SISMA – Supporting Innovative Schemes in the MED Area

Priority Axis 2. Fostering low-carbon strategies and energy efficiency in specific MED territories: cities, islands and rural areas.

Specific Objective 2.1. To raise capacity for better management of energy in public buildings at transnational level.

"Deliverable 3.4.1 SISMA Models"

THE SISMA Model

the SISMA Model and the SET Tool can be downloaded

upon registration at:

https://sisma.interreg-med.eu/index.php?id=8891

Activity **3.4 Development of SISMA Models**

Work Package **3 – Studying**

Author: PP6 – APE FVG

Partners involved: all Partners

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1. INTRODUCTION

1.1 The SISMA project

SISMA aims to develop innovative financing schemes that leverage European Structural Funds and other public funds available to regional or local administrations on private financial resources to finance investment projects that lead to deep energy retrofit of public buildings.

SISMA aims at providing a better insight into EPC and innovative financial mechanisms as well as developing models and training to increase know-how and confidence of local stakeholders and beneficiaries. Key priority is to fill in the existing gap between the demand of innovative energy services (EPC) and their suppliers (ESCos), at the same time connecting relevant stakeholders and beneficiaries into networks.

1.2 Legislative framework

According to the Energy Efficiency Directive (EED): "**energy performance contracting** means a contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, verified and monitored during the whole term of the contract, where investments (work, supply or service) in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed energy performance criterion, such as financial savings".

Under an EPC arrangement an external organisation (ESCO) implements a project to deliver energy efficiency, or a renewable energy project, and uses the stream of income from the cost savings, or the renewable energy produced, to repay the costs of the project, including the costs of the investment. Essentially the ESCO will not receive its payment unless the project delivers energy savings as expected.

The approach is based on the transfer of technical risks from the client to the ESCO based on performance guarantees given by the ESCO. In EPC, ESCO remuneration is based on demonstrated performance; a measure of performance is the level of energy savings or energy service. EPC is a means to deliver infrastructure improvements to facilities that lack energy engineering skills, manpower or management time, capital funding, understanding of risk, or technology information. Cash-poor, yet creditworthy customers are therefore good potential clients for EPC.

EU legislative framework

ID	Title	Key points	Remarks
2012/27/EU	**Energy Efficiency Directive - EED**	Establishes a set of binding measures to help the EU reach its 20% energy efficiency target by 2020. Under the Directive, all EU countries are required to use energy more efficiently at all stages of the energy chain, from production to final consumption. EED sets national	On 30 November 2016 the Commission proposed an update to the Energy Efficiency Directive including a new 30% energy efficiency target for 2030, and measures to update the Directive to make sure the new target is met

		energy efficiency targets, taking into account national circumstances (Article 3) Draw-up long-term national building renovation strategies which can be included in their National Energy Efficiency Action Plans (Article 4) Make energy efficient renovations to at least 3% of buildings owned and occupied by central government; only purchase public buildings which are highly energy efficient (Article 5) Promote high quality, cost effective audits to SMEs, and ensure that large companies are subject to regular energy audits at least every four years (Article 8) EU governments to ensure that competitively priced individual meters are provided to customers of electricity, gas, and district heating and cooling; building level and individual meters must be installed in multi-occupancy buildings with central heating or district heating and/or cooling or hot water (Article 9) Ensure the availability of certification, accreditation and/or qualification for	

		providers of energy audits and energy managers (Article 16) Promote the energy services market and support it by providing information on available energy service contracts, financial instruments and incentives (Article 18) Evaluate and remove regulatory and non-regulatory barriers to energy efficiency, and take measures to remove these – this includes the issue of split of incentives between building owners and tenants (Article 19)	
2010/31/EU	**Energy Performance of Buildings Directive - EPBD**	It is the main legislative instrument addressing energy use and efficiency in the EU building sector. It tackles both new construction and existing building stock in all sectors and sets a clear vision for a decarbonised building stock by 2050. Energy performance certificates are to be included in all advertisements for the sale or rental of buildings EU countries must establish inspection schemes for heating and air conditioning systems or put in place measures with equivalent effect All new buildings must	On 30 November 2016 the Commission proposed an update to the Energy Performance of Buildings Directive. This proposal will update the EPBD by: -integrating long term building renovation strategies (Article 4 of Energy Efficiency Directive), supporting the mobilisation of financing and creating a clear vision for a decarbonised building stock by 2050; - encouraging the use of ICT and smart technologies to ensure buildings operate efficiently; - streamlining provisions where they have not delivered the expected results

		be nearly zero energy buildings by 31 December 2020 (public buildings by 31 December 2018) EU countries must set minimum energy performance requirements for new buildings, for the major renovation of buildings and for the replacement or retrofit of building elements (heating and cooling systems, roofs, walls, etc.) EU countries have to draw up lists of national financial measures to improve the energy efficiency of buildings	

The project comprises partners from 5 EU Member States and 1 IPA country and each of them is at a different stage of EPC development. The following table provides insights on the current legislative framework enforced at participating countries' level, both in terms of transposition of EU law into national law and application of relevant national legal provisions.

SISMA participating countries legislative framework

Country	N°	Title
SLOVENIA	No 310-01/06-8/1 Ljubljana, 23 November 2006 EPA 868-IV	Act published on the Official Gazette of the Republic of Slovenia. 1.PUBLIC-PRIVATE PARTNERSHIP ACT (ZJZP)
SPAIN	Real Decreto 235/2013	Transposition of Energy Performance of Buildings Directive
	Real Decreto 56/2016	Transposition of EU Energy Efficiency Directive
	Real Decreto 314/2006	Spanish Royal Decree which establishes basic technical standards of buildings and its facilities in order to fulfil requirements of energy saving among others.
ITALY	D.Lgs. n. 102/2014	Transposition of EU Energy Efficiency Directive
	Legge n. 90/2013	Transposition of Energy Performance of Buildings Directive
	Decreti Ministeriali 26/06/2015	Italian Ministerial Decrees about minimum requirements for the energy performance of buildings (including application of calculation methodology, reference guidance for the project technical report, adaptation of national guidelines for the energy assessment of buildings)
	Codice Appalti D.Lgs 50/2016	Italian Public Procurement Code
FRANCE	Directive 2006/32 (5th of April 2006)	Concerning building energy efficiency for energy service. Define EPC as an agreement between a beneficiary and a service provider to improve energy efficiency
GREECE	Law 4122/2013	Transposition of Energy Performance of Buildings Directive (recast)
	Law 4342/2015	Transposition of EU Energy Efficiency Directive
	Ministerial Decision 178581 - July 2017	Greek Ministerial Decision about new Regulation of energy efficiency in buildings including new minimum requirements for the energy performance of buildings
BOSNIA AND HERZEGOVINA	Official Herald RS n° 59/13	Law on energy efficiency
	November 2011 BiH	Rulebook on methodology for calculating energy characteristics of buildings Rulebook on minimum requirements for energy performance of buildings
	Official Herald RS n° 106/15	Law on spatial planning and construction RS

1.3 Acronyms

SET **Subsidy Evaluation Tool**. An Excel® tool developed within the SISMA project in order to facilitate the assessment of the economic return on investments in energy efficiency and, in particular, to determine the minimum amount of public subsidy needed to make an investment bankable (yielding a minimum interest rate that equals the one required by the market for projects with a similar risk reward profile).

PPP **Public-Private Partnerships (PPPs)** are long-term contracts between two units, whereby one unit acquires or builds an asset or set of assets, operates it for a period and then hands the asset over to a second unit. Such arrangements are usually between a private enterprise and government but other combinations are possible, with a public corporation as either party or a private non-profit institution as the second party (ref.: article 15.41 of Regulation (EU) N° 549/2013).

ESCo **Energy Service Company**. Natural or legal person who delivers energy services or other energy efficiency improvement measures in a final customer's facility or premises (as defined by EED) (ref. Transparense – Increasing Transparency of Energy Service Markets)

ESP **Energy Service Provider**. Natural or legal person who delivers energy services or other energy efficiency improvement measures in a final customer's facility or premises (ref. UNI CEI EN ISO 50001)

EPC **Energy Performance Contract**. A contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, verified and monitored during the whole term of the contract, where investments (work, supply or service) in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed energy performance criterion, such as financial savings (ref. Directive 2012/27/EU)

ECM **Energy Conservation Measure**. Measure implemented in order to reduce energy consumption.

ES **Energy Savings**. Amount of saved energy determined by measuring and/or estimating consumption before and after implementation of an energy efficiency improvement measure, whilst ensuring normalisation for external conditions that affect energy consumption (as defined by EED)

EMS **Energy Management System** set of interrelated or interacting elements to establish en energy policy and energy objective, and processes and procedures to achieve those objectives.

ICP **Investor Confidence Protocols**.The Investor Confidence Project (ICP) provides a framework for energy efficiency project development, which standardises projects into verifiable project classes in order to reduce transaction costs associated with technical underwriting, and increase reliability and consistency of energy savings. The ICP Efficiency Project Framework enables a clear definition of the complete process necessary to ensure performance from initial audit through ongoing commissioning and M&V(ref. ICP Project Development Specification)

IREE **Investor Ready Energy Efficiency**. Assures investors that a project conforms to ICP Protocols, has standard documentation, and has been verified by a

certified third party. Therefore investors can rest assured that the project has been engineered to consistent industry best practices.

PD **Project Developer/Development team**. An accredited Project Developer/development team responsible for developing a project based on sound engineering principles and best practices, utilising industry standard approaches for the development of each component of the project in complete compliance with the procedures and documentation requirements presented in the ICP Protocols. The Project Developer must be ICP accredited, and only projects with an ICP accredited Quality Assurance Provider are able to receive IREE certification.

QA **Quality Assurance Provider**. The Certified Quality Assurance Provider must be a third party to the project developer, and is responsible for reviewing the outlined components and project documentation to ensure the specifications laid out in the PDS (PDS Project Development Specification) are met.

EnPI **Energy Performance Indicator**. Quantitative value or measure of energy performance, as defined by the organisation

EnB **Energy Baseline**. Energy consumption over a specified period providing a basis for comparison of energy performance, before and after implementation of ECMs. The baseline is usually normalised against variables affecting energy consumption (ref. ICP Project Development Specification)

AF **Adjustment Factors.** There are three types of adjustments:

- ***Non-Routine adjustment***: individually engineered calculation to account for the energy effects due to changes in the static factors within the measurement boundary;
- ***Routine adjustment***: individually engineered calculations to account for the expected change in energy consumption or demand due to changes in the Independent Variables within the measurement boundary;
- ***Static Factor***: those characteristics of a facility which affect Energy consumption and Demand, within the defined Measurement Boundary, that are not expected to change, and were therefore not included as independent variables. If they change, Non-routine Adjustments need to be calculated to account for these changes. (ref. EVO 10000 – 1:2016)

IPMVP **International Performance Measurement and Verification Protocol**. Developed and managed by EVO Efficiency Valuation Organization, the IPMVP is a guidance document that provides a conceptual framework for measuring, computing, and reporting savings achieved by energy or water efficiency projects at facilities. It defines key terms and outlines issues that must be considered in developing an M&V plan.

M&V **Measurement and Verification**. process used to quantify the actual savings achieved, following the implementation of ECMs, and to determine whether they meet the predicted savings targets (ref. ICP Project Development Specification)

O&M **Operations and Maintenance**. Requirements needed to ensure persistence of performance and savings (service, corrective maintenance and preventative maintenance tasks, and associated schedule of these tasks) (ref. ICP Project Development Specification)

OM&M **Operations, Maintenance and Monitoring**. Involves the practice of systematic monitoring of energy system performance and instituting corrective actions to ensure "in specification" energy performance over time. Ongoing OM&M can be critical to the persistence of energy savings and is designed to:

- prevent building "drift" and provide sustained energy savings through long-term tracking and trending procedures;
- give end-users the ability to make informed, effective energy decisions;
- Allow for continuous fine-tuning of measures to ensure optimal operation;
- Protect investments in energy efficiency (ref. ICP OM&M Plan template)

OPV **Operational Performance Verification**. Process used to ensure that the implemented ECMs have been implemented properly and will have the ability to achieve the predicted energy savings during the M&V phase (ref. ICP Project Development Specification)

2. ENERGY EFFICIENCY INTERVENTIONS ON BUILDINGS

Sound energy efficiency interventions on buildings especially on envelopes and glazing systems generally require long payback times and yield low IRRs (Internal Rate of Return) thus financial indicators of EPCs for the energy refurbishments of buildings are on average below the minimum levels required by the market.
This is the reason why long term investments in building renovation through EPCs, especially in the MED countries, are not being implemented on a large scale.
The minimum IRR percentage "required by the market" is not a precise measure but rather an empirical figure based on the risk reward profile of these kind of interventions. In other words only direct contacts with ESCOs, financial institutions and other stakeholders can provide evidence of the market threshold in terms of the IRR which needs to be met to make a project bankable.
In the case that a specific project does not yield a sufficient IRR, calibrated public funding shall be needed (a subsidy in the form of a grant, debt etc.).
Project feasibility revolves around bankability and profitability, hence EPCs must provide an IRR that meets the market threshold.

