IMPULSE PLUS

Integrated Management Support for Energy efficiency in Mediterranean PUblic buildings PLUS

A 3.4 Fine-tuning for transferring.

Instructions for the use of Financial Schemes tool

Project co-financed by the European Regional Development Fund

This tool is an improved version of the tool previously developed in the framework of the IMPULSE project.

One of the activities foreseen under the IMPULSE PLUS project was to implement the modifications and adjustments necessary to adapt the Financial tool to the specific contexts of the new receivers' territories, under a transnational and cooperative approach, and in line with EU energy directives (EPBD and EDD) amendments, as well as the new commitments set by the EU in the Renovation Wave Strategy and the European Green Deal.

OBJECTIVE

The objective of this financial schemes tool is to simulate possible financing of renovation plan calculated with PLUG-IN TOOL.
Two ways of financing the renovation plan are foreseen for the financial plan:

- The public body contracts one loan at the beginning whose amount is the total investment required for the entire renovation plan
- The public body contracts one loan per year over the duration of the renovation plan

The results are compared to energy bill baseline (if no works are done).
It can be used for a multiple simulation covering the possible evolution input data hypotheses, comparing up to 3 different combinations of data.

INSTRUCTIONS FOR EACH WORKSHEET

SHEET: Hypotheses

On the first sheet, different colored cells need to be completed according to your renovation plan:

- Yellow cells are results from previous deliverables (D3.4.1 and Plug-in tool) that need to be copy/pasted.
- Blue cells are general hypotheses about interest rate, inflation, …
- Orange cells are financial information about your pilot city that needs to be completed for each year of SEAP duration.

Yellow cells - Results from previous deliverables

- Total Energy Bill is a result from the sheet “Projection_Base-case” of D3.4.1 KPI : total for the whole initial sample of the Cost indicator “Annual total energy-related operational cost” in NC/yr (Cell V114)

Projection of results from Ambassador to the initial testing sample of buildi									
Base-case									
						Cost indicators			
Building No.	Building name	Building floor area (m2)	Public Building Typology	Retrofit scenario	Type of retrofit	Annual total energy-related operational cost		Annual electricity cost	
						National Currency/m²/yr	National Currency/yr	National Currency/m²/yr	National Currency/yr
			PBT10				15277,55		15277,5457
			PBT11				19679,67		9068,8026
			PBT12				36231,61		32960,3197
			PBT13				0		0
			PBT14				0		0
			PBT15				0		0
			TOTAL FOR THE WHOLE INITIAL SAMPLE				847957,7		680168,176

Location of field in D3.4.1

Hypotheses	**Comb 1**	**Comb 2**	**Comb 3**	
Interest rate of the loan	**1,50%**	**1,50%**	**1,50%**	
Energy discount rate	**3,00%**	**6,00%**	**10,00%**	
inflation /year (NC)	**2,00%**	**2,00%**	**2,00%**	
Annual increase of public body budget (%)	**1,00%**	**1,00%**	**1,00%**	
Loan duration / years in public body planning	**14**	**14**	**14**	/!\ Max 20 years
Seap duration (calculated)	**14**	**14**	**14**	For information
Annual increase of loan rate	**2,00%**	**2,00%**	**2,00%**	

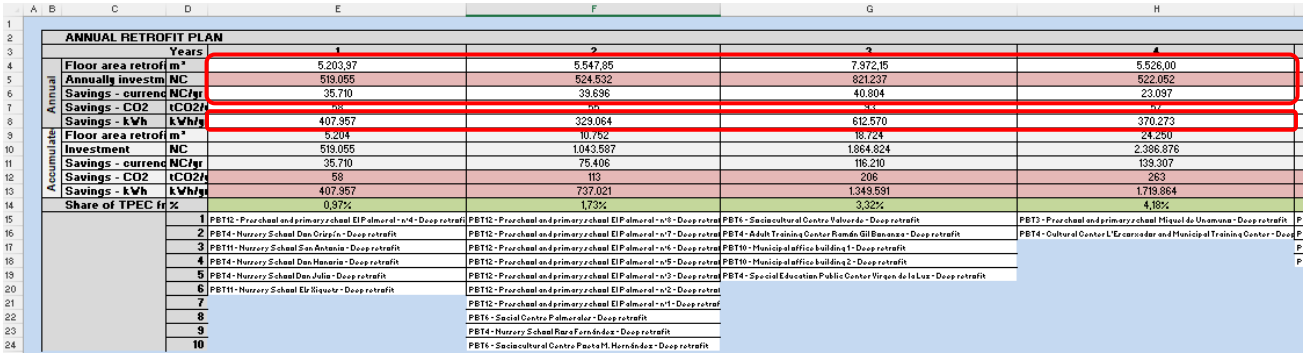
Data from D3.4.1	
Energy bill € / year	847.958

