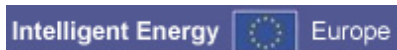




# Guideline for Saving Contracting in Street Lighting

*Long version*



The sole responsibility for the content of this reports lies with the authors. It does not necessarily reflect the opinion of the European Communities. The European Commission is not responsible for any use that may be made of the information contained therein.

<b>1</b>	<b>INTRODUCTION .....</b>	<b>2</b>
<b>2</b>	<b>DIFFERENTIATION OF PUBLIC PRIVATE PARTNERSHIP MODELS .....</b>	<b>3</b>
2.1	BASIC MODELS.....	3
2.2	CONTRACT MODELS .....	4
<b>3</b>	<b>FRAME CONDITIONS AND STANDARDS .....</b>	<b>5</b>
<b>4</b>	<b>MOTIVATIONS, BARRIERS AND SOLUTIONS.....</b>	<b>6</b>
4.1	MOTIVATIONS.....	6
4.2	BARRIERS .....	6
4.3	SOLUTIONS .....	6
<b>5</b>	<b>BEST PRACTISE EXAMPLE.....</b>	<b>8</b>
<b>6</b>	<b>OVERVIEW OF PROCEDURE.....</b>	<b>9</b>
<b>7</b>	<b>PROJECT IDENTIFICATION AND PREPARATION.....</b>	<b>11</b>
<b>8</b>	<b>PROJECT DEVELOPMENT .....</b>	<b>13</b>
8.1	DURATION OF CONTRACT.....	13
8.2	QUALITY CRITERIA .....	13
8.3	STANDARDS.....	13
8.4	INVESTMENT COSTS GRANTS.....	14
8.5	FINANCING .....	14
8.6	OTHER REQUIREMENTS .....	14
<b>9</b>	<b>TENDERING PROCEDURE.....</b>	<b>14</b>
9.1	INVITATION TO SUBMIT TENDERS / CALL FOR TENDERS .....	15
9.2	CONTENTS OF THE TENDER DOCUMENTS .....	15
<b>10</b>	<b>VALIDATION PHASE.....</b>	<b>15</b>
10.1	IDENTIFICATION OF THE BEST OFFER.....	16
10.2	OPTIMISATION OF OFFERS / CONCLUSION OF THE CONTRACT .....	18
10.3	FINAL RESULT.....	18
<b>11</b>	<b>SAVING GUARANTEE CONTRACT .....</b>	<b>18</b>

**Annex: Saving Guarantee Contract**

## **1 Introduction**

Investments to enhance the implementation of energy efficient lighting are among the most cost-effective and practical energy efficiency measures and offer the EU one of the most immediate and effective opportunities to increase the reliability of energy supply and to decrease greenhouse gas emissions.

The new **Directive on energy end-use efficiency and energy services in EU** (Energy Service Directive, ESD) aims to promote final energy efficiency, programmes and measures of energy efficiency. The ESD will stimulate and facilitate cost-effective investments in energy efficiency in different sectors like the building or lighting sector.

The public owners of street lighting systems have the duty to keep the systems in good shape to ensure road safety and to fulfil other functions of public lighting (e.g. city beautification, prevention of crime, etc.). The lack of public budget has led to a stagnation of investment in energy efficiency of the public street lighting; now there is a critical situation with regard to high operating costs and large refurbishment necessities without public funding possibilities. There is a “drive” towards outsourcing of cost reductions measures and other services to Public-Private-Partnerships (PPP). PPP models like Contracting and especially Performance Contracting can be successful tools to save energy and maintenance costs and furthermore guarantee quality standards for street light systems.

Street lighting contracting in general means **financing and operating procedures for the provision of specific energy services** for owners of street lighting systems. This may also contain cost effective delivery of electricity (and in some cases also gas) for the owner of the system. There are also models with combination of using Renewable Energy Sources (RES) and integration of replacement measures of existing components/systems, energy metering and billing, Life Cycle Cost Assessment (LCCA) as well as interfaces with other customer services.

These procedures aim at cost effective energy supply and/or saving of energy and cutting operating costs by modernising and optimising necessary functions of system automation installations. Thus, contracting is not just a financing instrument, but also includes essential elements of operation optimisation and management.

This manual shall be a valuable guideline for municipalities and authorities to establish successful and effective contracts with regard to street lighting. It will guide through all the necessary steps of action to be taken from project identification and development to tendering procedure and finally to the conclusion of the contract. Furthermore the manual will explain the different concepts and possibilities of contracting and discuss possible barriers and problems and how to solve them.

Also a standardized Saving Guarantee Contract and the respective Annexes are part of this manual. The original version of the model contract for buildings has been revised to account for legal requirements and practical experience in street light contracting. The contract will offer both project partners the highest possible degree of safety, as it takes account of all special requirements of the project and legally safeguards the client's interests.