2.1 Optimising funding for energy efficiency investment projects

The economic & financial assessment of a project goes beyond understanding whether an investment is convenient or not, it also provides a method to understand how to select the best investment in the case of different projects and different

financing schemes, and is always a fundamental support for the general understanding of the project.

Once cash flows related to an energy efficiency investment project (-Io Initial Investment, + CFj annual savings in the form of avoided costs from reductions in energy bills) have been assessed the IRR method involves finding the interest rate R which, used to discount the cash flows expected from the investment, will produce an NPV (Net Present Value) of zero where the total PV-Present Value of the sequence of cash inflows is equal to the present value of the cash amount invested.
The IRR therefore is that particular value of the discount rate R that makes a NPV (Net Present Value) equal to zero.

Formally:

$$\mathrm{NPV} = \sum_{j=1}^{n} \frac{\mathrm{CFj}}{(1+\mathrm{R})^{n}} - \mathrm{Io\,(Initial\ Investment)} = 0, \text{ when } \mathrm{R} = \mathrm{IRR}$$

in other terms, NPV is zero when:

$$\sum_{j=1}^{n} \frac{\mathrm{CFj}}{(1+\mathrm{IRR})^{n}} = \mathrm{Io\,(Initial\ Investment)}$$

One of the major problems with subsidies in general and specifically in the field of energy efficiency measures for buildings is calibrating their amount. Namely, if a subsidy is needed then it should be optimised (providing the minimum amount to make an investment financially feasible) and NOT based on a general flat rate, fixed percentage or defined as a certain amount of the energy measure investment. The fundamental question is how do we minimise subsidies in this context? A starting point is that the cost of a defined set of energy efficiency measures may be known in advance with reference to local standard costs. Baselines and savings from energy efficiency measures may also be calculated, as stated in the previous paragraph, what will really make a project financially feasible is its IRR (Internal Rate of Return) that MUST reach the market threshold.
Subsidies are minimised when their amount, given the total investment needed and all savings calculated over the considered period, enable the project to yield an IRR equal to the market threshold (IRR* minimum interest rate “required by the market”).
Coming down to basic financial maths, the optimal subsidy may be seen as the dependent variable that given all the other known values (Investment amount (-Io), CFj annual savings) makes the project’s NPV (Net Present Value) equal to zero.
Therefore, given the following values:

- **Io** (Initial Investment);
- **CFj** (annual savings for n years);
- **IRR*** discount rate = minimum IRR interest rate required by the market;

Then the minimum S (Subsidy) for project feasibility will have to make the project’s **NPV (Net Present Value)** equal to zero, formally:

$$NPV = \sum_{j=1}^{n} \frac{CFj}{(1+IRR^*)^n} - Io\,(Initial\ Investment) + S\,(Subsidy) = 0$$

That may also be written as:

$$S\,(Subsidy) = Io\,(Initial\ Investment) - \sum_{j=1}^{n} \frac{CFj}{(1+IRR^*)^n}$$

When $\sum_{j=1}^{n} \frac{CFj}{(1+IRR^*)^n} \geq Io\,(Initial\ Investment)$ then no subsidy is needed.

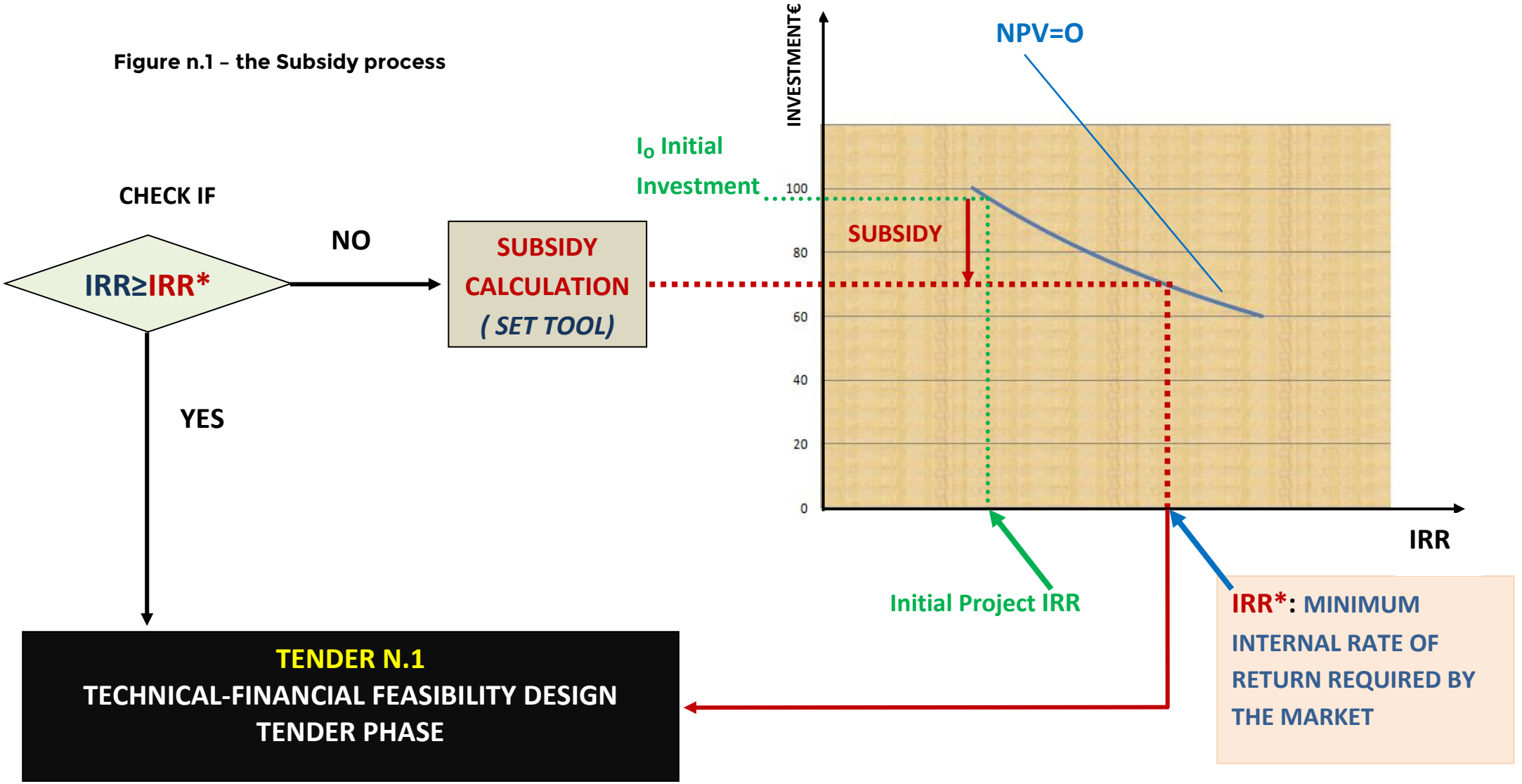
Cash flows stemming from an energy efficiency project are available and based on the technical characteristics of the ECM measures, market prices and on a sound baseline that leads to reliable savings. When calculating the project's IRR, if it is ≥IRR* then no subsidy is needed because the project is doing better than the minimum required by the market and any subsidy would be redundant
When evaluating a specific project, the subsidy calculation process may by summarised as follows:
start by calculating the project's IRR with the SET (Subsidy Evaluation Tool) spread sheet, as stated in the paragraph above, if IRR ≥IRR* then no subsidy is needed and it is possible to pass on to the next phase; if IRR is ≤ IRR* then a subsidy is needed, the optimised amount (that will make the project's IRR reach the IRR* minimum level) may be easily found in our SET spread sheet.

The subsidy is a total amount in Euro that may be provided through a single funding measure or as a combination of several financial instruments, that include one or more of the following funding possibilities:
- grants from local and national authorities
- European funds
- incentives: local and national
- technical assistance

Subsidies should not only cover investment expenses (intervention on the building with all the ECMs Energy Conservation Measures) but also:
- technical costs (building design and construction fees, building site security costs etc.);
- IREE - Investor Ready Energy Efficiency certification costs (implementation of an ICP-Investor Confidence Protocol that leads to an IREE certification, thus expenses for the ICP developer, Quality Assurance Provider, M&V - Measurement and Verification activities and other costs related to the IREE certification);
-VAT (Value Added Tax) in the case of public bodies that cannot recover VAT it should be considered as part of the total financial amount needed to complete the investment

Figure n.1 here below represents the logical framework of the subsidy process.

Figure n.1 – the Subsidy process



Public building owners using the SET (Subsidy Evaluation Tool) are able to carry out a general assessment of the project and optimise the subsidy amount when needed. What drives this new approach is the initial uncontroversial requirement coming from the market: a project is really bankable only if it is yielding an interest rate equal to the minimum interest rate required for projects with similar risk reward profiles. Before describing the other phases of the whole process, the major characteristics of this particular subsidy scheme should be outlined:

- public funding (subsidy) is specifically calculated for each building, this means that ECMs (Energy Conservation Measures) have to be carried out on a significant scale, in this scheme inaccurate funding methods such as flat rates, percentages etc. do not apply;
- the subsidy in this scheme is based on a calculation where costs of the ECMs (investment) are average local costs; annual savings in the form of avoided costs from reductions in energy bills are based on accurate baselines but remain an estimation; IRR* minimum interest rate "required by the market" is an empirical figure obtained directly by on field enquiries with ESCOs, financial institutions and other stakeholders; maximum financial leverage of funding is assured since subsidies are minimised;
- the owners of public buildings gain a sound technical & financial assessment of the project through data collection and the use of the SET (Subsidy Evaluation Tool) and therefore are in the condition of fully controlling the process through all its phases.

The subsidy therefore is a general project benchmark and cannot be tailored to specific technical/financial conditions of ESCOs, financial institutions and other firms involved in the tender (e.g. every operator has its mark-up, overhead and profit factor, specific equity/debt structure, technical expertise, debt service conditions, construction costs, scale economies, purchasing conditions etc., hence same ECM Energy Conservation Measures will have different costs according to the company that implements them).

Once the subsidy has been defined though the SET (Subsidy Evaluation Tool), the following objective is to have the complete technical/financial documentation specified in **Tender N.1 TECHNICAL-FINANCIAL FEASIBILITY DOCUMENTATION** that includes technical designs, an EPC model and an IREE (Investor Ready Energy Efficiency) Certification that assesses the initial compliance with the ICP-Investor Confidence Protocol together with all the documentation part of the Annexes. The above mentioned documentation shall be part of and defines **Tender N.2 ECM (Energy Conservation Measures) REALISATION**.

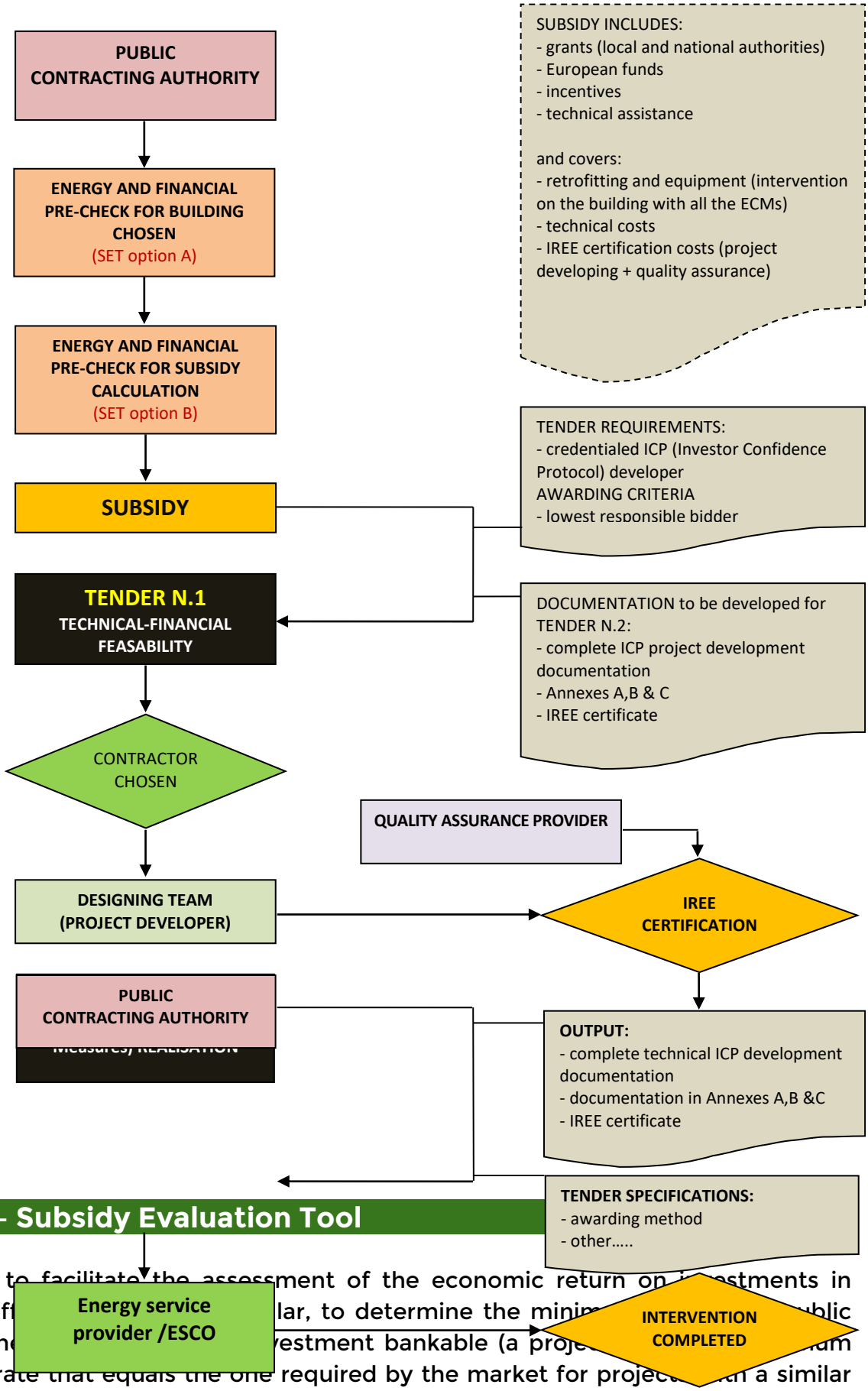
The major project milestones are:

1. **(Subsidy)** -> calculated with **SET** (Subsidy Evaluation Tool);
2. **(Tender N.1)** -> definition of all the technical-financial feasibility documentation;

3. **(Tender N.2)** -> intervention on the building with all the ECMs Energy Conservation Measures on the basis of the technical-financial documentation from Tender N.1.