Location of field in financial schemes tool

- Renovation plan results can be found in the sheet "PLAN" of the PLUG-IN tool: for every year of SEAP duration, floor area retrofitted, annual investment, savings – currency and savings – kWh need to be entered in the financial tool.

  Fields:

  - Floor area retrofitted, annual investment, savings – currency = E4:X6 in field Hypotheses!D94:W96
  - Savings – kWh= E8:X8 in field Hypotheses!D97:W97"



		ANNUAL RETROFIT PLAN				
		Years	**1**	**2**	**3**	**4**
Annual	**Floor area retrofi**	**m²**	5.203,97	5.547,85	7.972,15	5.526,00
Annual	**Annually investm**	**NC**	519.055	524.532	821.237	522.052
Annual	**Savings - currenc**	**NC/yr**	35.710	39.696	40.804	23.097
Annual	**Savings - CO2**	**tCO2/**	58	66	93	62
Annual	**Savings - kWh**	**kWh/y**	407.957	329.064	612.570	370.273
Accumulate	**Floor area retrofi**	**m²**	5.204	10.752	18.724	24.250
Accumulate	**Investment**	**NC**	519.055	1.043.587	1.864.824	2.386.876
Accumulate	**Savings - currenc**	**NC/yr**	35.710	75.406	116.210	139.307
Accumulate	**Savings - CO2**	**tCO2/**	58	113	206	263
Accumulate	**Savings - kWh**	**kWh/y**	407.957	737.021	1.349.591	1.719.864
	Share of TPEC fr	**%**	0,97%	1,73%	3,32%	4,18%
		1	PBT12 - Preschool and primary school El Palmeral - nº4 - Deep retrofi	PBT12 - Preschool and primary school El Palmeral - nº8 - Deep retrof	PBT6 - Sociocultural Centre Valverde - Deep retrofit	PBT3 - Preschool and primary school Miguel de Unamuno - Deep retrofit
		2	PBT4 - Nursery School Dan Crispín - Deep retrofit	PBT12 - Preschool and primary school El Palmeral - nº7 - Deep retrof	PBT4 - Adult Training Center Ramón Gil Benavas - Deep retrofit	PBT4 - Cultural Center L'Escorxador and Municipal Training Center - Deep
		3	PBT11 - Nursery School San Antonio - Deep retrofit	PBT12 - Preschool and primary school El Palmeral - nº6 - Deep retrof	PBT10 - Municipal office building 1 - Deep retrofit	
		4	PBT4 - Nursery School Dan Honorio - Deep retrofit	PBT12 - Preschool and primary school El Palmeral - nº5 - Deep retrof	PBT10 - Municipal office building 2 - Deep retrofit	
		5	PBT4 - Nursery School Dan Julio - Deep retrofit	PBT12 - Preschool and primary school El Palmeral - nº3 - Deep retrof	PBT4 - Special Education Public Center Virgen de la Luz - Deep retrofit	
		6	PBT11 - Nursery School El Riquete - Deep retrofit	PBT12 - Preschool and primary school El Palmeral - nº2 - Deep retrof		
		7		PBT12 - Preschool and primary school El Palmeral - nº1 - Deep retrof		
		8		PBT6 - Social Centre Palmeralez - Deep retrofit		
		9		PBT4 - Nursery School Rara Fernández - Deep retrofit		
		10		PBT6 - Sociocultural Centre Paola M. Hernández - Deep retrofit		

