

**STEPPING - Supporting The EPC Public Procurement IN Going-beyond**

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# EPC Investment Plans for public buildings

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**STEP UP TO ENERGY EFFICIENCY !**

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## INTRODUCTION

In order to launch a tender procedure for energy- saving of public buildings with EPC contracts , it is necessary to define an investment plan.

Financial planning is the process of preparing a comprehensive, organized, detailed and personalized investment plan that guarantees the achievement of previously determined financial targets as well as the periods, costs and resources needed to make the investments feasible.

In EPC contract the energy refurbishment work can be funded – partially or totally - either by the ESCO or by the owner of the buildings (Public Authority).

In the first case the financial scheme is based on Third-Party Financing, meaning that the ESCo shall make the capital available as equity, or be financed by a third party institution, or implement both solutions. Even in this case the PA will pay to the ESCo a fee that is proportional to the actual achievement of energy performance goals, but the fee have to be defined in a way that it is, in a given contractual timeframe, to repay the investments and reward the management service provided. In the case that the energy supply is also included, the fee should take into account this cost, too. Even in this case the performance risk has to be clearly borne by the ESCo with different level of earnings in case of under and over performance.

In the second case the investment are in charge of the Public Authority (PA), as owner of the buildings. In this case the ESCo will be asked to run the operational management (O&M) of the building and will be committed to respect an energy-saving performance. Furthermore the ESCo will be rewarded on the basis of the results achieved. The contractual requirement must therefore put in place a payment mechanism which is directly linked to the achievement of the contractual performance (in terms of energy savings). In the case of over-performance the ESCo will earn more, but in case of under-performance the ESCo will record a loss. The performance risk has to be clearly borne by the ESCo. Furthermore in case of under-performance the ESCO undergoes a penalty, clearly set in the contract.

In both cases, prior to the formalization of the EPC contract with ESCO, it is necessary to define an investment plan with the aim to achieve the required energy savings.

In order to define an investment plan the following steps are need:

- Select the buildings
- Draft energy audits

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- Define Baseline in terms of energy consumptions, energy savings targets, energy costs, level of performance (e.g. number of hours when the service must be guaranteed, spaces/volumes to heated, etc..)
- Define the possible interventions according to the energy audits outcomes (e.g. insulation of the envelope, installation of renewable energy sources, retrofit of heating systems, etc..) and quantify the relative costs
- Simulate a financial and economic plan.

Hereafter each step will be shortly described.

## SELECT THE BUILDING

The P.A. are owners of a different type of buildings (schools, gym, office etc.) normally characterized by a lot difference: time period of constructions, technologies and materials used, level of energy consumption, need of energy efficiency.

The P.A. can define the energy efficiency potential of its estate thanks to a soft energy audit analysis, at the end of this activity is possible determine a list of priority in order to define which buildings need of implement energy efficiency measures by a EPC.

During the soft energy audit a set of energy performance indicators will be verify, like:

- Total thermal energy consumption
- Total electric energy consumption
- Total primary energy consumption
- Electric load for day, month or year
- Ratio between primary energy consumption and total heating volumes
- Ratio between primary energy consumption and floor area
- other

The indicator values obtained by this analysis have to be compared with benchmark in order to understand the feasibility of the energy refurbishment.

The benchmark values will be defined by the energy auditors, and depend by different conditions:

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- whether conditions (e.g. day degree)
- energy prices
- fuel used
- other

## ENERGY AUDIT

According to the European Standard EN 16247-2 the energy audit can help a PA to identify opportunities to improve energy efficiency. The energy audit is a buildings preliminary examination composed by on-the-spot surveys and measurements, assessment of physical and dimensional characteristics of external wall insulation systems, HVAC system, internal and external lighting system etc.

An energy audit is a systematic process having the purpose to assess the final use of energy in a building and recognize and analyze any inefficiency and critical issues in the building itself and in the existing systems under real operating conditions. The process includes economic analysis and assessments of energy consumption and is aimed at identifying opportunities to reduce energy requirement and evaluating cost-effective measures for energy refurbishment.

A reliable energy simulation model must be set up and then be validated by comparing theoretical energy requirement and actual consumption. The simulation model can help to establish the theoretical consumption of primary energy for heating and cooling, ventilation, hot sanitary water, lights, office equipment, and other devices. Next step is a bottom-up process aimed at validating the model by reversing the procedure and verifying input data by comparing theoretical requirement and actual consumptions, and finally making any necessary adjustments to ensure that the two data are consistent. If the deviations found are below 10% for all the years under consideration, the model is deemed to correctly simulate the behavior of the building.