The complete scheme follows in Figure 2 The Complete process.

Figure 2 - The Complete process



3. SET – Subsidy Evaluation Tool

In order to facilitate the assessment of the economic return on investments in energy eff lar, to determine the minim ublic subsidy n vestment bankable (a proje am interest rate that equals the one required by the market for projec h a similar

risk reward profile) an Excel® tool called SET - Subsidy Evaluation Tool was developed.
The SET carries out an energy and economic-financial evaluation of ECMs (Energy Conservation Measures) and can be used for the following four types of public buildings: schools, gyms, office buildings and health care structures (nursing homes/rest homes).
The SET is a simplified tool that does not require in-depth energy expertise for its compilation. The input data, divided into thematic blocks, includes:

1. general project information (that does not affect energy nor financial calculation);
2. general description of the building (construction year, type of building, location and baseline climatic data, volume and internal surface, number of heated floors);

3.A heating energy consumption and - if necessary - hot water (at least 3 year consumption data recommended); in the case all consumptions of the building are electrical, the heating component must be identified;

3.B electricity consumption, excluding the eventual part of electricity used for heating, (also in this case it is recommended to enter consumption data of at least 3 years)

4. initial investment cost estimation (on the basis of the knowledge and empirical data based on average market costs) of the foreseen ECM intervention split down to single measures/interventions: the cells of all planned intervention costs must be filled in together with the percentages for building design & construction fees, for site security costs and VAT;
5. energy costs, if different from the ones calculated in blocks 3.A and 3.B;
6. selection of the energy calculation option (option A or B);

6.A Option A for a simplified energy assessment within the SET requires some basic data on the intervention (surfaces affected by the new insulation, part of the building affected by the interventions, possible change of fuel if foreseen - also through the menus of block n.4. - power of the photovoltaic system when installed);

6.B Option B is based on a detailed and sound Energy Audit for savings calculation and reference data for energy baselining;

7. main parameters for economic and financial calculation such as duration of the Financial Plan up to a maximum of 20 years, inflation rates, discount rate and IRR* (minimum Internal Rate of Return required by the market for projects with a similar risk reward profile). The optimal project subsidy (amount provided by public funding that enables the project to yield an IRR equal to IRR*) is automatically displayed in block 7 of the SET spreadsheet.

Providers/ESCOs participating to the tender can fill in block n.8 of page 5 of the SET spreadsheet indicating the amount, duration and interest rate of the loan (part of the project investment covered by the funds borrowed from the bank) whose remaining parts have been completed by the Public Contracting Authority. Once companies participating to the tender have provided their basic data, the SET model calculates the financial fundamentals related to the project (assessment) providing income statements, cash flows, DSCR-Debt Service Cover Ratio, LLCR-Loan Life Coverage Ratio.

3.1 Prioritising interventions

The SET can also be used by Public bodies to choose the building on which prioritize interventions/investments; when carrying out an analysis on several buildings where no energy audits are available, option A (simplified energy assessment) enables, with little data, to get a first technical-financial estimation of the interventions where the building with the most convenient intervention in terms of a Subsidy/Investment ratio may be identified so that the expenditure for the energy audit shall take place only once avoiding the cost of an energy audit for each building.

3.2 Technical notes on energy and financial calculations

The energy calculation consists of 4 phases, collected in a spreadsheet called "T-Calc option A", which address:

- building geometry calculation from simplified input data;
- calculation of the thermal dispersions of the building with and without ECM improvements;
- calculation of plant losses, possible improvements on the plant and the value in Euros of the savings on the supply of thermal energy;
- calculation of electricity savings and their monetary value in Euros.

The financial calculation is divided into two parts:

- the spreadsheet “F-Calc Subsidy” calculates the project Subsidy amount on the basis of Io (Initial investment cost estimation), **IRR***(market interest rate threshold required by the market for projects with a similar risk reward profile) and **CFj** (Nominal cash flows defined in the contract);
- the spreadsheets “F-Calc Cash flow” and “F-Calc Mortgage loan” contain the data necessary for the calculation of cash flows and income statements.

In the version distributed to Public Bodies the above mentioned spreadsheets are hidden.

3.3 Notes for national or regional contextualisation of the tool

Partners in the SISMA project can customize the energy and financial calculation parameters based on local peculiarities by accessing a sheet called "Parameters". At the foot of the "Parameters" sheet are also two tables for a customised calculation of deductible interest expenditures (deductible debt service) and of specific national or regional taxation rates for the correct compilation of the project financial assessment.
The SET, initially set up in English and Italian, can be translated into 6 additional languages corresponding to the official languages of SISMA participating countries. Each PP contributed to the translation of the tool by using the respective columns in the "Translation" and "F + T Translation" sheets.
In the SET version distributed to Public Administrations, the above-mentioned spreadsheets are hidden.

4. Technical & financial project assessment

4.1 The SET (Subsidy Evaluation Tool) and EPC scheme

Definitions:

- **Io (initial Investment)**: retrofitting and ECMs, equipment, technical costs (building design and construction fees, building site security costs etc.), energy audit, IREE certification costs (project developing + quality assurance);
- **Energy savings:** *Energy savings = (Baseline Energy consumption – Post-Installation Energy consumption) ± Adjustments*, in public buildings, adjustments refer principally to changes in occupancy and occupant behaviour together with changes in the building use and mission. Normalisation for external conditions is assured in the baseline energy definition generally through regression analysis;
- **CFj**: Cash Flow as annual energy savings (in the form of avoided costs from reductions in energy bills) paid by the Public Contracting Authority to ESCOs/Service providers for the entire project life cycle. ***CFj*** *(cash flow_j year) =* ***predefined energy savings*** *from the energy audit (deriving from all foreseen ECMs) x* ***energy price*** *(year 1)* ***adjusted to inflation*** *for the j_year. All CFjs are predefined and indicated in the EPC contract*;
- **HDD**: Heating Degree Days;
- **IRR***: minimum interest rate required by the market for projects with risk reward profiles similar to ours; a market threshold in terms of the IRR which needs to be met to make a project bankable;
- **Subsidy**: amount provided by public funding that enables the project to yield an IRR equal to the market threshold (IRR* minimum interest rate required by the market) given the total investment needed (Io) and all pre-defined cash flows CFj over the considered period
- **Energy audit**: a systematic procedure with the purpose of obtaining adequate knowledge of the existing energy consumption profile of a building or group of buildings, an industrial or commercial operation or installation or

a private or public service, identifying and quantifying cost-effective energy savings opportunities, and reporting the findings (ref. Directive 2012/27/EU);

- **Energy service provider**: a natural or legal person who delivers energy services or other energy efficiency improvement measures in a final customer's facility or premises (ref. Directive 2012/27/EU);
- **PCA:** Public Contracting Authority in general state, regional or local authorities

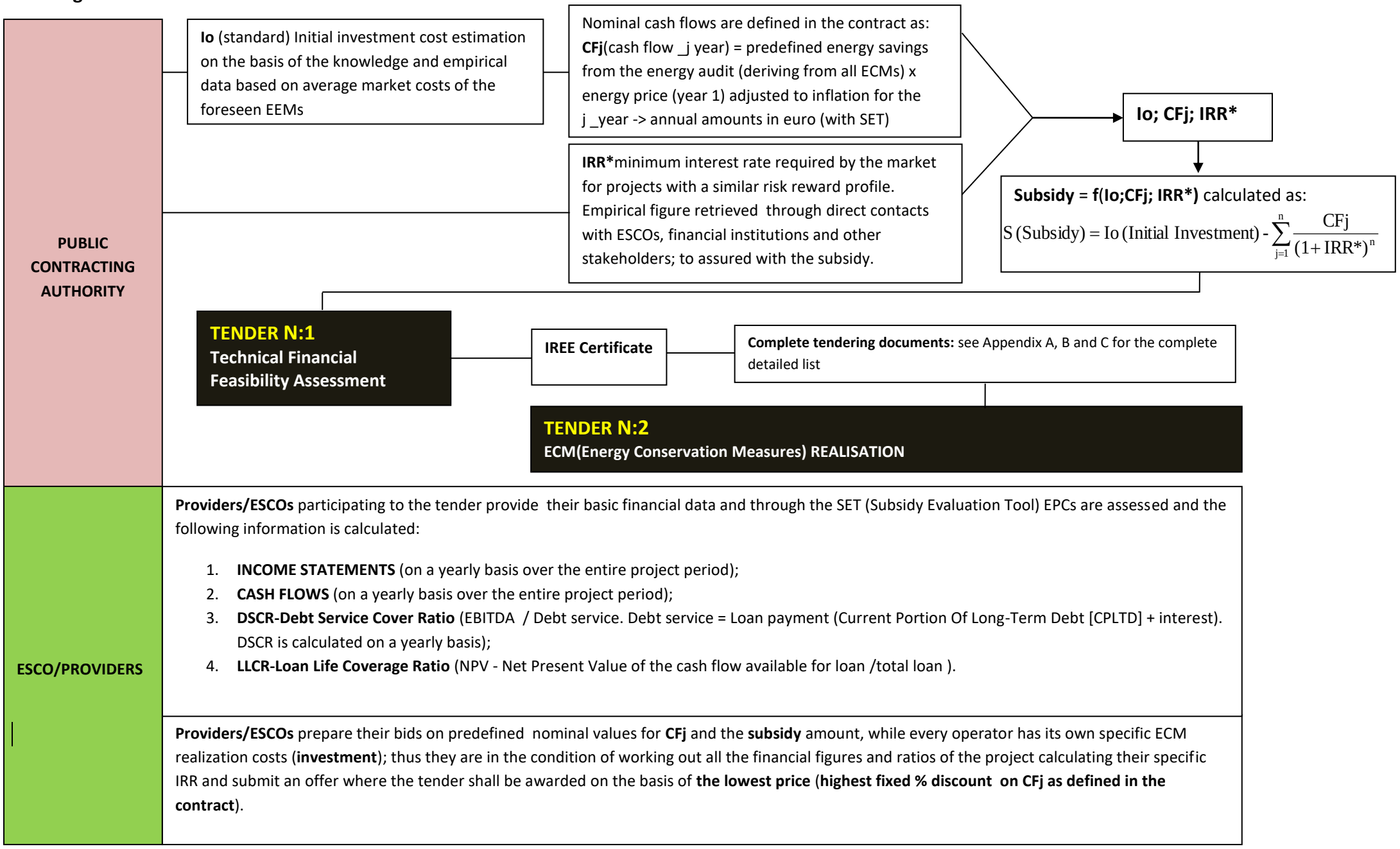
The SET focuses on project bankability, thus given the total initial investment (Io) and all pre-defined cash flows CFj (savings in euro), if a subsidy is needed, its amount will enable the project to yield an internal rate of return equal to the minimum interest rate required by the market (IRR*) for projects with a similar risk reward profile. The SET model represents the general project benchmark defined by the contractor where the subsidy is calculated on predefined set values for **Io**, **CFj** and **IRR***.
This means that providers/ESCOs may prepare their bids on predefined nominal values for **CFj** and subsidy amount, while the standard project value of the investment **Io** does not apply to the operators since their cost for realising all the foreseen ECMs in the project differ due to the fact that each firm has its specific technical expertise, mark-up, overhead and profit factor, specific equity/debt structure, debt service conditions, construction costs, scale economies, purchasing conditions etc. All ESCOs/providers participating to a tender are therefore in the condition of working out all the financial figures and ratios of the project calculating their specific IRR, with a sterilisation of the effects due to energy price changes, because all incoming cash flows CFj and the subsidy are pre-defined.