## **2 Differentiation of Public Private Partnership models**

Third Party Financing (TPF) as a kind of Public Private Partnership is a well established tool to finance energy efficiency measures in buildings and facilities. Especially Performance Contracting has become an instrument to realise relevant CO<sub>2</sub> emission reductions. Considering the specific limits, the different Third Party Financing concepts of Facility Contracting, Supply Contracting and Performance Contracting offer relevant advantages for an efficient management and refurbishment of energy consuming systems as well as the possibility to reduce operation costs.

From the customer's perspective, a contracting project can be financed in one of three fundamental ways (1) through self-financing, (2) debt financing, or (3) third party financing. Also the Energy Service Company (ESCO) has again these three fundamental ways to finance a project in which it engages.

A main distinguishing feature of contracting is, that the service company obliged under the contract bears the risk (or major parts of the risk) of the street lighting and installation management with regard to energy consumption and maintenance and thus, of course, at the same time is given the chance to gain its own appropriate profit if the intended improvement in efficiency is actually achieved. The undertaken tasks are characterised by a more or less high degree of multidisciplinaryity.

### **2.1 Basic models**

Although in recent years the most varied models have emerged, a basic structure can still be determined which has led to the following widely recognised classification. Depending on the system approach or aim of contracting, the following two basic forms can be distinguished:

- **Energy Supply Contracting** (also called Facility Contracting or Energy Delivery Contracting/delivery of useful energy) - EDC
- **Performance Contracting** (here called Saving Contracting)

Both of these basic models and especially the EDC are widely-used in several building sectors, but also used in the frame of several combinations and variants e.g. for the lighting sectors. The services offered by different companies in the field of energy services in the lighting environment range from project development to operation, from "light supply" to servicing and from maintenance up to complete reconstruction and financing.

Thereby, it can be differentiated between pure service models, in which the lighting system **remains in the ownership of the municipality, a complete transfer of the system to the private company** or rather a **combination of both models**.

In the lighting sector basically **three different models** of contracting can be differentiated:

- Lighting Contracting (operation or facility Contracting)
- Light supply Contracting (supply Contracting)
- Saving Contracting

	<b>Lighting Contracting</b>	<b>Light Contracting (Light supply Contracting)</b>	<b>Saving Contracting</b>
<b>Application</b>	Refurbishment of the lighting devices	Renewal, replacement and /or supplementing investments of the lighting system and additionally the operation of the lighting	Energy saving measures
<b>Services</b>	Financing (optional), Planning of the refurbishment, Installation and maintenance	Financing (optional), Planning of the refurbishment, Installation and maintenance.  Additionally: Whole operation of the lighting points including purchasing of the energy	Financing, Planning, Installation, maintenance and support of specific energy saving measures
<b>Financing</b>	Contracting rate as remuneration for the services	All costs for the supplied light (Contracting rate with basis and working price)	Contracting rate as remuneration for the energy and operating cost savings achieved
<b>Remarks</b>	For single refurbishment measures including maintenance	For total refurbishment/complex solutions including operation, can be combined with leasing/buying model	For more complex solutions with high saving potential; not so widely used (often combined model with subsidies of the lighting owner for refurbishment measures)
<b>Type of Contracting</b>	Facility Contracting	Supply Contracting	Performance Contracting

Table 1: Different models of contracting in the lighting sector

## 2.2 Contract Models

Basically, saving contracts can be divided into two groups based on the time-relation of the client's participation in the saved operating costs: **duration model** and **participation model**. Both models have in common that the contract period is divided into two phases: the preparatory phase and the phase of the ESCO's main obligation to perform.

