

EPC SIMULATION TOOL USER MANUAL

March 2022

Prepared by

Environment Park S.p.A.

Table of contents

1.	INTRODUCTION	3
2.	SCOPE OF THE EPC SIMULATION TOOL	3
3.	MAIN FEATURES OF THE EPC SIMULATION TOOL	4
4.	USE OF THE TOOL	5
4.1.	STEPPING	5
4.2.	BUILDING BASELINE	5
4.3.	BUILDINGS ENERGY SAVINGS	8
4.4.	INPUT DATA	12
4.4.1.	Energy cost	13
4.4.2.	Administrative and technical cost	14
4.4.3.	Financial and economic parameters	15
4.4.4.	Other financial parameters	16
4.5.	SCENARIOS	17
4.6.	CHARTS & TABLES	21
4.7.	CASH FLOW	26

1. INTRODUCTION

This User Manual provides definitions and explanations on the use of the EPC simulation Excel tool.

The EPC Simulation Tool is an Excel file that can be used autonomously and thanks to this User Manual, and a simple and intuitive interface, the user will be able to easily find and enter all the necessary data for the simulation of one or more Energy Performance Contract (EPC) and related Financial and Economic Plan (PEF) for the energy requalification of existing buildings.

2. SCOPE OF THE EPC SIMULATION TOOL

The main objective of the EPC Simulation Tool is to define possible investment scenarios for the energy refurbishment of buildings by simulating the investor's PEF under EPC.

The EPC Simulation Tool allows to:

1. Check the sustainability of the investment through four economic indicators:
 - NVP (Net Present Value)
 - IRR (Internal Rate of Return).
 - DSCR (Debt Service Coverage Ratio)
 - Profitability Index (NVP/investment)
2. Define the contractual conditions of an EPC to make the investment attractive to the market operator and building owners too. The EPC contractual conditions defined in each scenario are:
 - Energy supply
 - Total thermal energy savings (%)
 - Total electric energy savings (%)
 - Amount of energy refurbishment works (€)
 - Value of the annual fee paid by the building owner to the investor (ESCo), (€)
 - Value of the annual fee paid to the investor (ESCo) in relation to baseline costs incurred annually by the building owner (%)
 - Contract duration

3. Simulate investment plans for energy refurbishment including groups of buildings from different owners.

Be careful: the user of the EPC Simulation Tool must have the necessary technical knowledge to enter the correct data, make suitable choices between different options and correctly interpret the results. In particular, before simulating investment scenarios, it is necessary to carry out energy audits of the buildings considered in order to define savings percentages and investment values.

3. MAIN FEATURES OF THE EPC SIMULATION TOOL

The Excel file consists of seven sheets:

1. STEPPING
2. BUILDING BASELINE
3. BUILDING ENERGY SAVINGS
4. INPUT DATA
5. SCENARIOS
6. CHARTS & TABLES
7. CASH FLOW

In order to carry out a simulation, the user must **enter the required data in the white cells** of sheets 2, 3, 4 and 5. **All other cells containing text or formulas are locked and cannot be changed by the user.** Sheets 1, 6 and 7 contain information or the results of simulations and must not be changed by the user. The user has to fill in the sheets in sequence starting from 2 to 5 and display the results in sheets 6 and 7. Once all the spreadsheets have been filled in, the user can create new scenarios by modifying some data entered in sheets 2, 3, 4 and 5.

The operation of each spreadsheet will be described in details in the following sections.

- **use**, indicate by selecting from the drop-down menu the intended use of the building, choose between residential, offices, school, gym, swimming pool, theatre, other.

In the second part of the table (blue part) the user has to indicate for each building the annual costs for operation and maintenance as well as the energy consumption and related costs:

BASELINE											
energy heating consumption	energy heating annual cost	energy heating consumption	energy heating annual cost	energy heating consumption	energy heating annual cost	energy heating consumption	energy heating annual cost	energy heating consumption	energy heating annual cost	energy heating consumption	energy heating annual cost
methan	methan	wood biomass (pellets)	wood biomass (pellets)	wood biomass (chips)	wood biomass (chips)	district heating	district heating	diesel	diesel	LPG	LPG
m ³	€	t	€	t	€	kWh	€	lt	€	lt	€
10.000	7.000			500	15.000						
						90.000	8.100				

- **energy heating consumption - methan – m³**, indicate annual methane consumption
- **energy heating annual cost - methan - €**, indicate the annual cost for the methane purchase
- **energy heating consumption – wood biomass (pellets) - t**, indicate wood biomass (pellets) consumption
- **energy heating annual cost – wood biomass (pellets) - €**, indicate the annual cost for the wood biomass (pellets) purchase
- **energy heating consumption – wood biomass (chips) - t**, indicate wood biomass (chips) consumption
- **energy heating annual cost – wood biomass (chips) - €**, indicate the annual cost for the wood biomass (chips) purchase
- **energy heating consumption – district heating - kWh**, indicate district heating consumption
- **energy heating annual cost – district heating - €**, indicate the annual cost for the thermal energy purchase provide by district heating
- **energy heating consumption - diesel - lt**, indicate annual diesel consumption
- **energy heating annual cost – diesel - €**, indicate the annual cost for the diesel purchase
- **energy heating consumption LPG - lt**, indicate annual LPG consumption
- **energy heating annual cost – LPG - €**, indicate the annual cost for the LPG purchase
- **electric energy consumption KWhe**, indicate annual electric energy consumption
- **electric energy annual cost €**, indicate the annual cost for the electric energy purchase

- **O&M annual cost €**, indicate the annual cost for operation and maintenance services of the building system

After entering the data, the sheet will automatically calculate the following values in three grey cells per row:

total energy heating consumption	total energy heating annual cost	electric energy consumption	electric energy annual cost	O&M annual cost	Baseline energy cost
kWh	€	kWhe	€	€	€
95.900	7.000,00	10.000	2.000	1.000	10.000,00
1.920.000	15.000,00	40.000	8.000	3.000	26.000,00
90.000	8.100,00	15.000	3.000	500	11.600,00

- **Total energy heating consumption kWh**, sum of all energy heating consumptions entered by the user and converted to kWh
- **Total energy heating annual cost €**, sum of all energy heating annual costs entered by the user
- **Baseline energy cost €**, sum of all costs entered in the same row by the user (heating, electricity and O&M).