As defined above, ***CFj*** *(cash flow_j year) is equal to* ***predefined energy savings*** *from the energy audit (deriving from all foreseen ECMs) x* ***energy price*** *(year 1)* ***adjusted to inflation*** *for the j_year*. CFj is also the annual amount in Euros paid by the Contracting Authority to ESCOs/Service providers (shared savings), hence CFj is also their annual sales revenue. CFjs are all defined in the EPC contract and calculated with the SET Excel spreadsheet.

Financially the process is similar to a loan where the Providers/ESCOs carry out the investment (Io) supporting all the related costs and are entitled to a subsidy and all predefined annual cash flows CFj over the entire project life cycle (**predefined shared savings**).

Figure 3 The EPC financial scheme that follows represents the logical framework and principal phases of the EPC scheme.

Figure 3 The EPC financial scheme



4.2 ESCO/provider financial assessment

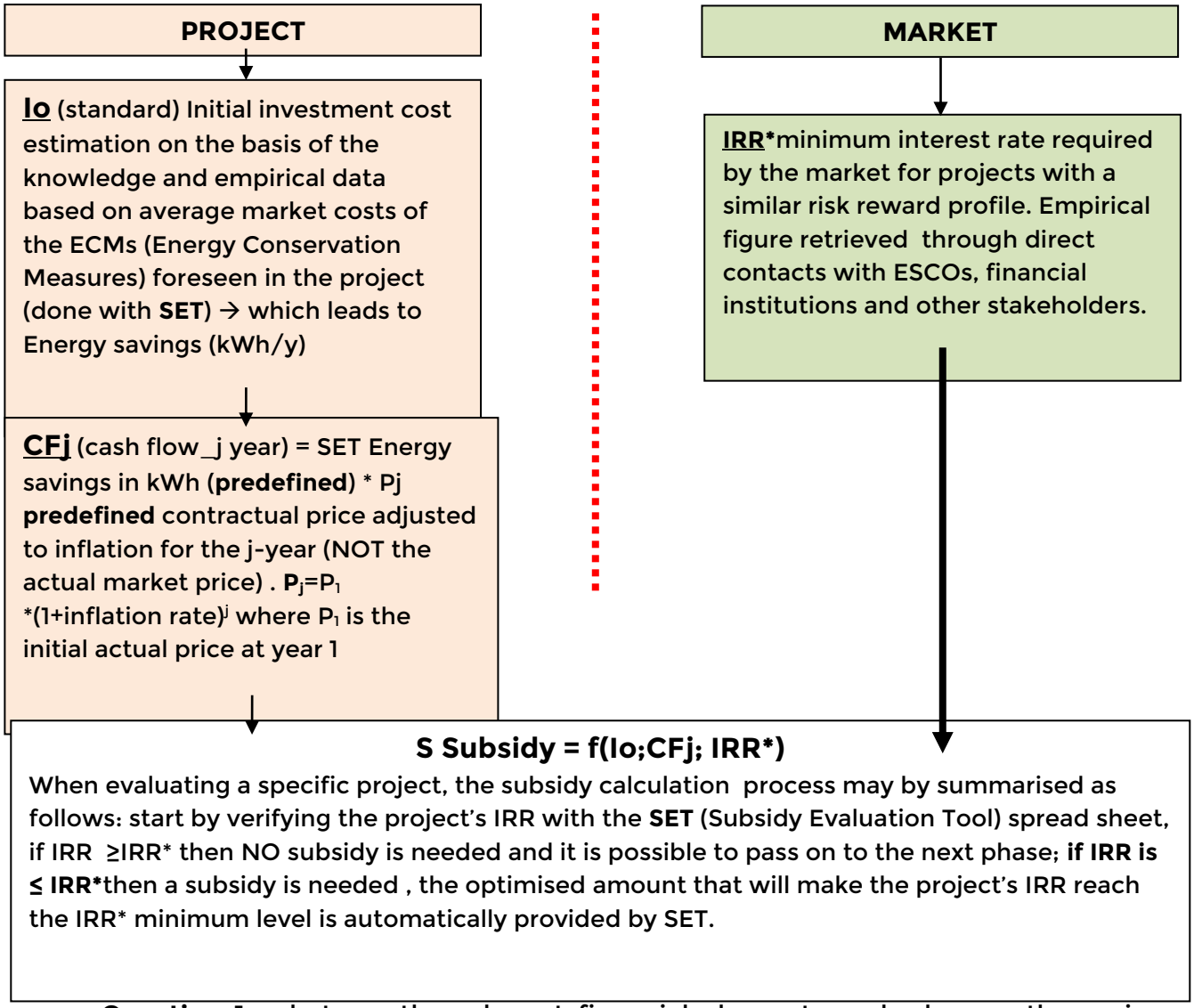
Companies participating to the tender together with their offer shall also provide their basic financial data (basic loan details: amount, duration and interest rate) so that through the SET excel spreadsheet an automatic financial assessment of the ESCO/Service provider may be carried out and the following documentation/ratios automatically calculated:

1. **INCOME STATEMENTS** (on a yearly basis over the entire project period);
2. **CASH FLOWS** (on a yearly basis over the entire project period);
3. **DSCR-Debt Service Cover Ratio** (EBITDA / Debt service. Debt service = Loan payment (Current Portion Of Long-Term Debt [CPLTD] + interest). DSCR is calculated on a yearly basis);
4. **LLCR-Loan Life Coverage Ratio** (NPV - Net Present Value of the cash flow available for loan repayment/total loan).

See Annex N.3 and point 3.2 above for details.

4.3 The SISMA EPC scheme in detail

This is a "financially closed" EPC scheme where all figures are predefined contractually, savings through sound energy auditing and proper ICP (Investor Confidence Project) realisation (especially with accurate baselining and M&V). Furthermore, precautionary low inflation rates on energy prices are defined in advanced for the whole project duration leading to reliable contractually predefined CFj (cash flows-nominal values in Euros) adjusted to inflation calculated by SET spreadsheets. Energy price changes do not have an influence on ESCOs/providers since payments are predefined and the energy supply is NOT part of the EPC contract.
A general representation regarding only the financial process follows.



- **Question 1**: what are the relevant financial elements and who are the major players of the EPC ?
- **Question 2**: what are the principal key elements/activities of the SISMA EPC ?
- **Question 3**: who is doing what ?

- **Question 4**: who is paying what ?
- **Question 5**: who is taking the risks ?

A specific table may be developed in order to clarify the major issues regarding each of the five questions above. The five tables that follow, therefore, provide details on the EPC developed within the SISMA process.

Table 1 Financial elements of the EPC between PCAs and ESCO/Providers

Question 1: *what are the relevant financial elements and who are the major players of the EPC?*

Financial elements of the EPC between PCAs and ESCO/ Providers	
PCA-Public Contracting Authority	**Service provider/ESCO**
Io (standard) Initial investment cost estimation on the basis of the knowledge and empirical data based on average market costs of the EE measures foreseen in the project (done with **SET**)	Each operator has its specific construction costs depending on the firm's technical expertise, mark-up, overhead and profit factor, specific equity/debt structure, debt service conditions, construction costs, scale economies, purchasing conditions etc therefore final investment costs (all interventions foreseen by the contract) differ for each ESCO/provider (**own calculation**)
Nominal cash flows are defined in the contract and calculated as: **CFj** (cash flow_j year) = energy savings adjusted to inflation-> **annual amounts in euro** (done with **SET**) paid to ESCO/Service provider	**Predefined** in the contract (**given value**), **CFj** is also the annual sales revenue for ESCOs/Service providers paid by the Contracting Authority for the entire project life cycle (**predefined shared savings**)
IRR*minimum interest rate required by the market for projects with a similar risk reward profile. Empirical figure retrieved through direct contacts with ESCOs, financial institutions and other stakeholders.	As pointed out above, each operator bares specific investment costs, since CFj cash flows are predefined by the contract(energy savings adjusted to inflation-> annual amounts in Euro), each provider/ESCo shall have a specific IRR that may differ from the project IRR*
Subsidy: a calculated outcome (done with the **SET**) $S\,(\text{Subsidy}) = \text{Io}\,(\text{Initial Investment}) - \sum_{j=1}^{n} \frac{CFj}{(1+\text{IRR}^*)^n}$	**Predefined** in the contract (**given value**)
Awarding criteria: lowest price (highest fixed % discount on CFj as nominally predefined in the EPC contract).	Every operator has its own specific ECM realization costs (investment); thus is in the condition for working out all the financial figures of the project and submitting an offer (**own calculation**)

The key elements/activities/risks defining the SISMA EPC follow in Tables 2, 3, 4, 5 and 6.

Table 2 SISMA and EPC identification key elements

Question 2: *what are the principal key elements/activities of the EPC?*

EPC identification key elements	
Principal contract objective	The **ESCO/service provider carries out** the overall building retrofitting and the implementation of all ECMs (Energy Conservation Measures) together with the OM&M activities according to the tender specifications that stem from the deployment of the ICP (investor Confidence Project) protocols in order to provide savings.
ICP Project Developer	Independent ICP **credentialed developer** in charge of developing the ICP-Investor Confidence Project protocols. Activities performed: Baselining, Saving Projections, Design, Construction and Verification and **planning** of the OM&M and M&V activities. Paid by the Public Contracting Authority.
IREE	Investor Ready Energy Efficiency Certificate, issued by a certified **independent third party** (**ICP Quality Assurer**) and paid by the Public Contracting Authority.
M&V activities	Done by an independent **third party** and paid by the Public Contracting Authority.
Guarantees	IREE certificate (ICP assured) through which the ESCO/provider guarantees a minimum performance, throughout the contract life, related to energy consumption (kWh/year) according to the M&V plan and the verification of savings procedure.
Payment	Predefined in the contract for its entire duration, the contractor pays annual amounts **CFj** (cash flow_j year) which correspond to the energy savings in euros adjusted to inflation-> annual amounts in euro (nominal values defined over the period).
Energy savings potential	High - comprehensive and detailed approach based on a sound energy audit and HDDs (Heating Degree Days) determination.
Energy savings transparency	High - independent M&V. ICP implementation with baselining and M&V planning. According to the specific HDD of a certain year, energy consumption should be: consumption (baseline value) ± x%, where x% depends on the level of confidence (usually 90%) and is provided by the M&V plan together with the expected level of energy consumption.
Verification of savings	Verifications are foreseen on a yearly basis, if the measured energy consumption is >than [consumption (baseline value) + x%] then there's a need for a contractual even up according to the algorithm defined in the EPC.

Equipment and materials ownership	ESCO/service provider for the entire project life, upon termination of contract the propriety passes on to the public contracting authority.

Source: D3.1 Energy Performance Contracting Manual_ Transparense Project, Interreg Central Europe

Table 3 SISMA activity ownership

Question 3: *who is doing what ?*

SISMA activity ownership		
	PLANNING	**REALISATION ACTIVITIES**
DESIGN	ICP Project Developer	
CONSTRUCTION		ESCO/service provider
OM&M	ICP Project Developer _ OM&M planning and verification	ESCO/service provider
M&V	ICP Project Developer _ OM&M planning	Independent third party
IREE		Quality assurance by an ICP certified third party

Table 4 SISMA and payments

Question 4: *who is paying what ?*

SISMA and payments	
	Paid by the PCA-Public Contracting Authority
To ESCOs/Providers	Cash flows CFjs nominally predefined for the entire project duration where **CFj (cash flow_j year)** = SET Energy savings in kWh (predefined) * Pj predefined contractual price (starting year) adjusted to inflation for the j-year (NOT the actual market price) (done with SET).
To the ICP developer for the ICP Project Development	**Development** of the ICP-Investor Confidence Protocol **documentation/activities**: - Baselining; - Saving Projections; - Design; - Construction. **Planning** and **verification** of OM&M activities. **Planning** of M&V.
To the ICP Quality Assurer for the IREE certificate	Investor Ready Energy Efficiency Certificate, issued by a credentialed **independent third party (ICP Quality Assurer)**.
For M&V activities	Done by an independent **third party.**

	Paid by the ESCO/Service provider for:
Complete building retrofitting + OM&M activities + insurance	**Building retrofitting** and realisation of all ECMs (Energy Conservation Measures). **Costs:** own personnel, materials, suppliers, external services etc. **OM&M Operations, maintenance & monitoring activities.** **Costs:** mainly all planned maintenance activities over the project's entire life cycle. To be carried out according to the tender specifications defined by the ICP project developer. **Insurance.** **Costs** according to the insurance requirements for Providers/ESCOs defined in the EPC contract following the risk identification and assessment process.

Table 5 SISMA and risk ownership

Question 5: *who is taking the risks ?*

SISMA and risk ownership		
RISK TYPE		
Contract Performance		Totally on the ESCO/service provider
Design	ICP Project Developer	
Construction		Totally on the ESCO/service provider
OM&M	ICP Project Developer _ OM&M only for wrong planning	On the ESCO/service provider the all the OM&M activities
Energy price changes	Sterilized for the ESCO/service provider since payments are predefined and the energy supply is not part of the EPC contract.	