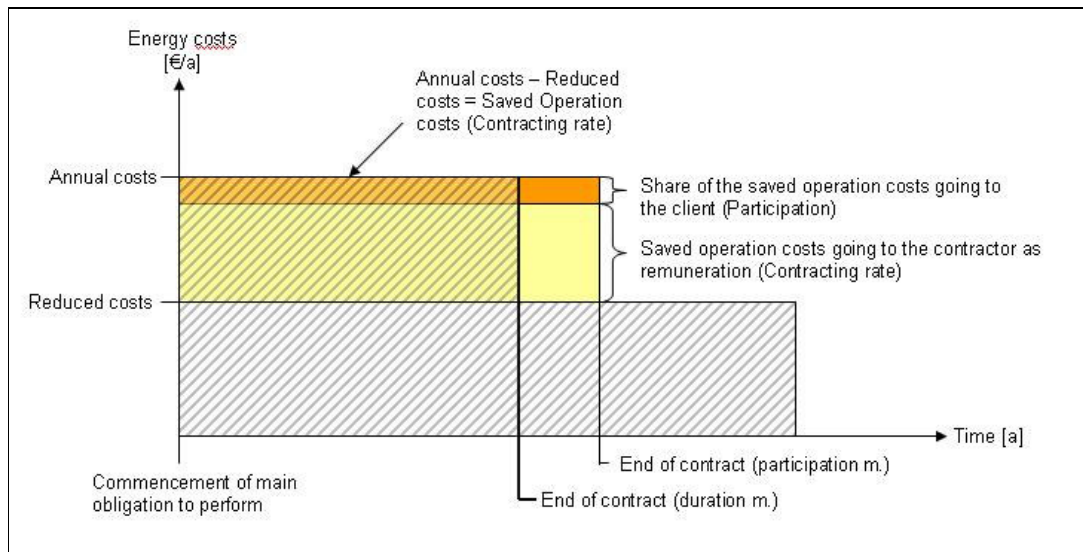


Fig. 1: Principle of duration and participation model

In the case of the *duration model* contract, the contractor is entitled to the cost savings to be achieved for the entire duration of the main obligation to perform, i.e. the client pays the ESCO contracting rates the amount of which corresponds to the saved operating costs. Thus, the client can actually enjoy the cost savings only after the end of the contract period.

In the *participation model*, the client participates in the cost savings from the commencement of the main obligation to perform. The amount of the client's participation is to be stipulated in the contract and usually is at least 10% of the savings achieved. The participation results in longer contract durations, however, at the same time, the client's budget is immediately unburdened during the phase of the main obligation to perform.

### 3 Frame conditions and standards

Besides such basic legal duties like the duty of the owner of the streets to ensure road safety (in Germany based on § 823 of the Civil Code and Art. 28 (2) of the Basic Constitutional Law) there are a number of **technical norms and standards** to consider. Outdoor lighting is processed in national/international technical standards (concerning both lighting and electrical requirements) and in national laws (concerning properties).

Despite the fact that new energy efficiency standards are being implemented in all EU member and EU associated countries, there are still different standards in force by EU countries (e.g. for Germany the European standard DIN EN 13201 is in force since the end of 2005 replacing the parts of national standards like DIN 5044 (Road Traffic), DIN 67523 (Pedestrian Crossing), DIN 67524 (Tunnels), DIN 67528 (Parking areas) ). European standards and norms will be developed as common basis therefore the CIE is elaborating the new TC 4-44 "management and maintenance of road lighting", a draft is under discussion. The final publishing shall be in summer 2007.

The ESCO has to assure that the according norms and laws are being applied and hence road safety will not be negatively influenced by any refurbishment measure (*see also Saving Guarantee Contract, Annex 3 III., Data Basis*).

## **4 Motivations, Barriers and Solutions**

### **4.1 Motivations**

There are several advantages of Performance Contracting for the owner of the public lighting. First of all the authority or the owner is – after signing the contract – relieved from both organisational implementation and financial burden which are both interesting incentives for cities and municipalities.

Due to the specific knowledge, financial incentives and the legal commitment for the ESCO, economical saving potentials are efficiently used and saving measures are implemented much faster than by the owner himself. Besides significant reductions of operating costs implemented measures can lead to better light quality, fewer failures, raise of value and attractiveness and also to a reduction of greenhouse gases.

### **4.2 Barriers**

Experience has shown some general barriers for the use of contracting models in the municipal sector, which can also be found in the street lighting sector. Some of the main barriers are:

- *Technical barriers*  
(data collection; baseline calculation; increased organisational efforts)
- *Legal barriers*  
(provision of a secure and fair contract; uncertainties in e.g. public budget, municipal law, procurement)
- *Human barriers*  
(lack of confidence in the largely unknown model: 'we can do it better'; fear of staff reduction)

Additional barriers for public lighting improvement were analysed in the frame of the EnLight-project. A summary (abstract) can be found on the project webpage<sup>1</sup>:

- Lack of promotion of best practise examples
- Proof of energy savings and subsequently cost reductions through new outdoor lighting concepts
- Lack of appropriate cost benefit analysis and planning instruments for outdoor lighting

### **4.3 Solutions**

**Technical barriers:** The effort in compiling data depends on the complexity of the project, the background knowledge of the authorised personnel and the detailedness of the records. Available tools like data entry forms (*see Annex 3 of the model contract*), model contracts (*Saving Guarantee Contract as appendix of the manual*) or the *Financial Tool* of the E-Street project can assist in collecting data and calculating the baseline for energy consumption and operating costs. Furthermore the possibility exists to contact energy agencies or consulting companies for further assistance during project preparation which is the only period of increased efforts for the public authority.

**Legal barriers** are solved by a model contract which is legally examined and hence provides a fair and secure contract. Usually only small adaptation is needed for the concrete project conditions.

Additionally, the EU directives referring to public tendering give enough flexibility related to the characteristics of Performance Contracting projects.

