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Energy Performance Contracts in Piemonte

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Summary

1. Allocation of risks in the EPC
2. The bundling approach
3. The concept (Administrative, financial, technical issues)
4. Technical details
5. Financial assessment
6. Measurement and verification of the performance
7. Examples in Piemonte

Energy Performance Contracts

OPERATION RISK ALLOCATION IN THE EPC

The legal nature of the EPC in a PPP context, imposes that the ESCO must take on specific risks:

TECHNICAL RISKS: risks regarding the planning and design of the technical solutions phase, risks regarding the technical efficiency of the measures and services performed;

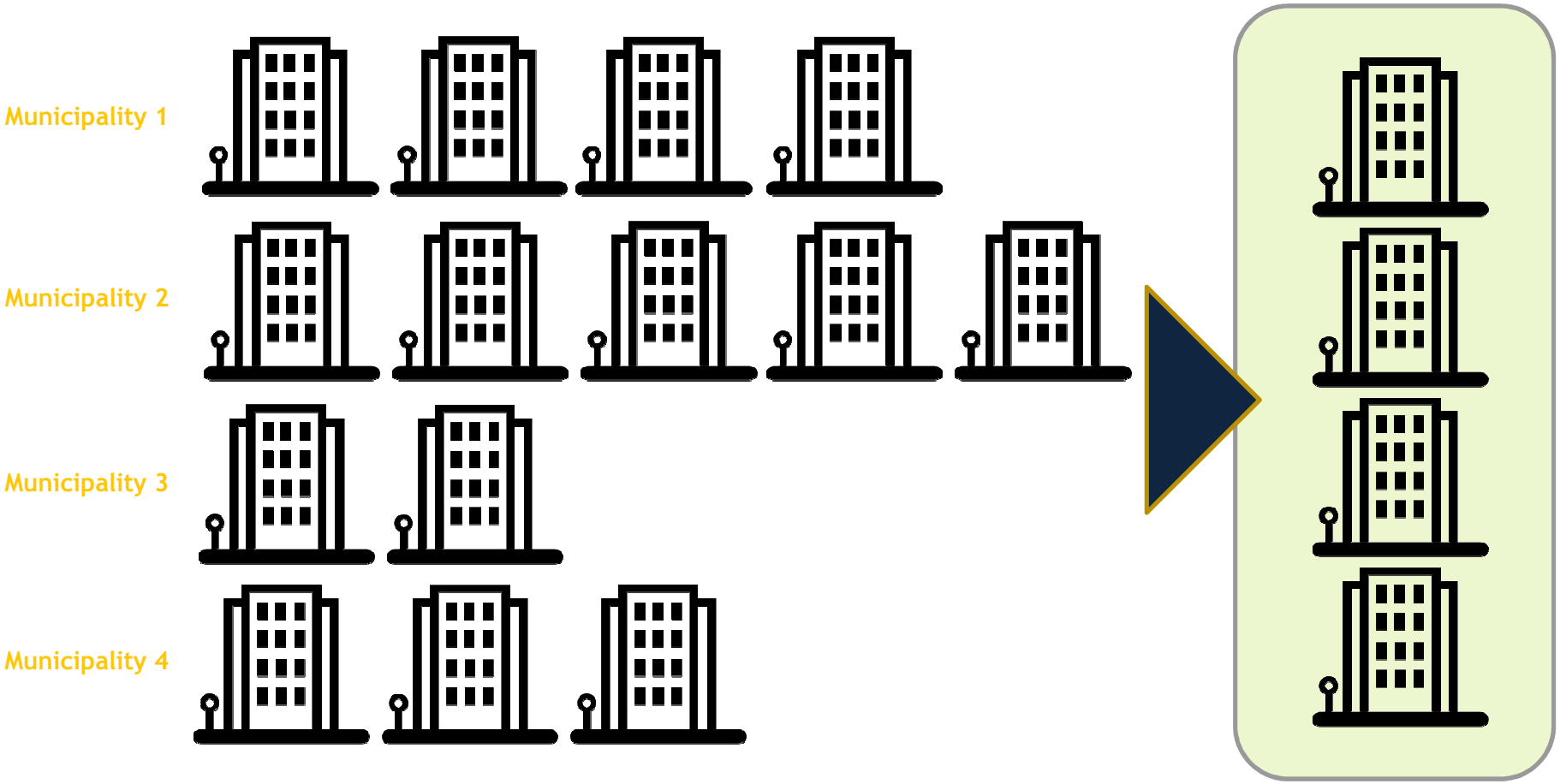
FINANCIAL INVESTMENT RISK: increase in the cost of loans and money over the contract duration

CONSTRUCTION RISKS: related to the late completion of works, non compliance to planned standards, increase in building costs, any inconveniences related to the building performance and activities as well as the non completion of the e.e measures.

