. Smaller investments and/or low cost savings will therefore not be attractive – neither from the TPF company's point of view, nor from that of the client. Possible solution: a smaller building could be included in a project together with several other buildings.
- In most cases, the term of an energy performance contracting project is more than five years. This means that a long-term commitment will have to be made to the ESCO. This may, however, be desirable from your point of view anyway.

1.3 Literature on Energy Performance Contracting

-  **öbu (ed.) (1996)**
Energie-Contracting. Mit Drittinvestoren Energie und Geld sparen. öbu series 9/1995. 2nd, extended edition. Adliswil
-  **öbu (ed.) (1997)**
Energie-Contracting: Outsourcing zahlt sich aus. Volume 14/1997. Adliswil
-  **Energie Tirol (ed.) (1998)**
Energie-Contracting. Der Stern am Energiesparhimmel und wie man ihn zum Leuchten bringt! Meeting on Friday, March 27, 1998, in Innsbruck. Innsbruck
-  **Leutgöb, K. et al. (1998):**
Einspar-Contracting in der Praxis – Ein Leitfaden. Vienna
-  **Braunmühl, W. von (2000):**
Handbuch Contracting. 2nd, revised edition. Düsseldorf
-  **Freund, R. (ed.) (2000):**
Einspar-Contracting im öffentlichen Bereich – Make or buy? Conference proceedings. Vienna
-  **Freund, R. (ed.) (2000):**
Third Party Financing of Energy Efficiency in Public Buildings. Workshop in Graz 10 – 11 February 2000. Vienna

Current information on the theme of energy performance contracting is available on the E.V.A. Internet homepages (<http://www.eva.wsr.ac.at>).

2 HOW TO APPROACH AN ENERGY PERFORMANCE CONTRACTING PROJECT

Maybe you would now like to know how you could apply energy performance contracting in *your municipality*. In this chapter, you will find tips and ideas on how to approach a concrete project.

It is of particular importance

- to know how to identify buildings that are suitable for an energy performance contracting project,
- to clearly establish the targets to be reached by the project,
- to know which points to consider when awarding an energy performance contract,
- to know which elements should be included in this contract, and
- to know what will be the duties of the local government after the contract is concluded.

The following sections will provide answers and assistance.

2.1 Identification of Suitable Buildings

In energy performance contracting, all expenses of the TPF company are covered by the savings made in terms of energy costs. The energy savings achieved during the implementation of the energy-saving investments must therefore be high enough to provide coverage for interests and repayment of investment costs, as well as for the expenses accrued by the TPF company in connection with services such as operation and maintenance.

Some enterprises that offer energy performance contracting in Austria go on the assumption that a project can be implemented if the energy costs of the respective object exceed 20,000 € per year. If several buildings are combined in one joint project, it is possible to include objects with lower annual energy costs as well.

The explanations provided in this section will help you find out whether your buildings are suitable for an energy performance contract with an external partner. The following explanation will first of all tell you which objects are suitable, principally, for energy performance contracting projects. In a next step, you will learn about the criteria for the selection of individual buildings.

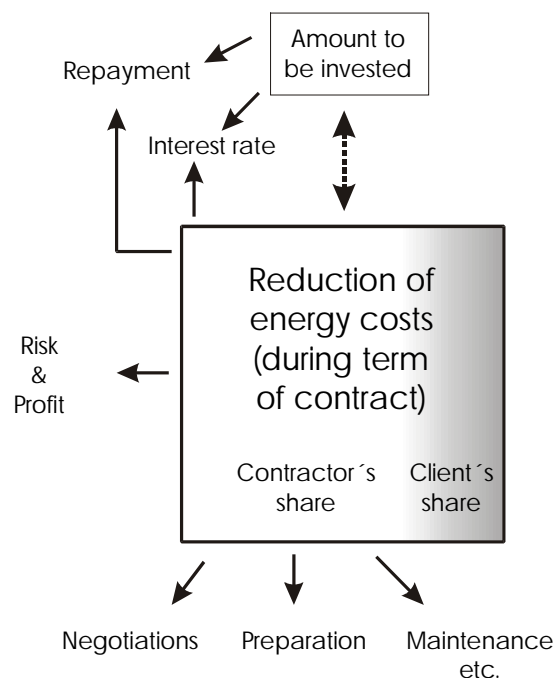
2.1.1 Which Buildings are Principally Suitable for Energy Performance Contracting Projects?

Answer: any buildings that offer a *sufficiently high economic* potential for the reduction of energy costs. This is a brief answer which is, however, based on a few considerations that require detailed explanation:

2.1.1.1 Is There Any Potential for Economic Energy Saving?

In the course of an energy performance contracting project, the contractor makes investments in energy-saving measures carried out at the client's. Consequence: The client's expenses for energy supply are reduced. In return, the TPF company receives, in most cases, at least 80 % of the savings in energy costs achieved over a period of time that is to be agreed upon. This share in savings must be high enough to cover *all project-related expenses* (see Figure 2-1) accrued by the TPF company. Only under this precondition can the energy performance contracting project be viewed as *efficient*. What has to be taken into consideration in the project calculation in particular – besides the refinancing of investment costs –, are the comparatively high (monetary) efforts required for the other services rendered by the TPF company in the course of the project. The TPF company will try to compile a service package that can be offered for the object in question by means of energy performance contracting – and therefore *economically* – and under the prevailing conditions.

Figure 2-1: Project-Related Expenses in Energy Performance Contracting



2.1.1.2 Is the Economic Savings Potential *Sufficiently High*?

Expenses for operating and maintaining the existing technical equipment are also accrued in buildings that require comparably little expenses for energy supply itself. As explained above, the savings achieved in terms of energy costs must cover all the project-related expenses of the TPF company, including the expenses for operation and maintenance services. Therefore, there are certain minimum requirements regarding the achievable savings (or the contractor's share in them). In deciding whether a concrete object is suitable for an energy performance contract, TPF companies will, for example, use the **value of annual energy costs**.

Some TPF companies in Austria assume that energy performance contracting projects can be implemented if energy expenses exceed a value of approximately 20,000 € per year. Maybe your municipality manages several buildings that show economic savings potentials but which, if regarded individually, do not appear attractive for a TPF company (due to the fact that their annual energy costs are too "low"). In this case, several objects can be combined in a joint energy performance contracting project and it is thus possible to take advantage of synergy effects. This solution is called "pooling".

Perhaps it is also possible to combine suitable objects in several municipalities in a joint project – in an inter-municipal way, so to speak. Especially if cooperation structures have already been established (such as, for example, within the framework of a special purpose association for waste water), it will be possible to keep the work needed for the preparation of such a project within certain limits.

2.1.1.3 You Can Influence the Way Your Energy Performance Contracting Projects are Organised!

Together with your contract partner, you can determine the ratio formula for the distribution of cost savings – and thus the share in savings granted to the TPF company during the contract period. By means of "pooling", synergy effects can be utilised. You can also decide whether to use the savings to cover expenses for services such as the operation and maintenance of old equipment and systems or whether to use them almost entirely to refinance the investments made in the energy-saving measures. Perhaps you even wish to go one step further and make a financial contribution towards a comprehensive energy-oriented optimisation of the object in question.

The scope of the set of measures that can be implemented in the course of an energy performance contracting project will therefore be influenced in particular by the way the project is organised – and thus, in the end, by your decisions. It has always been – and will always be – an indispensable condition for energy performance contracting projects that there is a sufficiently high *economic* savings potential.

2.1.2 How Can a Building's Energy-Saving Potential be Assessed?

2.1.2.1 Is There a Building Analysis for the Energy Consumption of Municipal Buildings?

A building analysis tells you the extent of the economic energy-saving potential. In the course of a building analysis, the possibilities of technical improvement are identified and economically assessed. Measures are considered efficient if the cost savings are sufficient to cover investment costs over a certain period of time.

Does such an analysis already exist for some of the buildings owned by your municipality? Based on its results, it is possible to estimate whether (or which) project-related expenses can be realised via the savings accrued.