**Human barriers** are sometimes shown in the opinion: We can realise refurbishments the same way but even cheaper! There are three factors which stand against this. Firstly the amount of investment can often not be provided due to the lack of public budget, secondly the ESCO usually has very specific know-how and experience and thirdly the ESCO guarantees for the operating savings and therefore has a much higher economical interest in achieving these savings.

The fear of staff reduction caused by external energy services can be reduced if the responsible personnel are involved in the process right from the start. Usually the ESCO works in the field of energy saving and energy management and therefore takes over responsibilities which have been sparsely, if at all, been focussed on before. In general Performance Contracting only leads to a shift in duties and hence to a relief of the personnel.

The barriers analysed in the EnLight project (best practise, proof of reductions, cost benefit analysis) shall be focussed on within this manual and possible solutions are shown.

---

<sup>1</sup> [www.eu-enlight.org](http://www.eu-enlight.org)

## 5 Best Practise Example

### **Municipality of Gunskirchen**

Country: Austria  
Inhabitants: 5,500

### **Contact:**

Franz Mallinger  
Gemeindeamt Gunskirchen  
Auholz 1  
A – 4623 Gunskirchen  
+43 (0)7246/6255-320  
franz.mallinger@gunskirchen.ooe.gv.at

### **Aims of the municipality:**

- Reduction of failures of the street lights
- Implementation of best available technology
- Saving of energy and money
- Precise planning of next years budget
- Maintenance to be done by the ESCO

### **Saving measures:**

- Exchange and renovation of pillars
- New lighting control devices
- Extension of street lighting system
- Reduced lighting power at night with monitoring devices
- Exchange of all lamps

<b>Duration of contract:</b>	10 years
<b>Total investment:</b>	138,930.58 €
<b>Energy savings:</b>	24,615 kWh/a
<b>Energy costs savings:</b>	3,200 €/a
<b>CO<sub>2</sub> savings:</b>	7.4 t/a

The municipality of Gunskirchen signed the contract in 2003 with the aim to improve the lighting quality and on the same hand to reduce costs. The energy statistics and installation data was easily assessed by the annual records from the accounting department. Local electricians and maintenance personnel were also involved in the preparation phase. All guaranteed savings were fulfilled and apart from early communication problems no difficulties occurred during the project. However, the municipality of Gunskirchen did not make any call for tender as they had worked with the ESCO before.

## Steps to develop a Performance Contracting Project for Street Lighting

### 6 Overview of Procedure

Saving Contracting projects usually are complex projects requiring thorough preparation and appropriate know-how. Therefore, anyone not yet familiar with the subject should seek support from energy representatives, energy agencies, consulting firms or responsible persons of current projects. Furthermore, a functioning energy consumption and cost registration is one of the most important prerequisites for successful project preparation and development. The time needed until project implementation is approx. 6 – 12 months from project development to contract conclusion.

Identification and implementation of energy efficiency and operating cost measures in street lighting in the framework of Saving Contracting requires a number of activities presented in the following describing individual steps.

After the decision of the owner of the street light to implement such a project the lighting system needs to be evaluated in the course of project development and the **operating (energy and maintenance) costs baseline** needs to be determined to serve as the reference value for the operating costs in the contractual period of the *Saving Guarantee Contract*. Furthermore, the **system requirements** should be defined already at this stage. This requires clarification of the interfaces with regard to maintenance and above all definition of the minimum savings to be expected and the client's share in it.

Firstly, the question needs to be answered whether or not the thresholds for construction work or services are exceeded with regard to the project's estimated total order value and thus EU-wide invitation to tender with the associated award procedure is required. The expected threshold results from the annual amounts of savings added up over the contract duration. Also, the relevant award rules for the procurement contract (in Germany: VOL, VOB or VOF) are to be selected in dependence on the kind of main service to be provided (building and construction work, supplies and service or freelance services).

The client compiles the tender documents with the *Saving Guarantee Contract* as a main component. The next step is publication in the official gazette, other official publications for public contracts and above all in special databases. Prospective bidders may then express their interest and those apparently best suited are invited to tender in a **functional invitation to tender**.