Location of fields in PLUG-IN tool

Data from plugin D3.5.1			**1**	**2**	**3**	**4**
Floor area retrofited		m ²	5.204	5.548	7.972	5.526
Anualy investment		NC	519.055	524.532	821.237	522.052
Savings - currency		NC / year	35.710	39.696	40.804	23.097
Savings - kWh		kWh / year	407.957	329.064	612.570	370.273
Savings - NC /MWh		NC / MWh	88	121	67	62
ROI		year	15	13	20	23

Location of fields in financial schemes tool

Blue cells – General hypothesis

For your simulation, you need to estimate financial data during SEAP duration:

- Interest rate of the loan
- Energy discount rate
- inflation /year (NC)
- Annual increase of public body budget (%)
- Loan duration / years in public body planning – The duration cannot exceed 20 years
- Annual increase of loan rate (for multi-loan simulation you can either enter a different loan rate each year or increase every year your loan rate with this indicator)

Up to 3 combinations of data can be entered to compare different hypotheses simultaneously.

	Hypotheses	Comb 1	Comb 2	Comb 3	
3	Interest rate of the loan	1,50%	1,50%	1,50%	
4	Energy discount rate	3,00%	6,00%	10,00%	
5	inflation /year (NC)	2,00%	2,00%	2,00%	
6	Annual increase of public body budget (%)	1,00%	1,00%	1,00%	
7	Loan duration / years in public body planning	14	14	14	/!\ Max 20 years
8	Seap duration (calculated)	14	14	14	For information
9	Annual increase of loan rate	2,00%	2,00%	2,00%	

Example of general hypotheses

Orange cells - Your city financial information

The last entries regard your pilot city budget for building renovation and possible subsidies you need to estimate for each year investment.

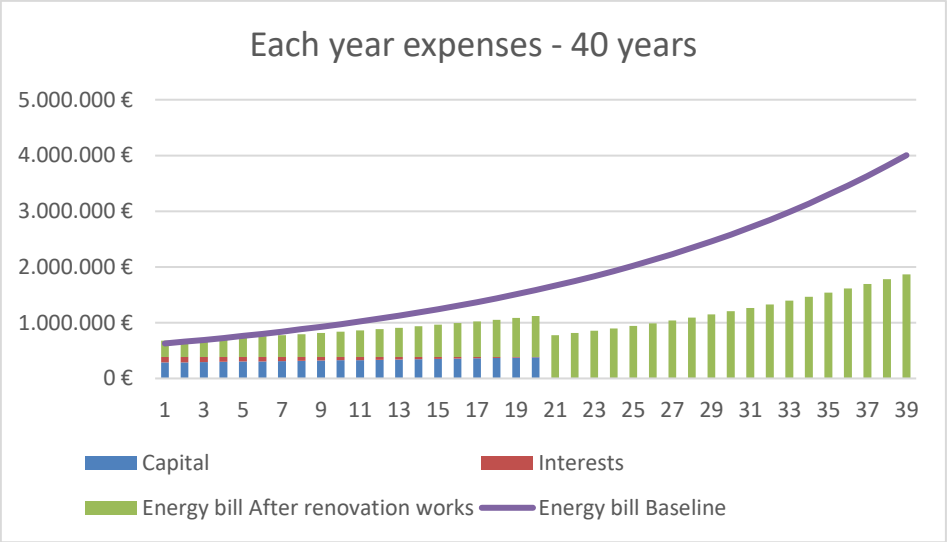
- Budget of public body over SEAP Duration = equity capital
- European subsidies
- National subsidies
- Regional subsidies
- White certificates
- Interest rate of the loan (different each year) - you can use a different known value each year or use the formula with % annual increase of loan rate

		Over 20 years	Year 1	Year 2	Year 3	Year 4	Year 5
14	Anual investment (D3.5.1 plugin)	0	0	0	0	0	0
	Budget of public body over Seap Duration(x years)						
15	= equity capital	0					
16	European subsidies	0					
17	National subsidies	0					
18	Regional subsidies	0					
19	White certificates	0					
20	Interest rate of the loan (different each year)	Comb 1	0,00%	0,00%	0,00%	0,00%	0,00%
21		Comb 2	0,00%	0,00%	0,00%	0,00%	0,00%
22		Comb 3	0,00%	0,00%	0,00%	0,00%	0,00%