2.1.2.2 There is No Building Analysis Yet

Principally, if no building analysis is available for the building in question, the following approaches are possible:

- commissioning a building analysis,
- contacting a TPF company directly, or
- assessing the energy savings potential according to building-specific energy indicators.

If you commission a **building analysis**, you will get a detailed picture of the savings potential of the building in question, as described above. There is, however, the disadvantage that such an analysis requires a lot of time and money. It may be necessary to employ an external partner.

You can also directly commission a **TPF company** to examine which buildings are suitable for an energy performance contracting project. An experienced company will, without too much effort, be able to tell you whether or not an energy performance contracting project is worthwhile for the object in question. If, in doing so, the municipality already decides in favour of a certain TPF company, however, there will be no competition of ideas and prices.

Table 2-1: Energy Indicators of Public Buildings

Energy Indicators (Space Heating and Hot Water Production) of Public Buildings			
Building category	Actual average values	Actual average values	Desired values after renovation SIA 380.1
	[kWh/m ² ·a]	[kWh/m ² ·a]	[kWh/m ² ·a]
Administrative buildings	183	179	98
Hospitals	195	(no values collected)	182
Kindergartens	237	182	105
Homes	172	234	168
Schools	197	165	107
<i>Source</i>	<i>[1]</i>	<i>[2]</i>	<i>[3]</i>

Sources:

- [1] Fachinformationszentrum Karlsruhe (1991), p. 40
- [2] Amt der ö. Landesregierung, Referat Umweltschutz (1994), p. 15
- [3] Schweizerischer Ingenieur- und Architektenverein (ed.) (1988), Tab. A 4-1/4-2.1988 (see also Service Section, Chapter 3, p. 37 ff)

The third alternative is therefore recommended: to assess your municipality buildings according to selected **building-specific energy indicators**. Based on these indicators (in particular: surface-related energy or heat consumption per year) one can assess, in a relatively simple (and therefore both time-saving and cost-saving) way, whether a building offers favourable conditions for an energy performance contracting project. The energy indicators of the buildings in question must be compared to the respective desired value. The desired energy values for the thermic (see Table 2-1) and electric use of energy in old and new buildings can be found, for example, in the Swiss Standard SIA 380/1¹. If you wish to carry out energy-oriented improvements in existing buildings, you should aim to reach the indicators given in Table 2-1. If the **actual values** of the respective buildings are significantly higher than the **desired values**, one can assume that the building in question shows an economically viable potential for the reduction of energy costs². One more point regarding this table: In the building categories of *hospitals* and *homes*, the average values of the ascertained energy indicators

¹ Schweizerischer Ingenieur- und Architektenverein (ed.) (1988)

² Experience has shown that the preconditions for energy performance contracting projects are favourable if the building-specific actual energy indicators are 20 to 30 % higher than the desired values – see E.V.A.(1997), p. 51 f

are sometimes only insignificantly higher than the desired values to be aimed at during renovation. It has to be taken into consideration in this case that, with regard to the efficiency of energy use, there can be extremely high differences even in buildings within the same category or from the same building period. Here are two examples from a study commissioned by the Energy Agency of NRW³:

- The specific energy consumption for the heating of small school buildings (with a heated surface area of less than 1500 m²) built in the period between 1950 and 1965 ranges from 160 to 650 kWh/m²·a.
- In kindergartens (built between 1966 and 1975), the respective specific energy consumption ranges from 145 to 430 kWh/m²·a.

Another example:

- The costs for the energy supply of secondary schools (all building periods) in Vienna ranged from € 1,300 to 3,800 per classroom in 1996.⁴

If, owing to its actual energy indicator, one of your municipality buildings appears to be principally suitable for an energy performance contracting project, it may be a good idea to have one of your local government employees walk through the building "with open eyes." Particular attention should be paid to the heating room in order to closely inspect the monitoring and regulation of the heating and ventilation systems. Do the heating room facilities correspond to the latest state of technology?

By the way: Implemented projects have shown that up to 30% of costs can be saved efficiently by finding better ways of adapting the energy supply to actual demands (key word: energy management).

Tip: If the annual energy costs of the examined building are comparably low, please check whether it is possible to combine several buildings in a pool (see also explanations in Section 2.1.1, p. 6). Buildings with a rather low energy savings potential can thus be included in a pool if necessary (key word: cross-subsidisation).

Please check the respective energy indicators from the energy records of your municipality. If up to now, the energy consumption values of public buildings have not been continuously recorded and evaluated on a regular basis⁵, it is specifically recommended at this point that you make use of this tool – not only because energy records

- can provide a useful help in assessing the need of energy-related improvement of municipality-owned buildings, but also because they

³ See Energieagentur NRW (year unknown)





⁴ Calculations by the E.V.A., based on data provided by the Federal Ministry of Education and Cultural Affairs

⁵ In this case, surface-specific energy indicators can easily be calculated by dividing the respective annual energy consumption values by the respective surface area.

- create the necessary preconditions for the quick identification, and solution, of any errors that cause additional consumption.

The expenses for the energy management of a building can be reduced by up to 15 % just by recording the consumption values and by quickly providing feed-back to the users of the building.

2.1.3 Literature on the Topic of Building Identification / Energy Bookkeeping

-  **Duscha, M.; Hertle, H. (ed.) (1999):**
Energiemanagement für öffentliche Gebäude. Organisation, Umsetzung und Finanzierung. 2nd, revised edition. Heidelberg
-  **Landeshauptstadt Hannover; Niedersächsische Energie-Agentur (year unknown):**
Planungsleitfaden Ganzheitliche Energetische Sanierung (P-GES). Hannover
-  **Stenitzer, M.; Reininger, St.; Cervený, M.; Freund, R. (1999):**
Kommunale Energiebuchhaltung. Leitfaden für die Einführung von Energiebuchhaltung. Vienna
-  **Stenitzer, M.; Freund, R.; Schmaranz, R. (1999):**
Kommunale Energiebuchhaltung. Marktübersicht Software. Vienna

2.2 Establishing Targets, General Conditions and Priorities

If you come to the conclusion that one or several municipal buildings are suitable for an energy performance contracting project, it is recommended that the best project partner is determined in the course of a tendering competition. Only in this way can a competition of prices and ideas be initiated. It is necessary, however, to find suitable categories for the assessment of in-coming offers. These selection criteria should be based on the project targets. Considerations on this topic can be found in this section.

2.2.1 Possible Effects of an Energy Performance Contracting Project

An energy performance contracting project *may have* effects in several different areas. Therefore, you must consider the targets of your project way in advance – or, to put it in other words: *What effects are desirable from your point of view?*

Easing the Burden on the Local Authority Budget

Energy-saving measures cause a reduction of energy costs. You can arrange that your municipality receives a share in these savings already during the contractual period. After the termination of the contract, the community will profit fully from the savings. As progress reports show (see Chapter 3, p. 29 ff), it may be important for the political acceptance of an energy performance contracting project that the local authority participates in the savings right from the beginning of the cooperation with the TPF company.

The Availability of Technical Facilities is Increased

Question: Are the present technical facilities in the buildings of your municipality maintained and repaired on schedule? TPF companies also offer services in the field of maintenance and repair. If required, the availability of technical facilities in municipality buildings can be increased by means of energy performance contracting.

The Value of the Building is Maintained or Even Increased

The use of new energy-saving facilities and components reduces the expenses for energy supply. Positive side effect: parts of the building's existing technical facilities are up-dated. So energy performance contracting can also contribute to maintaining the building's value.

Positive Environmental Effects are Produced

Maybe your energy performing contracting projects are intended to contribute to the reduction of greenhouse gas emissions. In this context, please note that not all the measures that reduce costs (e.g. adjustment of energy supply contracts or peak load management) will directly relieve the burden on the environment. The ecological effects of an energy performance contracting project can only be assessed if you ask the tenderer to provide details on the expected reduction of energy consumption and emissions.