PERFORMANCE RISK: the risk of not reaching guaranteed performances and results implicates the proportioned reduction of payback fees

LESS ENERGY SAVINGS = LESS PAYBACK FEES

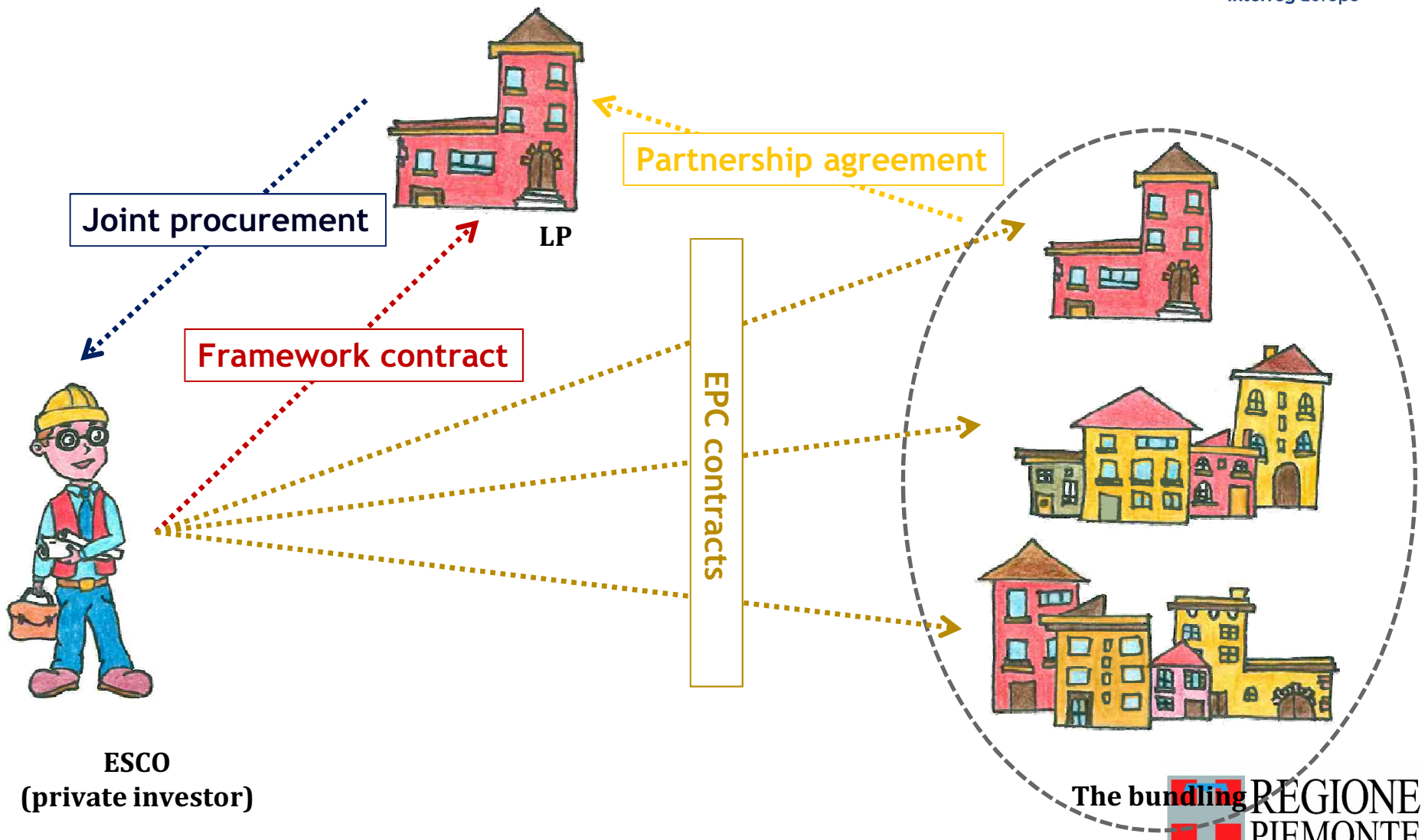
Aggregation of demand



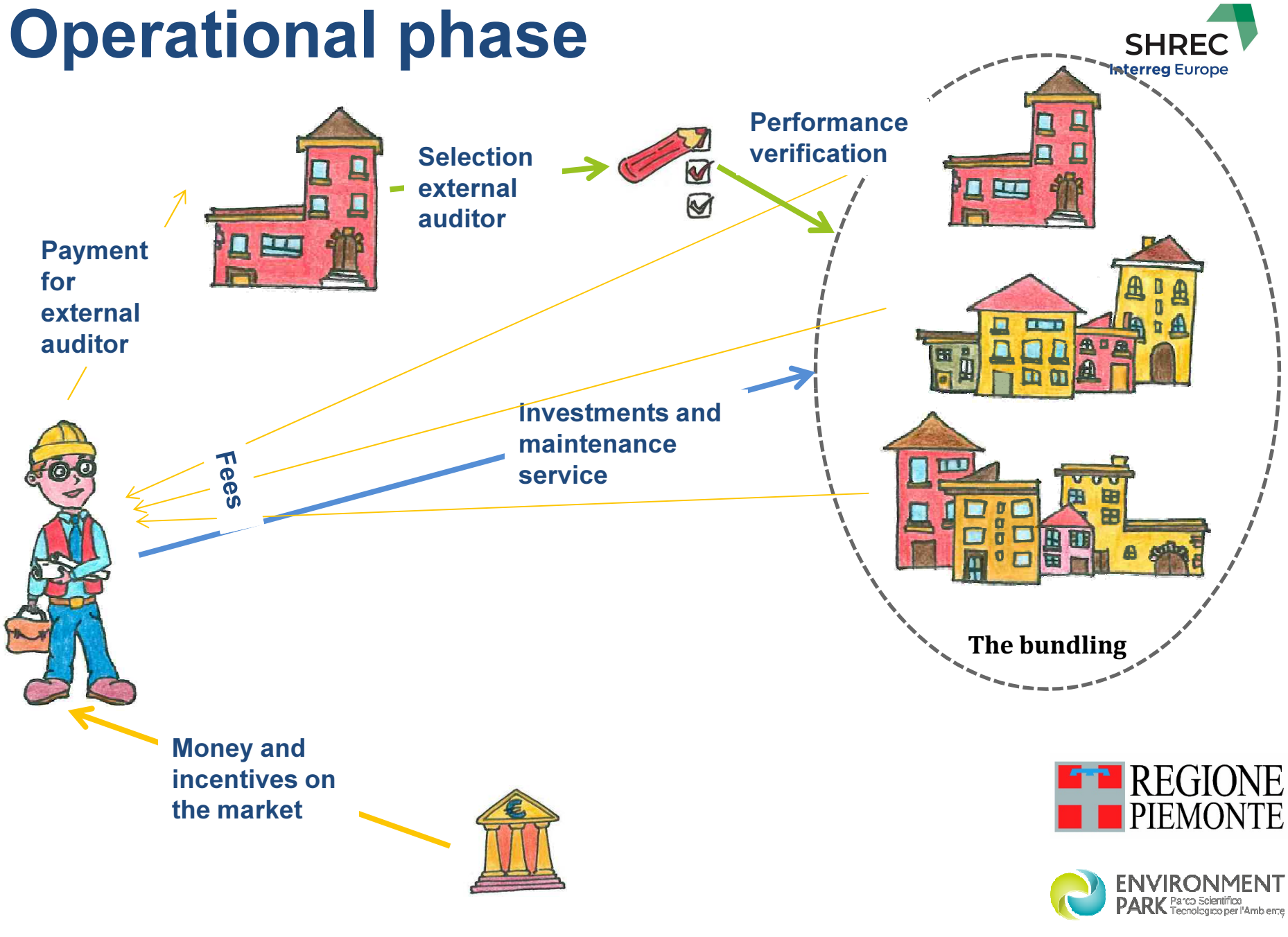
Implementation of the EPC Investment Plan

1. **Energy Audit and financial assessment**
2. **Tendering process (joint procurement)**
3. **Operational phase**
   - Investment implementation
   - Maintenance services delivery
   - Measurement and verification procedure

Tendering procedure



Operational phase



Step by Step technical assessment

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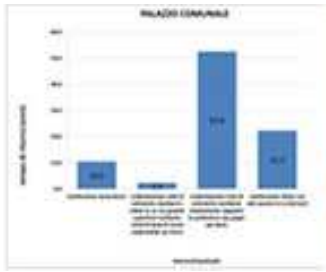
Technical assesment for starting an EPC investment with Public Authotities

Select the buildings

Energy Audit



Financial assessment and selection of the most suitable scenario

Elaboration of tender schemes, contracts and specifications .