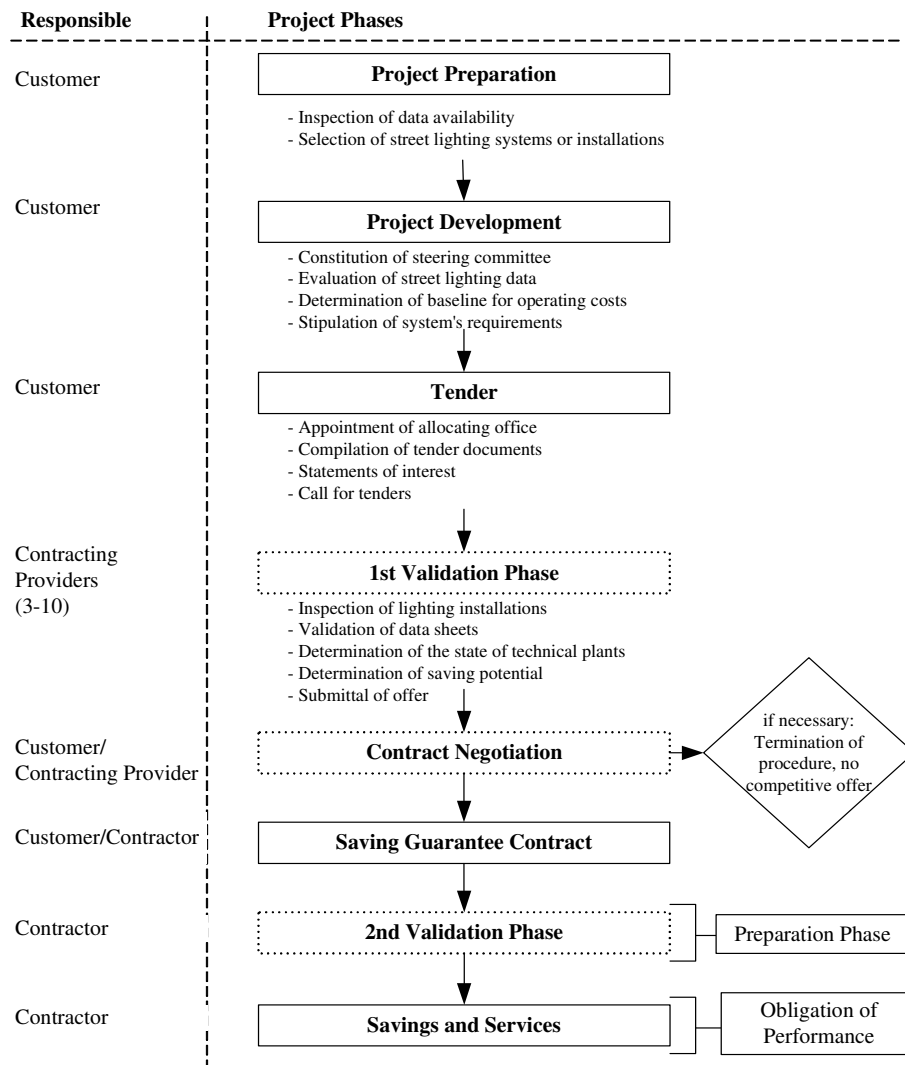
The bidders are given the opportunity to inspect all installations and devices and validate the technical data. The most important characteristics of the tenders to be submitted are the guaranteed cost cuttings, data on investment volume and structure and on the required extent of maintenance. The best offers should be substantiated as the **negotiation process** progresses; only after this step the best bidder is finally selected.

Following the conclusion of the contract, the Energy Service Company implements the saving measures in street lighting system during the **preparatory phase**. Only on completion of the preparatory phase the **period of main obligation to perform** will commence in which

the savings achieved are determined and the ESCO will have to answer for his saving guarantee.

The following figure shows the steps and responsibilities for the project preparation, development and the implementation of the Saving Guarantee Contract:

**Implementation of Saving Guarantee Contract**



Regarding the implementation and realisation of contracting projects there are some general issues to consider. Contracting is a win-win model for both partners, but it needs good preparation and partnership collaboration on the basis of adequate and proven contract models like the Hesse Energy Saving Guarantee model contract for Saving contracting projects in the building sector. The Federal Environmental Agency of Germany (UBA) states that the ecological and economical benefit of Saving Contracting depends significantly on the quality of the tender and the evaluation of offers.

## **7 Project identification and preparation**

First step is the inspection of data availability and a selection of appropriate parts of the street lighting system for the Saving Contracting project which are later on listed in *Annex 2 of the model contract (Contractual Object)*. All further specified data will refer to these objects.

A fundamental element of the project identification process is the **energy audit** (expert examination). The results of the audit indicate the technical scope of the necessary refurbishment measures, the prospective volume of investment, and a cost-benefit ratio, which is a starting point for the definition of the financial needs.

A street light analysis including costs for energy and maintenance tells the extent of the economic saving potential. In the course of a street light 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.

Principally, if **there is no street light analysis available** the following approaches are possible:

- You commission a street light analysis,
- You contact an ESCO directly, or
- You assess the energy and maintenance savings potential according to street light-specific indicators. For the assessment the calculation tool developed in the E-Street project can be used.

If the public authority commissions a **street light analysis**, you will get a detailed picture of the savings potential of the street light installations in question. There is, however, the disadvantage that such an analysis requires a lot of time and money. It may be necessary for the street light owner to employ an external partner.

You can also directly commission a neutral **Energy Agency** to examine the suitability for a Saving Contract project. An experienced company will, without too much effort, be able to tell you whether or not a Saving Contracting project is worthwhile for the object in question.