At the end of the insertion of all the data, at the bottom of the table it is possible to visualize the totals of the sums of each category both of energy consumption and cost, in this way the user has the possibility to visualize the overall baseline of the bundling inserted in the EPC simulation.

energy heating consumption	energy heating annual cost	energy heating consumption	energy heating annual cost	energy heating consumption	energy heating annual cost	energy heating consumption	energy heating annual cost	energy heating consumption	energy heating annual cost	energy heating consumption	energy heating annual cost	total energy heating consumption	total energy heating annual cost	electric energy consumption	electric energy annual cost	O&M annual cost	Baseline energy cost
methan	€	wood biomass	€	wood biomass	€	wood biomass	€	district heating	€	diesel	€	LPG	€	kWh	€	€	€
10.000	7.000	0	0	500	15.000	50.000	8.100	0	0	0	0	2.105.900	95.100	65.000	13.000	4.500	47.600

4.3. BUILDINGS ENERGY SAVINGS

In the "Building Energy Savings" sheet it is necessary to insert the percentages of energy savings that can be obtained following the implementation of the interventions foreseen in the simulated EPC.

BUILDINGS		SAVINGS															
Building Owner	buildings	energy heating saving	new energy heating consumption	energy heating saving	new energy heating consumption	energy heating saving	new energy heating consumption	energy heating saving	new energy heating consumption	energy heating saving	new energy heating consumption	energy heating saving	new energy heating consumption	energy heating saving	new energy heating consumption	energy heating saving	new energy heating consumption
		methan	methan	wood biomass (pellets)	wood biomass (pellets)	wood biomass (chips)	wood biomass (chips)	district heating	district heating	district heating	district heating	district heating	district heating	district heating	district heating	district heating	district heating
		%	m3	%	t	%	t	%	kWh	%	kWh	%	kWh	%	kWh	%	kWh
Torino	Dante Alighieri Primary School		10.000														10.000
Milano	New Theatre						500										40.000
Cuneo	Municipal Warehouses								90.000								15.000
TOTAL		0%	10.000	0%	0	0%	500	0%	90.000	0%	0	0%	0	0%	0	0%	65.000

The percentages entered by the user must be the result of previous technical analysis (Energy Audits). The EPC Simulation Tool is a tool to support economic and financial analysis and should be complementary to technical and energy analyses.

The "Building Energy Savings" sheet should be filled after the "Building Baseline".

The sheet displays some general data about the owners and buildings included in the "Building Baseline" sheet:

BUILDINGS	
Building Owner	buildings
Torino	Dante Alighieri Primary School
Milano	New Theatre
Cuneo	Municipal Warehouses

- Building Owner
- building

- **new energy heating consumption methane m³**, in case of methane consumption, the tool automatically calculates the new annual consumption expected as a result of energy efficiency measures
- **new energy heating consumption wood biomass (pellets) t**, in case of wood biomass (pellets) consumption, the tool automatically calculates the new annual consumption expected as a result of energy efficiency measures
- **new energy heating consumption wood biomass (chips) t**, in case of wood biomass (chips) consumption, the tool automatically calculates the new annual consumption expected as a result of energy efficiency measures
- **new energy heating consumption district heating kWh**, in case of thermal energy consumption delivered by district heating, the tool automatically calculates the new annual consumption expected as a result of energy efficiency measures
- **new energy heating consumption diesel lt**, nel caso in cui sia presente un consumo di gasolio il tool calcola automaticamente il nuovo consumo annuale a seguito degli interventi di efficientamento energetico
- **new energy heating consumption LPG lt**, in case of LPG consumption, the tool automatically calculates the new annual consumption expected as a result of energy efficiency measures
- **new electric energy consumption kWh**, in case of electric energy consumption, the tool automatically calculates the new annual consumption expected as a result of energy efficiency measures

The tool gives the possibility to simulate an EPC in which it is foreseen the replacement of an energy carrier with another one, in this case the user has to set to zero the consumption of the energy carrier to be replaced, select the new carrier and indicate the new consumption

SAVINGS									
energy heating saving wood biomass (chips)	new energy heating consumption wood biomass (chips)	energy heating saving district heating	new energy heating consumption district heating	energy heating saving diesel	new energy heating consumption diesel	energy heating saving LPG	new energy heating consumption LPG	new energy carrier consumption	electric energy saving
%	t	%	kWh	%	lt	%	lt		%
40,0%	300							methan	20,0%
		50,0%	45.000					methan	8.000
								wood biomass (pellets)	16.000
								wood biomass (chips)	11.250
								district heating	
								diesel	
								LPG	
								electricity	



The following is an example in which it is assumed that a wood chip biomass heat generator is to be replaced with a new methane one; in this case the cells to be filled in to enter the new vector and relative consumption are:

SAVINGS											
energy heating saving wood biomass (chips) %	new energy heating consumption wood biomass (chips) t	energy heating saving district heating %	new energy heating consumption district heating kWh	energy heating saving diesel %	new energy heating consumption diesel lt	energy heating saving LPG %	new energy heating consumption LPG lt	new energy carrier consumption methan m3	electric energy saving %	new electric energy consumption kWh	
100,0%								7.500	20,0%	8.000	
		50,0%	45.000						60,0%	16.000	
									25,0%	11.250	

- **energy heating saving wood biomass (chips) %**, write 100% energy savings as a result of the elimination of the wood biomass (chips) heat generator
- **new energy carrier consumption**, select from the drop-down menu the methane energy carrier and fill in the white cell indicating the new energy consumption.

Be careful: in "new energy carrier consumption" in "new energy carrier consumption" it is possible to select only one energy carrier for all the buildings

At the end of the insertion data, at the bottom of the table it is possible to visualize both the totals of the new energy consumptions and the energy saving both overall and for each single carrier, in this way the user has the possibility to visualize the new consumptions and the savings of all the buildings inserted in the EPC simulation.