As previously specified, in the SISMA EPC the ESCO/Service provider is entitled to receive contractually predefined CFj (cash flows-nominal values in Euros) adjusted to inflation calculated by the SET tool, where CFj (cash flow_j year) = SET Energy savings in kWh (predefined) * Pj which is the predefined contractual energy price adjusted to inflation for the j-year (NOT the actual market price). $P_j=P_1 *(1+\text{inflation rate})^j$ where P_1 is the initial actual price at year 1. What happens if over the years the difference between the predefined contractual energy price at a certain j year differs significantly from the actual energy price of the same year? The tables and paragraph that follow provide an insight to the contractual implications and possible compensations between PCAs and ESCOs/Service providers.

Table 6 SISMA and risks related to energy price changes

ENERGY CONSUMPTIONS AND PRICES: DEFINITIONS		
a) SET Energy savings in kWh (predefined) from sound energy audit adjusted to HDD decrease over the period due to heat increase: **Savj predefined**	**b) Pj** predefined contractual price adjusted to inflation for the j-year (NOT the actual market price) (€/kWh)	**c) CFj: SET Energy Savings in EURO** (axb) = (Savj_predefined x Pj_predined)
d) Savings in kWh [consumption (baseline value)] - [consumption (measured value after intervention)]: **Savj baseline - measured**	**e) Pa** actual energy vector price of the j-year (€/kWh)	**f) AESj: Actual Energy Savings in EURO** (dxe) in the j-year = Savj baseline - measured x Pa
Δ Savings in kWh (a-d)	**Δ prices in euros (b-e)**	**Δ Savings in euros (c-f)**

Predefined SET energy savings (kWh) and savings based on measures and baselines tend to have the same values when baselining and audit are done correctly, hence the difference between CFj and AESj depends principally on the Δ between prices. The table that follows presents CFj versus AESj values according to price difference between actual energy prices (market value) and predefined contractual prices adjusted to inflation for the j-year (NOT actual market prices).

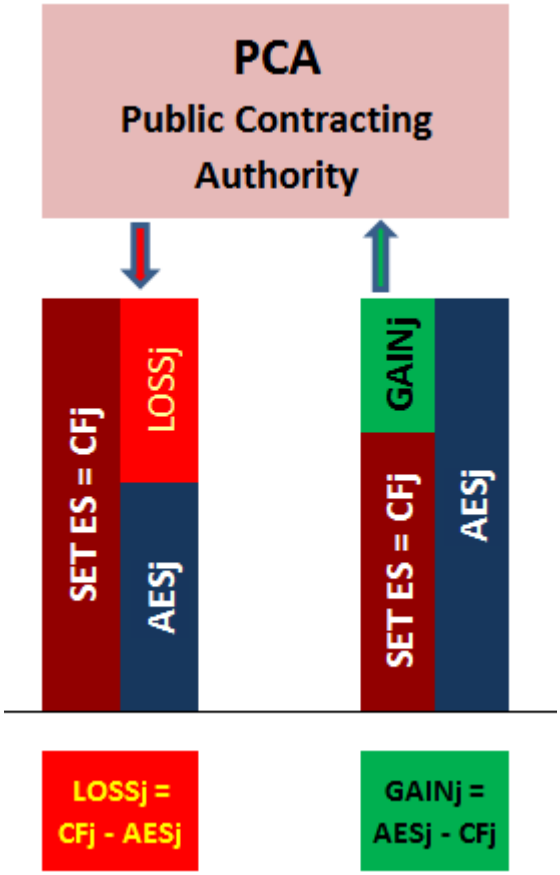
Table 7 Price risks

PRICE RISKS: if SET Energy savings in kWh (predefined) are reliable then the CFj VERSUS AESj condition depends principally on price variation				
SCENARIO 1		**SCENARIO 2**		**SCENARIO 3**
CFj > AESj (energy prices go DOWN)		**CFj < AESj (energy prices go UP)**		**CFj = AESj**
CPA-Contracting Public Authority: **risk of losing (CFj-AES) on savings** since it is getting Actual Energy Savings(AES) paying them CFj (higher value in euro).	**ESCO/Provider:** price variatioin risk is **sterilised** CFj and Io and the Subsidy are all pre-defined (nominal values over the entire period).	**CPA**-Contracting Public Authority is **profitting (AES - CFj) on extra savings** since it is getting Actual Energy Savings(AES) paying themCFj (lower value in euro).	**ESCO/Provider:** price variatioin risk is **sterilised** CFj and Io and the Subsidy are all pre-defined (nominal values over the entire period).	**CPA**-Contracting Public Authority: 100% of Actual Savings = CFj Cash Flows paid to the ESCO/Provider. No extra gains/losses for both parties.

SCENARIO 1	**SCENARIO 2**	**SCENARIO 3**
CFj > AESj (energy prices go DOWN)	**CFj < AESj (energy prices go UP)**	**CFj = AESj**
NOTES		
If SET Energy savings in kWh (predefined) are realible then the **CFj > AES** condition depends on **price fall**.	If SET Energy savings in kWh (predefined) are realible then the **CFj < AES** condition depends on **price increase**.	

If price adjustmet is set precautionarily low (e.g. 1% year, low below the average inflation rate) then the risk of loss on savings is kept low. For providers, this may cause longer payback periods, but their IRR is nonetheless defined over the entire project period.	With price adjustmet set precautionarily low (e.g. 1% year, low below the average inflation rate) it's a highly probable that CFj are <AESj giving CPAs extra profits (AESj-CFj) . Precautionary predefined CFj cause longer payback periods for providers, but their IRR is nonetheless defined over the entire project period	
The CPA, as well, in a spefic "j year" may register a "potential loss" in comparison with actual energy prices, but also in this case, knowing Io (investment costs =value of all ECMs), CFj have been predefined in order to yield IRR*.	The SISMA EPC provides ESCOs/providers with: - a complete set of technical/financial documentation (ref. Table 3); - pre-defined nominal values of all cash flows CFj; enabling them to calculate the IRR of the project and work out their bids. This means that ESCOs/providers have all the relevant documentation ready and can, with a minimum effort, submit their bids (only price discount). An average profiting of CPAs on potential price increases compared to the chosen adjustment rate (e.g. 1%) may be considered as an equitable compensation for all the preparatory work done and paid for by CPAs (documentation and activities: complete design, OM&V, M&V plan, IREE certificate etc) and for the opportunity given to all ESCOs/providers to calculate a reliable IRR based on predefined contractual cash flows.	

What happens to a PCA when the CFj paid differs from AESj (Actual Savings in Euro)



As long as AESj is ≥ than CFj then the PCA Public Contracting Authority is not paying more than it would have paid before the intervention.

When CFj = AESj there are no extra gains/losses for both parties, while gain or loss depend on whether (AESj - CFj) is > 0 or < 0.
Recalling the definitions of CFj and AESj as described in row 1 & 2 of Table 6 :

- **CFj** = **a** x **b** = [**a**: ***SET Energy savings*** in kWh (predefined)] x [**b**: ***Pj*** predefined contractual price adjusted to inflation for the j-year in (€/kWh)];
- **AESj** = **d** x **e** = [**d**: ***Savings*** in kWh [(consumption_baseline value) - (consumption_measured value after intervention)] x [**e**: ***Pa*** actual energy vector price of the j-year (€/kWh)];

Savings in Euros are defined as the multiplication of energy savings (kWh) x prices per kWh (€/kWh), if CFj ≃AESj then Δ Savings in kWh (a-b) →0 and Δ prices (b-e) →0.

In general, **Δ Savings** in kWh should tend to zero when both baselining and audit are done correctly, formally:

$$\sum_{j=1}^{n} \Lambda \text{Savings in kWh } (aj - dj) \rightarrow 0$$

while **Δ prices** = (Pj – Paj) depend on the price trend of energy over the project period, **Pj** is the predefined contractual price adjusted to inflation for the j-year (NOT the actual market price (€/kWh) while **Paj** is the actual energy vector price at the j-year (€/kWh), the difference between the two prices depends on the inflation rate chosen initially for the calculation of Pj, where Pj = $P_{1(\text{actual first year price})} * (1+i_{\text{annual fixed inflation rate for the entire period}})^{j}$.

A precautionary $i_{\text{annual fixed inflation rate for the entire period}}$ is defined with a value well below the average inflation rate of the last 10 years so that, in general, over the project period it is expected that Pj < Paj.
Since (CFj – AESj) = f(Δ Savings in kWh, Δ prices) where Δ Savings in kWh → 0, (CFj – AESj) depends principally on Δ prices where it is expected that Pj < Paj thus in general CFj < AESj and (CFj – AESj)<0 with the contracting body gaining (AESj- CFj).

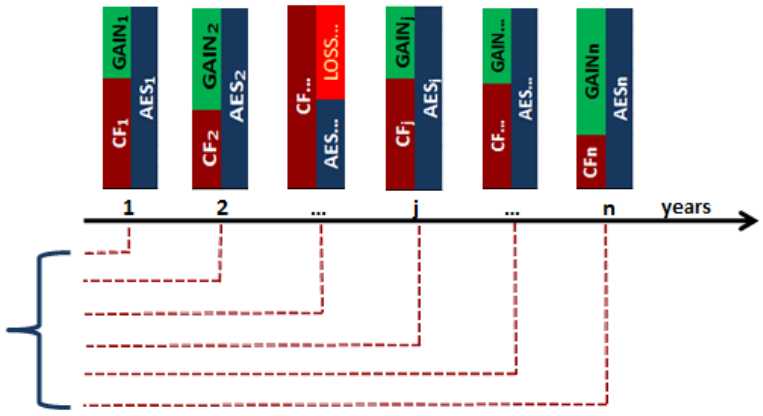
With price adjustment set precautionary low (e.g. 1% year, low below the average inflation rate) it is highly probable that CFj are <AESj giving CPAs extra profits (AESj-CFj). Precautionary predefined CFj cause longer payback periods for providers, but their IRR is nonetheless defined over the entire project period.
The CPA may in a specific "j year" register a "potential loss" in comparison with actual energy prices, this happens when actual energy prices plunge to the point where CFj>AESj. Also in this case, the model is “closed” in the sense that knowing Io (investment costs =value of all ECMs), the eventual subsidy amount, CFj have been predefined in order to yield IRR*.

Reference to "potential" loss is justified on the fact that this is a "financially closed" EPC scheme where all figures are predefined contractually, savings through sound energy auditing and proper ICP realisation (especially with accurate baselining and M&V). Furthermore, precautionary low inflation rates on energy prices are defined in advance for the whole project duration leading to reliable contractually predefined CFj (cash flows-nominal values in Euros) adjusted to inflation calculated by SET spreadsheets.

Clearing and settlement

As specified above, precautionary predefined CFj cause longer payback periods for Providers and extra profits to PCAs calculated as (AESj-CFj). The system is "closed" and works like a loan where all cash flows are predefined and IRRs for both CPAs and Providers are known in advance.
Even though for both players (PCAs and Providers) the above mentioned predefined "closed" system yields positive IRRs, especially in the case of significant amounts or when certain public spending constraints apply to PCAs e.g. (proof that the Authority is not paying more than it would have paid before the intervention) a calculation on a yearly basis of gains/losses (clearing) together with payments (settlement) can be necessary or appropriate in order to adjust possible excessive differences between AESj and CFj.
A separate clearing and settlement method may be defined for this purpose and can be added to the EPC within the SET scheme (as an Annex to the EPC contract between PCA and Service providers).
In general the NPV of cumulative extra profits gained by the PCA may be defined as follows:

$$\text{Cumulative net gain} = \sum_{j=1}^{n} \frac{(AESj - CFj)}{(1 + \text{i discount rate})^{j}}$$



When j = n (project duration) this equation is the NPV of total extra profits gained over the entire project life cycle, otherwise (when j<n) it represents the amount gained up to the j-year.

Let's consider an EPC where extra profits are shared between PCAs and ESCOs/Service providers who receive x% of (AESj - CFj), while losses for PCA must be zero.
The following table summarises payments carried out by PCAs to Providers assuring x% sharing of gains and no losses for the PCAs according to all possible conditions.

(AESj - CFj)	PCA	PCA's part	ESCO's part	PCA pays to ESCO/provider
> 0	**gain** = (AESj - CFj)	(1-x%)* (AESj - CFj)	x%* (AESj - CFj)	CFj + x%(AESj - CFj)
= 0	no-loss, no-gain			CFj
< 0	**loss** = (AESj - CFj)	0%	100%	AESj= [CFj-(CFj-AESj]

When there's a loss in a generic j-year then AESj ≤ CFj and (AESj - CFj) ≤ 0 hence the PCA is going to pay AESj (and NOT CFj) to the ESCO to avoid losses.
How does this impact the ESCO, is it suffering a loss? This depends on the overall NPV of cumulative extra profits gained by the ESCO/Service provider at the j – year which is defined as:

$$\text{ECGSj} = \text{ESCO Cumulative Gain Share at j - year} = x\% * \sum_{j=1}^{n} \frac{(\text{AESj - CFj})}{(1+\text{i discount rate})^{j}}$$

Let's consider all the possible outcomes for ESCOs when there's a loss in a generic j-year and (AESj - CFj) < 0.