## BASELINE

To conduct a technical-economical assessment of any potential measures required to enhance energy efficiency in the building, an energy “baseline” must to be created.

The energy baseline could be defined by the sum of different baselines which represent the energy consumption of different uses (thermal, illumination, etc), the baseline values refer to average data normalized on specific condition. The energy baseline for thermal consumption could be calculated by applying average monthly temperatures of the seasons under consideration to obtain the average

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consumption for each season. The creation of a “baseline” for energy consumption and costs is a crucial step in the process of identifying existing critical issues and potential opportunities for savings and investment, and consequently defining technical and economic requirements for the tender.

Energy and cost baseline, defined by assessing:

1. actual consumption as extrapolated from energy bills (thermal and electric consumptions) or by specific meters;
2. real climate data provided by the nearest climate stations in the building area
3. calculation of Heating and Cooling Degree Days for the conditioning
4. internal temperature of the building rooms as extrapolated from specific meters;
5. hours and days of use of HVAC systems
6. heated and/or cooled volumes
7. hour of use of internal and external light.
8. energy supplies cost
9. O&M cost
10. Other

All the baselines have to be defined by the average of at least three year (or season) data.

## INTERVENTIONS

The Energy Audit shall identify energy efficiency improvement opportunity on the base of:

1. the building's and technical system age, condition, and how they are operated and maintained
2. the technology of existing systems and equipment in comparison to the best available technology
3. energy savings performance achievable
4. best practice.

For each proposed energy efficiency measure, the annual energy savings generated and the costs to realize it will have to be quantified. Then a pay back time analysis will have to be carried out for each intervention with the aim to define a list of priorities.

Measures with a lower pay-back time will be considered priority over measures with higher pay-back times.

The list of priority energy efficiency targets should be considered as the basis of the investment plan, however, so that this can be confirmed and validated, a financial and economic simulation that takes into account all cash flows during the investment period considered, will have to be carried out.

## FINANCIAL AND ECONOMIC PLAN

A financial and economic simulation must be carried out in order to verify the feasibility of the investment plan based on the results of the energy audits. This activity is essential in the case that the investment is implemented directly by the ESCo with equity or by third party financing. In the following description only this case is taken into account.

The financial and economic plan contains a simulation of interventions with the aim to evaluate the financial sustainability under the conditions to be set in the EPC. In relation to interventions to be implemented by the ESCO, the approaches can be 2: in some cases the local authority sets mandatory interventions the ESCO has to implement (and the ESCO is requested to offer also additional improvements in order to meet the energy saving % established in the contract). This approach takes generally into account both the refurbishment needs of the local authority as well as available financial resources. The second approach foresees to make a very detailed energy audit in order to calculate a quite precise energy saving potential to be reached and to be established in the contract, but then it leaves total freedom to the ESCO on the choice of the interventions to be undertaken.

The financial and economic plans have to be elaborated under the perspective of an ESCO considering the market condition at the timeframe of the contract.

The analysis represents also a simulation of an EPC, including all typologies of intervention that an ESCO could implement, in order to verify the financial feasibility in the given structure of the contract:

1. O&M requirements (level of quality of the standards)
2. energy saving targets
3. contract duration.

The typologies of intervention simulated in the financial and economic plan came from the result of the energy audit and could be for instance: fuel price saving (if supply is included), intervention on energy equipment, structural intervention, energy saving, and other.

Since the energy saving has been determined by the energy audit, the financial and economic plan aims to define the minimum condition of the EPC contract:

1. Minimum contract period so that the financial sustainability for the ESCO could be respected.
2. Minimum energy saving compared to the historical baseline
3. Minimum cost saving compared to the historical baseline.

In order to define these minimum conditions of the EPC contract the following financial and economic indicators must be calculated:

1. Net present value NPV : difference between the present value of cash inflows and the present value of cash outflows. NPV should be used in business case to analyse the profitability of a projected investment.
2. Internal Rate of return IRR: used in the business cases in order to measure the profitability of potential investments. Internal rate of return is a discount rate that makes the net present value NPV of all cash flows from a particular project equal to zero. IRR calculations rely on the same formula as NPV does. Generally it should be higher than 6%.
3. Net profit: calculated as the ratio between NPV and costs. The Financial and economic plan reports the hypothetical cash flow of an ESCO involved in the EPC contract. Every Financial and Economic Plan could be validate when the net profit is more than 25%.