STEPPING PLUS

BUILDINGS		SAVINGS														
Building Owner	buildings	energy heating saving methan %	new energy heating consumption methan m3	energy heating saving wood biomass (chips) %	new energy heating consumption wood biomass (chips) t	energy heating saving wood biomass (chips) %	new energy heating consumption wood biomass (chips) t	energy heating saving district heating %	new energy heating consumption district heating kWh	energy heating saving diesel %	new energy heating consumption diesel lt	energy heating saving LPG %	new energy heating consumption LPG lt	new energy carrier consumption methan m3	electric energy saving %	new electric energy consumption kWh
Torino	Garze Algham Primary School	100,0%	7.000												20,0%	8.000
Milano	New Theatre					100,0%								7.500	60,0%	16.000
Cuneo	Municipal Warehouse					50,0%	45.000								25,0%	11.250

4.4. INPUT DATA

The "Input Data" sheet allows defining the economic and financial conditions necessary to simulate the different investment scenarios and the EPC contractual conditions

INPUT DATA								
Energy cost			Energy conversion			inflation rate		
Energy carrier	P.A. energy cost	Unit	ESCO energy cost	Unit	kWh/Unit	Unit		Unit
methan	0,700	€/m3		€/m3	9,59	m ³		%
wood biomass (pellets)		€/t		€/t	4900	t		%
wood biomass (chips)	30,000	€/t		€/t	3840	t		%
district heating	0,090	€/kWh		€/kWh				%
diesel		€/lt		€/lt	9,17	lt		%
LPG		€/lt		€/lt	6,52	lt		%
Electricity	0,200	€/kWh		€/kWh				%
Administrative and technical costs								
Tender cost		%						
Design cost		%						
PMVP		%						
O&M		%						
Financial and economic parameters								
Loan 1								
Bank interest rate		%						
Loan duration	0	years						
Investment covered by loan 1		%						
Loan 2								
Bank interest rate		%						
Loan duration	0	years						
Investment covered by loan 2		%						
Other financial parameters								
Discount rate		%						
Inflation rate		%						
ESCO business profit		%						
EQUITY	100,0%	%						
Taxes on profits		%						
WACC (before taxes)	#DIV/0!	%						
WACC	#DIV/0!	%						

It is therefore necessary to enter several parameters relating to:

- **Energy Cost**
- **Administrative and technical costs**
- **Financial and economic parameters**
- **Other financial parameters**

4.4.1. Energy cost

Based on the data entered by the user in the sheets "Building Energy Savings" and "Building Baseline" the tool automatically calculates the unit prices, with which the building owner(s) purchased the energy carriers.

Energy carrier	P.A. energy cost	Unit
methan	0,700	€/m3
wood biomass (pellets)		€/t
wood biomass (chips)	30,000	€/t
district heating	0,090	€/kWh
diesel		€/lt
LPG		€/lt
Electricity	0,200	€/kWh

In this sheet the user, in case he intends to simulate the profitability of an EPC in which energy supply is included, has to enter for each energy carrier the unit price at which the investor (ESCO) is expected to buy it:

Energy cost				
Energy carrier	P.A. energy cost	Unit	ESCO energy cost	Unit
methan	0,700	€/m3	0,690	€/m3
wood biomass (pellets)		€/t		€/t
wood biomass (chips)	30,000	€/t	25,000	€/t
district heating	0,090	€/kWh	0,090	€/kWh
diesel		€/lt		€/lt
LPG		€/lt		€/lt
Electricity	0,200	€/kWh	0,190	€/kWh

- **ESCO energy cost– methan €**, if methane consumption is foreseen, enter the unit cost at which the ESCo will purchase it, €/m³
- **ESCO energy cost – wood biomass (pellets) €**, if wood biomass (pellets) consumption is foreseen, enter the unit cost at which the ESCo will purchase it, €/t
- **ESCO energy cost – wood biomass (chips) €**, if wood biomass (chips) consumption is foreseen, enter the unit cost at which the ESCo will purchase it, €/t
- **ESCO energy cost – district heating €**, if thermal energy consumption from district heating consumption is foreseen, enter the unit cost at which the ESCo will purchase it €/kWh
- **ESCO energy cost – diesel €**, if diesel consumption is foreseen, enter the unit cost at which the ESCo will purchase it, €/lt

- **ESCO energy cost – LPG €**, if LPG consumption is foreseen, enter the unit cost at which the ESCo will purchase it, €/lt
- **ESCO electric energy cost €**, if electric energy consumption is foreseen, enter the unit cost at which the ESCo will purchase it, €/kWh

The user may also enter:

- **Energy conversion kWh/Unit** to convert any amount of energy expressed in the unit of the individual energy carrier into kWh.

Energy cost						Energy conversion	
Energy carrier	P.A. energy cost	Unit	ESCO energy cost	Unit		kWh/Unit	Unit
methan	0,700	€/m3	0,690	€/m3		9,59	m ³
wood biomass (pellets)		€/t		€/t		4900	t
wood biomass (chips)	10,000	€/t	25,000	€/t		3840	t
district heating	0,090	€/kWh	0,090	€/kWh			
diesel		€/lt		€/lt		9,17	lt
LPG		€/lt		€/lt		6,52	lt
Electricity	0,200	€/kWh	0,190	€/kWh			

- **inflation rate** for each energy carrier, in percent

Energy cost						Energy conversion		inflation rate	
Energy carrier	P.A. energy cost	Unit	ESCO energy cost	Unit		kWh/Unit	Unit		Unit
methan	0,700	€/m3	0,690	€/m3		9,59	m ³	4,00%	%
wood biomass (pellets)		€/t		€/t		4900	t	1,00%	%
wood biomass (chips)	10,000	€/t	25,000	€/t		3840	t	1,20%	%
district heating	0,090	€/kWh	0,090	€/kWh				3,50%	%
diesel		€/lt		€/lt		9,17	lt	3,00%	%
LPG		€/lt		€/lt		6,52	lt	3,40%	%
Electricity	0,200	€/kWh	0,190	€/kWh				4,10%	%

4.4.2. Administrative and technical cost

In this part of the spreadsheet, it is necessary to enter the administrative and technical costs incurred by the ESCO before and during the EPC:

- **Tender cost**, it is the costs covered by the ESCO to participate in the tender, percentage on the investment value
- **Design cost**, it is the costs covered by the ESCO to design the energy efficiency measures, percentage on the investment value
- **PMVP**, it is the costs covered by the ESCO for the performance measurement and verification services, percentage on the economic value of the energy savings

- **O&M**, it is the cost covered by the ESCO to perform the operation and maintenance service, cost savings as a percentage of the O&M cost baseline

Administrative and technical costs		
Tender cost	1,0%	%
Design cost	5,0%	%
PMVP	4,0%	%
O&M	20,0%	%

4.4.3. Financial and economic parameters

The user has the option to assume that the ESCO will access 1 or 2 Third Party Loans in order to cover part of the investment for the implementation of the energy efficiency measure foreseen in the EPC.