Utilisation Comfort is Increased

A targeted distribution of the required energy can increase the level of comfort in the rooms used while at the same time reducing the overall energy input. Precondition: adequate technical facilities are installed during the course of the project (key word: single room control). Positive side effect of a targeted energy distribution: the maintenance of a minimum level of comfort is guaranteed also in rooms where this was not the case before (see progress reports in Chapter 3, p. 29 ff).

2.2.2 Targets for Your Energy Performance Contracting Project

Based on the desired effects, you should now formulate the targets for your project. In doing so, please consider the mutual dependencies of the various possible effects an energy performance contracting project may have.

Example:

As shown in Figure 2-1, the cost savings achieved from energy performance contracting can be used for different purposes. Any amount spent on facilities maintenance will increase the availability of the facilities, but will not be available to refinance energy-saving investments.

The scope of viable investments also depends on what kinds of services the TPF company is charged with during the project. The less you invest in energy saving, the less you will save in terms of energy costs. During the term of the contract, this disadvantage can be compensated by saving maintenance costs. After the contractual relation with the TPF company is terminated, however, the budgetary relief will be less. The targets of sustainably relieving the local authority budget and of increasing the availability of the technical facilities in the building by means of scheduled maintenance and repair can therefore be regarded as competing with each other.

2.2.3 General Conditions and Assessment Criteria for Your Project

From the targets defined for your energy performance contracting project, criteria can be deduced for the assessment of in-coming offers. In addition, it has to be decided whether to give TPF companies a certain predefined general framework for preparing their offers. Set standards make it easier to compare in-coming offers⁶.

2.2.3.1 General Conditions

In any case, a general framework should be established for the following aspects:

Duration of Contract

The longer the period available for the amortisation of investment expenses, the easier it is to also include less efficient energy-saving investments in the project. It is easier to compare different offers if the TPF companies are given a definite contractual term on which to base their offers.

⁶ See Chapter 2.3.3.2, p. 19

Change of Energy Source

If certain areas in your municipality have e.g. been identified as preference areas for district heating or natural gas, this has to be pointed out to the TPF companies. Even if there are no respective provisions in the Building Plan, you can insist, in advance, that the TPF company changes over to a certain source of energy.

You may also insist that energy sources may only be changed if disadvantageous environmental effects can be excluded. The tenderer has to prove this by means of an emission balance. A calculation procedure and emission factors for the relevant emissions must be laid down and made available to the TPF company.

Utilisation Comfort

The reduction of excessive comfort levels leads to the reduction of energy costs. It is necessary, however, to guarantee a sufficient level of utilisation comfort. It is therefore recommended that the energy performance contracting partner is obliged to keep to the relevant standards and regulations with regard to certain comfort parameters such as room temperature, rate of air exchange, and lighting intensity.

Investment Costs Grants

If a measure is to be implemented by means of energy performance contracting, sufficient economic efficiency is a precondition. On principle, less profitable energy efficiency measures can be cross-subsidised within a whole package of measures. As an alternative, such measures can also be included in a project if the client offers to contribute to investment costs. You should inform the TPF company on your willingness to grant a contribution towards investment costs at an early stage to make it possible for the TPF company to consider this factor in their project calculation.

Just to avoid wrong expectations: if a building is to be completely optimised in the course of the project, the client will *have* to contribute to investment costs.

2.2.3.2 Examples for Assessment Criteria

In the following, you will find a few ideas and tips regarding criteria by which you can "measure" *whether* and *to what extent* an offer seems to be able to produce certain effects (see Section 2.2.1, p. 11f). These assessment criteria are of particular importance for awarding the energy performance contract (see Chapter 2.3, p. 16).

Figure 2-2: Examples of Assessment Criteria

- **Guaranteed Energy Cost Savings**
- **Client's Share in Savings Quota**
- **Savings regarding Other Expenses**
- **Reduction of Energy Consumption**
- **Reduction of Greenhouse Gases/Pollutants**

In order to assess the extent of relief for the local authority budget *after terminating the cooperation* with the TPF company, take a look at the ***guaranteed energy cost savings***. When assessing the project's financial impacts *during the contractual period*, the ***share in savings quota*** and the ***savings regarding other expenses***, e.g. maintenance expenses, must also be taken into consideration.

Assessing the environmental effects of an energy performance contracting project requires details on the **reduction of energy consumption** and on the **reduction of selected greenhouse gases and pollutants**.

2.2.4 Establishing Priorities and Assessment Criteria

Presumably, not all the possible effects of an energy performance contracting project will be of equal relevance to you. In order to examine concrete offers, it will therefore be necessary to establish an order of priorities regarding the assessment criteria. Setting priorities depends on how the fulfilment of certain criteria is weighted within the overall assessment (see explanations in Chapter 2.3.3.2, p. 19f in particular). You can weight the criteria directly or by using the method of paired comparison:

Paired Comparison

The different criteria are compared in pairs. The more important one of the two is given two points, the less important one none. If the importance of both criteria is considered equal, both criteria are given one point. The number of points is added up for each criterion. The weighting of individual criteria then results from the share its total points have in the overall number of points.

Table 2-1: Example for Weighting Criteria by Means of Paired Comparison

criterion	compared to:				total points	weighting
	A	B	C	D		
A	—	2	1	1	4	4/12
B	0	—	2	1	3	3/12
C	1	0	—	0	1	1/12
D	1	1	2	—	4	4/12
<i>total number of points</i>					12	

2.3 Awarding an Energy Performance Contract

The suitable buildings have been selected and you have considered what aims you want to pursue with your energy performance contracting project. The question is now how to find a suitable energy performance contracting partner.

2.3.1 On the General Legal Framework For Awarding Contracts

In particular in Germany and Austria, a number of energy performance contracting projects have been implemented in the field of public administration. There are still some uncertainties, however, regarding the question of how to award energy performance contracts correctly.

For this reason, the E.V.A., the Austrian Energy Agency, has called for a legal opinion⁷ on the compatibility of energy performance contracting models with the general legal framework for awarding contracts in the field of public administration. Questions of Community Law have also been taken into consideration by this legal opinion.

As the results show, the general legal framework for contract awarding by public clients can be assessed as "predominantly positive." On principle, the regulations for awarding contracts do not provide any obstructions for the use of energy performance contracting by public clients. There are certain "problem areas", however, such as classifying energy performance contracting projects within certain categories of orders. It is therefore recommended that attention is paid to the relevant legal framework during the organisation of the project.

Even if the relevant Community Law is considered in the quoted legal opinion, you will have to find out whether the respective energy performance contracting solutions are compatible with the legal framework for awarding contracts in your own country. Such an examination would go beyond the scope of this guide, which is why the following explanations will be limited to general recommendations for awarding energy performance contracts.

⁷ Straube, M.; Zehetner, F. (1999)

In order to be able to take advantage of a competition of prices and ideas, it is suggested, in particular for larger projects, that a "two-step procedure" is applied when awarding energy performance contracts.

- ⇒ Step 1: To *publicly assess the field of potential applicants* before starting the actual awarding procedure. In this way, you will both get to know the tenderers on the market and be able to eliminate non-suitable tenderers at the same time. This helps to reduce the work regarding the assessment of in-coming offers (Step 2) to a minimum.
- ⇒ Step 2: Inviting suitable companies to *submit a tender* and subsequent start of *contract negotiations*.

It remains to be examined, however, in which way this procedure can be brought into accordance with the relevant legal framework in your country.

2.3.2 Public Assessment of the Field of Potential Applicants (Procedure of Expressing Interest)⁸

Objective of this step: to identify those tenderers that basically appear to be suitable partners for your project. All TPF companies interested will have to submit documents proving their *competence*, their financial, economic and technical *capability* and their *reliability*.

The tenderers themselves will also be interested in obtaining more information on the project. It is therefore recommended to prepare a respective information leaflet. It is sensible for larger projects in particular to give tenderers the chance to obtain detailed information on the project at an informative event. The criteria for the assessment of in-coming documents must be publicly announced in advance. On this basis, you may select those tenderers that can be considered suitable project partners. These will then be invited to submit their tenders.

