

USER MANUAL RENTALCAL WEB-TOOL v2.0

This RentalCal Tool User Manual is part of the RentalCal - European Rental Housing Framework for the Profitability Calculation of Energetic Retrofitting Investments.

Imprint

Editor

RentalCal Consortium

RENTL

European Rental Housing Framework for the Profitability Calculation of Energetic Retrofitting Investments

Project partners

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TIAS School for Business and Society

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1. INTRODUCTION TO THE RENTALCAL PROJECT

The project *RentalCal* - *European Rental Housing Framework for the Profitability Calculation of energetic Retrofitting Investments* is a research project carried out by 11 institutions in eight European countries (2015 – 2018). Over a project duration of 3 years, the participating markets for sustainable modernisation were analysed and compared. The results of the project were used for reports and the creation of a tool for evaluating the profitability of energy modernisation projects. The results are especially relevant for real estate owners, housing companies and housing associations, property managers, municipal administrators and energy consultants. RentalCal facilitates with the implementation of energy modernisation measures for rented residential properties by providing basics and tools for the calculation of the economic efficiency and thus contributes to the achievement of the EU climate targets.

The RentalCal Profitability Calculation Tool presented here (hereinafter also referred to as "Tool") is a major result of the RentalCal project. Funded by the German Government ("Zukunft Bau") an update of the RentalCal Tool was released in 2022 (v2.0) (<u>http://www.rentalcal.eu</u>).

The web-based software enables a structured and comprehensive economic efficiency calculation in connection with planned energy modernisation measures in rented housing construction. After recording (input) the respective input parameters and framework conditions of the relevant investment, the tool user receives a comprehensive analysis with regard to the economic advantage of the measure (output). This supports decision-making. Both quantitative and qualitative results are presented. The tool is versatile: In addition to owners and investors, it also supports (energy) consultants, politicians and other groups of players such as property managers and associations in the housing industry.

2. INTRODUCTION TO THE RENTALCAL TOOL

2.1. Functional Description

This web-based tool is based on a special form of economic efficiency calculation, namely the Visualisation of Financial Implications (VoFi). Especially in this scenario (energy modernisation), it makes it possible to model the economic efficiency in great detail. The calculation is based on the delta approach, which simply includes the change in cash flows in the economic efficiency assessment. In this way, the difference between cash flows before and after the energetic modernisation is considered in the calculation.

In addition to the direct cash flows of the property and the energetic motivations, essential differences to other financial mathematical approaches are that indirect payments can also be modelled. These include in particular the consideration of taxes, depreciation, amortisation and financing. Based on the investment costs of the energy-related modernisation, the return on equity of the investor for the capital employed is thus calculated and presented, considering possible rent increases, subsidy measures, changes in other management costs and much more.

For further information on the investment calculation in general and the calculation of a Visualisation of Financial Implications in particular, please refer to the video tutorial, which can be accessed at <u>http://www.rentalcal.eu.</u>

The RentalCal Tool is based on the simple principle of **input**, **processing and output**. Data is either entered directly by the user or selected from default values (see below: Databases). The user is guided through the work steps in a structured manner and at the end, the calculation results are presented to the user in a thematically structured and graphically prepared form. It is possible to download the Visualisation of Financial Implications as well as further calculation results in PDF format.

2.2. Software and Data Privacy

The RentalCal Tool can be started from any common **internet browser** (Mozilla Firefox, Google Chrome, Microsoft Edge, Apple Safari, etc.).

The RentalCal Tool or RentalCal Consortium does not request or archive any **personal or other meta-information/data.** The RentalCal Tool does not store, process or pass on the entered data, both input and output.

2.3. Terms of Use

The RentalCal Profitability Calculation Tool is provided to you without guaranteeing the correctness and completeness of the software or calculation results. The software, its documentation and the underlying data are provided **free of charge**. The terms of use must be **approved** before using the tool.

The project parties and the European Union shall **under no circumstances be liable** for any loss of data or **any other damage resulting** from the use of such data. No data or images of the tool may be passed on or published to third parties beyond the agreed use. Commercial use is strictly prohibited without the consent of the RentalCal Consortium.