The third alternative is to assess the lighting according to selected **street light-specific indicators**. Based on these indicators (in particular: lamp-related energy consumption and maintenance costs per year) one can assess, in a relatively simple (and therefore both time- and cost-saving) way, whether a street lighting system offers favourable conditions for a Saving Contracting project. The indicators of the street lights in question must be compared to the respective desired value. The desired energy values for the use of energy of old and new street lights can be found in the National Standard.

Indicator	Bad values	Average values	Desired values after renovation
Luminous efficacy [lm/W]	< 60	50 – 80	90 – 120
Nominal lifetime [h]	< 10,000	15,000	> 25,000
Failure rate after 16,000 h [%]	30	15	5 – 10

Table 2: Specific Indicators of Street lighting

If you wish to carry out energy-oriented improvements in street lighting, you should aim to reach the indicators given in table 1. If the **actual values** of the respective installations are significantly different than the **desired values**, one can assume that the street lighting system in question shows an economically viable potential for the reduction of operating costs. Other indicators are e.g. age and condition of the luminaire body, the reflector, and the existence of ballasts.

**Which requirements have to be fulfilled for an economical SAVING CONTRACTING?**

- above-average energy consumption, energy and maintenance costs
- guaranteed contractual relationships and ownership
- a long term usage concept

Depending on lifetime and costs of the lamps it is possible that maintenance costs increase after the refurbishment. If, for example, the actual lifetime of the lamp is only slightly lower than that of the refurbishment while the costs for the lamp are noticeably higher, there is the chance that maintenance costs will be higher. Therefore it is advisable to use calculation tools which calculate the energy costs savings as well as the emerging maintenance costs to assure the economic potential of the street lighting (e.g. the *Excel calculation tool of the E-Street project*). As the simple example in Table 3 shows 40% of the energy costs are reduced while costs for maintenance increased by 25%, nevertheless the operating costs still show a saving potential of 37%.

	Before	After	Savings
Lamp type	HME 250	HST 150	
Number	1	1	
Operating hours*	4,331	4,331	
Energy consumption [kWh/a]	1,064	639	
Electric power costs [€/kWh]	0.11	0.11	
<b>Energy costs [€/a]</b>	<b>141.89</b>	<b>85.14</b>	<b>56.75</b>
Nominal life of lamp	15,000	18,000	
Labour costs lamp exchange* [€/lamp]	20	20	
Costs for lamp* [€/lamp]	4	16	
<b>Maintenance costs [€/a]</b>	<b>6.61</b>	<b>8.27</b>	<b>- 1.66</b>
<b>Operating costs [€/a]</b>	<b>148.50</b>	<b>93.41</b>	<b>55.09</b>

Table 3: Calculation example for operating costs

\* based on data of the EnLight project for the city of Bremerhaven

## **8 Project Development**

The next step is the constitution of a steering committee that works out targets and a time schedule. On the basis of energy and maintenance costs the reference value for the contractual period – the so-called **operating costs baseline** for the expected savings - is calculated. This can be done for energy costs on the basis of existing utility bills or calculative regarding number of lighting points, energy consumption, yearly operating hours and the definition of reference prices, while the costs for maintenance depend on material costs, wages, cleaning and disposal costs for a single change of lamp. Detailed calculation models can be found in the *Calculation Instructions (Annex 8)*. The operating costs baseline is the sum of all operating costs for the last annual period before the beginning of the planned Saving Contracting.

The steering committee now has to stipulate the **system requirements** for the bidding documents with the **minimum level of operating cost savings** (e.g. 15% compared to the operating costs baseline) and other general conditions. From the targets defined for your Saving Contracting project, criteria can be deduced for the assessment of incoming offers.

In addition, it has to be decided whether to give the Energy Service Companies a certain predefined general framework for preparing their offers. Set standards make it easier to compare incoming offers. A general framework should be established for the following general aspects:

### **8.1 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 and/or more expensive investments in the project. It is easier to compare different offers if the ESCOs are given a definite contractual term on which to base their offers.

### **8.2 Quality criteria**

To avoid inconveniences between the contract partners the client should predefine minimum desired quality criteria for all parts of the system and compile these. This should include aspects like minimum lifetime expectations, protection rates, design, luminous efficacy or possibilities to dim the lamp. All equipment provided and installed by the ESCO will have to meet at minimum these criteria.

### **8.3 Standards**

In Germany there is no duty to retrofit old installations after the coming into force of DIN EN 13201. There is, however, the duty to follow these norms for any new installations and refurbishments. The contractor has to follow these regulations for any refurbishment and it also might have to be considered for the preparation of the operating costs baseline. If refurbishment measures are applied for older parts of the street lighting system, the baseline may have to be calculated for the theoretical energy consumption if the old installation would fulfil the DIN EN 13201. This is due to the fact that energy saving measures might not show

their full saving potential because the DIN has to be followed and e.g. additional lighting posts are necessary.

