



STEPPING

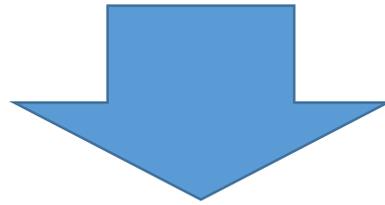
*Supporting The EPC Public Procurement IN
Going-beyond*

Module 3 – Energy Audit



The proposed Energy Conservation Measures

An energy audit is an examination of a building for energy efficiency improvement purposes. Through analysis of energy usage, building characteristics, weather data, and the typical usage of the building, an energy audit uncovers energy conservation opportunities. These measures are then assessed to identify savings, improve the quality of life within the building and provide environmental benefits.



Which measures can be implemented in order to improve the energy efficiency of a building?

The answer to this question is simply an accurate energy audit to be carried out by an expert within the public building itself or by an external reliable organisation (EPC facilitator), possibly different from the ESCO in charge of the implementation of those measures.



The energy audit must take into account the following factors

- *Credibility*: the actual data should be acquired in number and quality necessary for the development of the energy inventory of the Energy System; energy consumption must be consistent with the billing and/or with the findings of the measuring equipment;
- *Completeness*: the energy system described should cover significant energy aspects (uses);
- *Traceability*: there must be an energy inventory with the identification of the origin of the data, how to process such and the procedures employed in the energy audit;
- *Utility*: measures to improve energy efficiency must be identified and assessed in terms of cost/benefit. Improvements must be expressed and properly documented according to the sector, the purpose and scope;
- *Verifiability*: the elements that allow the client to verify the attainment of energy efficiency improvements resulting from the application of the proposed actions must be identified.



Source: jamiesarner.com



In Italy....

The carrying out of the audit of buildings is currently regulated by the Italian Unification Body through two different standards, which are fully in force: the European standard EN 16247-2:2014 and the Italian standard UNI CEI / TR 11428:2011 (applicable to any sector subject to energy audit).

The objectives of the energy audit are:

- Streamlining the flow of energy;
- The recovery of lost energy;
- The identification of technologies for energy saving;
- The optimization of energy supply contracts;
- The management of the technical and economic risks;
- The improvement in the method of Operation and Maintenance (O&M).



In Italy....

The Italian Law 115/08 defines the building energy audit as:

*"... A systematic procedure to obtain adequate knowledge about the energy consumption of a building or group of buildings, a business and / or industrial or public or private facility, to **identify and quantify the energy savings and the cost-effective opportunities and to report the results.**"*

The audit is normally developed according to three consequential stages :

- an **initial screening** for a macro evaluation,
- a **detailed analysis** supported by calculations made by software from specific technical and field measurements (thermography measures heat flow , etc.),
- a **final report** with the preliminary indication of the possible ECMs to improve energy efficiency, the related costs, the economic and environmental benefits, ROI, energy class obtained, possibly highlighting everything according to different scenarios.



In Italy....

- The energy performance contract Energy Service Plus, provides for additional performance as compared to the "Energy Service" contract, "the reduction in the primary energy index for winter heating by at least 10% compared to the index shown in the certification "... and to be prepared in the manner specified by the "Energy Service", and thus charged to the client... "through the implementation of structural upgrading of energy efficiency of the plants or of the building's shell that are shown above and aimed at improving the process of the transformation and the use of energy".
- "The index of primary energy for winter heating" shown in the documented certification is not the "Real consumption" of the building, but rather its "requirements", *i.e.* the amount of energy required to maintain the internal temperature of a building or an apartment to the "assigned temperature", typically 20°C, regardless of the occupation of the premises and the actual operating mode of the plants. A building, for example, depending on its specific type of use, may submit a "Primary Energy Index" which is even 30% or 40% greater than the actual consumption.
- It is therefore convenient to pay attention to the values reported in the Energy Performance Certificates (EPC) and the correspondence between demand and consumption; in this sense, the baseline consumption should be based on the actual consumption of the building (*e.g.* the "energy signature") and the calculation of energy savings for the redevelopment should be based on percentage ratios (*ex ante* and *ex post* interventions by the use of software recognized by CTI).



In Italy....

- The choice of "**mandatory**" **energy-saving actions** and of those which are "optional" is based on the results of the energy audits; normally the most cost-effective actions are included as mandatory, while those that pay off in a longer time are included as optional so as not to prejudice the success of the tenders and in order to leave some degrees of freedom in the potential of the market.
- Thus one outlines the structure of the tenders: a trial of comprehensive energy service including supply and maintenance, of which the baseline consumption has been reduced due to the mandatory interventions required by energy audits.
- It is clear that in order to handle this type of contract, **the methodology for monitoring, verification and reporting of results** will be a key point of the specification.