LOSS/GAIN conditions for ESCOs / Service Providers		
	$ECGS_{j-1} > 0$	$ECGS_{j-1} \leq 0$
When (AESj - CFj)<0	if $\lvert(AESj - CFj)\rvert \leq ECGS_{j-1}$ -> there is NO loss for the ESCO who is still **gaining**: $(ECGS_{j-1} - \lvert(CFj-AESj)\rvert$	if $ECGS_{j-1}$= 0 then the **Loss is:** $\lvert(AESj - CFj)\rvert + \lvert ECGS_{j-1}\rvert$
	if $\lvert(AESj - CFj)\rvert > ECGS_{j-1}$ -> ESCO's **loss is:** $\lvert(AESj - CFj)\rvert - ECGS_{j-1}$	if ECGSj-1<0 then the **Loss is:** $\lvert(AESj - CFj)\rvert + \lvert ECGS_{j-1}\rvert$

4.4 Verification of savings

In general, *Savings = (Baseline Energy consumption – Post-Installation Energy consumption) ± Adjustments*, in public buildings, adjustments refer principally to changes in occupancy and occupant behaviour and together with changes in the building use and mission. Verification of savings will focus on the difference between baseline and post-installation whilst the "Adjustments" in the equation will be eventually treated apart within the M&V plan.

Among the key barriers to profit in Energy Performance Contracting (EPC) are uncertainties on attaining the realised energy cost savings and potential disputes over the guaranteed cost savings (performance) therefore energy savings transparency should be assured through independent M&V and ICP implementation. If all the project phases are carried out correctly then the ECMs should yield expected consumptions of energy ± x% according to the confidence level that has been chosen for the baselining.

Energy savings transparency assurance: according to the specific HDD of a certain year, energy consumption should be: consumption (baseline value) ± x%, where x% determined from **regression analysis** depends on the level of confidence (usually 90%) and is provided by the M&V plan together with the expected level of energy consumption.

If the **measured post-installation** energy consumption in the same year is > than [consumption (baseline value) + x%] then there is a need for a contractual even up.

The amount in kWh to be balanced shall be: [consumption (measured value)] - [consumption (baseline value) + x%] and is defined as **M*kWh** (Match in kWh), thus:

M*kWh (Match in kWh) = [consumption (measured value)] - [consumption (baseline value) + x%]

Since Cash flows CFj are predefined in the SISMA model, the matching amount in Euros defined as **M*euro** (Match in Euros) shall be equal to [consumption (measured value)] - [consumption (baseline value) + x%] *Pj that can be written as **M*kWh** (Match in kWh) x **Pj**, therefore:

M*euro (Match in Euros)= [consumption (measured value)] - [consumption (baseline value) + x%] ***Pj** where **Pj** is the predefined contractual price adjusted to inflation (NOT the actual market price), thus:

M*euro =M*kWhxPj

The amount paid by the contractor **shall be**:

CFb (balanced amount) = **CFj** (predefined nominal contractual value) – **M*euro** (Match in euro) = **CFj-M*euro**.

Summary of definitions

M*kWh (Match in kWh):	[consumption (measured value)] - [consumption (baseline value) + x%]
M*euro (Match in euros):	**M*kWh** x **Pj**
CFb(balanced amount)	**CFj-M*euro** amount paid to the ESCO/provider in the considered j year

4.5 SISMA model general requirements compliance

Good financial indicators are not enough to make ECM (Energy Conservation Measure) projects bankable. A well conceived and well executed energy efficiency project requires a framework structured on the five ICP (Investor Confidence Protocol) steps covering its entire lifecycle. To make things happen tender participation of ESCOs/Providers should be fostered by putting all the documentation burden on the Public Contracting Authority that on the other hand gains full control on the project and standardises all the procedures and ensures maximum transparency. If a subsidy is needed then it should be optimised (providing the minimum amount to make an investment financially feasible) and NOT based on a general flat rate, fixed percentage etc.

Errore. L'origine riferimento non è stata trovata.7 that follows lists the five major requirements for a complete ECM project feasibility.

Table 8 Compliance

Requirements	Compliance
Requirement n.1: *meet market thresholds*	**Very high** - as stated previously, a project is really bankable only if it is yielding an interest rate equal to the minimum interest rate required for projects with similar risk reward profiles. That is what the **subsidy** is for.
Requirement n.2: *optimise public funding*	**Very high** - Subsidies are minimised when their amount, given the total investment needed and all savings calculated over the considered period, enable the project to yield an IRR equal to the market threshold (IRR* minimum interest rate "required by the market").
Requirement n.3: *define a sound technical framework covering its entire project lifecycle for a complete control of the project through all its phases*	**Very high** - a well conceived and well executed energy efficiency project requires a framework structured on five steps covering its entire lifecycle: ICP Investor Confidence Protocol enables a clear definition of the complete process necessary to ensure performance from initial audit through ongoing commissioning and M&V (Measurement & Verification) guaranteed by the IREE certificate.

Requirement n.4: *foster tender participation*	**Very high** -ESCOs/Providers can easily participate to the tenders because all the technical documentation is **predefined** and part of N.1 TECHNICAL-FINANCIAL FEASIBILITY DOCUMENTATION that includes technical designs, an EPC model and an IREE (Investor Ready Energy Efficiency) Certification together with all the Annexes. Regarding the financial documentation, nominal values for CFj (cash flows stemming from savings) and the subsidy amount are predefined, all participants have to do is work out their financial figures and make a bid where the tender shall be awarded on the basis of the lowest price (highest fixed % discount on CFj as predefined in the contract.
Requirement n.5: *facilitate the awarding process*	**Very high** - through the SET (Subsidy Evaluation Tool) a standard process for the financial assessment of tender participants and for the awarding system is assured.

4.6 IREE™ certification

The **Investor Ready Energy Efficiency IREE™** protocol builds on the US EDF – Environmental Defense Fund Programme and is conceived to meet the needs of the investment and energy efficiency sectors at European level. The Investor Confidence Project Europe (ICP Europe) working group is currently involved in the EU-wide promotion and uptake of the IREE™ protocol.

A milestone of the process defined by the SISMA model (see figure N.2) is the IREE™ certification, that ensures:

- compliance of all relevant documentation with ICP protocols;
- reliability of the documentation required to participate in the tender procedure.

ICP protocols aim at standardising the development of energy efficiency projects ultimately to provide more stable, predictable and reliable savings outcomes thus enabling greater private investment.

Key strength is the adoption of a standard which revolves around the best practices already in use and the involvement of a third-party Quality Assurance Provider throughout the project development process.

Projects that are developed by a Project Developer, in full compliance with the ICP protocols and have been verified by a certified third party are eligible to be certified as IREE™ projects.

There are different ICP protocols available that describe a standardized approach to the development of Large, Standard and Targeted energy efficiency projects both in tertiary and in residential buildings.

The documentation package required by ICP protocols is reported in Annex A. For further reference, it is possible to access the official ICP documentation online, in particular the Project Development Specifications document and the Index of National resources which compiles national standards, guidance documents and sources of information to support the implementation of ICP projects at country level.

The certification procedure which applies to all ICP protocols follows a five-stage approach as it is outlined in the following chart. Further details for each stage are provided below

IREE™ certification is issued before the interventions and depending on the positive outcomes of document verification checks for each stage of the procedure.
Further details for each stage are provided below.

Baselining
Proper baselining derives from a precise analysis of the initial situation and of the consumptions of each energy vector. It provides a critical starting point for accurate projection of potential energy savings, and is also critical for measurement and verification upon completion of retrofit.
It must also factor in the impact of independent variables such as weather, occupancy, and operating hours on the building's energy consumption. Where there are charges identified with peak demand, daily load profiles should be analysed.

Savings Calculations
Savings calculations can be performed using detailed energy modelling, spreadsheet calculations, or other methods, depending on the requirements of the project and protocol. Regardless of the method employed, the procedure should be transparent and well documented. The final outcome is an energy audit comprising a technical and economic feasibility analysis of the proposed retrofit.

Design, Construction and Verification
Project development and construction teams should ensure that the project is designed and implemented as intended by the recommendations of the energy audit.
Verification during construction and commissioning activities is carried out during this stage to ensure that:

- ECM installation are compliant with the project and with the setup guidelines provided by the producer/supplier;
- ECM operation are correct and ensured through performance testing carried out during construction;
- ECM technical description and operation instructions are provided and maintenance personnel is trained to optimize performance over time

Commissioning activities should be detailed in the construction verification plan before the retrofit takes place to obtain IREE™ certification.

Operations, Maintenance and Monitoring (OM&M)

Operational performance of installed ECMs should always be monitored and assessed to prevent performance degradation over time.
Assessment and monitoring activities as well as the maintenance plan for each ECM should be detailed before the retrofit takes place to obtain IREE™ certification.

Measurement & Verification (M&V)
M&V procedure quantifies the savings from energy conservation projects (or individual ECMs) by comparing the established baseline with the post-installation energy performance and use, normalised to reflect the same set of conditions.
The Measurement and Verification plan should be drafted in compliance with the international IPMVP protocol after the definition of the baseline and the identification of the potential ECMs.

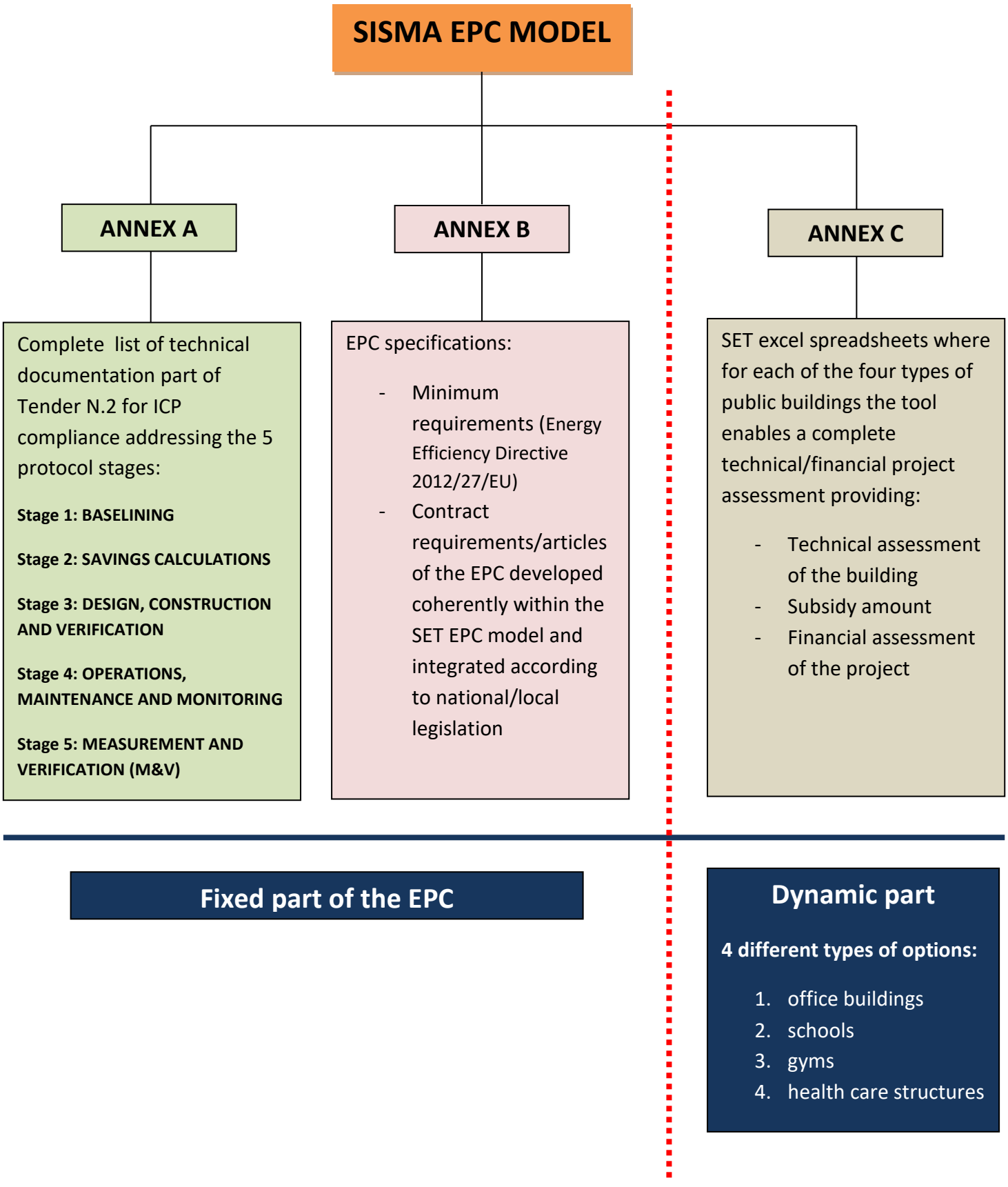
ICP Europe: official documentation
The main reference documents for ICP Europe associated with IREE™ certification are the following:

- ICP Energy Performance Protocol - Project Development Specification
  http://europe.eeperformance.org/project-development-specification.html
- Tertiary Protocols (Large, Standard and Targeted)
  http://europe.eeperformance.org/tertiary-protocols.html
- Apartment Block Protocols (Large, Standard and Targeted)
  http://europe.eeperformance.org/apartment-protocols.html
- ICP Energy Performance Protocol - Quality Assurance Specification
  http://www.eeperformance.org/quality-assurance-specification.html
- ICP Energy Performance Protocol - Annex A: Index of National Resources
  http://europe.eeperformance.org/index-of-national-resources.html
- Models of the main technical reports requested
  http://europe.eeperformance.org/project-development-templates.html