Any use is at your **own risk**. All calculations are based on the data entered by the user or selection of data. No liability is assumed for the actual, exact occurrence of the determined results. The **plausibility** of entered data is checked by the programme only selectively. The **careful and correct input** of data by the user is therefore essential and mandatory. The results of the tool are intended in particular to support, but in no way replace **advice from specialist firms, energy consultants or other experts**. Investment decisions should under no circumstances be made solely on the basis of the calculation results of this software.

Neither the European Commission, nor the RentalCal Consortium, nor its members are obliged to make updates after the end of the project. The tool will be available on the servers of the RentalCal after completion of the project.

3. START OF RENTALCAL TOOL

3.1. Accessing the RentalCal Website

If you access the RentalCal website at <u>http://www.rentalcal.eu/</u>, you will be connected to the general RentalCal homepage (see Fig. 1). Here you can start the tool or you can view or download further information.

RC RentalCal	Re To		Launch Tool	User Manual	Case Stories	Video Tutorial	Tool Parameters
The RentalCal Tool							
The RentalCal Profitability Calculation tool is a wide-ranging, straightforwa adopt established methodologies and valid input parameters to evaluate v The RentalCal Tool consists of three parts:					s available to inve	stors in the reside	ntial rental market. The to
 In the first part, the basic information to understand and apply the tool is 	s provided to the user.	This includes a com	prehensive prese	ntation and a video	tutorial.		
 In the second step, the necessary input data for the profitability calculation 	ion is requested from t	he user.					
 For the third step (output data), the tool calculates the profitability of the relationships between the input data and the output data. 	investment in questio	n and displays the r	esults to the user	. This also include a	a feature enabling	sensitivity and pro	bability analyses of the
	Assisted Mode	sure s,	tion Fr	eehand Mode			
	detailed kippet	increase and intereset deve	rmation, Jioa, rent jorice/ topment				
	III. Output	Calculation Re					

Figure 1: RentalCal Website

3.2. Basic Menu Navigation

The navigation follows common web-based applications and is intuitive to use. The menu or screen area is divided into several areas (see Fig. 2). This allows easy navigation through the software application. To navigate between individual info screens and to correct values, please use the blue buttons ("Continue", "Back") and the red one ("Restore default values") at the bottom of the respective input page (see Fig. 3).



Figure 2: RentalCal Tool

Section 1: You can **select the language** (Danish, German, English, French, Polish, Spanish, Czech). The selected language can be seen in the upper right corner of the screen.

Section 2: The **tab structure** shows you which topic you are currently working in. The subject areas structure the workflow and represent the central steps of a decision-making process with regard to the implementation of energetic modernisation measures.

Section 3: This section displays the entire **subdivision** of the respective tab and the corresponding title of the main screen currently open (see Section 4). The user-friendliness and usability of the tool is supported by the so-called **help box** ("Help"), which you will find at the top of this area. Help can either be opened manually or activated by clicking on the green information fields in the main screen (see Chapter 4.3.). The user manual refers to the help boxes several times (for avoiding duplication). Corresponding places are marked with the following arrow symbol (\rightarrow) in the user manual.

Section 4: The **main screen** is primarily designed as an input or output mask for data. The user can only make entries in this area of the screen. Scrolling may be necessary depending on the size of the corresponding input fields. You will recognise this in case you cannot see the "Continue" or "Back" buttons at the bottom of the screen.

3.3. Project Partners and Terms of Use

This screen (see Fig. 3) summarises the main contents of the RentalCal project. It is possible to display the **participating organisations** and a **video-tutorial**. To do this, click on "See Contributors". An additional **sub-module** opens. Click on "Back" to return to the initial screen (see Fig. 3).



Figure 3: Project partners and terms of use

Please read the terms of use for the tool **carefully**. Please take the time to avoid misunderstandings. See Chapter 2.3. for more information. Then check the box next to "I accept the terms of use". The terms and conditions must be **explicitly accepted** for the use of the software. Then click on "Continue".

3.4. Tool Structure and Basic Functions

The basic structure and functions of the tool are summarised here (see Fig. 4). The RentalCal Tool was designed for **different user groups** (e. g. energy consultants, real estate owners). The schematic representation of the tool is shown in the diagramme on the right-hand side of the screen (see Fig. 4).