Location of fields in financial schemes tool

SHEETS: Comb 1 or 2 or 3 + "All in one loan + Works"

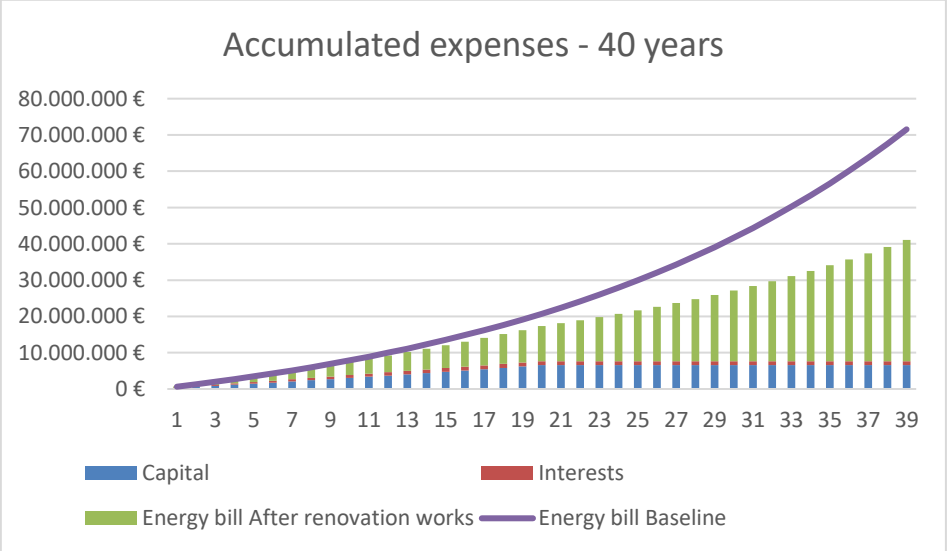
Each worksheet (Comb 1/2/3 All in one loan + Works) shows expense each year of SEAP through financing all renovation plan with one loan, depending on the hypothesis introduced in blue cells for each combination.
The tool calculates loan capital and interests every year and the energy bill after renovation works.
It can be compared graphically and with the results table to energy bill baseline (no renovation works, only updated with inflation each year).



Example of each year expenses - All in one loan + Works

The "each year expenses" chart shows generally that the renovation plan (with works + loan capital and interests + energy bill after works) presents fewer annual expenses than energy bill baseline (energy bill updated with inflation each year) within a few years.

In the example above, in year 4 there are fewer expenses with renovation plan.



Example of accumulated expenses - All in one loan + Works

The "accumulated expenses" chart shows the accumulated expenses of the renovation work project and the energy bill baseline, and the gap between the two situations at the end of the borrowing. Generally, the balance-sheet is balanced before the end of the loan.

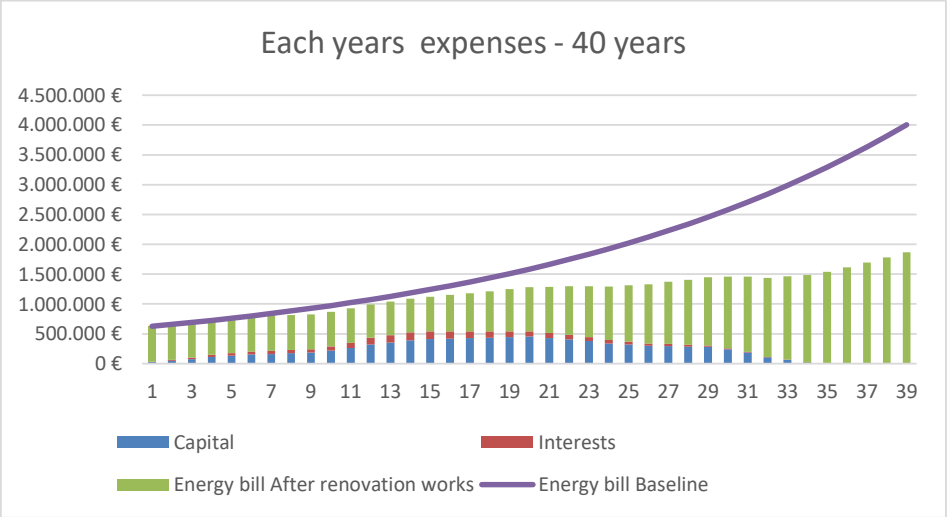
In the example above, the balance-sheet is balanced in 7 years and the total benefit is 30 501 k€ (-43%) over 40 years.