2.3.3 Invitation to Submit Tenders and Contract Negotiations

The amount of time and money to be spent on the second stage of the awarding procedure depends on the estimated project scope. As a general rule, one can say:

- As a client you will, as a rule, profit from awarding a contract on competitive conditions (key word: competition of prices and ideas). You should therefore invite tenders from several companies in any case.

⁸ An example for an advertisement announcing a public assessment of the field of potential applicants can be found in the Service Section (Section 4, p. 37 ff).

- The larger your project, the more time should be invested in the preparation of the tender documents. If the project is small, it will be enough to lay down a number of essential framework conditions. As for larger projects, in order to reach your targets, it is important to use the basic principles described in the following section as a means of orientation.

2.3.3.1 Contents of the Tender Documents

It is helpful and/or necessary to address various aspects in the tender documents of an energy performance contracting project:

Figure 2-3: Contents of the Tender Documents

- Subject Matter and Targets of Project
- Tips for Preparation of Documents
- Determination of Remuneration
- General Framework
- Time Planning
- Assessment Criteria
- Building-specific Data

Preliminary remarks should be made regarding the **subject matter** and **targets** of your project; **tips for preparing the tender documents** should be included as well. Please describe the procedure you will use to **determine the remuneration** of the TPF company and name the **general framework** that tenderers will have to consider in preparing their offers.

A further focus is the course of the awarding procedure. Besides providing information on **time planning**, you will also have to tell tenderers which procedure you are going to use to identify the best offer according to the relevant **assessment criteria**. As already mentioned in Section 2.2.3.2 (p. 14), you can establish the assessment criteria on the basis of the targets of your project. You will find tips regarding the assessment procedure in the following Chapter 2.3.3.2.

As for **building-specific data**: the more extensive, detailed and complete the data material that is made available to tenderers in the tender documents, the fewer questions will have to be asked by the TPF companies.

2.3.3.2 Identifying the Best Offer⁹

Both *monetary* and *non-monetary* effects must be considered when assessing in-coming offers. In order to be able to assess an offer comprehensively, the assessment of these two parts must be combined.

Monetary Assessment

Energy performance contracting mainly leads to a reduction of energy costs. Other expenses, e.g. for maintenance, may also decrease during the contractual period. Precondition: The TPF company is put in charge of maintenance duties, financing the related expenses from the energy cost savings achieved.

Two ways of monetary assessment:

1. Offers made by different companies can be easily compared by taking a look at the **guaranteed annual reduction of energy costs**. What is not considered in this case are savings regarding other expenses, such as e.g. maintenance.
2. Another possibility: taking a collective look at **all expense categories** that are changed due to the activities of the TPF company.

During the *contractual period*, these categories are above all

- the guaranteed annual *share* in savings granted to the municipality, but also
- other expense categories, such as e.g. maintenance costs.

When examining the period from the termination of the contractual relation to the end of the operating life of the installed facilities and components,

- the guaranteed annual reduction of energy costs is of special interest.

Considering the present value¹⁰ of cost savings, you can now compare different offers. The period under review, in this case, is the *entire operating life* of the installed facilities and components.

Non-Monetary Evaluation

Some effects of energy performance contracting tenders cannot be assessed on a monetary basis. They may still be of particular importance to you, however, which is why they must be taken into consideration when assessing in-coming offers. Non-monetary, qualitative criteria may be for example:

⁹ See particularly Oberfinanzdirektion Stuttgart (1997), enclosure: *Guide to the Examination and Assessment of Offers*.

¹⁰ In calculating the present value, first of all the current value of future cost savings is determined by means of the compound interest formula. The interest rate your community has to pay for outside capital may be used as a discount factor, for example. The total sum of current values is also called the *present value* of cost savings – for further details see e.g. Däumler, K.-D. (1994)

- ⇒ the range and quality of the investments the contractor intends to make in your buildings;
- ⇒ suggestions made by the contractor as regards integrating the users of the building into the project;
- ⇒ suggestions made by the contractor in view of integrating the existing operating personnel;
- ⇒ integration of the regional economy.

In this context it is necessary for you to formulate the criteria for the assessment of the qualitative effects of these measures on the basis of your project targets and to weight them according to their respective importance.¹¹

Using the **points system**, you can then determine the offer which, on the whole, is best able to meet your non-monetary requirements. Please bear in mind that subjective estimations can play an important role in the assessment of non-monetary effects. This assessment should therefore be carried out independently by several persons. If necessary, you can then organise a discussion to deal with any apparent differences in opinion.

Final Result




If one and the same offer is the most lucrative according to both the monetary and the non-monetary assessment, you have already identified the best offer. If both assessment procedures produce different results, however, the following approach is recommended: evaluate the extent of cost savings in a qualitative way by means of a modified utility value analysis. The assessment criteria will have to be re-weighted. A model assessment form can be found in the Service Section (section 4, p. 37ff).

2.3.3.3 Optimisation of Offers

Based on the offers submitted by the TPF companies you may then negotiate any necessary changes of the offer with the tenderers during the negotiation procedure. Take this opportunity to optimise the conditions of the offer before awarding the contract.

¹¹ Examples of *assessment criteria* can be found in section 2.2.3.2 (p. 14) as well as in Oberfinanzdirektion Stuttgart (1997) enclosure: *Guide to the Examination and Assessment of Offers*. For details on the *weighting of criteria* see explanations in section 2.2.4 (p. 15)

2.3.4 Literature on the Topic of Awarding Contracts

-  **Ecoplan Wirtschafts- und Umweltstudien (1996):**
Energie-Contracting. Checkliste: Datengrundlage zur Offerteinholung. Im Auftrag der Arbeitsgruppe „Contracting“ der Schweizerischen Vereinigung für ökologisch bewusste Unternehmensführung (Ö.B.U.). Altdorf, Bern
-  **Oberfinanzdirektion Stuttgart (1997):**
Drittfinanzierung von Energiesparmaßnahmen. Leistungsbild. Wettbewerb. Prüfung und Bewertung. Arbeitshinweise. Stuttgart
-  **Straube, M.; Zehetner, F. (1999):**
Vergaberechtliche Aspekte von Einspar-Contracting-Modellen. Vienna

2.4 The Energy Performance Contract

While working out the text of an energy performance contract, particular attention has to be paid to various aspects. This guide is intended to provide important information on these aspects. It will still be necessary, however, to consult a legal expert when planning a concrete project.

A sufficient amount of time should be spent on the (first) phrasing of an energy performance contract. A demand that comes up again and again in discussions on this topic is that model and standard contracts should be made available. It is possible and recommendable that given standard texts are used as a means of orientation and there are, of course, certain elements that should be included in every energy performance contract. It will still be necessary, however, to adapt the text of your contract to the concrete situation – in particular to the structures existing on the part of the client and to the targets of the respective project.

The essential text elements of an energy performance contract are:

- ⇒ **Contractual period:**
If the energy performance contract is concluded for a certain period of time, the dates of commencement and termination of the contract must be specified exactly in the contract.
- ⇒ **Contracting parties:**
Identifying the contact persons at the contracting parties' as well as a regulation regarding their representatives.
- ⇒ **Range of services to be rendered by contractor**, in particular:
 - savings guarantee, usually defined as a percentage of the energy costs reference value (see Section 2.5.2.3, p. 27);
 - free choice of energy efficiency measures:
Within a certain framework, the contractor can choose freely which measures to use. Essential framework conditions may be:
 - execution of measures according to the latest state of technology;
 - maintaining minimum standards of utilisation comfort;
 - exclusion of negative effects on the environment;
 - client's right of veto in special cases (measure offends against effective law, encroachment on the rights of third parties, and similar cases);
 - etc.

– binding measures:

Here the client can define measures the contractor **must** implement, such as e.g.:

- building up an energy controlling system;
- integration of models for user motivation.

– maintenance and repair of energy-related technical facilities:

It must be defined clearly here whether and to what extent the contractor should take on duties that go beyond the implementation of energy-saving investments. In many cases it will make sense to put the contractor in charge of at least part of the following duties (also regarding already existing technical facilities):

- operation control and correction of faults;
- inspection, maintenance and repair.