### **8.4 Investment Costs Grants**

If a measure is to be implemented by means of Saving 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 the investment costs. Such financing is called “additional contribution model” and may also enable the realisation of compulsory measures and/or a reduction of the contract duration. Subsidies make sense if the client can obtain more favourable terms of financing or if the attainable savings do not completely cover the ESCO’s expenses within the desired contract period. You should inform the ESCO on a willingness to grant a contribution towards investment costs at the beginning of the tendering procedure to make it possible for the ESCO to consider this factor in their project calculation.

### **8.5 Financing**

The following refinancing variants and contract constructions are possible, subject always to the precondition that funds are available (each separately or in combination):

- The client takes over all costs (full subsidy)
- The client takes over a reasonable portion of the costs (part subsidy)
- The client waives his share in the energy cost savings
- Longer contract duration
- Combination of energy saving and energy supply contracting

### **8.6 Other Requirements**

For the system requirements the steering committee may set other important criteria according to their demands and expectations which should also be defined for the bidding documents, e.g. the client’s share in saving quota, the reduction of energy consumption or the minimum requirement of investment costs.

## **9 Tendering procedure**

The search for the best Saving Contracting provider begins. The project is advertised for bids. The offers received are compared and individually negotiated. Based on the suitability criteria stated, bidders are selected which will receive the tender documents and are invited to submit tenders.

The bidders are now given the opportunity to inspect the lighting system, validate the technical data, and perform a **draft analysis** with regard to energy on which they will base their tender. Through a call for tender the **most appropriate provider** will be found and

charged with the financing, planning, implementation and maintenance of saving measures for these street lights.

Even if a public call for tender is not necessary for you, as a client you will, as a rule, profit from awarding a contract on competitive conditions.

### **9.1 Invitation to Submit Tenders / Call for tenders**

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, 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.

### **9.2 Contents of the Tender Documents**

It is helpful and/or necessary to address various aspects in the tender documents of a Saving Contracting project:

- subject matter and targets of the project
- tips for preparation of documents
- determination of remuneration
- general framework
- a draft of the Saving Guarantee Contract
- time planning
- assessment criteria
- street light installation-specific data

## **10 Validation phase**

It is assumed that all costs covered by ESCO in connection with operating efficiency investment shall be repaid from the operating cost savings achieved. Thus, the savings achieved during the effective period of the contract have to be large enough to cover the bank interest and the very costs of the investment as well as the costs incurred by ESCO in connection with the provision of operation services.

Depending on the tradition in the field of energy efficiency projects, and the type of contract concluded, the ESCO usually gets at least 80% of the operating cost savings achieved in the agreed period of time (participation model).

In order to assess whether the savings achieved will cover all the costs incurred by the ESCO, a detailed analysis has to be carried out by the ESCO. The focus of this analysis is:

- precise assessment of the technical condition of the applied street lights,
- identification of all potential savings that could be achieved,
- planning of improvement measures and the scope of the modernisation,
- precise determination of shares in the investment and in the operation costs.

The specification of the street light's technical parameters before and after the modernisation makes it possible to determine the level of energy savings. Then, those savings have to be presented in the financial dimension.

The identified technical parameters and financial possibilities create a basis for the planning of the optimum modernisation measures, the guaranteed savings and the calculation of own costs and risks by the ESCO. This basis is used for the offer of the ESCO.

### 10.1 Identification of the best offer

The best offer will be determined from the incoming offers with the help of a defined procedure. The bidders have to be aware of the procedure and the criteria for identifying the best offer. The criteria are based on the predefined priorities and also the weights assigned to individual criteria may differ.

During the evaluation of the offers, both financial and non-financial effects of the selection of a particular offer should be considered. In order to be able to assess an offer comprehensively, the assessment of these two parts must be combined.

#### Monetary Assessment / Evaluation

A saving contract leads first of all to a reduction of energy costs. However, during the contractual period other costs (e.g. maintenance costs) may be reduced too.

To compare the offers **all cost categories** under which changes will take place as a result of the ESCO's work (e.g. yearly share in the savings, operational costs etc) have to be considered.

A method to compare the different guaranteed yearly energy cost reduction is the “**net present value method**”:

$$K = \sum_{t=1}^{t_v} E_t \cdot (1 + i)^{-t}$$

K net present value of savings over the entire operating life with the interest rate  $i$ , at time  $t=1$

$E_t$  saving in the year  $t$

$i$  interest rate (e.g. 0.06 for 6 %)

$t_v$  contract duration

As savings achieved may be different in different years, it is most profitable to take into consideration the effects to be achieved over the whole period of operation of the installed equipment and elements, and to measure the project's economic effects by means of its net present value (NPV).