SHEETS: Comb 1 or 2 or 3 + "One loan + Works per year"

Each worksheet (Comb 1/2/3 One loan + Works per year) shows expense each year of SEAP through financing renovation plan gradually with multiple loans and doing parts of renovation plan every year depending on the hypothesis introduced in blue cells for each combination.

The tool calculates each loans capital and interests every year and the energy bill after renovation works.

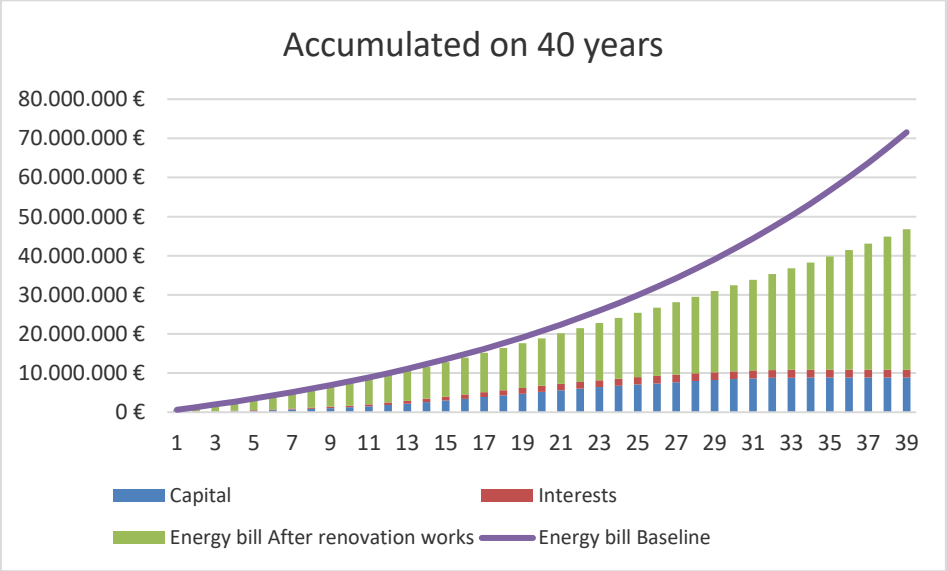
It can be compared graphically and with the results table to energy bill baseline (no renovation works, only updated with inflation each year).



Example of each year expenses - One loan + W per year

The "each year expenses" chart shows generally that the renovation plan (with works + multiple loans capital and interests + energy bill after works) presents fewer annual expenses than energy bill baseline (energy bill updated with inflation each year) within a few years.

In the example above, in year 7 there are fewer expenses with renovation plan. In year 21, first loan repayment ends. In year 34, all loans are completed.