The tool can be run in two different modes. First, the **Assisted Mode** that is intended to serve users with less knowledge about energy efficiency and energy efficiency refurbishments in specific. Secondly, the **Freehand Mode** that give the user more flexibility in the input section, but requires more knowledge.

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Figure 4: Tool structur

3.5. Mode Selection

As illustrated in 3.4., the tool is divided into two different streams according to the knowledge and data available for the user. In this screen, the two user groups are explained and data requirements for each mode can be downloaded and printed by clicking the respective buttons. After reading the information you need to choose one mode and continue by clicking on it. You will always see in which **mode you currently are** by looking in the upper right corner.

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	formation Terms of Service Contributors Tool structure Video tutorial Mode selection put put		The Restation Performability Calculation Tool offers several approaches to proceed from here, shop of the Restation Performance is a genetic building in question that infinited included mergy correspondent to the Restation of Restation and the Succession product DFSCOOR alignment for central approaches, there are different to the Restation of Restation and the Restation of Re	or a whether the calculation couplet to be performed for an exemplary sample building tom ingo for buildings in several forcepace noutrines according to their energy-relative properties to sets of required input data which can be examined below. The input requirements for the obtain the data from different sources if needed, before commencing the actual data input List of Outs Requirements (Prechard Model) Profitability Calculation for an own energy concept without any default values for energy communition and avings, investment costs or suggestions on the right buildie of measures. If the required input data are available, this option in stater and more precise. It is especially intended for energy consultants, civil engineers, architects, owner's associations and other building professionals who know the technical details and potential costs of the entropice and wants perform a guida profitability calculation. Moreover, lindicates
				Ellart Freehand Mode

Figure 5: Mode selection

Mode Explanation:

The RentalCal Profitability Calculation Tool offers several approaches to proceed from here, depending on whether an energy concept already exists (for example by an energy consultant's expertise), whether there is a specific building in question (but without a finalised energy concept) or whether the calculation ought to be performed for an exemplary sample building from the TABULA database (TABULA and its follow-up project EPISCOPE attempted to create a typology for buildings in several European countries according to their energy-related properties and to track the progress of energy performance).

Assisted Mode:

The assisted mode is based on a selected reference building and a selection of default bundles of measures from TABULA and the RentalCal databases. Default values for energy consumption, average cost figures for measures and energy savings are provided by the tool, which might be overwritten by the user if more accurate information is available. Moreover, the RentalCal consortium has worked out estimations for measure costs which are provided as suggestion values.

This option is especially suitable for users who do not have a specific building in mind, but would like to gain a general insight into the profitability of energy efficiency retrofit in rental

housing within different building types, ages and measures across the eight European countries.

This option is intended for landlords who want to perform a profitability calculation for a specific building which does not come close enough to the offered reference buildings and who do not have obtained a complete energy concept (current consumption, bundle of measures and expected savings) yet. In the supported input mode, the submodules and sensitivity analysis are also available.

Freehand Mode:

The freehand mode is based on an own energy concept without any default values for energy consumption and savings, investment cost or suggestions on the right bundle of measures. If the required input data are available, this option is faster and more precise. It is especially intended for energy consultants, civil engineers, architects, owner's associations and other building professionals who know the technical details and potential costs of the retrofit and want to perform a quick profitability calculation. Moreover, landlords who are consulted by these groups may also use this option. In the freehand mode, the submodules and sensitivity analysis are not available.

4. ENTRIES INTO THE RENTALCAL TOOL (INPUT)

You are now in the **input area** of the tool. All entries (exception: Project Description) are directly included in the calculation result.

In the following, different chapters are only used for freehand mode and assisted mode if the input screens differ significantly. *If the input screens do not differ or only slightly, the difference is explained in the text.*