For each loan (maximum 2) the user has to enter the following parameters:

- **Bank interest rate**, it is the interest rate applied to the loan/mortgage granted to the ESCO and used by the tool for mortgage value calculation
- **Loan duration**, if the duration of the EPC contract is less than the loan/mortgage duration, this one will be replaced automatically by the tool with the EPC contract duration entered by the user in the "scenario" sheet.
- **Investment covered by loan**, it is the percentage of the investment covered by the loan/mortgage.

Financial and economic parameters		
Loan 1		
Bank interest rate	2,00%	%
Loan duration	14	years
	12	years
Investment covered by loan 1	50,0%	%
Loan 2		
Bank interest rate	2,50%	%
Loan duration	8	years
	8	years
Investment covered by loan 2	30,0%	%

4.4.4. Other financial parameters

The user has the possibility to enter other financial parameters useful for the simulation of EPC scenarios

- **Discount rate**, it is used by the tool for the NPV calculation
- **Inflation rate**, it is the rate at which the value of a currency is falling and, consequently, the general level of prices for goods and services is rising
- **ESCO business profit**, indicare il profitto atteso dalla ESCO rispetto al capitale investito, in percentuale
- **Taxes on profits**, indicate the profit expected by the ESCO in relation to the capital invested.

Other financial parameters		
Discount rate	2,00%	%
Inflation rate	2,00%	%
ESCO busines profit	25,00%	%
EQUITY	20,0%	%
Taxes on profits	25,0%	%
WACC (before taxes)	6,60%	%
WACC	6,20%	%

After entering all the required data, the tool will automatically calculate some financial parameters:

- **EQUITY**, investment rate covered directly from ESCO, it is used by the tool for the NVP calculation.
- **WACC (before taxes)**, weighted average cost of capital (WACC) is the average rate of return a company expects to compensate all its different investors. The weights are the fraction of each financing source in the company's target capital structure, it is calculated before taxes
- **WACC**, weighted average cost of capital (WACC) is the average rate of return a company expects to compensate all its different investors. The weights are the fraction of each financing source in the company's target capital structure

Other financial parameters		
Discount rate	2,00%	%
Inflation rate	2,00%	%
ESCO business profit	25,00%	%
EQUITY	20,0%	%
Taxes on profits	25,0%	%
WACC (before taxes)	6,60%	%
WACC	6,20%	%

4.5. SCENARIOS

The “SCENARIOS” sheet allows the user to simulate different EPC contract scenarios and to check their economic and financial sustainability by calculating some indicators and verify the exceeding of some thresholds. The spreadsheet is divided into two tables, the first allows the user to enter data and information and verify the economic indicators and the sustainability of the scenario, the second is a macro and allows the user to save 5 different EPC scenarios

EPC SIMULATION TOOL		
INPUT DATA		
Type of EPC		
EPC includes the energy supply?		no
Energy parameters		
Total thermal energy savings	%	76,36%
Total electric energy savings	%	31,96%
Investment		
Value of works	I	530.000,00
Subsidy		
Value of subsidy 1	I	250.000,00
Duration of subsidy 1	years	5
Value of subsidy 2	I	5
Duration of subsidy 2	Y	0
Additional resources provided by the owner	Y	0,00
Financial and economic parameters		
Fee on baseline cost	%	100,00%
Value of annual fee	I	53.612,50
EPC DURATION		
EPC contract duration	years	13
ECONOMIC INDICATORS		
Net Present Value (NPV)	I	55.800,14
Internal Rate of Return (IRR)	%	6,56%
Debt Service Coverage Ratio (DSCR)		1,5
NPV/INVESTMENT	%	9,93%

	Save scenario 1	Save scenario 2	Save scenario 3	Save scenario 4	Save scenario 5
Type of EPC	no	no	no	no	no
EPC includes the energy supply?	no	no	no	no	no
Energy parameters					
Total thermal energy savings	%	76,36%	76,36%	76,36%	76,36%
Total electric energy savings	%	31,96%	31,96%	31,96%	31,96%
Investment and subsidy					
Value of works	I	500.000,00	500.000,00	500.000,00	530.000,00
Financial and economic parameters					
Fee on baseline cost	%	99,0%	100,0%	97,0%	100,0%
Value of annual fee	I	52.361,50	53.612,50	51.150,50	53.612,50
EPC DURATION					
EPC contract duration	years	12	12	13	13
ECONOMIC INDICATORS					
Net Present Value (NPV)	I	41.037,28	52.540,43	60.839,27	48.332,65
Internal Rate of Return (IRR)	%	6,00%	7,38%	7,70%	6,36%
Debt Service Coverage Ratio (DSCR)		1,5	1,5	1,5	1,5
NPV/INVESTMENT	%	7,74%	9,91%	11,48%	9,12%

In the first table, the data and information to be entered by the user are:

- **L'EPC includes the energy supply?** In EPC contracts the ESCo may also provide energy, the user has to indicate whether energy is included or not in the contract by selecting yes or no using a drop-down menu
- **Value of works,** indicate the cost that the ESCo will incur for the implementation of the energy efficiency measures,
- **Value of subsidy 1,** indicate the total value of the subsidy/incentives that the ESCo will get from the implementation of the energy efficiency measures
- **Duration of subsidy 1,** indicate the number of years over which the ESCo contribution is divided. In case the user specifies a number of years longer than the EPC duration the tool will automatically change it to the EPC contract duration
- **Value of subsidy 2,** the user has the possibility to enter the value of a possible second contribution/incentive that the ESCo will get due to the implementation of the energy efficiency measures
- **Value of subsidy 2,** indicate the number of years over which the ESCo contribution is divided. In case the user specifies a number of years longer than the EPC duration the tool will automatically change it to the EPC contract duration.
- **Additional resources provided by the owner,** Indicate the amount, if any, of economic resources provided by the owner(s) to cover part of the investments and reduce the ESCo's equity
- **Fee on baseline cost,** indicate the ratio between the value of the annual fee (paid by the building owner(s) and the ESCo) and the cost baseline, the lower the value the higher the economic savings for the owner(s)
- **EPC contract duration,** indicate the duration of the EPC contract

EPC SIMULATION TOOL			
INPUT DATA			
Type of EPC		EPC includes the energy supply?	
		no	
Energy parameters			
Total thermal energy savings		%	76,36%
Total electric energy savings		%	31,96%
Investment			
Value of works		€	500.000,00
Subsidy			
Value of subsidy 1		€	250.000,00
Duration of subsidy 1		years	5
		years	5
Value of subsidy 2		€	
Duration of subsidy 2		Y	
		Y	0
Additional resources provided by the owner		€	0,00
Financial and economic parameters			
Fee on baseline cost		%	99,00%
Value of annal fee		€	52.381,50
EPC DURATION			
EPC contract duration		years	12

After entering these data, the tool will automatically calculate the following values:

- **Total thermal energy savings**, is the total thermal energy savings expected from the implementation of the energy efficiency measures,
- **Total electric energy savings**, is the total electric energy savings expected from the implementation of the energy efficiency measures
- **Value of annual fee**, is the annual amount that the building owner(s) will pay to the ESCO under the EPC contract

EPC SIMULATION TOOL

INPUT DATA			
Type of EPC			
EPC includes the energy supply?			no
Energy parameters			
Total thermal energy savings	%	76,36%	
Total electric energy savings	%	31,96%	
Investment			
Value of works	€	500.000,00	
Subsidy			
Value of subsidy 1	€	250.000,00	
Duration of subsidy 1	years	5	
	years	5	
Value of subsidy 2	€		
Duration of subsidy 2	Y		
	Y	0	
Additional resources provided by the owner	€	0,00	
Financial and economic parameters			
Fee on baseline cost	%	99,00%	
Value of annal fee	€	52.381,50	
EPC DURATION			
EPC contract duration	years	12	

- **Net Present Value (NPV)**, If $NPV > 0$ the investment would add value to the company (cell in green). If $NPV < 0$ the investment would not add value to the company (cell in red).
- **Internal Rate of Return (IRR)**, If $IRR > WACC$ the investment returns exceed the financing costs and produce profits (cell in green). If $IRR < WACC$ the investment returns don't cover the entirety of costs and don't produce profit (cell in red).
- **Debt Service Coverage Ratio (DSCR)**, is a measure of the cash flow available to pay current debt. In general, the debt-service coverage ratio is calculated as: $DSCR = \text{Net Operating Income} / \text{Total Debt Service obligations}$. If the DSCR is minus than 1,3, the entity is vulnerable, and a minor decline in cash flow could make it unable to service its debt.
- **VAN/INVESTMENT**, the Profitability Index attempts to identify the relationship between the costs and benefits of a proposed project. If the index is < 0 would indicate that the project's present value (PV) is less than the initial investment (in red). As the value of the profitability index increases (in green if > 0), so does the financial attractiveness of the proposed project.

ECONOMIC INDICATORS			
Net Present Value (NPV)		€	41.037,28
Internal Rate of Return (IRR)		%	6,00%
Debt Service Coverage Ratio (DSCR)			1,5
NPV/INVESTMENT		%	7,74%

In the second table the user has a macro to save 5 different EPC scenarios. To save the scenario the user has to click on the boxes "Save scenario..."

	Save scenario 1	Save scenario 2	Save scenario 3	Save scenario 4	Save scenario 5
Type of EPC					
EPC includes the energy supply?	no	no	no	no	no
Energy parameters					
Total thermal energy savings	76,36%	76,36%	76,36%	76,36%	76,36%
Total electric energy savings	31,96%	31,96%	31,96%	31,96%	31,96%
Investment and subsidy					
Value of works	500.000,00	500.000,00	500.000,00	500.000,00	530.000,00
Financial and economic parameters					
Fee on baseline cost	99,0%	100,0%	98,0%	97,0%	100,0%
Value of annal fee	52.381,50	53.612,50	51.150,50	49.919,50	53.612,50
EPC DURATION					
EPC contract duration	12	12	13	13	13
ECONOMIC INDICATORS					
Net Present Value (NPV)	41.037,28	52.540,43	60.839,27	48.332,65	55.800,14
Internal Rate of Return (IRR)	6,00%	7,38%	7,70%	6,36%	6,56%
Debt Service Coverage Ratio (DSCR)	1,5	1,5	1,5	1,5	1,5
NPV/INVESTMENT	7,74%	9,91%	11,48%	9,12%	9,93%