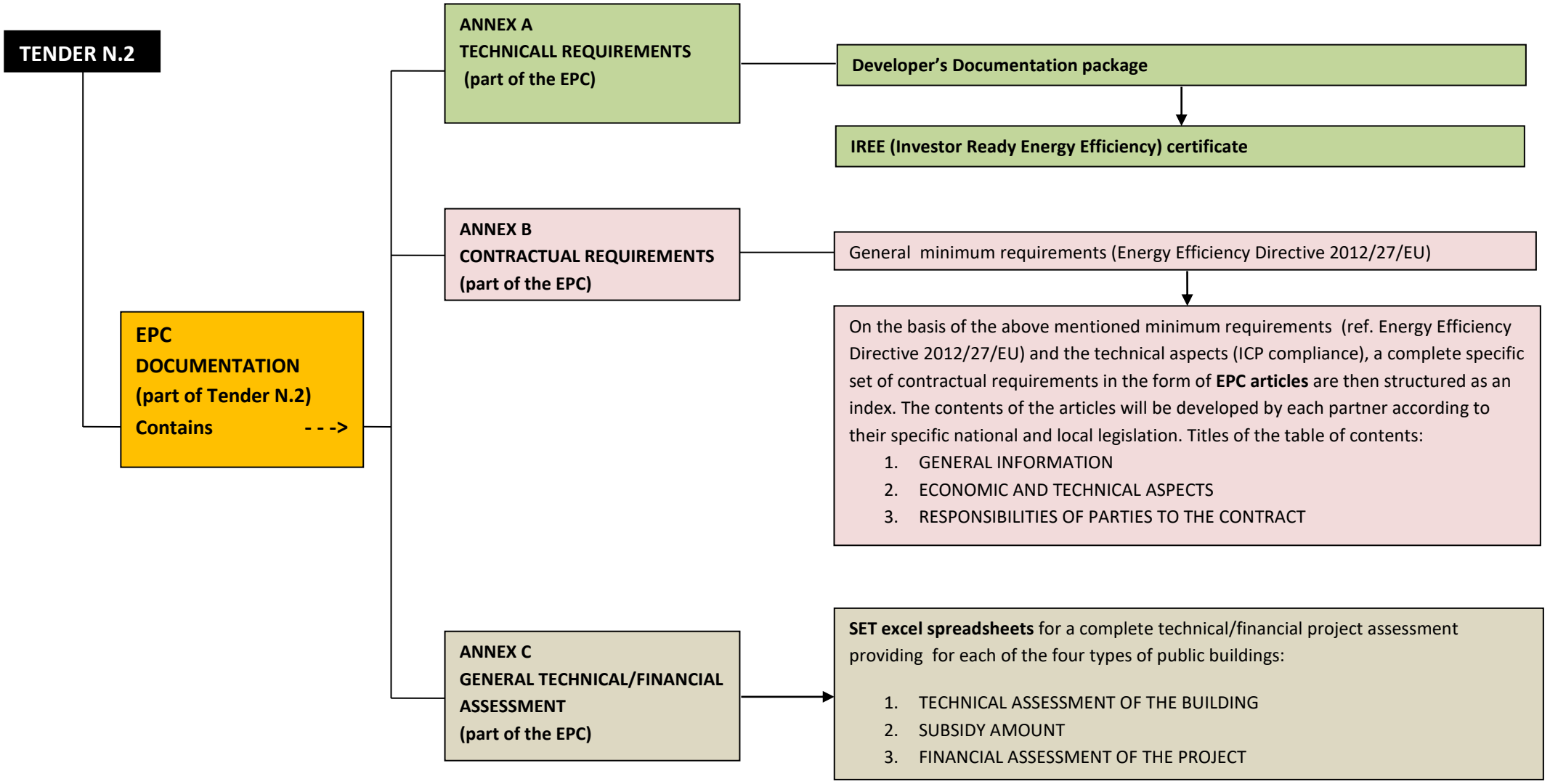
Further details can be found in the websites of national Quality Assurance Providers.

The SISMA model developed within the project provides effective support to public contracting authorities through :

1. technical documentation (Annex A) for the ICP compliance;
2. a complete specific set of contractual requirements (Annex B);
3. an excel tool for each type of building for a complete technical/financial assessment of the project (Annex C).


SISMA EPC MODEL
ANNEX A
ANNEX B
ANNEX C
Complete list of technical documentation part of Tender N.2 for ICP compliance addressing the 5 protocol stages:
Stage 1: BASELINING
Stage 2: SAVINGS CALCULATIONS
Stage 3: DESIGN, CONSTRUCTION AND VERIFICATION
Stage 4: OPERATIONS, MAINTENANCE AND MONITORING
Stage 5: MEASUREMENT AND VERIFICATION (M&V)
EPC specifications:
- Minimum requirements (Energy Efficiency Directive 2012/27/EU)
- Contract requirements/articles of the EPC developed coherently within the SET EPC model and integrated according to national/local legislation
SET excel spreadsheets where for each of the four types of public buildings the tool enables a complete technical/financial project assessment providing:
- Technical assessment of the building
- Subsidy amount
- Financial assessment of the project
Fixed part of the EPC
Dynamic part
4 different types of options:
1. office buildings
2. schools
3. gyms
4. health care structures

The tender includes the EPC- Energy Performance Contract whose documentation (ready for use by the contracting authority) is contained in three Annexes: a scheme of the logical framework follows.



ANNEX A

Technical requirements: Documentation package for the Project Developer

List of technical documentation for the ICP(Investor Confidence Project) Protocols compliance to be developed by the project developer. This detailed list of technical specifications is a compulsory part of the tender.

Key:

X	Compulsory documents	LT	Large Tertiary	ST	Standard Tertiary	TT	Targeted Tertiary
O	Optional documents	LAB	Large Apartment Block	SAB	Standard Apartment Block	TAB	Targeted Apartment Block

		PROTOCOL					
		LT	LAB	ST	SAB	TT	TAB
Stage 1: BASELINING							
1.1	Utility data						
–	Building type and age	X	X	X	X	X	X
–	non-routine maintenance interventions or retrofit, especially those occurred within baseline period	X	X	X	X	X	X
–	energy performance certificate, if available, or alike	X	X	X	X	X	X
1.2	Adjustment factors (data related to independent variables and static factors)						
–	weather data representative of the area where the building is located for the baseline period	X	X	X	X	O	O
–	occupancy data (if relevant): number of occupants, occupancy time and intended use of space	X	X	X	X	X	X
–	Other useful data (e.g. internal temperature, building size, etc.)	X	X	X	X	O	O
1.3	Report on building surveying						
–	on-site measurements of weather data	O	O	O	O	O	O
–	interviews with building users, owners and maintenance personnel	X	X	X	X	X	X
–	details of any metering and sub metering arrangements in the building	X	X	X	X	X	X
–	building survey detailing heating and cooling zones	X	X	X	X	X	X
–	details on Energy contracts including tenancy agreements	X	X	X	X	X	X
–	details on mode and hours of operation of plants and equipment (heating system, mechanical ventilation, lighting, IT equipment, electrical appliances, etc.)	X	X	X	X	X	X
–	pictures (opaque and transparent elements of the envelope, heating system, mechanical ventilation, lighting, IT equipment, electrical appliances, etc.)	X	X	X	X	X	X
–	operation specifications of BMS, if any	X	X	X	X	X	X
–	results of tests, monitoring, metering and calibration certificates of instruments used, if any	X	X	X	X	X	X
1.4	Building survey						
–	maps, sections and prospects indicating intended use of space and details on heating and cooling systems	X	X	X	X	X	X
–	construction details (requested if ECM is implemented on the envelope)	O	O	O	O	O	O
–	building plans and technical reports on thermal and electrical systems and mechanical ventilation	X	X	X	X	X	X

1.5	Records on maintenance of thermal, electrical and air supply systems	x	x	x	x	x	x
1.6	Analysis of Energy consumption and related costs						
	– energy bills for each energy vector and utility (at least 12 months, recommended 36 months) and for any BMS system	x	x	x	x	x	x
	– details on baseline period taken into consideration	x	x	x	x	x	x
	– consumption profile (full-month data)	x	x	x	x	o	o
	– energy consumption index for each energy vector	x	x	x	x	o	o
	– cost analysis for each energy vector	x	x	x	x	o	o
	– analysis of tariff scheme of bills	x	x	x	x	x	x
	– analysis of power draw and development of load profiles	x	x	x	x	o	o
	– cost estimates and/or measurements carried out to allocate consumption to different end-use (e.g. lighting, heating, cooking equipment)	x	x	x	x	o	o
	– normalised baseline through a regression model	x	x	x	x	o	o
	– statistical specification of accuracy of normalised baseline	x	x	x	x	o	o
1.7	Calculation of interactive effects due to multiple ECMs					x	x
1.8	Energy audit report	x	x	x	x	x	x
1.9	M&V Plan (template: icp_option_c_m_v_plan_v1.0_template_160616)	x	x	x	x	x	x

		PROTOCOL					
		LT	LAB	ST	SAB	TT	TAB
Stage 2: SAVINGS CALCULATIONS							
2.1	Report on planned interventions and linked objectives	x	x	x	x	x	x
2.2	Energy calculation: technician qualifications, name and version of used software, third-party validation certificate			x	x	x	x
2.3	Energy calculation with dynamic simulation: technician qualifications, name and version of used software, report on correct calibration of model	x	x				
2.4	Description of input data						
	– weather data and building orientation	x	x	x	x	o	o
	– building geometry	x	x	x	x	o	o
	– data obtained from building survey and/or measurements	x	x	x	x	x	x
	– characteristics of the envelope and plants of both the initial situation and after project realization	x	x	x	x	x	x
	– energy costs at the initial situation	x	x	x	x	x	x
2.5	Calculation of interactive effects occurring as a result of ECMs					x	x
2.6	Description of output data						
	– building plans (maps, sections, prospects, construction details, plants etc.)	x	x	x	x	x	x
	– details on energy calculations and foreseen ECMs	x	x	x	x	x	x
	– estimate of energy consumption resulting from each intervention	x	x	x	x	x	x
	– estimate of energy savings resulting from each intervention	x	x	x	x	x	x
	– Interactive effects occurring beyond measurement boundary					x	x
2.7	Results analysis and comparison against benchmarks (reference energy indicators or results of similar past interventions)	x	x	x	x	x	x
2.8	Analysis of costs of intervention: technical feasibility, operational challenges, estimates (project planning, implementation, maintenance, estimate of equipment useful life expectancy)	x	x	x	x	x	x
2.9	Economic and financial evaluation of the investment and summary report	x	x	x	x	x	x

PROTOCOL					
LT	LAB	ST	SAB	TT	TAB

Stage 3: DESIGN, CONSTRUCTION AND VERIFICATION						
3.1 Operational performance verification (OPV) (template: icp_cx__opv__plan_v.1.0_template_160616)						
– description of verification activities (surveying, measuring, testing, etc.), roles and responsibilities of individuals involved in implementing the action	X	X	X	X	O	O
– definition of performance indicators to verify the interventions (individually and in overall terms)	X	X	X	X	O	O
3.2 Qualifications of individuals in charge of operational performance verification	X	X	X	X	X	X
3.3 Details on the requirements and implementation criteria of operational tests and measures, with reference to performance indicators to be verified	X	X	X	X	O	O
3.4 Training plan for staff dedicated to controls and operational performance verification /	X	X	X	X	X	X

	PROTOCOL					
	LT	LAB	ST	SAB	TT	TAB
Stage 4: OPERATIONS, MAINTENANCE AND MONITORING						
4.1 Operations, maintenance and monitoring (OM&M) (template: icp_om_m_plan_v.1.0_template_160616)						
– definition of performance indicators for continuous verification of interventions (individually and in overall terms)	X	X	X	X	X	X
– description of method, interval and duration of consumption monitoring for the continuous verification of performance indicators	X	X	X	X	X	X
– guidelines for addressing repairs and malfunctioning	X	X	X	X	X	X
– collection of data on system operation and record of maintenance works	X	X	X	X	X	X
– warranty of newly installed components	X	X	X	X	X	X
– definition of roles and responsibilities for management and control	X	X	X	X	X	X
– qualifications of staff in charge of management, maintenance and control	X	X	X	X	X	X
4.2 Training materials for OM&M staff) (may be integrated into the OPV Training Plan referred to in point 3.4)	X	X	X	X	X	X
4.3 Basic guidelines for OM&M staff manual	X	X	X	X	X	X
4.4 Basic guidelines for building use and maintenance manual	X	X	X	X	O	O
4.5 Basic guidelines for user's manual	X	X	X	X	X	X

	PROTOCOL					
	LT	LAB	ST	SAB	TT	TAB
Stage 5: MEASUREMENT AND VERIFICATION (M&V)						
5.1 Measurement and Verification Plan (M&V) (template: icp_option_c_m_v_plan_v1.0_template_160616)	X	X	X	X	X	X
5.2 Details on estimated parameters (system characteristics and/or adjustment factors)					X	X

Notes:
All data collected for technical, energy and financialanalysis (e.g. weather data, measurements, costs, etc.) should be reported together with details on origin, collection methods and measurement.