H Language selection			RentalCal English
evestor O Property	0 Refurbishmen	O Financing O Market O	
Where am I Help		General Project Data	
nformation	>	To identify the respective project and version, it might be advisable to enter some user, investor, object and version	on data. These invots are not saved or nonnessed outside the user's domain and
sput	-	only show up here and in the printed compilation of the results at the end of the tool.	
Project Data		It is also possible to leave an E-Mail-Address which will only be used for information about errors, patches or imp	provements of the tool. Previous projects and version might be loaded below.
		E-Mail Address:	
Location Data	- C	User (Company):	
Investor Data		Investor, if different (Company):	
Property Description		Object name:	
Energy Consumption	0		
Energy Costs		Object's Address:	
Cost Summary	5	Project Number:	
Maintenance Costs		Version Number:	
Depreciation			
Energy Consumption			
Energy Costs	5	+ Back	Continue +
Financial Information			
Price development			
Tenancy Situation			
Rent Increase Method			
Exit Yield			
Disclaimer			
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© The RentalCal Core			Funded by the Europeen Lincon

4.1. General Project Data (Freehand and Assisted Mode)

Figure 6: Project data

When using the tool for the first time, you will be asked to enter your project details at this point (see Fig. 6). It is not necessary to enter a **password**, as no data is stored on a RentalCal server.

4.2. Property Location (Freehand and Assisted Mode)

Please select the **location of your property** by selecting the respective country from a list. Please do not use your personal location if you operate from another country.

H Language selection								RentalCal English
Investor O Property	O Refurbishment (0 Financing 0 Market 0						
Where am I Help		Location						
Information	> î	This icon indicate	•** c	This icon indicates default	•-	This icon indicates the	X	This icon indicates the
input	1	This scon indicate selection of one o from a dropdown		suggestion values which might be overwritten by the user.	°0	selection of several options from a given set.	<u>к</u>	selection of one option from a set.
Project Data	3							
Location Data		Location of the Property:	10	Germany		-		
Investor Data								
Property Description	>	Area Metric:	10	Square Meters	O Square F	eet.		
Energy Consumption	× .							
Energy Costs	3	Calculation Currency:	13	Euro				
Cost Summary								
Maintenance Costs	2							
Depreciation		+ Back		Restore def	ault values \$			Continue +
Energy Consumption	×							
Energy Costs								
Financial Information								
Price development								
Tenancy Situation								
Rent Increase Method								
Exit Yield								
Disclaimer	2							
Output								

Figure 7:Property location

With the red "Restore default values" button, all entries on the corresponding page can be **reset** to the default setting. In most cases, a new entry is then necessary.

4.3. Investor Type and Corporate Structure (Freehand and Assisted Mode)

As already mentioned, the user has the possibility to display help texts for input. To do this, the user simply clicks on the **green button** or symbol with the cursor. The respective information text then opens in the left half of the menu (see Fig. 8). However, the user can also click on "Help" to display additional information.

Please fill in all fields. We would like to point out that the **calculation horizon** in particular can have a decisive influence on the profitability of energy modernisation. Since energy efficiency measures are still a long-term investment, too short periods under consideration can lead to an incorrect assessment of the profitability. Please also note that the chosen calculation horizon also plays a role for a possible sale (see Chapter 4.19.).

After entering or selecting all relevant data, you can continue. If you have not made an entry that is relevant for the calculation result, you will be informed before you can continue.

Next Next Next Next Next <							Renta
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Calculation Period for Prostability Analysis: 2 Phisperty Description Pringery Conta Prin	Project Data	2	Marginal Tax Rate:	35	e.		
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Figure 8: Investor characteristics

4.4. Property Description (Freehand Mode)

In freehand mode the lettable area is the central input data. When entering the lettable area, please note that the programme automatically activates the corresponding input field for your entry. The system first asks for the property type. If an entire building is selected (SFH/TH/MFH or AB) (\rightarrow), the rentable floor space of the building should be registered. Entries for the living space of the apartment are therefore not possible. If a single dwelling (in MFH/AB) is selected as building type, nothing can be entered for the living space of the building. Then an entry is required for the living space of the apartment. Basically, cells with a grey background cannot be described. They are mostly used for the conversion of input values or, as in the above case, are enabled by a corresponding selection. Please enter the area as it is mentioned in the rental agreement with your tenant(s)/rental contract(s).