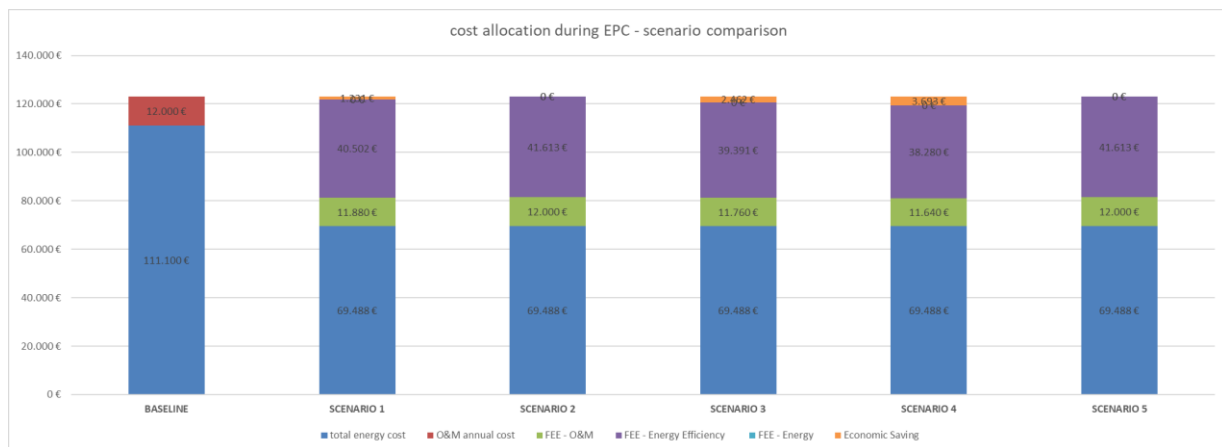
The information saved by the tool for each scenario concerns both contractual conditions and economic indicators:

- **EPC includes the energy supply?**
- **Total thermal energy savings**
- **Total electric energy savings**
- **Value of works**
- **Fee on baseline cost**
- **Value of baseline cost**
- **EPC contract duration**
- **Net Present Value (NVP)**
- **Internal Rate of Return (IRR)**
- **Debt Service Coverage Ratio (DSCR)**
- **VAN/INVESTMENT**

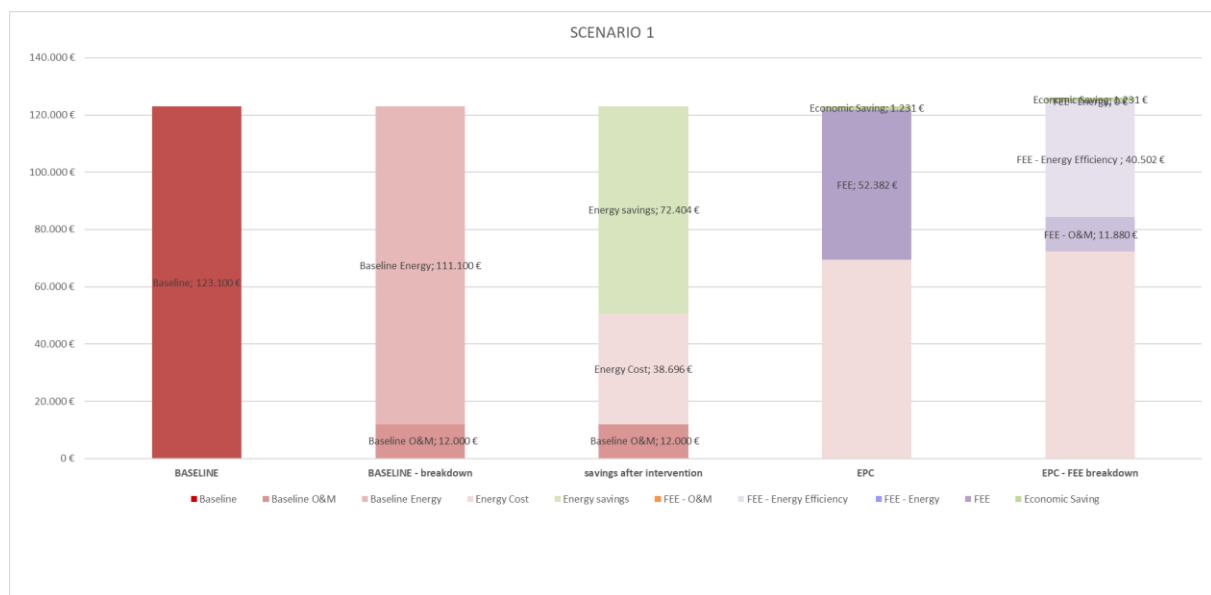
4.6. CHARTS & TABLES

On the "CHART & TABLES" sheet, the tool automatically defines graphs to describe the 5 scenarios saved by the user on the "SCENARIOS" sheet. The graphs created in this sheet are 8

- **Cost allocation during EPC – scenario comparison**, the tool defines a histogram for the comparison of the 5 scenarios saved, for each scenario the different components of the fee are reported (O&M, Energy Efficiency and Energy in case it is included in the EPC) and the cost for the purchase of energy by the building owner in case it is excluded from the EPC. The graph also shows the baseline values (energy and O&M).



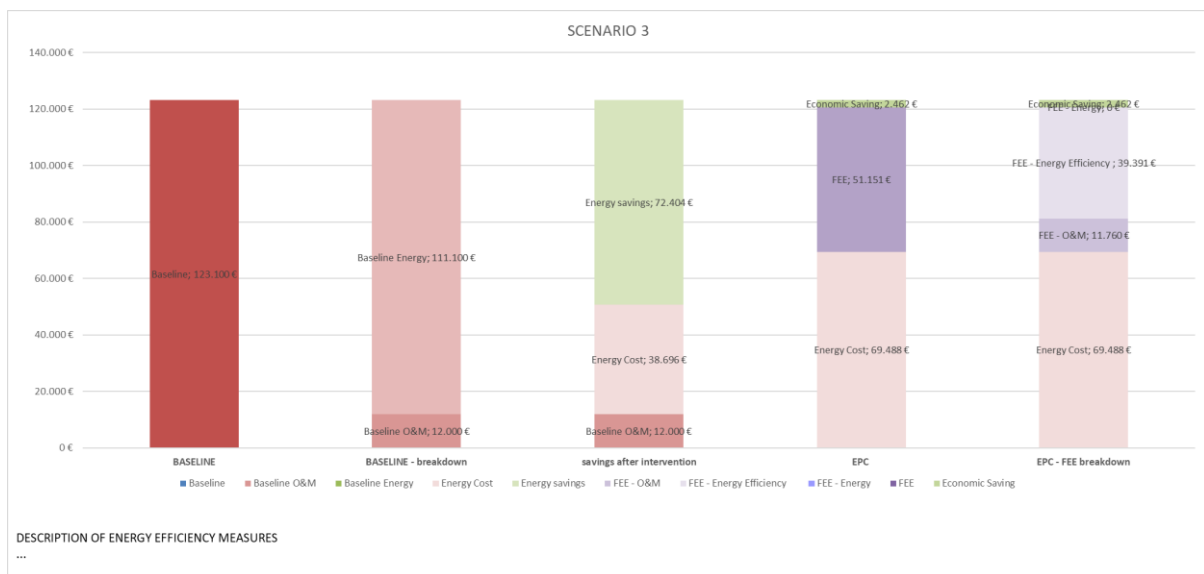
- SCENARIO 1**, the tool shows in a histogram chart the pre-EPC economic baseline (overall and divided between energy and O&M), the economic savings generated after the implementation of the energy efficiency measures foreseen in SCENARIO 1 saved in the "SCENARIOS" sheet, the overall value of the fee and its division into components.