ANNEX B

Contractual requirements: Definition of the EPC articles

Step one, **minimum requirements** to be included in EPC as set forth by the Energy Efficiency Directive 2012/27/EU (Annex XIII):

- Clear and transparent list of the efficiency measures to be implemented or the efficiency results to be obtained
- Guaranteed savings to be achieved by implementing the measures of the contract
- Duration and milestones of the contract, terms and period of notice
- Clear and transparent list of the obligations of each contracting party
- Reference date(s) to establish achieved savings
- Clear and transparent list of steps to be performed to implement a measure or package of measures and, where relevant, associated costs
- Obligation to fully implement the measures in the contract and documentation of all changes made during the project
- Regulations specifying the inclusion of equivalent requirements in any subcontracting with third parties
- Clear and transparent display of financial implications of the project and distribution of the share of both parties in the monetary savings achieved (i.e. remuneration of the service provider)
- Clear and transparent provisions on measurement and verification of the guaranteed savings achieved, quality checks and guarantees
- Provisions clarifying the procedure to deal with changing framework conditions that affect the content and the outcome of the contract (i.e. changing energy prices, use intensity of an installation)
- Detailed information on the obligations of each of the contracting party and of the penalties for their breach

On the basis of the above mentioned minimum requirements (ref. Energy Efficiency Directive 2012/27/EU) and the technical aspects (ICP compliance), a complete specific set of contractual requirements in the form of EPC articles follow, ready to be used by contracting authorities in the form of an index guide linked to the SISMA EPC model. Other general contents of the articles may be developed by each partner according to specific national and local legislation.

ARTICLES

GENERAL INFORMATION	SPECIFIC REFERENCE TO THE SET EPC MODEL
Definitions	Acronyms and definitions points 1.3 & 4.1
Purpose and terms of agreement	Tables 2, 3 and 4

Subject of agreement	Tables 2, 3 and 4
Tender and sub-contract procedure if applicable	
Duration of agreement	
Termination of contract and express termination clause	
Contractor's obligations	Tables 3 and 4
Client's obligations	Tables 3 and 4
Safety and health requirements of construction site personnel	
Professional certifications if applicable	IREE certification of the project
Contract manager	
Responsible third parties	**1-Independent ICP credentialed developer** in charge of developing the ICP-Investor Confidence Project protocols. Activities performed: Baselining, Saving Projections, Design, Construction and Verification and planning of the OM&M and M&V activities. **2-IREE**: Investor Ready Energy Efficiency Certificate, issued by a certified independent third party (ICP Quality Assurer). **3-M&V activities**: done by an independent third party.
Address and contacts of contractor	
Compliance with policies and law	
Privacy clause	
Applicable law	
Notices	
Safety regulations	
Jurisdiction and dispute resolution	
Independent M&V documentation	

ECONOMIC AND TECHNICAL ASPECTS	SPECIFIC REFERENCE TO THE SISMA EPC MODEL
Contract price	**SET Excel spread sheet**_block n.4: Interventions and estimated investments
Public subsidy and energy efficiency bonds	Subsidies need to be verified and the eventual amount calculated with the SET Excel spread sheet
Payment terms and verification of savings	Table 1 and **SET Excel spread sheet** where all amounts in euros are defined. Verification of savings and eventual evening method and algorithm is specified in 4.3.

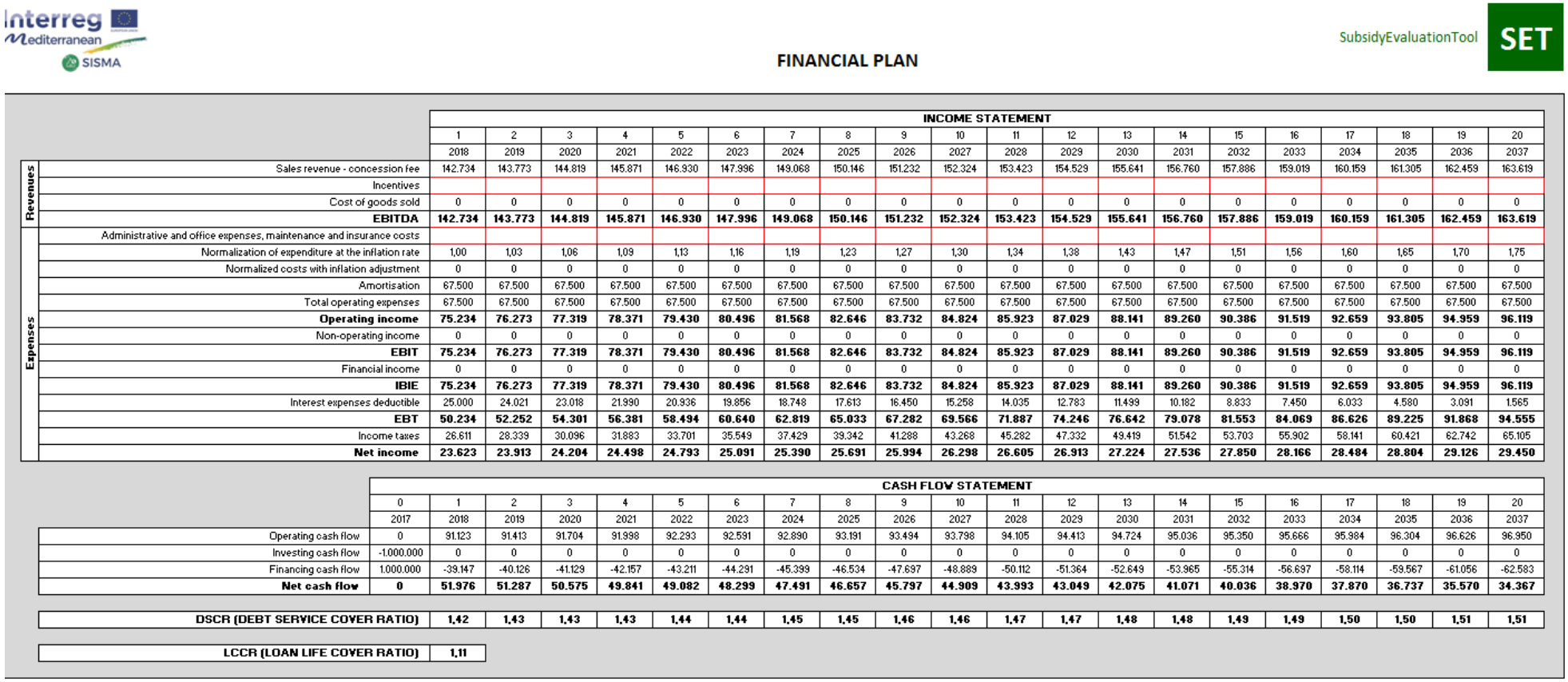
Definition of all financial parameters and data	Defined in **SET Excel spread sheets**
Project and payment modifications	
Contract charges and taxes	To be specified also in the **SET Excel spread sheet** in Parameters_financial assessment data
Funding	
Energy audit for implementation of energy efficiency measures	**SET option B** foreseen in the SISMA EPC model process_Figure 2
Energy efficiency interventions	**SET Excel spread sheet**_block n.4: Interventions and estimated investments
Technical tender documentation.	Annex A technical requirements_Documentation package for the project developer. Complete list of technical documentation for ICP compliance addressing the 5 protocol stages: Stage 1: BASELINING Stage 2: SAVINGS CALCULATIONS Stage 3: DESIGN, CONSTRUCTION AND VERIFICATION Stage 4: OPERATIONS, MAINTENANCE AND MONITORING Stage 5: MEASUREMENT AND VERIFICATION (M&V). IREE certification.
Buildings and power supply systems information and delivery terms	
Buildings and power supply systems re-delivery terms and certifications	

RESPONSIBILITIES OF PARTIES TO THE CONTRACT	SPECIFIC REFERENCE TO THE SISMA EPC MODEL
Responsibilities of contractor	Tables 3 and 4
Responsibilities of contractor for subcontractor	
Responsibilities of administration (behaviour code)	
Force majeure	
Guarantee and penalty clauses	
Security deposit	
Insurance guarantee - civil and criminal liability	
Penalty clauses	

ANNEX C

General technical/financial assessment: Financial assessment

To be done with the **SET Excel spread sheet** where, after inserting all the technical data of the building, the project's bankability is assessed checking the summary of cash flows together with DSC and LCC ratios, see the screen shot of the spread sheet that follows as an example.



Interreg Mediterranean SISMA

SubsidyEvaluationTool SET

FINANCIAL PLAN

INCOME STATEMENT

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Revenues	Sales revenue - concession fee	142.734	143.773	144.819	145.871	146.930	147.996	149.068	150.146	151.232	152.324	153.423	154.529	155.641	156.760	157.886	159.019	160.159	161.305	162.459	163.619
	Incentives																				
	Cost of goods sold	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	EBITDA	**142.734**	**143.773**	**144.819**	**145.871**	**146.930**	**147.996**	**149.068**	**150.146**	**151.232**	**152.324**	**153.423**	**154.529**	**155.641**	**156.760**	**157.886**	**159.019**	**160.159**	**161.305**	**162.459**	**163.619**
Expenses	Administrative and office expenses, maintenance and insurance costs																				
	Normalization of expenditure at the inflation rate	1,00	1,03	1,06	1,09	1,13	1,16	1,19	1,23	1,27	1,30	1,34	1,38	1,43	1,47	1,51	1,56	1,60	1,65	1,70	1,75
	Normalized costs with inflation adjustment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Amortisation	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500
	Total operating expenses	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500	67.500
	Operating income	**75.234**	**76.273**	**77.319**	**78.371**	**79.430**	**80.496**	**81.568**	**82.646**	**83.732**	**84.824**	**85.923**	**87.029**	**88.141**	**89.260**	**90.386**	**91.519**	**92.659**	**93.805**	**94.959**	**96.119**
	Non-operating income	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	EBIT	**75.234**	**76.273**	**77.319**	**78.371**	**79.430**	**80.496**	**81.568**	**82.646**	**83.732**	**84.824**	**85.923**	**87.029**	**88.141**	**89.260**	**90.386**	**91.519**	**92.659**	**93.805**	**94.959**	**96.119**
	Financial income	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	IBIE	**75.234**	**76.273**	**77.319**	**78.371**	**79.430**	**80.496**	**81.568**	**82.646**	**83.732**	**84.824**	**85.923**	**87.029**	**88.141**	**89.260**	**90.386**	**91.519**	**92.659**	**93.805**	**94.959**	**96.119**
	Interest expenses deductible	25.000	24.021	23.018	21.990	20.936	19.856	18.748	17.613	16.450	15.258	14.035	12.783	11.499	10.182	8.833	7.450	6.033	4.580	3.091	1.565
	EBT	**50.234**	**52.252**	**54.301**	**56.381**	**58.494**	**60.640**	**62.819**	**65.033**	**67.282**	**69.566**	**71.887**	**74.246**	**76.642**	**79.078**	**81.553**	**84.069**	**86.626**	**89.225**	**91.868**	**94.555**
	Income taxes	26.611	28.339	30.096	31.883	33.701	35.549	37.429	39.342	41.288	43.268	45.282	47.332	49.419	51.542	53.703	55.902	58.141	60.421	62.742	65.105
	Net income	**23.623**	**23.913**	**24.204**	**24.498**	**24.793**	**25.091**	**25.390**	**25.691**	**25.994**	**26.298**	**26.605**	**26.913**	**27.224**	**27.536**	**27.850**	**28.166**	**28.484**	**28.804**	**29.126**	**29.450**

CASH FLOW STATEMENT

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Operating cash flow	0	91.123	91.413	91.704	91.998	92.293	92.591	92.890	93.191	93.494	93.798	94.105	94.413	94.724	95.036	95.350	95.666	95.984	96.304	96.626	96.950
Investing cash flow	-1.000.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Financing cash flow	1.000.000	-39.147	-40.126	-41.129	-42.157	-43.211	-44.291	-45.399	-46.534	-47.697	-48.889	-50.112	-51.364	-52.649	-53.965	-55.314	-56.697	-58.114	-59.567	-61.056	-62.583
Net cash flow	**0**	**51.976**	**51.287**	**50.575**	**49.841**	**49.082**	**48.299**	**47.491**	**46.657**	**45.797**	**44.909**	**43.993**	**43.049**	**42.075**	**41.071**	**40.036**	**38.970**	**37.870**	**36.737**	**35.570**	**34.367**

DSCR (DEBT SERVICE COVER RATIO)	**1,42**	**1,43**	**1,43**	**1,43**	**1,44**	**1,44**	**1,45**	**1,45**	**1,46**	**1,46**	**1,47**	**1,47**	**1,48**	**1,48**	**1,49**	**1,49**	**1,50**	**1,50**	**1,51**	**1,51**

LCCR (LOAN LIFE COVER RATIO)	**1,11**