Tender procurement

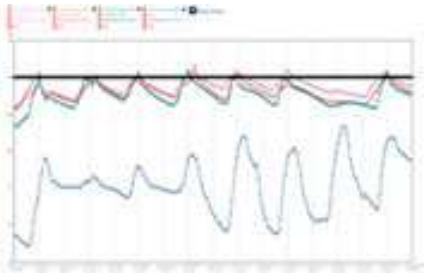
Contract signature

Activities during the EPC

Planning

Implementation

O&M



M&V

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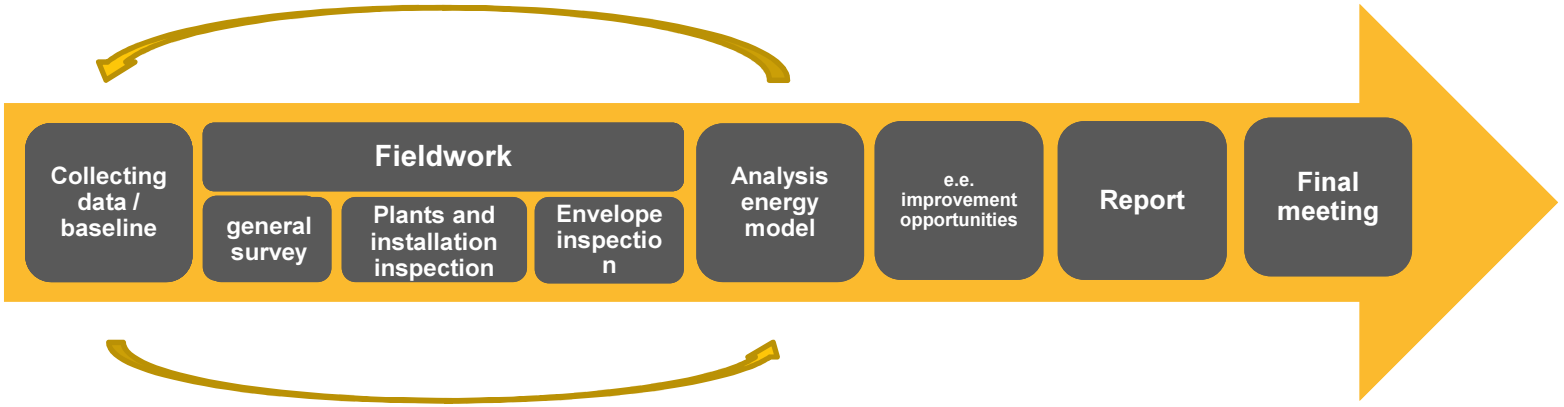
Energy Audit



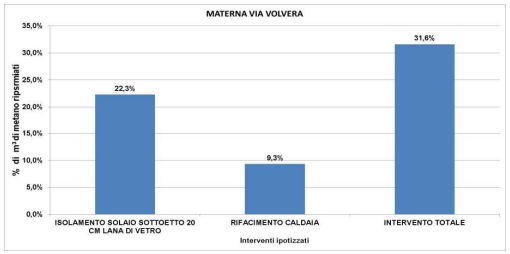
The methodology is defined by the European Standard EN 16247:2014
«an energy audit can help an organization to identify opportunities to improve energy efficiency»

The energy audit report provides:

- A description of the use and operation of buildings
- A description of heating, cooling, ventilation, lighting and domestic hot water systems
- A description of the thermal envelope
- The baseline of:

Energy consumption
Energy cost
O&M cost

- List of potential energy efficiency measures with the related implementation cost, energy savings expected, and payback time of the investments



Summary table for proposed scenarios	
Measures	Payback time
Boiler replacement	7,4
Ceiling insulation on attic with 20cm of glass wool	2,5

Energy Audit – Energy model- validation

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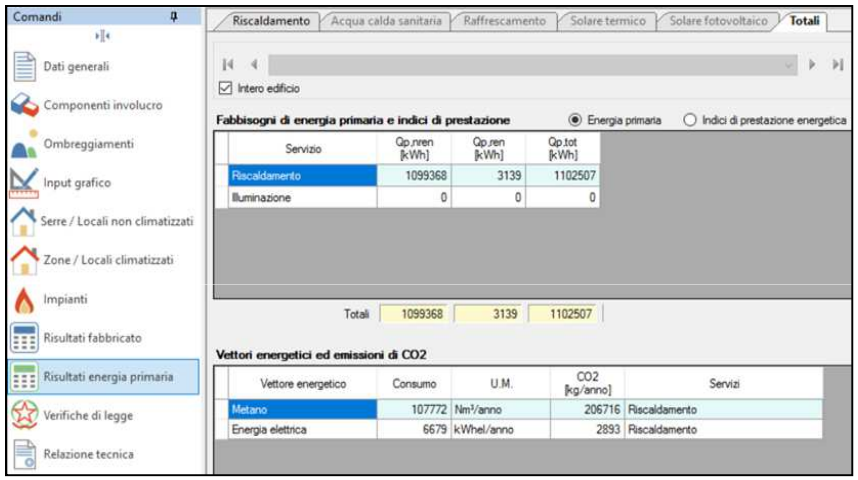
"the energy modelling or calculation should be at level appropriate to the scope and thoroughness of the energy audit the modelled energy use should ideally be **checked for consistency** with actual measured energy consumption"