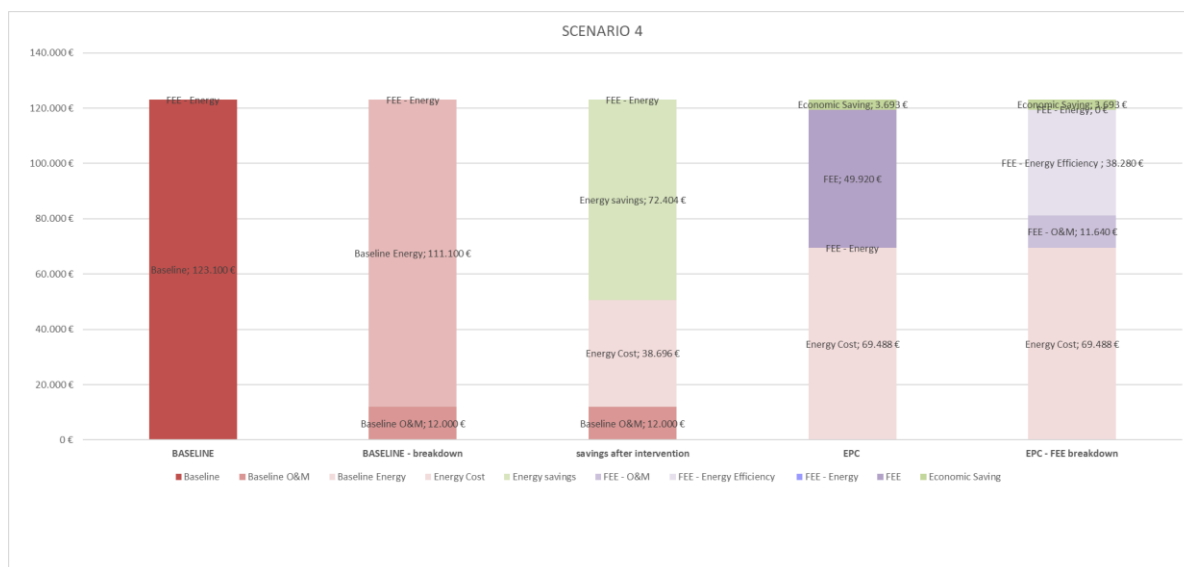
- SCENARIO 2**, the tool shows in a histogram chart the pre-EPC economic baseline (overall and divided between energy and O&M), the economic savings generated after the implementation of the energy efficiency measures foreseen in SCENARIO 2 saved in the "SCENARIOS" sheet, the overall value of the fee and its division into components.



- SCENARIO 3**, the tool shows in a histogram chart the pre-EPC economic baseline (overall and divided between energy and O&M), the economic savings generated after the implementation of the energy efficiency measures foreseen in SCENARIO 3 saved in the "SCENARIOS" sheet, the overall value of the fee and its division into components.



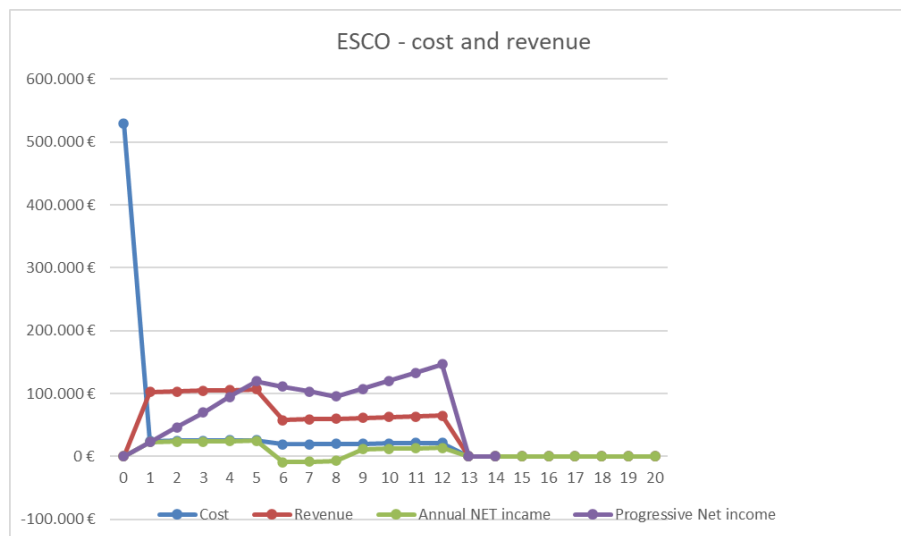
- SCENARIO 4**, the tool shows in a histogram chart the pre-EPC economic baseline (overall and divided between energy and O&M), the economic savings generated after the implementation of the energy efficiency measures foreseen in SCENARIO 4 saved in the "SCENARIOS" sheet, the overall value of the fee and its division into components.