F Language selection						Rent	alCal English
Investor O Property	Refurbishment O	Financing O Market O					
Where am I Help	~	Property Description					
Information	2						
Input	-	Property type:	Single Family Ho	use		9	
Project Data	2	Lettable Area of the property: This will be the	220 0				
Location Data	2	reference value for all further calculations.	200 🕑	-	0		
Investor Data		0 875 N.C.					
Property Description		Lettable area of the apartment(s) in Multi- Family House / Apartment Block: This will be the reference value for all further		m ²	e		
Energy Consumption	3	calculations.					
Energy Costa	5						
Cost Summary		+ Back		Restore de	fault values	Continue -	
Maintenance Costs	2						
Depreciation	2						
Energy Consumption							
Energy Costs							
Financial Information	2						
Price development							
Tenancy Situation							
Rent Increase Method	2						
Exit Yield							
Disclaimer							
Output	, •						_
© The RentalCal Cons	ortium 2017					Punded by the Europeen Union	

Figure 9: Property description (Freehand Mode)

4.5. Property Description (Assisted Mode)

The input mask for the property description in assisted mode differs significantly from freehand mode (see Fig. 10).

The system first asks for the **property type** and the **construction year class** offered by the TABULA database.

According to the **TABULA** concept (<u>http://webtool.building-typology.eu</u>) a national residential building stock is divided in size and age classes. By knowing the building type, a building could be classified into a building size class. The building size classes reflect different sizes and geometries of the building envelope. They are defined for each country separately often according to national statistics. In building practice sometimes sub-types exist.

By knowing the year of construction a building could be classified into a construction year class. The construction year classes reflect shifts in building practice and energy requirements by regulations. They are defined for each country separately often according to national statistics.

If the selected combination of property type and construction year class is part of the TABULA database, an example photo and some building data are presented on the screen. The **lettable area** of the example building from TABULA is used as default value. It can be **overwritten** by the user to adapt it to a specific building.

If the selected combination of property type and construction year class is not part of the TABULA database, the user is requested to select another property type or construction year class.

Please note that the analysis of a single apartment in a multi-family building is not possible in assisted mode because TABULA only provides energy balance calculations for a whole building.

Finally the tool asks for the **heat supply system** of the building (selected from a given set of common systems per country).

For each building type per country TABULA provides a set of exemplary energy supply systems. Per choice of a building type and a system type the existing state and energy performance level of a model building can be described. In RentalCal only those energy supply systems from TABULA that are most relevant for refurbishment in rental housing were considered (a maximum of three possible system packages per building type but a minimum of one system package). In some cases these measures were also slightly adapted to better represent the rental housing stock.

Language selection			RentalCal English
investor - Property	. Refutishment . Finan		
Where an 1 Help	• 6	Property Description	
		Property Type: 📃 Apartment Block 🖉 🗨	
nout	-	Construction Hear Class:	
Project Data		Reference building in TABLUA database? Yes	
Lacetion Data		The TADULA database offers the following reference building which can be used as a starting point to run the profitability analysis:	
woodfor Data	-	Object Type AB	
Property Description		Construction Year Class: 1968-1974	
Energy Consumption		Number of Fixors 6 Number of Devellings 48	
Conversion Pactors		Lattadie Area 4276.71 m ²	
Energy Costs		Lattable Area of the actual building if	
Bundle of Retroft Meakures		different from the protetype of all 4265.75 of all	
Detailed Drangy Prices		further calculations)	
Cost Summary	×	Head Stapply System: Einit district heading transfer station for heading and DHHs, natural ventility 🔹 🔮	
Detailed Measure Coats			
Maritimance Costs			
Depreciation		Allerk Restore default values: 1	Continue -
Depreciation Plan			
Energy Consumption			
Conversion Pactors			
Energy Costs			
Detailed Energy Prices			
Francial Information			
Proz development			
Tenancy Situation			
Owtailed Tenancy Imput			
Rest Increase Method			
Dati Yang			
100.00			Furtherd by the European Union

Figure 10: Property description (Assisted Mode)

4.6. Energy Consumption before Refurbishment (Freehand and Assisted Mode)

In the following input mask (see Fig. 11), all relevant information on energy consumption are queried **prior to modernisation**. Please note that this is an **annual data** entry. Corresponding information can be found in the annual accounts of your energy supplier. Please use the average value of the past years, if available, to compensate for weather-related fluctuations. Input fields of unused energy sources can be left blank (corresponds to an input of "0").

Assisted mode: All displayed energy consumption data are default values from the TABULA database. It can be overwritten by the user.