Example of accumulated expenses - One loan + W per year

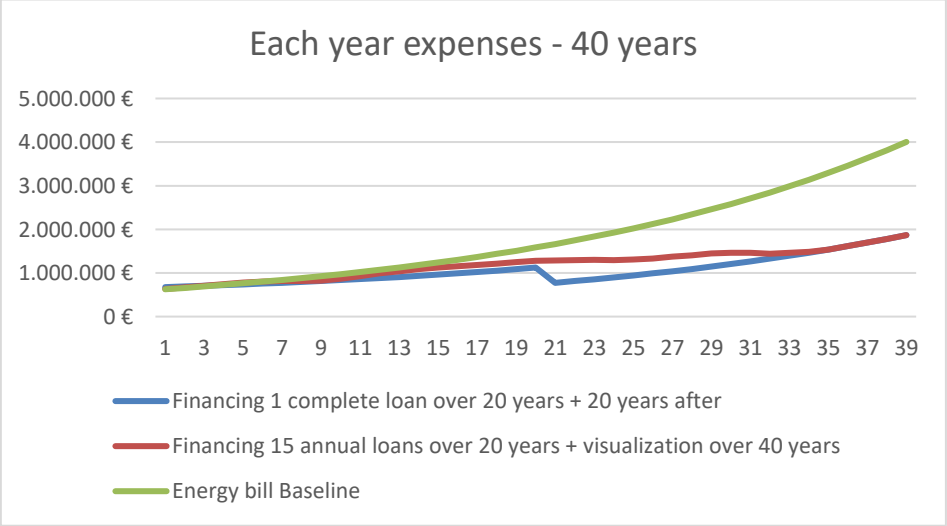
The “accumulated expenses” chart shows the accumulated expenses of the renovation work project and the energy bill baseline, and the gap between the two situations at the end of the borrowing. Generally, the balance-sheet is balanced before the end of the loan.

In the example above, the balance-sheet is balanced in 8 years and the total benefit is 24 796 k€ (-35%) over 40 years.

SHEETS: Comb 1 or 2 or 3 + Comparison

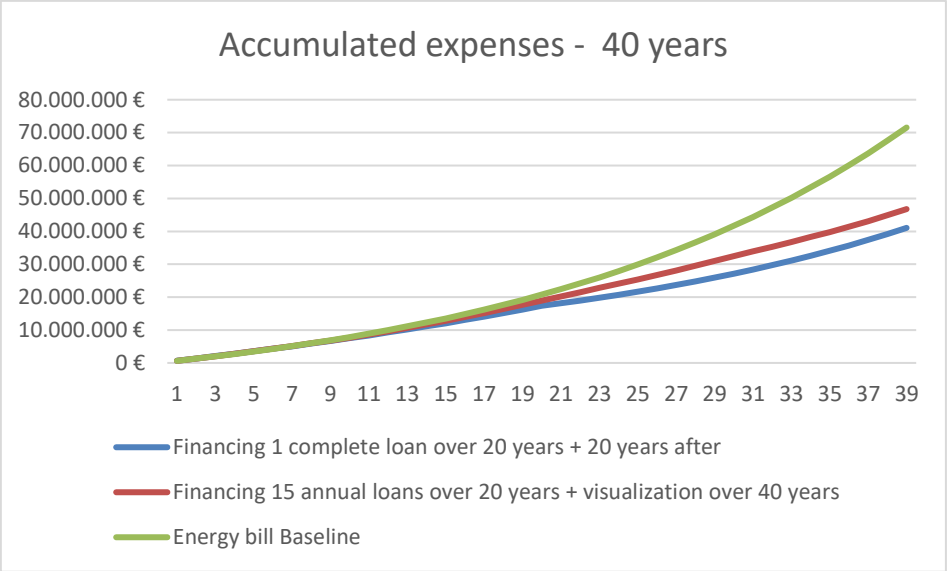
Each worksheet (Comb 1/2/3 Comparison) aims at comparing each financing through SEAP duration depending on the hypothesis introduced in blue cells for each combination.

It presents calculated total expenditures (capital + interest + energy bill after renovation works) every year and accumulated with both financing and also energy bill baseline.



Example of each year expenses - Comparison

The “each year expenses” chart shows generally that the renovation plan with “all in one loan”-financing presents fewer annual expenses after the loan is repaid in year 20. The “One loan + renovation works per year” -financing curve overlap the “all in one loan” at the end of the last loan (in the case above, in year 35).



Example of accumulated expenses – Comparison

The "accumulated expenses" chart shows the accumulated expenses of the renovation work project with both financing and the energy bill baseline, and the gap between each situation at the end of the borrowing. Generally, the balance-sheet is balanced before the end of the loan and the multi-loans.

