



# Guideline for Saving Contracting in Street Lighting

*Short version*



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# 1 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.

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.

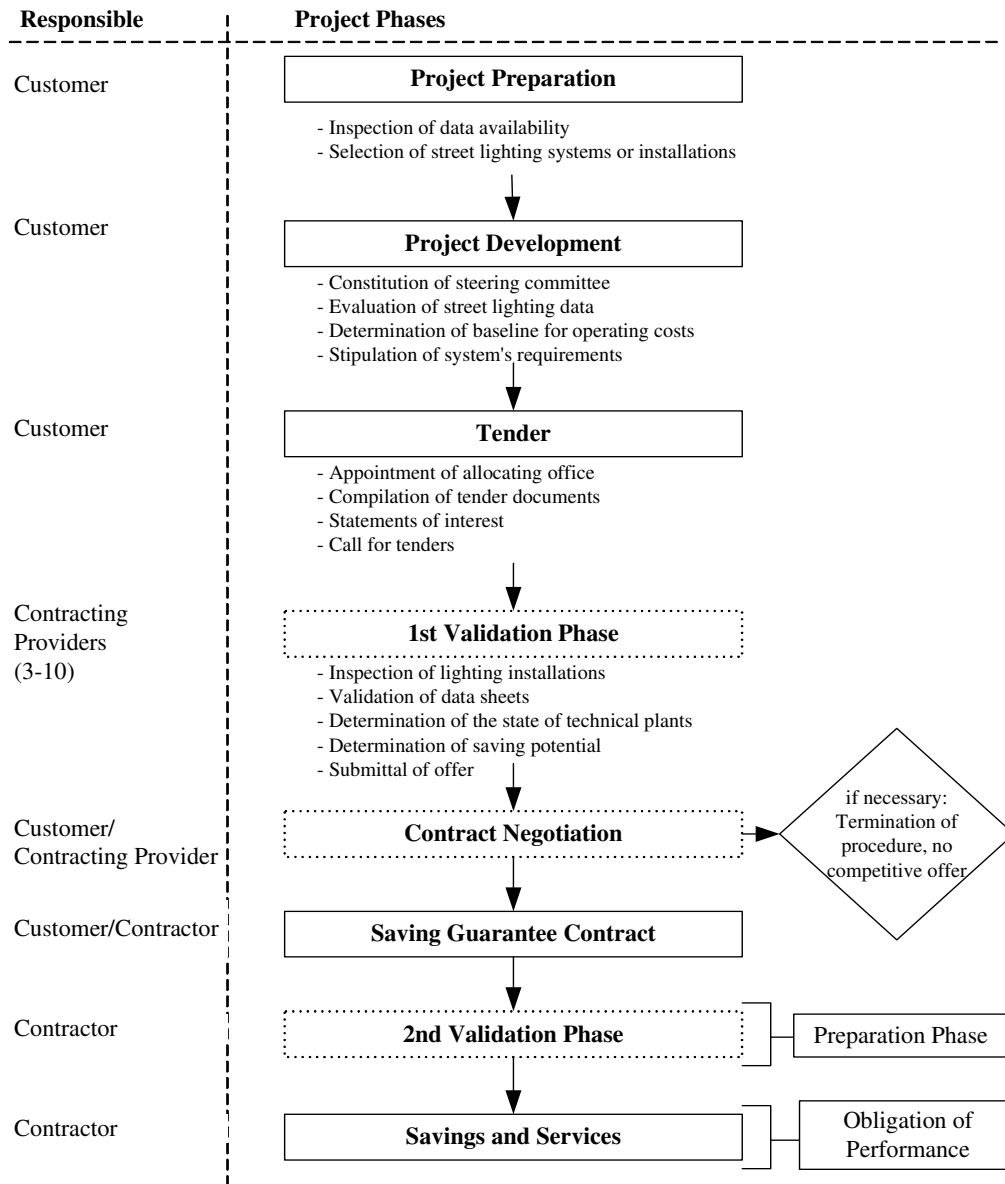
The client compiles the tender documents with the *Saving Guarantee Contract* as a main component. The next step is publication in the official gazette, other official publications for public contracts and above all in special databases. Prospective bidders may then express their interest and those apparently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

## 2 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. 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.

Table 1: Specific Indicators of Street lighting

Indicator	Bad values	Actual average values	Desired values after renovation
Luminous efficacy [lm/W]	< 60	50 – 80	90 – 120
Nominal lifetime [h]	8000	15000	18000
Failure rate after 16,000 h [%]	30	15	5 – 10

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.

#### Which requirements have to be fulfilled for an economical Saving Contracting?

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

## 3 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:

### 3.1 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.

### 3.2 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.

### 3.3 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.

### 3.4 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.

### 3.5 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 cost savings
- Longer contract duration
- Combination of Saving Contracting and energy supply contracting

## 4 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.

### 4.1 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.

## 4.2 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

## 5 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.

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.

## 5.1 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 Contracting 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<sub>t</sub> saving in the year t  
i interest rate (e.g. 0,06 for 6 %)  
t<sub>v</sub> 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**):

Table 2: Cost-benefit Analysis for Saving Contracting

criteria		assessment											Weigh- ting	points				
		0	1	2	3	4	5	6	7	8	9	10						
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	

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 cost-benefit 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 coarser, 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

## 5.2 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.

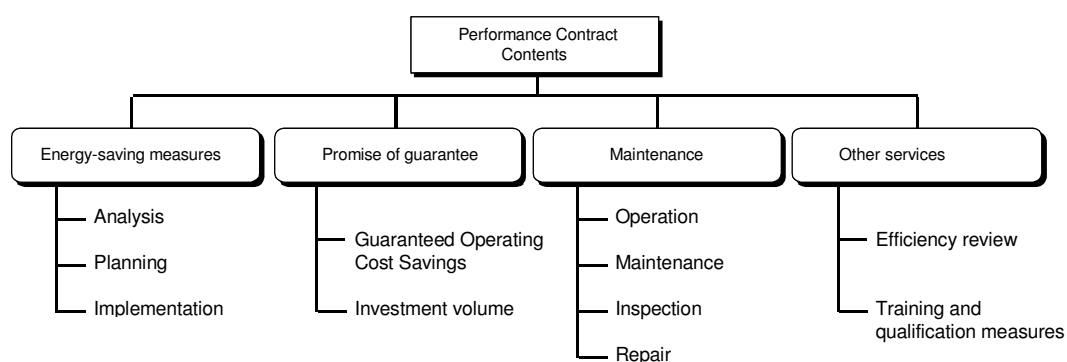
### 5.3 Final result

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.

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