calculated by software



measured by meter

The energy model results have to represented the real condition

- External temperature (day degree)
- Internal temperature
- Heated and cooled volumes
- Hours of use
- Etc.

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Energy Audit – Energy model- validation

ENERGY MODEL VALIDATION			
Thermal season	Energy consumption measured (methane gas Sm^3)	Energy consumption calculated (Sm^3)	Difference (%)
2015-2016	23.930	24.811	3,7%
2016-2017	23.463	22.844	-2,6%
2017-2018	24.287	24.007	-1,2%
average	23.893	23.887	|2,5%|
energy consumption normalized on day degree	**23.887**	**Day degree of reference**	**2.496**

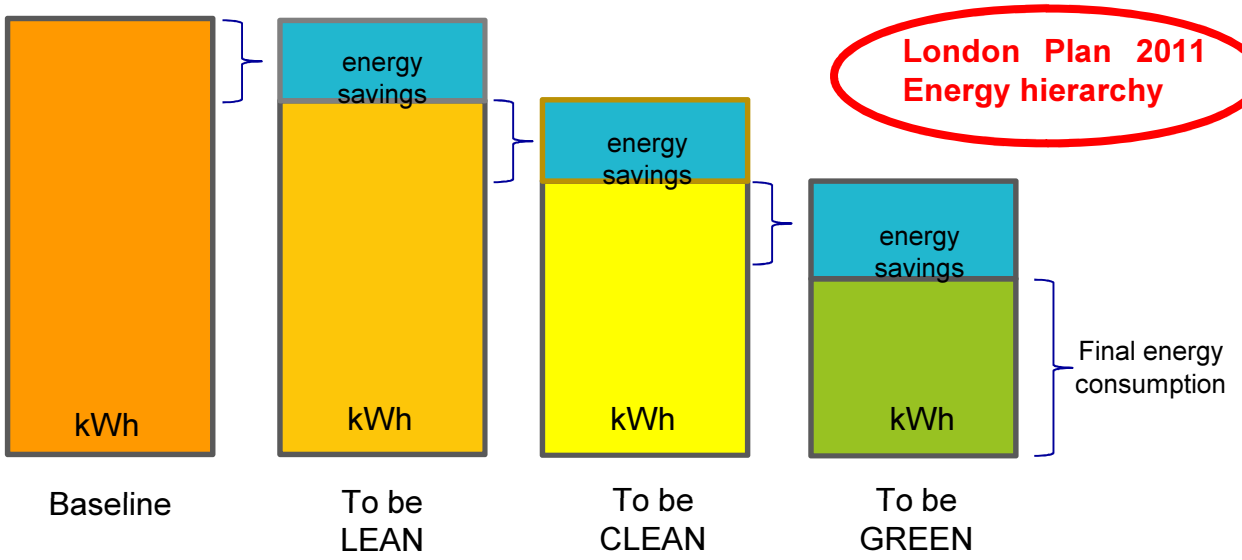
$$-5\% < \frac{(energy\ consumption\ measured - energy\ consumption\ calculated)}{energy\ consumption\ caculated} < 5\%$$

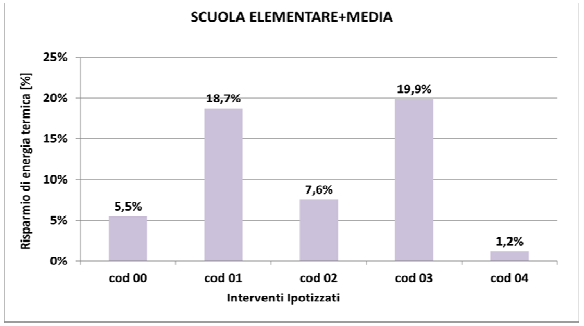
→ ***Validated!***

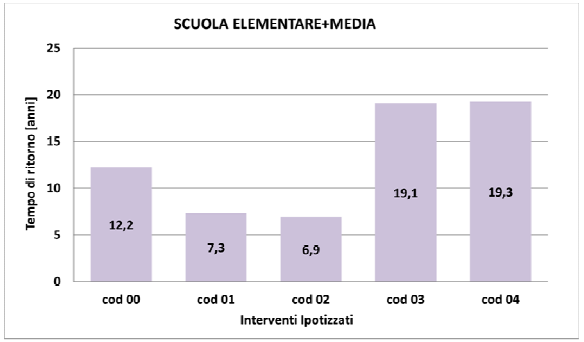
The validated energy model is used to define the energy saving for each energy efficiency measurment simulated