As a general rule, one can say: the more duties taken on by the contractor, the higher the respective remuneration will have to be (consequence: longer duration of contract and/or lower users' share in cost savings during the contractual period). It will hardly ever be possible to refinance extensive maintenance and repair measures exclusively from the energy savings alone, i.e. the client will have to make a contribution towards investment costs.

⇒ **Services to be rendered by the client:**

in particular

- granting right of access and admittance;
- making the necessary documents available (in particular energy bills as a basis for project invoicing);
- obligation to cooperate (user behaviour must show energy-awareness, etc.);
- obligation to maintain building(s).

⇒ **Remuneration model:**

in particular

- amount of savings (reduction of costs and/or consumption) guaranteed to the client;
- distribution of extra savings exceeding the value of guaranteed cost savings;
- procedure to determine the TPF company's remuneration (see also explanations in Section 2.5.2, p. 25);
- possible contributions to costs of maintenance and repair measures;

- regulations of payment.

⇒ **Objects:**

Relevant data on the buildings included in the contract must also be provided (often in an enclosure), in particular:

- base line of energy costs;
- condition of energy-relevant systems;
- contacts.

⇒ **Other:**

- property regulations (in particular: date of passage of title to property);
- termination of contract and/or notice terms;
- regulation regarding the sale of buildings;
- final inspection, warranty;
- liability, etc.

Tip: It is useful to lay down the text of the contract as a basic condition for the tender. Thus, the in-coming offers will be prepared on a comparable basis. It will still be possible to *modify* individual passages of the contract during contract negotiations as long as the regulations for awarding contracts are not violated.

2.4.1 Literature on the Topic of Energy Performance Contracts



Unterweger, J. (1999):

Contracting. Einführung und Musterverträge. Vienna

2.5 After Conclusion of Contract

After the conclusion of the contract, the contractor will immediately begin with the detailed planning of the respective measures and with their short-term implementation. During the contractual period, the question of how to calculate the TPF company's remuneration will be of special importance. The external partner's share should be determined on the basis of the savings achieved by their activities. Therefore, any influences (on the level of energy costs) that are not within the contractor's field (of responsibilities) should be excluded, if possible, from the calculation of the TPF company's remuneration.

2.5.1 The Local Administration Mainly Has a Controlling Function

Depending on the terms of contract, the TPF company can be put in charge of various duties (see in particular Figure 1-2 in Chapter 1.2, p. 3). In many cases, the external partner also takes on duties regarding data acquisition and reporting. This leaves the local administration mainly with a **controlling function**.

In order to be well informed about when certain measures are implemented in your buildings you should place a respective **duty to inform** on your partner. In addition, a **plausibility check** is to be carried out regarding the consumption details given in the TPF company's reports. If you can understand the individual steps of calculating the reduction of costs, the results presented in the report will be reliable.

2.5.2 Of Special Importance: How to Calculate the TPF Company's Remuneration

The remuneration for the TPF company is calculated on the dates set in the contract. The following partial steps are required:

- ⇒ definition of a reference value for energy costs (base line);
- ⇒ identification of actual energy costs for the respective accounting period;
- ⇒ adjustment of actual energy costs by any factors the contractor has no influence on and which cannot be attributed to the efficiency measures carried out by the contractor either;
- ⇒ determination of the difference between actual energy costs during the accounting period and the base line;
- ⇒ if necessary: consideration of local administration's share in savings.

2.5.2.1 Determination of Actual Energy Costs

If the accounting period set for the energy performance contracting project coincides with the period the energy bill refers to, you can take over the invoice amount. The matter is more complicated if these two periods do not coincide, e.g.:

- if the respective (conducted) energy carrier is exclusively used for space heating:
In this case, the costs accrued during the accounting period can be calculated from the invoice amount (by approximation) via the ratio to the number of degree days.
- if the respective (conducted) energy carrier is *not* used to provide space heating:

By way of approximation, the ratio of time intervals can be used to calculate the actual energy costs.

- In all other cases, including non-conducted energy carriers, adequate solutions must be found. An experienced TPF company will be able to make specific suggestions.

Tip: If necessary, turn to the contact person in charge at your utility company and ask him/her to adjust the accounting periods. This will save you any conversions during future accounting periods.

2.5.2.2 Adjusting Energy Costs

The amount of actual energy costs is influenced by a series of factors. The external partner implements energy efficiency measures in order to reduce the municipality's expenses for energy supply. Weather influences, changes in energy prices and in utilisation intensity *may* have a negative influence on these measures, however. Energy costs may even rise although saving measures have been carried out.

One reason for a rise in energy costs may of course be that the measures taken by the TPF company do not produce the desired results. In this case, the external partner must take responsibility. The additional costs may, however, also result from changes regarding any of the above-mentioned factors of influence. In this case, the municipality should assume the responsibility for unforeseeable events.

Reason:

- Both contracting parties should bear the risks they are able to control best. *Changes in the utilisation intensity* are directly within the decision-making competence of the municipality.
- *Weather influences* and *changes of energy prices* would in any case have to be covered by the municipality, even if no TPF company was in charge.
- Furthermore: The TPF company will take any unforeseeable events on which it has only little or no influence into account in their calculation, introducing the respective margins of safety.

It is therefore a good idea to *adjust* the energy costs of the accounting period by the mentioned factors of influence. In doing so, expenses must be converted to match the level of the reference period (see remarks in the following Section 2.5.2.3). Make sure you use the correct indicators for the various influencing factors.

Some examples:

- the utilisation intensity of an administration building can e.g. be assessed by means of the number of persons working in the building;

- degree days must be used as indicators for weather influences (please consult the relevant standards for more information on how to determine the degree days);
- changes in energy prices can e.g. be taken into account by means of price indices.

One more tip: Please do not expect that the adjustment of energy costs can exactly reflect the full extent of actual developments. This topic is being discussed again and again, and opinions differ as to how weather influences are to be taken into account. In addition, changes in the various influencing factors do not cause a proportional change in energy costs. An experienced TPF company will be able to recommend an adequate procedure for the adjustment of energy costs.

By the way: The external partner will be interested in an adjustment of energy costs that is "close to reality," especially because the contractor is paid on the basis of energy costs savings and cannot foresee the future development of different factors of influence at the beginning of the contractual period. An unbalanced adjustment procedure can have disadvantageous effects on the TPF company.

2.5.2.3 Establishing Reference Values

Reference values must be established for any **energy costs** and **factors of influence** that are to be taken into account when adjusting energy costs. In this context, please pay attention to the explanations in the previous Section 2.5.2.2. And how is the reference period defined? During adjustment, changes vis-à-vis the reference period are omitted for selected factors of influence. The influence of other factors which have an effect on energy costs can, in most cases, hardly be excluded at all, or their exclusion requires extreme efforts. This e.g. applies to changes in user behaviour. It is therefore recommended that the reference period chosen is the period immediately before the TPF company starts its activities. In this case one can assume that e.g. no serious changes in user behaviour will have taken place.

2.5.2.4 How to Determine the Adjusted Savings and Deduct the Client's Share

Based on the adjusted energy costs and the respective reference value, the adjusted cost savings must now be calculated for each period. Depending on the terms of contract, the local administration's share in cost savings must now be deducted before you can determine the TPF company's remuneration.

3 ENERGY PERFORMANCE CONTRACTING: EXAMPLES OF PROJECTS AND EXPERIENCES

In the public sector, a whole series of energy performance contracting projects has been implemented. Selected examples will be presented in the following section. These are mainly projects which have been going on for several years, so there is the respective experience to rely on.

3.1 Project Examples and Experiences from Austria

Energy Performance Contracting in the Municipality of Bruck/Großglocknerstraße

In **Bruck** an der Großglocknerstraße (Land of Salzburg) a building management system was implemented for several public buildings. The savings guaranteed by the TPF company regarding the costs for electricity and heating amount to ca. € 16,000 per year.