In the example above, after 5 years, financing with one loan total expenditures is inferior to 15 annual loans expenses. On year 7, balance-sheet between 1 loan and Energy bill Baseline is balanced and renovation plan means less expenditures every year. After 8 years, Financing 15 annual loans over 20 years presents inferior expenses than energy bill baseline increased with inflation.

The following tables sums up total expenditures for 3 situations:

- Financing with 1 complete loan
- Financing with X (depends on SEAP duration) annual loans
- Energy bill Baseline if no renovation works are done

Comparison / Baseline

		Financing 1 complete loan	*Financing 15 annual loans*	*Energy bill Baseline*
Complete expense over 40 years	k€	41 047 €	46 752 €	71 548 €
Benefit / Baseline	k€	-30 501 €	-24 796 €	0 €
	%	-43%	-35%	0%
Total interests	k€	1 086 €	2 021 €	0 €
Total capital	k€	6 583 €	8 852 €	0 €
Total energy bills	k€	33 379 €	35 879 €	71 548 €

Comparison 2 types financing

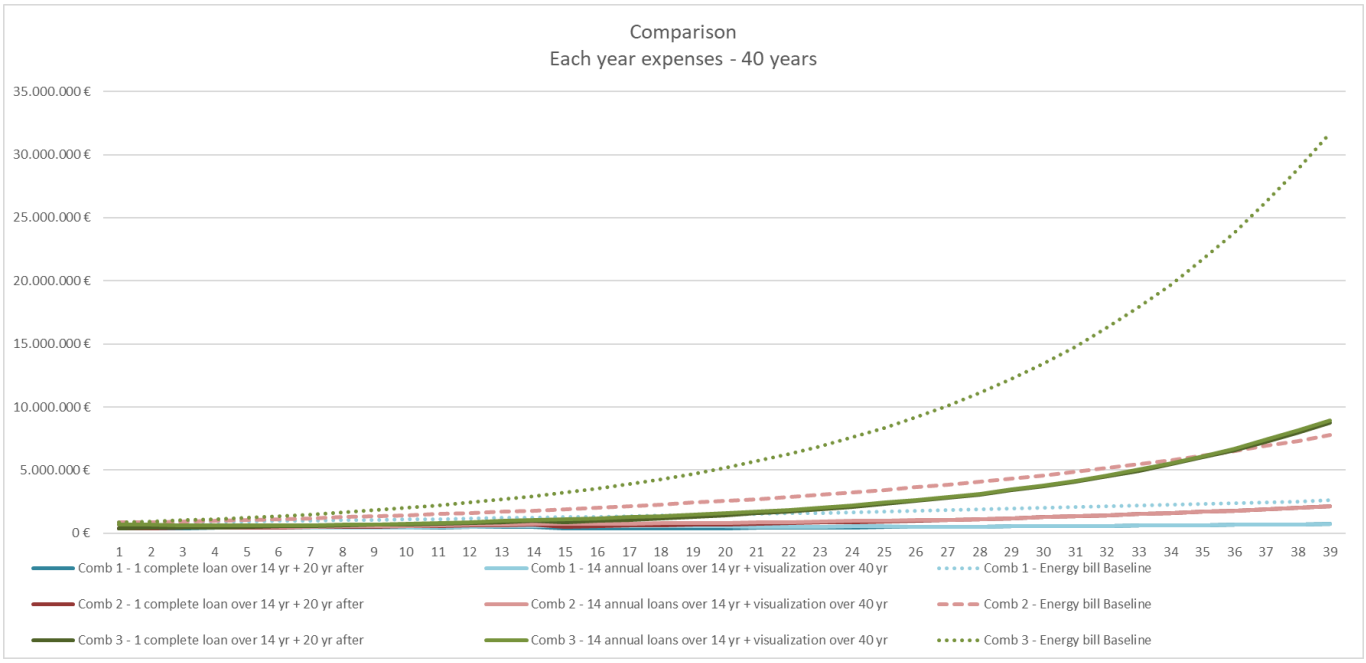
		Financing 1 complete loan	*Financing 15 annual loans*	*Gap*
Complete expense over 40 years	k€	41 047 €	46 752 €	5 705 €
Annual medium expense	k€ / year	1 052 €	1 199 €	146 €
Total interests	k€	1 086 €	2 021 €	935 €
Total capital	k€	6 583 €	8 852 €	2 269 €
Total energy bills	k€	33 379 €	35 879 €	2 501 €