The energy savings value depends by the baseline

Energy Audit – Energy Efficiency Measures







1) To be Lean: use less energy manage demand during operation and optimize the functioning of the building , envelope and plant system (eg: LED lighting, structural insulation, efficiency of doors and windows, temperature control, changes in use methods, etc.);

2) To be Clean: Increased efficiency of on-site energy production systems through the exploitation of high-efficiency technologies (eg: replacement of heat generator with a high-efficiency one, high efficiency chiller, district heating, district cooling, cogeneration);

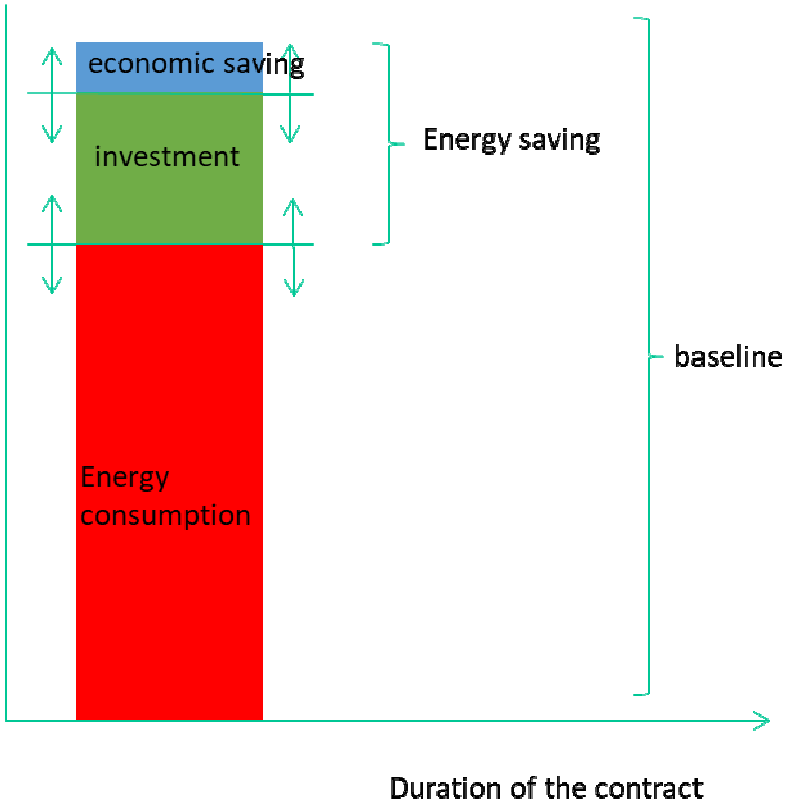
3) To be Green: generate, store and use renewable energy on- site (es: Heat Pump ,PV plant, etc.).

EPC conditions

Based on Energy Audit results the EPC conditions were defined in order to make the contract attractive for ESCo:

- Duration of the contract (the payback time of energy savings measures should be lower than contract duration)
- Minimum energy savings required
- Minimum economic saving required
- Minimum Investment value required

Target: to find a balance between private and public interest



Economic & Financial Analysis

In order to define the economic indicators a detailed economic and financial analysis must be performed considering several variables:

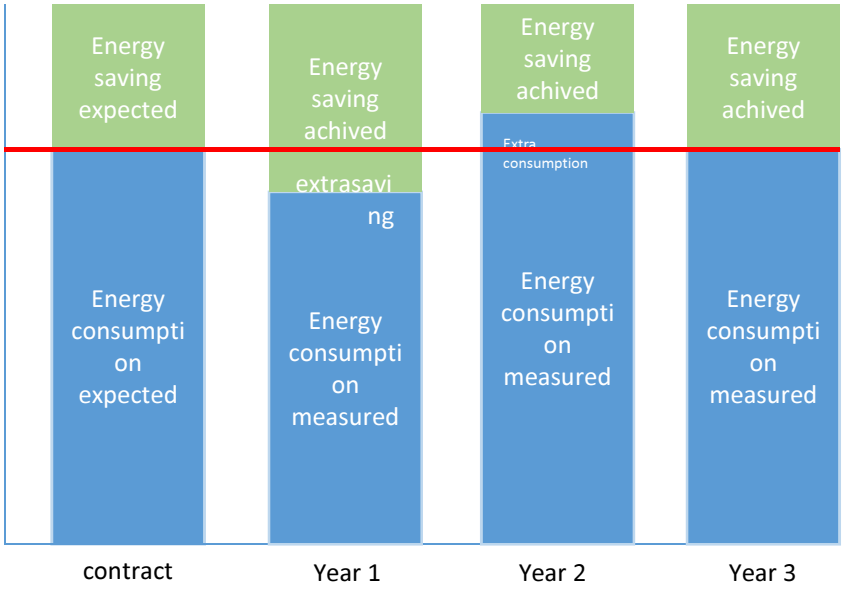
- Energy carrier cost (paid by ESCo)
- EEM implementation cost (works paid by ESCo)
- Contract management cost (paid by ESCo)
- Design cost (paid by ESCo)
- O&M cost (paid by ESCo)
- M&V cost (paid by ESCo)
- Bank interest rate (mortgage)
- Inflation rate
- Energy carrier inflation rate
- Equity
- Taxes on profint
- Incentives and subsidy
- .....
- ……

Economic indicators could help to understand the economic and financial feasibility of a EPC contract

International Rate Return (IRR) > 8%
Net Present Value (NPV) positive
Debt Service coverage Ratio (DSCR) > 1,3
NPV/INVESTIMENT positive

Plan for the measurement and verification of performance

The guarantee of savings is set in the contract and the energy service company usually guarantees the annual volume of energy savings in physical units (such as MWh).



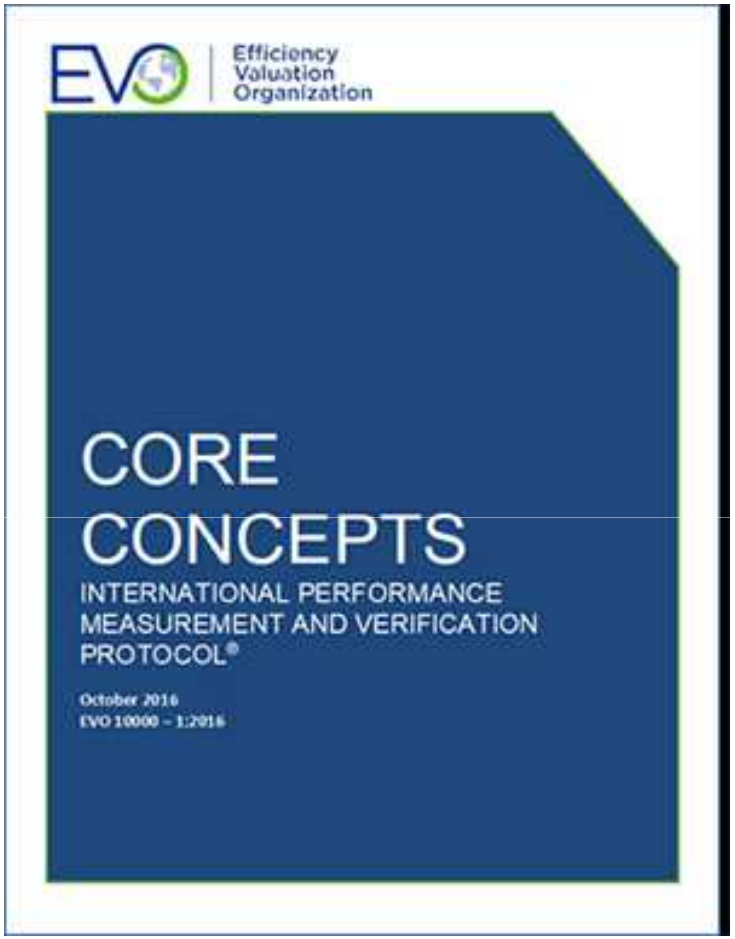
If the savings are smaller than the guaranteed volume of savings, the corresponding amount is usually fully reimbursed by the ESCO to the client according to the contract.

If the savings are higher than the guaranteed volume, excess savings are to be divided between ESCO and client according to the methodology defined by the contract.

The transparency of the savings achieved depends on the quality of measurement & verification (M&V) provided. In general the more independent M&V on the ESCO, the more transparent are the energy savings.

Plan for the measurement and verification of performance

The International Performance Measurement and Verification Protocol (IPMVP) can provide an overview of current best practice techniques available for verifying results of energy efficiency projects.