In Italy....

An ***accurate energy baseline*** is crucial in determining the amount of savings that could be available in an EPC. ESCOs will usually conduct their own baseline analyses, but it is beneficial for the municipality to have a picture of current consumption before proceeding further.

- *MassEnergyInsight (MEI)* is a great tool to develop an energy baseline for municipal buildings. A variety of reports relevant to ESPCs can be generated directly from its dashboard.
- Fact-check all utility accounts, such as electric and gas, to ensure that the information is up to date. Municipalities often find themselves still being charged for old or closed accounts. Upload other fuel data (heating oil, propane) as necessary.
- Ensure a complete building inventory by adding useful information such as surface, year of construction, completed upgrades/retrofits, and number of occupants, if available.



In Italy....

The actions proposed, based on the payback analysis, provide different options such as:

Operations Management:

- Information and sensitization of staff,
- Changing the way of maintenance,
- Changing the mode of acquisition of goods and services,
- Energy Management System Certification according to ISO 50001.

Technological Measures (Structural and Plant):

- Reduction of heat input on the windows through solar films,
- Redevelopment of the heating and cooling systems,
- Upgrading of the indoor and outdoor lighting,
- Installation of automation controls,
- Installation of photovoltaic systems, and others RES.

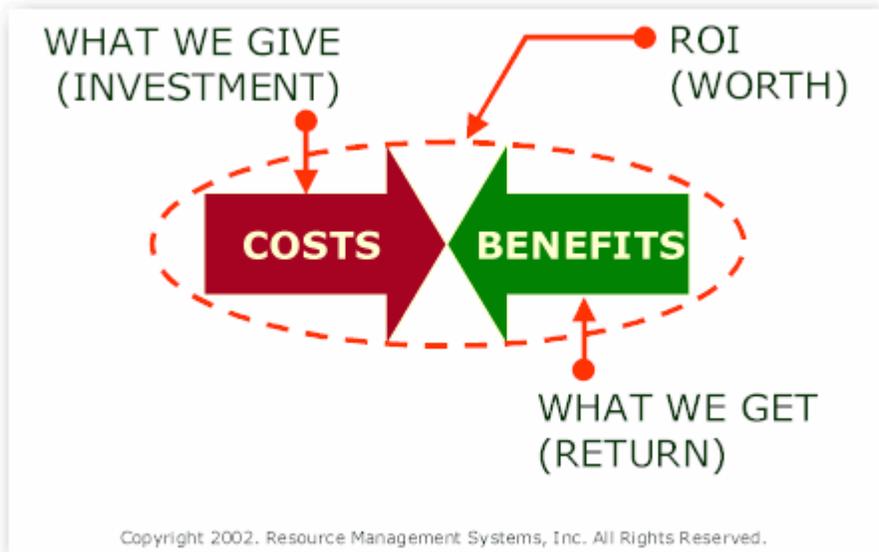


Investment Grade Proposal

It is in the early stage of an EPC process that is recommendable to assess the capital investment needed for implementing all the ECMs suggested by the energy audit. Either through available resources from the Public Body itself, from available private/public subsidies/grants/funds or from third party financier (ESCO, bank, etc).

→ Here it comes the so called ***Investment Grade Proposal***

Investment Grade Proposal explores the viability of the EPC and gives you a business case that captures savings, costs, risks and wider benefits.



Investment Grade Proposal

- It can be the awarded ESCO to complete the investment grade proposal through an *Investment Grade Audit* that will include an analysis of each proposed project with projected savings and itemized project costs. The ESCO will present a project proposal that includes recommended measures, financing term and projected annual cash-flow analysis. The ESCO can also propose different options. These results can form the basis for negotiating a subsequent EPC contract.
- In most private and public settings, upgrades to a facility's energy infrastructure must compete for capital funding with non-energy-related investments. Both energy and non-energy investments are rated on a single set of financial criteria that generally stress the expected **return on investment (ROI)**. The projected operating savings from the implementation of energy projects must be developed such that they provide a high level of confidence. In fact, investors often demand guaranteed savings.
- The investment-grade audit expands on the detailed audit described above and relies on a **complete engineering study** in order to detail technical and economical issues necessary to justify the investment related to the transformations.



End of Module 3