Town Council Office of Bruck an der Großglocknerstraße, fax +43(0)6545 7207-33

The Federal School Centre in Feldbach

The classrooms in the Federal School Centre in **Feldbach**, Styria, are now heated according to the classroom use plan and thus the burden on the environment is reduced. A contribution to the reduction of electricity consumption (and therefore electricity costs) is made by controlling the lighting system according to the presence of persons and the available daylight. This lighting system was installed in the course of an energy performance contracting project.

The director of the Federal Commercial College, Ms. Resnik, is very pleased with the course of the project up to now. The TPF company's employees keep the agreed deadlines and can be consulted at any time. In addition, the school technician has received excellent training regarding the operation of the system. Both students and teachers are extremely satisfied with the lighting and air quality in the classrooms. At the beginning of the start-up phase – and as it had been ever since the school was opened –, it was too cold in some classrooms on the northern side of the building on some days. In the meantime, however, a comfortable minimum temperature can be guaranteed in these rooms as well. The major part of the necessary works could be carried out when there was no school. The rest was planned in a way that no disturbances were caused.

Owing to these positive experiences and above all due to the fact that the TPF

company guarantees that the savings are really achieved, Ms. Resnik is in favour of implementing further energy performance contracting projects.

***Federal Commercial Academy & Federal Commercial School Feldbach,
fax +43(0)3152 4394***

Gerasdorf near Vienna: Energy-Saving Measures in a Multi-Functional Object

In a multi-functional object (voluntary fire brigade, event hall, after-school care centre, library) of the municipality of Gerasdorf near Vienna (Land of Lower Austria) energy efficiency measures were implemented by means of energy performance contracting. The heating energy consumption was reduced by ca. 35 % by renewing the heating system, insulating the top floor ceiling and adjusting the pump control (ventilation system).

Town Council Office Gerasdorf, fax +43(0)2246 2272-33

Experience from the Role Model Municipality of Großraming

In the primary and secondary modern schools of the role model municipality of **Großraming**, Upper Austria, a single room control system was installed. Since then, the annual heating expenses have been reduced by ca. € 7,250.

Mr. Pumsleitner from the Town Council Office points out that the external partners are very helpful if there is a problem and react immediately to any demands or ideas. The users of the building say that rooms are now pleasantly warm compared to the moderate temperatures prevailing before. Apparently, the energy used is distributed in a more targeted way now. Since the systems are remote-controlled, the modem line is busy at certain times according to prior arrangement. Applying remote control also means that the operator of the facilities is supervised. Mr. Pumsleitner is in favour of implementing further projects – not least because this would be a way of motivating the executing companies to prove that their facilities are efficient.

Town Council Office Großraming, fax +43(0)7254-84088

Vienna Starts Energy Performance Contracting at 10 Municipal Authority Objects

In the course of an energy performance contracting project, the Municipal Authority Department MA 32 of the City of **Vienna** has put external partners in charge of carrying out energy-saving measures in ten municipality buildings. In order to find out how different enterprises approach such a project, five tenderers were selected and awarded a contract. The implemented measures ranged from exchanging the boiler, optimising the regulation system, installing equipment for heat recovery to insulating façades and improving the lighting systems.

In the meantime, energy performance contracts have been put out for tender for a second and third group of buildings.

Municipal Authority of the City of Vienna, MA 32, fax +43(0)1 4000-998032

The Loidesthal Kindergarten in the Municipality of Zistersdorf

In the summer of 1999, the TPF company replaced the wall-mounted electrical convection heaters of the Loidesthal kindergarten by a gas-based hot-water heating system. In addition, electric light bulbs were replaced by compact fluorescent lamps. Before the implementation of these measures, the annual energy costs amounted to at least 6,500 €. The 10-year energy performance contract guarantees a 57 % reduction of energy costs. In addition, a reduction of CO₂ emissions by 11,700 kg/year is to be expected.

Town Hall Zistersdorf, telephone: +43(0)2532-2401-0

3.2 Examples and Experiences from Germany and from Switzerland

The Berlin Energy Efficiency Partnership

At the moment, a large-scale energy performance contracting project is going on in *Berlin*. In the course of the so-called "Energiesparpartnerschaft Berlin" (Berlin Energy Efficiency Partnership) the energy management of more than 170 public buildings with an annual volume of energy costs of approx. 15.3 million € was assigned to private partners. Without using funds from the city budget, the existing technical facilities of the buildings included in the project are being adjusted to the latest state of technology. 9.7 million € have already been invested in energy-saving measures by the energy efficiency partners. The annual cost savings resulting from this project amount to more than 2.6 million €. For the contractual period, the Land of Berlin is guaranteed a reduction of the burden on their budget of approx. 1 million € per year. After the end of the contractual period, the local administration will profit fully from the savings.

According to the Energy Management Office of the Berlin Senate Administration, the basic cooperation with the energy efficiency partners works well. There are, however, discussions whenever buildings have to be taken out of the project because they are being sold. In particular during the installation period, comparably intensive additional work was required from the administrative personnel. In addition, the energy-saving measures were partly implemented on an extremely short-term basis. Mr. Kist also points out that a project of the dimension of the Energy Efficiency Partnership requires organisational adjustments from both contracting parties. It has proved to be good practice that each contracting party names *one* person in charge to act as a contact for the other party. In order to make project handling smoother, it can also be useful during the implementation phase to sometimes deviate to a certain degree from the

juridical stipulations provided by the contract and to apply practical regulations. Only incomplete, or sometimes almost no, records were available regarding the energy consumption in many of the buildings whose energy management was assigned to external partners in the course of a first round of tenders. For this reason, the preparation phase was rather complicated.

Senate Administration of Berlin, Energy Management Office, fax +49(0)30 9025-1057

Cooperation Contract between Municipal Administration and Public Utilities

The City of **Bielefeld** concluded a cooperation contract with the local public utilities. This agreement lays down the implementation of energy-saving measures by means of energy performance contracting. In this way it was possible, for example, to improve the lighting system in a school building on a short-term basis without having to use the city's own budgetary funds. The investments made, which amount to ca. 220,000 € in total, caused a reduction of electricity costs by ca. 47,000 € per year. In a few other objects, the public utilities invested in new heating systems. In doing so, it was partly necessary to also carry out measures regarding the heating network. Mr. Oberschelp from the Bielefeld Municipal Administration says that it was not always possible to finance these measures via the cost savings. So one will sometimes have to rely on funds from the public budget if necessary.

However, for selected objects, funds from the local budget were used for a different purpose: in a few buildings where the heating systems were replaced by the energy performance contracting partners, the city administration had the façades insulated at their own cost. In this way, it was possible to design the new heating system on the basis of a reduced nominal output. By means of this measure, it was possible to save investment costs and thus to reduce the required contractual period.

Altogether, the feedback received from the users of the buildings is positive. The monthly recorded consumption values "more or less" confirm expectations regarding the reduction of energy consumption. Experience has shown that a clear definition of points of intersection favours problem-free project handling: financing and invoice handling belong to the duties of the public utilities, while the Building Construction Authority is in charge of the technical development and the planning and implementation of the individual measures. According to Mr. Oberschelp, this division of responsibilities has proved to be very useful. According to him, energy performance contracting is interesting in particular because it provides a possibility of implementing energy-saving measures in local authority buildings even at times when the city's volume of credits is completely exhausted. In his opinion, however, financing from own resources under the conditions applicable to municipal loans would, on principle, be more cost-effective.

Municipal Administration Bielefeld, fax +49(0)521 51-3382

Frankfurt am Main: Energy Performance Contracting at St. Paul's Church, the City Hall and the Art Hall

For the City Hall of **Frankfurt am Main** as well as for several neighbouring buildings (for example St. Paul's Church), an energy management system was installed by a TPF company. The investment volume of ca. 0.5 million € can be compared to annual energy cost savings to the amount of ca. 160,000 €. During the contractual period, the City of Frankfurt already receives a share in cost savings.