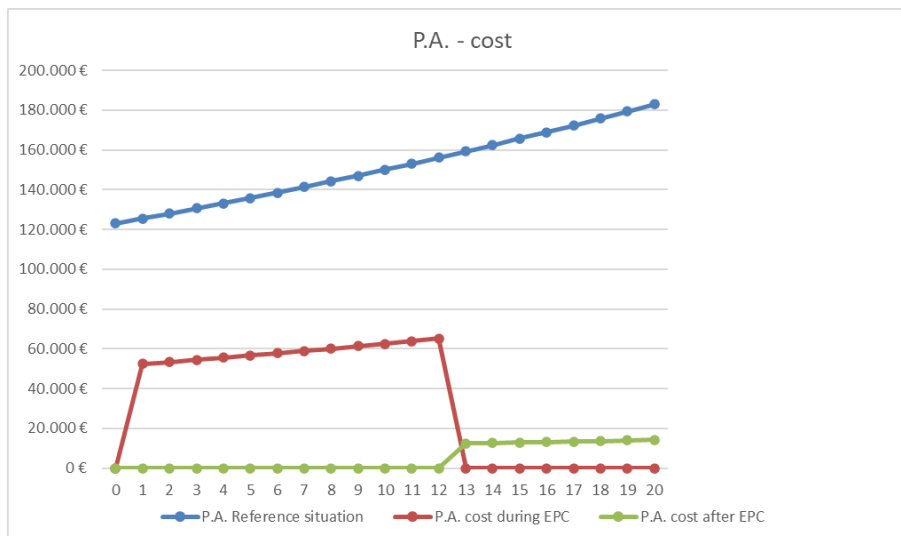
- SCENARIO 5**, the tool shows in a histogram chart the pre-EPC economic baseline (overall and divided between energy and O&M), the economic savings generated after the implementation of the energy efficiency measures foreseen in SCENARIO 5 saved in the "SCENARIOS" sheet, the overall value of the fee and its division into components.



- ESCO cost and revenue**, the graph shows the development of the ESCO's cost-revenue during the EPC, the graph also shows the development of the annual net income and the progressive net income. **ATTENTION** the graph refers to the last assumed SCENARIO



- Building owner cost**, the graph compares the cost development over time that the building owner would incur without EPC and the costs incurred during the EPC and after the end of the EPC. **ATTENTION** the graph refers to the last assumed SCENARIO



4.7. CASH FLOW

On the "cash flow" sheet the user can view a table showing the cash flows over the years (maximum 30) divided into cost and revenue items. The tool automatically fills in the table on the basis of the data entered by the user in the previous sheets and uses this sheet to calculate the economic indicators for the various scenarios assumed.

In this sheet, the user does not have to enter data.

YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12
COST													
tender cost	5 000,00												
administrative cost		8 435,38	8 511,09	8 588,31	8 667,07	8 747,42	4 179,96	4 262,95	4 348,21	4 435,17	4 523,88	4 614,36	4 706,64
management cost		4 535,15	4 575,85	4 617,37	4 659,72	4 702,91	2 246,97	2 291,91	2 337,75	2 384,50	2 432,19	2 480,84	2 530,45
works	500 000,00												
methan cost		0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
wood biomass pellet cost		0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
wood biomass chips cost		0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
district heating cost		0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
diesel cost		0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
LPG cost		0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
electric energy cost		0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
PMV		2 078,50	2 120,07	2 162,47	2 205,72	2 249,84	2 294,83	2 340,73	2 387,54	2 435,29	2 484,00	2 533,68	2 584,35
OGM		9 600,00	9 792,00	9 987,84	10 187,60	10 391,35	10 599,18	10 811,16	11 027,38	11 247,93	11 472,89	11 702,35	11 936,39
design cost	25 000,00												
TOTAL COST	530 000,00	24 649,03	24 999,01	25 355,99	25 720,11	26 091,51	19 320,34	19 706,75	20 100,88	20 502,90	20 912,96	21 331,22	21 757,84
REVENUE													
subsidy 1		50 000,00	50 000,00	50 000,00	50 000,00	50 000,00	0	0	0	0	0	0	0
subsidy 2		0	0	0	0	0	0	0	0	0	0	0	0
additional resources by the owner	0,00												
FEE		52 381,50	53 429,13	54 497,71	55 587,67	56 699,42	57 833,41	58 990,08	60 169,88	61 373,28	62 600,74	63 852,76	65 129,81
TOTAL REVENUE	0,00	102 381,50	103 429,13	104 497,71	105 587,67	106 699,42	57 833,41	58 990,08	60 169,88	61 373,28	62 600,74	63 852,76	65 129,81
EBIT (Earnings Before Interests and Taxes)	-530 000,00	77 732,47	78 430,12	79 141,72	79 867,56	80 607,91	38 513,07	39 283,33	40 068,99	40 870,37	41 687,78	42 521,54	43 371,97
loan 1 payment		25 058,29	25 058,29	25 058,29	25 058,29	25 058,29	25 058,29	25 058,29	25 058,29	25 058,29	25 058,29	25 058,29	25 058,29
loan 2 payment		22 175,31	22 175,31	22 175,31	22 175,31	22 175,31	22 175,31	22 175,31	22 175,31	22 175,31	0	0	0
Total financial cost		47 233,60	47 233,60	47 233,60	47 233,60	47 233,60	47 233,60	47 233,60	47 233,60	47 233,60	25 058,29	25 058,29	25 058,3
bank financing	424 000,00												
equity	106 000,00												
Total financial revenue	530 000,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Financial cash flow	530 000,00	-47 233,60	-47 233,60	-47 233,60	-47 233,60	-47 233,60	-47 233,60	-47 233,60	-47 233,60	-25 058,29	-25 058,29	-25 058,29	-25 058,29
EBT (Earnings Before Taxes)	0,00	30 498,87	31 196,52	31 908,12	32 633,96	33 374,31	8 720,53	-7 950,27	-7 164,61	15 812,08	16 629,49	17 463,24	18 313,68
taxes on EBT	0,00	7 624,72	7 799,13	7 977,03	8 158,49	8 343,58	0,00	0,00	0,00	3 953,02	4 157,37	4 365,81	4 578,42
ANNUAL NET INCOME	0,00	22 874,15	23 397,39	23 931,09	24 475,47	25 030,73	-8 720,53	-7 950,27	-7 164,61	11 859,06	12 472,12	13 097,43	13 735,26
PROGRESSIVE NET INCOME	0,00	22 874,15	46 271,54	70 202,63	94 678,10	119 708,83	110 988,30	103 038,02	95 873,42	107 732,48	120 204,59	133 302,03	147 037,28