Example of tables of comparison

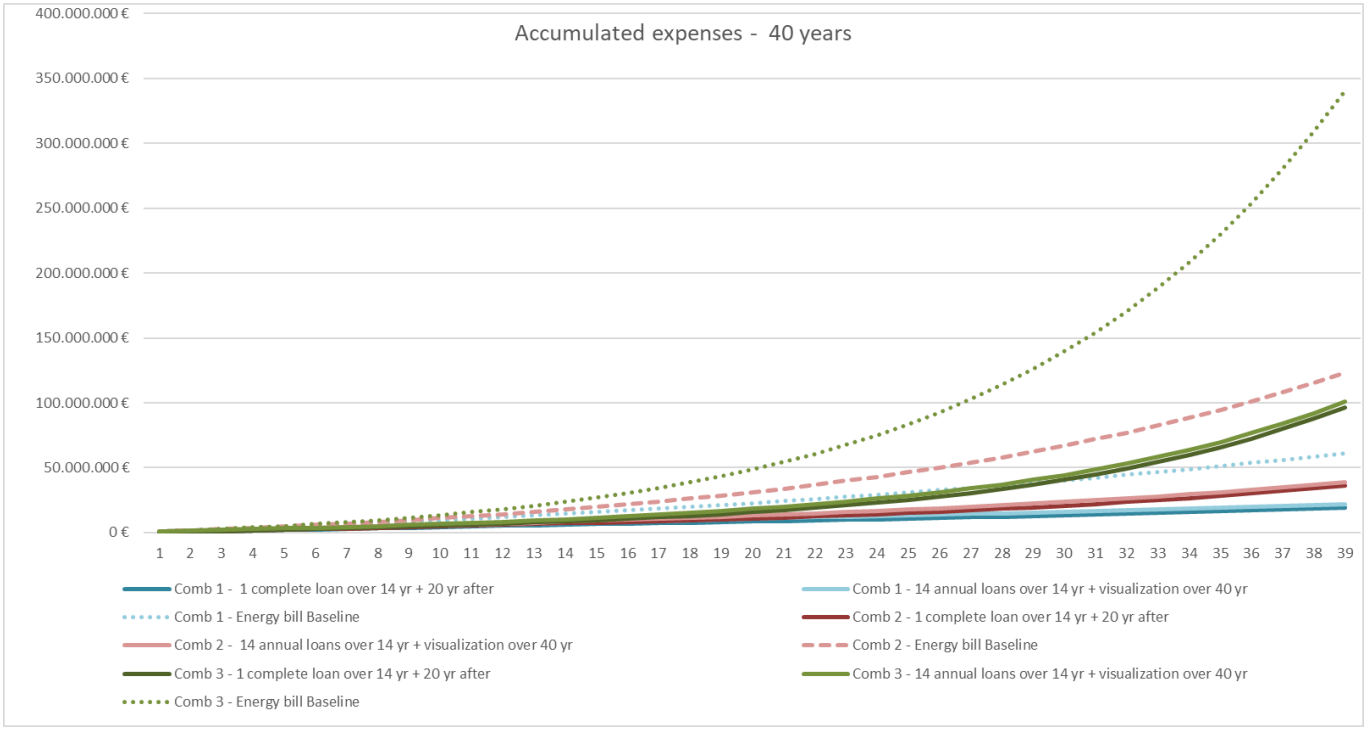
SHEET: Comb 1,2, 3 Comparison

This sheet aims to compare the financing, over the duration of the SEAP, for the hypotheses, up to 3 possible combinations, set out in the hypotheses tab.

It presents calculated total expenditures (capital + interest + energy bill after renovation works) every year and accumulated with both financing and also energy bill baseline, for the up to three input data combinations introduced in hypothesis tab.



Example of each year expenses – Overlapping of the 3 calculated combinations



Example of accumulated expenses – Overlapping of the 3 calculated combinations