Even if there were delays in the course of the project, Mr. Lindner from the Building Construction Authority of the City of Frankfurt am Main is, all in all, still ("rather") pleased with the cooperation with the TPF company. In this context, however, he points out, that in the past, there were differences with the tenderer regarding the interpretation of fluctuations in energy consumption. At the beginning of the project, the users of the building complained about room temperatures being too low. These complaints were partly justified. In many cases, however, the persons were simply used to too high room temperatures. According to Mr. Lindner, the project initially caused increased coordination efforts for the local authority. In his opinion, further contracting projects are to be approved especially if no means for the implementation of energy-saving measures can be made available from the public budget, or if the local authority is offered particularly lucrative contracting conditions.

City of Frankfurt am Main, Building Construction Authority, fax +49(0)69 212-37851

Schools in Heidelberg also Save Energy

The City of **Heidelberg** has put TPF companies in charge of implementing energy efficiency measures in school buildings. Without having to use funds from the city budget, it was thus possible to make short-term investments aimed at the improvement of lighting, heating and ventilation systems.

Mr. Bermich from the Heidelberg Office for Environmental Protection and Health Promotion reports that the City has made "quite divergent experiences with energy performance contracting", adding that the speed and/or quality of execution was not completely satisfactory in some cases. The same is true for the continuity of operation control and optimisation. As with any other craft services, differences in performance can be observed in energy performance contracting as well. The efforts required for the implementation of energy performance contracting projects are greater than initially expected, but still lower than the efforts necessary for the implementation of other energy efficiency measures. What proved to be particularly time-consuming was the elaboration of the contractual stipulations. To a great extent, project handling within the administration is going smoothly. With regard to political approval, it was very helpful to see that all these energy performance contracting projects provide a secured contribution to reducing the burden on the local authority budget. Mr. Bermich also points out, however, that there were problems in the delimitation of these contracts

from existing maintenance contracts. The feedback from the users is predominantly positive. In the initial phase (breaking in of new control systems), however, there were sometimes complaints about room temperatures being too low.

All in all one can say that it has, in fact, been possible to realise savings in all the objects concerned. Mr. Bermich thus considers energy performance contracting to be a "successful approach to energy saving." Based on the experiences gathered so far, he approves of the implementation of further energy performance contracting projects. For the following projects, especially

the competences for maintenance, operation control and repair works should be broken down in more detail,

the requirements regarding the quality of components and installations should be defined more clearly and

stricter conditions are to be set regarding the scheduling of installation works.

City of Heidelberg, Environmental Protection Office, fax +49(0)6221 58-1829

Examples from Mainz: Primary School, City Hall and Museum

At the primary school in the **district of Laubenheim in Mainz**, the heating system was renovated in the course of energy performance contracting. The school's energy consumption has since been reduced by ca. 1/3 and the environmental burden has been reduced by 140 t of CO₂ per year. With the renewal of the lighting equipment in the exhibition rooms at the Gutenberg Museum and the optimisation of the existing technical facilities in the City Hall, the administration of the City of Mainz has already implemented two further energy performance contracting projects. Mr. Stibitzky from the Mainz Environmental Office points out that the works were carried out on schedule in every case.

In addition to the energy performance contracts mentioned above, a number of further energy efficiency agreements have already been concluded with the Mainz Public Utilities.

Land Capital City of Mainz, Environmental Office, fax +49(0)6131 12-2555

Offenbach: Three Schools and the City Hall

The optimisation of the existing technical facilities in three school buildings and the City Hall of **Offenbach** (Germany) required investments of ca. 180,000 €. Throughout the contractual period, the authority responsible for the building(s) receives 15 % of the achievable cost savings.

The cooperation with the external partner has made a positive impression on Mr. Schendel from the Municipal Administration of Offenbach. According to him, the contractor takes care of the technical facilities of their own accord and always endeavours to improve and optimise the systems. The City Hall employees were informed that certain impairments regarding user comfort were to be expected especially during the start-up phase. In this context, Mr. Schendel points out that as soon as many persons are working in one building, there will always be some who feel too hot and others who feel too cold. Now the local authority is no longer responsible for the technical facilities. There is always the possibility, however, to intervene when system parameters have to be changed. Because of the City of Offenbach's tight financial situation, Mr. Schendel would recommend that further energy performance contracting projects are realised. According to his experience, it is important for the political acceptance of such projects that the local government receives a share in the savings right from the beginning of the contractual period.

City of Offenbach, Building Authority, fax +49(0)69 8065-2024

Replacement of Lamps at the Town House

In the lobby of the Town House of the Brundtland city of **Viernheim**, the existing electric light bulbs were replaced by compact fluorescent lamps. The local public utilities acted as a contractor in this deal.

Brundtland representative Mr. Granzow expressed his satisfaction regarding the cooperation with the TPF company, giving the following reason: The energy efficiency partner was very cooperative from the beginning, taking into consideration any wishes expressed by the client. Since this is a small-scale project, the effects on the local administration's every-day business are rather slight. It is important, however, that the success of the project produced a positive attitude within the local authority and created a certain openness towards further energy performance contracting projects.

According to Mr. Granzow, it is always worth considering "whether one wants to let a contractor have a share in savings or whether the local government shouldn't rather cash in all the profits itself."

Municipal Authority of the City of Viernheim, Brundtland Representative, fax +49(0)6204 988-300

A Better Ventilation System for the Refectory

The ventilation system of the refectory/cafeteria at the ETH Höggerberg in **Zurich** (Switzerland) was optimised by means of energy performance contracting. The range of the services to be rendered by the energy performance contracting partner also comprised the installation of a heat-recovery system.

Mr. Küttel from the ETH sees the cooperation with the TPF company very positively. What he points out in particular are mutual trust, open calculation and the clear, unambiguous contractual conditions. The installation works at the technical facilities were finished in autumn 1997. Owing to this positive experience, negotiations were started regarding other energy performance contracting projects. What is of special importance for Mr. Küttel in this context is the aspect of operational optimisation, a clear definition of responsibilities and the optimisation of the return on investments.

ETH, Technical Services, fax +41(0)1 632-1130

4 SERVICE SECTION

4.1 Literature

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4.2 Enclosures

Overview

Energy indicators of existing buildings before and after renovation

Advertisement for the assessment of potential applicants

Assessment form – separated procedure

Assessment form – combined procedure

Enclosure 1: Energy Indicators of Existing Buildings before and after Renovation

Cat.	Utilisation of Building ¹	Actual value (values of existing buildings without serious defects, as of 1988)						Desired Value (good values after complete renovation)					
		Q _h	Q _{ww}	η	E _h	E _w	E _e	Q _h	Q _{ww}	η	E _h	E _w	E _e
		(2)						(2)					
		(3)											
I	Detached and semi-detached family houses												
	Water heating with combined boiler	450	60	0,70		700	120	340	60	0,80		500	100
	Separate water heating electrical	425	*	0,75	575		170*	340	*	0,85	400		150*
II	Multiple dwellings												
	Water heating with combined boiler	450	100	0,75		725	130	330	100	0,80		550	120
	Separate water heating electrical	450	*	0,80	575		180*	330	*	0,85	400		170
	Old people's, children's & youth homes	450	100	0,75		725	150	330	100	0,80		550	125
	Hotels	450	100	0,75		725	300	330	100	0,80		550	250
III	Administrative buildings												
	natural ventilation	400	*	0,80	500		125*	300	*	0,85	350		100*
	mainly mechanical ventilation	450	*	0,80	575		250*	320	*	0,85	375		225*
	air-conditioned, e.g. banks, excl. computer centres	500	*	0,80	625		350*	330	*	0,85	400		300*
	Schools												
	kindergartens, primary and secondary schools	375	25	0,75		525	50	280	25	0,80		375	40
	junior high/vocational/technical schools	425	25	0,75		600	150	320	25	0,80		425	125
	Simple shops (without ventilation and without cooling devices)	400	*	0,80	500		200*	300	*	0,85	350		150*
	Warehouses and workshops	400	*	0,80	500		125*	300	*	0,85	350		100*
	V	Universities	550	25	0,75		775	300	380	25	0,80		500
Department stores (air-conditioned and with industrial cooling)		450	25	0,75		625	1000	350	25	0,80		475	800
	Nursing homes	550	100	0,75		875	200	380	100	0,80		600	175
	Hospitals (general hospitals)	600	100	0,75		925	250	420	100	0,80		650	225
	Indoor pools												
	medium and large	900 ⁴		0,75		1200	350	750 ⁴		0,80		950	300
	small (< ca. 3000 m ² reference area)	1300		0,75		1700	450	1050		0,80		1300	400