#### Non-Monetary Evaluation

The following non-financial qualitative evaluation criteria can be applied:

- reduction in the emission of pollutants
- quality of the products
- energy management measures
- guarantees for maintenance and service
- the ESCO's references and experience in implementing similar projects,

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.

Using the **point system** or a “**cost-benefit analysis**” adopted for the project, it is possible to identify the offer which as a whole meets the non-financial requirements best. However, it should be remembered that the evaluation of non-financial effects is usually non-objective and as such should be carried out independently by several persons.

The following table includes a model form to be used for the cost-benefit analysis for the evaluation of the best offer (**the weighting may be adapted**):

		assessment														
criteria		0	1	2	3	4	5	6	7	8	9	10		Weigh- ting	points	
1a	Net present value of the budgetary relief within the contract period (guaranteed savings less basis remuneration)	Low	(Rating is calculated)										High	35		
1b	Net present value of the budgetary relief after the end of contract	Low	(Rating is calculated)										High	8		
2	Investment in hardware	Low	(Rating is calculated)										High	35		
3	Reduction of CO <sub>2</sub> -emissions	Low												High	3	
4	Compatibility of energy concept with existing structures	Low												High	3	
5	Compliance of energy management (measuring and metering concept) with the characteristics of performance features	Low												High	3	
6	Services offered maintenance/ troubleshooting	Low												High	10	
7	Quality, useful life and future availability of replacement parts	Low												High	3	
Sum													100			

Table 4: Cost-benefit Analysis for Saving Contracting

We would like to point out once more that tender assessment is a sensitive area. Quantification often gives the impression of a high degree of objectivity, but it is merely an expression of subjective will and individual objective. However, the net present value method used and explained here will meet with the best acceptance among bidders, as the underlying economic principles to a great extent correspond to the calculation principles of the enterprises.

As a rule, hard criteria should always add up to more than 75% of the weighting. Too detailed scaling for soft assessment such as from 1 to 10 is not very plausible in practice. Scaling will be easier to justify if it is more coarse, as in the example below:

10 points	Very good, ideal
8 points	Good, fully realisable
5 points	Good, but with minor flaws
3 points	Satisfactory, with major flaws
0 points	Not realisable, not existing

## 10.2 Optimisation of offers / Conclusion of the contract

The bidders explain their offers, and the most appropriate Saving Contracting provider with the best offer is found. Based on the offers submitted by the ESCOs, it is possible to negotiate with the bidders any changes required in the offer. The Saving Guarantee Contract, finally signed from client and ESCO, is the result of these negotiations.

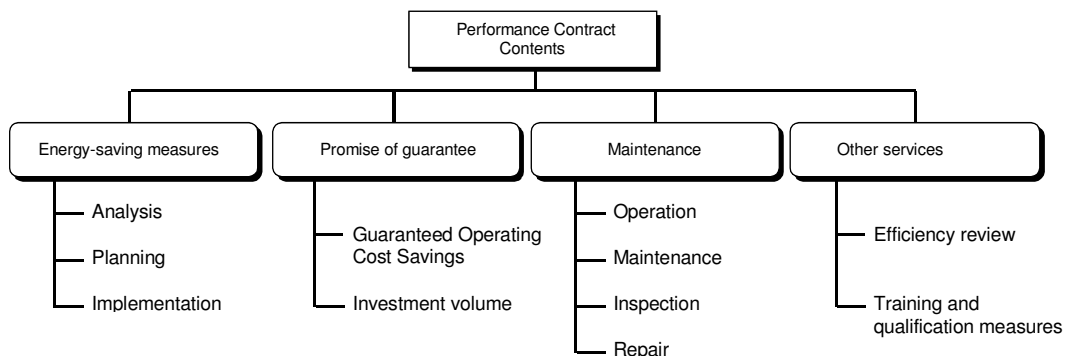
## 10.3 Final result

If one and the same offer turns out to be the best according to both financial and non-financial evaluation criteria, it should be selected as the winning one. If the two evaluation procedures give different results, all subjective criteria should be considered in detail.

# 11 Saving Guarantee Contract

This contract serves as a contractual framework for the implementation of Saving Contracting models. Since Saving Contracting is a comprehensive concept ranging from the planning of measures via their implementation to guaranteeing the cost-saving results, the contract regulates a whole series of services.

The analysis, planning and implementation of saving measures, including a permanent guarantee of the saving effect, are the central services contained in the Saving Guarantee Contract like the following figure:



In general, it is recommended that the contract that is to be used as the basis for the Saving Contracting project is always drafted by the client himself, and that tenderers are then invited

to submit their offers on the basis of this contract. In the course of the final negotiations, individual items of the contract can then be adapted or specified.

Even though each project must be adapted to the relevant project environment as well as to the client's specific interests and situation, this model contract can serve as a valuable standard tool and can provide the client with useful information and assistance.