In order to calculate the financial indicators an ESCO cash flow must be simulated.

This analysis have to simulate the incomings and outgoings of cash, representing the operating activities of an ESCo specifically on the EPC contract. In accounting, cash flow is the difference in amount of cash available at the beginning of the EPC contract period (opening balance) and the amount at the end of that period (closing balance). It is called positive if the closing balance is higher than the opening balance, otherwise called negative. In these cases the Cash flow can be increased by improving energy saving, reducing fuel and energy costs, reducing investment cost, reducing financial cost, taking incentives, bringing more equity.

In order to simulate the ESCO cash flow and calculated the financial indicators several outgoing and incoming data must be considered

Outgoings costs:

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1. administrative and management
2. works
3. energy
4. operation & maintenance
5. financial (mortgage payment)
6. professional (designer, construction manager).

An important aspect to be taken into account in an cash flow analysis and in particular in the professional cost is the need to continuously monitoring the actual energy saving results (e.g. through the IPMVP tool). This means that the Investment Plan should also take into account from the very beginning of the project the necessary financial and human resources to carry out this crucial activity.

Incoming data:

1. incentives schemes for RES or energy efficiency
2. fee
3. loans
4. energy production
5. equity

With the aim to verify the financial sustainability of the call for EPC tender, the financial and economic indicator have to be calculated. The duration of the contract has to be determined on the basis of the interventions that have a longer payback time that are to be included in the list of envisaged interventions.

The scenario considered optimal as result of the financial and economic simulation determines the value of the potential investment and consequently the investment plan.

Public funding programmes could be take into account in order to enhance the investment plan, for instance ERDF programme could help this kind of operations increasing the public equity. A combination of funding (soft loan + grant) and financial engineering instruments, useful to improve the access to credit for small and medium enterprises could be activated thanks to a ERDF.

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## MAIN INDICATORS FOR INVESTMENT PLAN ASSESSMENT

In order to compare the different investment plans or investment scenario, it is necessary to use a scheme of indicators that can highlight the main results of each plan. Besides of a general description of the buildings included in the investment plan (for example location, type of use, photographs, etc..), the following list of indicators can be taken into consideration.

No. of Municipalities/Public Bodies involved	
No. of buildings (bundled EPC)	
Degree Days	
Heated volume (m <sup>3</sup> )	
Usable area (m <sup>2</sup> )	
Total Investments needed (€)	
Loan by the Public Body? If yes, amount (€)	
Available public funding/incentives considered (€)	
VAT (%)	
Energy vector included? If yes, related value (i.e. €/smc of natural gas and or €/kWh)	
O&M included? If yes, related value (€)	
Typology of ERMs - Energy Renovation Measures (description)	
Energy saving (%)	
kWh ANTE and kWh POST implementation ECMs (not standard but resulting from the energy audits)	
Avoided CO <sub>2</sub> emissions (kgCO <sub>2</sub> /y)	
Contract duration envisaged (Years)	
Yearly fee (€/y), possibly with details on how it is split out	

On the basis of the above list, additional financial indicators can be calculated, such as: Internal Rate of return IRR, Net Present Value and Net profit.

It is recommended the investment plan for the promotion of EPC in public buildings and is incorporated in an energy concept endorsed by P.A. (e.g. SEAP developed by covenant of mayors, see the handbook).

## BACKGROUND CONDITION

Eurostat, the Statistical Office of the European Commission, has published at 19 September 2017 an updated guidance note on the recording of energy performance contracts (EPCs) in government accounts.

This note is mainly intended to provide statisticians with guidance on the recording of Energy Performance Contracts (EPCs) in government accounts. The note is in accordance with the most recent interpretation of the relevant ESA 2010 provisions by the Excessive Deficit Procedure Statistics Working Group (EDPS WG). This guidance note substitutes the previous guidance note on the impact of Energy Performance Contracts on government accounts published on 7 August 2015. Eurostat is releasing this guidance note to ensure an adequate accounting treatment of EPCs as well as to ensure a homogenous statistical treatment across countries.

For more information: [http://europa.eu/rapid/press-release\\_IP-17-3268\\_en.htm](http://europa.eu/rapid/press-release_IP-17-3268_en.htm)

It is recommended the investment plan for the promotion of EPC in public buildings and is incorporated in AN energy concept endorsed by P.A. (e.g. SEAP developed by covenant of mayors, see the handbook).

A good practice is to organize workshop or round tables with local ESCo before the launching tender procedure because in this way is possible evaluate the financial sustainability and technical conditions with the market operators