¹ Allocation of individual types of utilisation to the respective building category see Table 4

² The energy requirements for hot water are always based on standard utilisation (calculated values acc. to Table D 1 1)

*The energy indicators shown in these examples apply to cases where hot water is heated separately, using electricity; the examples without * apply to combined boilers

³ Desired utilisation value: between limit and target value of new buildings

⁴ for indoor pools: not Q_h, but Q_w (including hot water requirements)

Source: Schweizerischer Ingenieur- und Architektenverein (ed.) (1988), p. 28

Enclosure 2: Advertisement for the assessment of potential applicants

Federal Ministry of Education and Cultural Affairs
1010 Vienna, Minoritenplatz 5
represented by:



BUNDESIMMOBILIENGESELLSCHAFT
Bundesimmobiliengesellschaft m. b. H.
1030 Vienna, Neulinggasse 29

Negotiating Procedure Assessment of Potential Applicants PERFORMANCE CONTRACTING

1. Client:

Federal Ministry of Education and Cultural Affairs, 1010 Vienna, Minoritenplatz 5, represented by Bundesimmobiliengesellschaft m. b. H., 1030 Vienna, Neulinggasse 29

2. a) Contract Awarding Procedure:

Negotiating procedure

b) Category of Services and Description:

Category 12.

Planning, implementation and financing of suitable measures for the reduction of energy costs in two pools of buildings, each comprising ca. 20 - 25 federal schools, including maintenance, repair and operation of the buildings' technical facilities, efficiency review and measures towards a greater energy-awareness in users' behaviour (energy performance contracting).

Economic goal: to save at least 20 % of energy costs.

Estimated investments required (excluding VAT): ca. 45-50 million ATS per pool

c) CPV Classification:

Main part: 74000 000-9.

Description: Other economic services (energy performance contracting).

3. Place of implementation:

Austria, Vienna, various addresses.

4. a) Tenderers' reservations:

According to the legal and administrative provisions shown below, the implementation of the service is reserved for a specific professional group.

Austrian legal provisions and regulations by the Council for the Mutual Recognition of Proofs of Competence to Carry out the Services Put out to Tender.

b) Details on persons responsible:

Legal persons must give the names and professional qualification of those persons who will be responsible for implementing these services in case they are awarded.

5. Partial offers:

It is inadmissible to submit offers for parts of the services put out to tender.

6. Invitation margin:

Number of providers of services (tenderers) invited to submit tenders: 6 (six) at a minimum.

7. Prohibition of partial or alternative offers:

It is inadmissible to submit partial or alternative offers for the services put out to tender.

8. Term of the contract:

Beginning of contractual term: ca. October 1998.

End of contractual term: ca. September 2008.

9. a) Entry deadline for participation applications:

April 30, 1998

b) Address to which applications must be sent:

Bundesimmobiliengesellschaft m. b. H., 1030 Vienna, Neulinggasse 29.

c) Language in which applications are to be written:

German

10. Reasons for use of expedited procedure:

Federal construction project, urgency, in order to produce energy-saving effects as fast as possible.

11. Required guarantees:

See tender documents.

12. Essential conditions of financing and payment and / or reference to the regulations these conditions are contained in:

See tender documents.

13. Legal form required for the community of tenderers to which the contract is awarded:

Of joint and several liability, with a duly authorised representative.

14. The following proofs of competence to carry out the ordered services are to be produced:

(1) Authenticated copy of the professional and commercial registers of the entrepreneur's country of origin or the certification or statutory declaration required there.

(2) Production of a promissory note by a bank, to the amount of a minimum of 10 million ATS per pool of buildings.

(3) Declaration providing information on the annual average of employees employed by the entrepreneur during the past 3 years and the number of managers employed over the last 3 years.

(4) Declaration regarding the turnover of the last three business years, with regard to those services that are the subject of this tender.

(5) List of essential services rendered and of services rendered that are similar to those that are the subject of this tender, over the last three years, stating the invoice value, the date the services were rendered, as well as the client and proofs of the maintenance of the estimated costs and set deadlines.

(6) Declaration regarding the facilities, devices and technical equipment the entrepreneur will have at his disposal for rendering these services.

(7) Declaration by the entrepreneur in which he explicitly confirms his reliability, the fact that there are no on-going, or closed, insolvency proceedings and proof of his lack of criminal convictions.

(8) Declaration stating which trade licences the tenderer intends to produce by means of sub-contractors.

(9) Further proofs upon request.

15. Names and addresses of the enterprises already selected by the client:

No enterprises have been selected yet.

16. Other details:

Administrative and technical information:

Bundesimmobiliengesellschaft m. b. H., 1030 Vienna, Neulinggasse 29.

INFORMATION WORKSHOP for interested tenderers: April 20, 1998, please notify by telephone (01/71604/44 ext. or fax 01/71604/50 ext.).

17. Date of publication of the preliminary information in the "Official Journal of the European Communities":

February 11, 1998.

18. Date the present announcement will be sent to the Office for Official Publications of the European Communities:

April 6, 1998.

Vienna, April 2, 1998

Source: Wiener Zeitung vom 8.4.98

Enclosure 3: Assessment Form – Separated Procedure

BENEFIT ANALYSIS FOR THIRD PARTY FINANCING													
Offer:	Points												
ASSESSMENT CRITERIA		0	1	2	3	4	5	6	7	8	9	10	
COSTS/FUNDING													
Investment costs tenderer (value increase)	low												very high
Repair costs for client (advance payment)	high												none
Share in renovation	none												very high
Client's share via savings guarantee	low												very high
Attendance costs during contractual period	very high												low
Attendance costs after end of contractual period	very high												low
Planning costs	very high												very low
ENGINEERING/PERSONNEL													
Measures for saving operation costs (information content)	low quality												high quality
Functionality of regulation & control and building automation systems	low												very good
Training, know-how transfer	none												intensive
Takeover of personnel	none												yes, without restriction
Personnel savings (number of persons)	none												high
Attendance (stand-by/qualification)	none												very high
ENVIRONMENTAL PROTECTION/DEADLINES/REFERENCES/OTHER													
Share of environment-friendly technologies	low												very high
Execution deadline for construction services	long												very short
References on third party financing	none												numerous
Miscellaneous													
TOTAL UTILITY													

Source: Oberfinanzdirektion Stuttgart (1997), Leitfaden zur Prüfung und Bewertung von Angeboten

Enclosure 4: Assessment Form – Separated Procedure

BENEFIT ANALYSIS FOR THIRD PARTY FINANCING													
Offer:	Points												
ASSESSMENT CRITERIA		0	1	2	3	4	5	6	7	8	9	10	
CAPITALISED VALUE operation and personnel cost	low												high
COSTS/FUNDING													
Investment costs tenderer (value increase)	low												very high
Repair costs for client (advance payment)	high												none
Share in renovation	none												very high
Client's share via savings guarantee	low												very high
Attendance costs during contractual period	very high												low
Attendance costs after contractual period	very high												low
Planning costs	very high												very low
ENGINEERING/PERSONNEL													
Measures for saving operation costs (information content)	low quality												high quality
Functionality of regulation, control and building automation systems	low												very good
Training, know-how transfer	none												intensive
Takeover of personnel	none												yes, without restrictions
Personnel savings (number of persons)	none												high
Attendance (stand-by/qualification)	none												very high
ENVIRONMENTAL PROTECTION/DEADLINES/REFERENCES/OTHER													
Share in environment-friendly technologies	low												very high
Execution deadline for construction services	long												very short
References for third party financing	none												numerous
Miscellaneous													
TOTAL UTILITY													

Source: Oberfinanzdirektion Stuttgart (1997), Leitfaden zur Prüfung und Bewertung von Angeboten