Plan for the measurement and verification of performance

www.eco-world.org

EPC investments in Piemonte

Type of investments	Amount	Status	Project
18 public buildings (5 Municipalities)	2.5 M€*	***Awarded*** *and in operation*	2020Together
3.000 street light points (6 Municipalities)	2.4 M€*	***Awarded*** *and in construction phase*	2020Together
3 public buildings (1 Municipality)	0.5 M€**	***Failed***	PEACE_Alps
8 public buildings (4 Municipalities)	0.5 M€**	***Failed***	STEPPING
6 public buildings (2 Municipalities)	0.5 M€**	*Tender launched.* ***No bids***	STEPPING
8 public buildings (1 public authority)	2 M€*	***Awarded*** *. Design phase*	STEPPING
16 public buildings (10 Municipalities)	1 M€*	***Awarded*** *. Design phase*	STEPPING

*Awarded **Baseline

EPC investments in Piemonte

- Energy Renovation of 18 public buildings coupled with energy supply
- EPC duration of 13 years (1 for construction + 12 of maintenance)
- 5 Municipalities and Bosch Energy and Solutions Italy as ESCO

- Guaranteed savings by 61% with a shared system in the case of over-performance (70-30)
- Investments: 2.5 M€ + VAT

EPC investments in Piemonte

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Site visits

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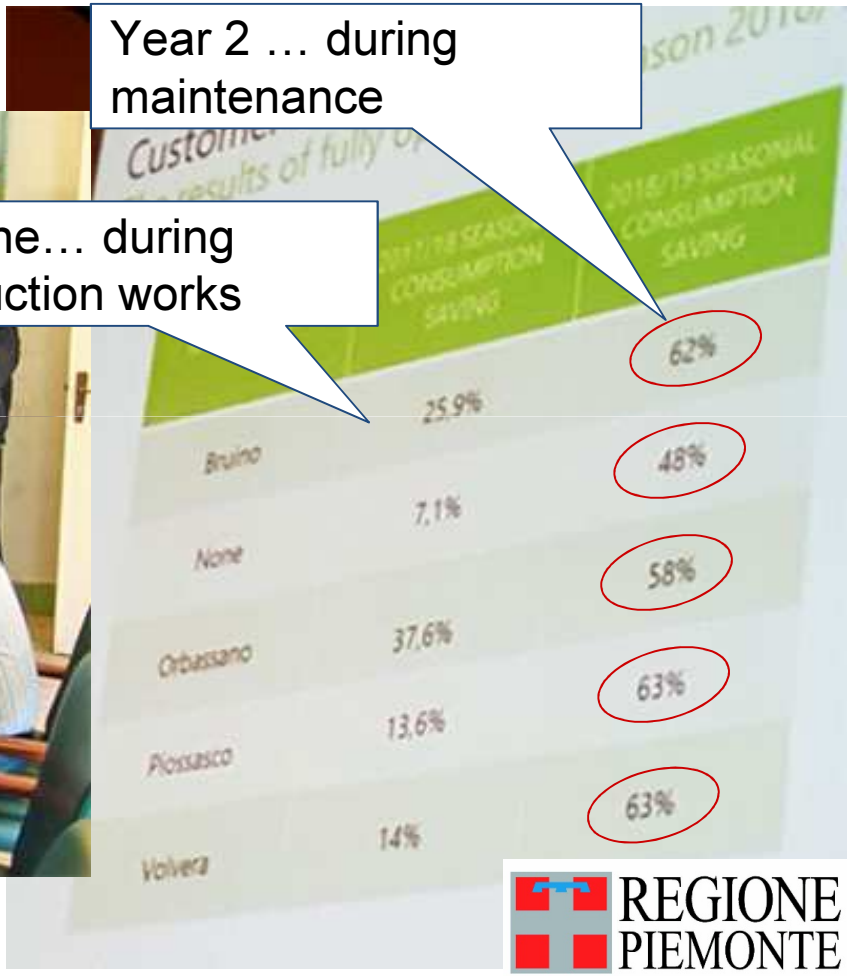
Year one… during construction works



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CONCLUSIONS

- TPF and EPC can be a solution but their feasibility must be adequately assessed on a case by case basis
- EPC can provide benefits for the Public Administration, but these are not only to be considered from a financial point of view
- PDA services are essential in order to keep the public interest as the top priority
- Maintenance and management phase is key and measurement and verification phase must be carefully considered from the beginning
- It is crucial to move the attention to impacts in their broader senses

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Thank you!

Questions welcome

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