									RentalCal Inglish annuan
mestor 2 Property	helatishneet fin	ancing Market							
Where an I Help		Energy Consumpti	on before Refurbishr	nent					
information	2.0	Average annual energy conturns	tion for space heating and domestic and vacancy disloweth hour = kith)	hot water only! The data	should consist of the ave	rage consumption over	at least the last three year	rs and	
mput	-		are recardly for the read						
Project Data					1912.14		15.45		
Location data		Dectroly				kontyje		kars/(m ¹ 4)	
mvestor Data		OE.	1797.8	los/s	17972.96	100/3	185.98	k#h/(m/k)	
Property Description		Oas		1974 -		beet-ca		kanv(orla)	
Energy Consumption		Cost		tata (100ya		kath/(m ¹ 4)	
Conversion Factors		Boness		Rg/s		ANT/CR		1.00x/(m ² 4)	
Energy-Cents		Dutriet Heating				lan, a		am/or/so	
Bunche of Retrofit Measures		Other				107/0		Imonia	
Detailed Energy Prices									
Cost Summary		Total End Energy			19485.1	bith/a	201.88	\$10%(10 ² 4)	
Detailed Measure Costs				10000000000			2022/000		
Maintenance Costs			ption of non-renewal						
Degree lation		arman companyour in normal	and a result from \$1 and a resolution	in collebrate of an	and over the merginese	and done of the rest of	and the second second		
Depreciation Plan		Kon serve alde Dimare Former			22545.53	100.0	191.77	remonitor	
Depreciation Plan		Non-rememble Primary Darryy			22545.53	lativa	201.27	xmv(m ¹ k)	
Energy Consumption		 Non-innermable Primary Energy Use user supplied non-renevable 	e frimary Energy value.			Mitta Mitta	201.27	smc(ork)	
Energy Consumption Conversion Factors	•		e fronary Chergy value.				231.27 71.63		
Drange Consumption Conversion Pactors Drange Costs	•	Use user supplied non-renewable			\$864.07	antes		KMA/(m/d)	
Energy Consumption Consension Factors Energy Costs Detailed Energy Prices	•	Ute user suggited non renewable 00 ₃ equivalents			\$864.07	kath is		kational kational	
Drwg Conuription Conversion Factors Drwg Costs Detailed Energy Prices Financial Information	* * *	Use user supplied non-nenevable CO ₂ equivalents User user supplied CO ₂ equivalent	ts value		\$864.07	kath is		kational kational	
Drwg Constription Constraint Factors Energy Costs Detailed Energy Prices Financial Information Price Devidgment	8 9 9 9 9 9 9	Ute user suggited non renewable 00 ₃ equivalents	ts value		\$864.07	kath is		kational kational	
Deergi Consurption Conversion Pactors Unergi Costs Detailed Energy Prices Protected Information Price development Temany Structure	• • • •	Use user supplied nun normatik OS, applinitents User user supplied OS, approxim Technical Conversion Factors	ts value	4	4864.67	kath is		100(94%) 14(94%) 14(94%)	
Deergi Consumption Conversion Pactors Energy Contri Detailed Energy Prices Prinancial Information Price development Temany Situation Catalled Teraney Input	* * * * *	Use user supplied non-nenevable CO ₂ equivalents User user supplied CO ₂ equivalent	ts value	4	\$864.07	kath is		kational kational	
Deergi Consurption Conversion Pactors Unergi Costs Detailed Energy Prices Protected Information Price development Temany Structure	• • • •	Use user supplied nun normatik OS, applinitents User user supplied OS, approxim Technical Conversion Factors	ts value	4	4864.67	kath is		100(94%) 14(94%) 14(94%)	

Figure 11: Energy consumption before refurbishment

The tool works with **stored conversion factors**, e.g. to convert the energy consumption of liters or m³ into kWh. Primary energy and CO2 factors are also stored in order to calculate primary energy consumption and CO2 emissions from energy consumption (end energy). The user has the possibility to enter individual values for primary energy consumption and CO2 emissions before refurbishment or to adapt the conversion factors by using the **sub-module** ("Individual Conversion Factors").

4.7. Sub-Module Individual Conversion Factors (assisted mode only)

Standard values are stored in the tool for all conversion factors and energy sources. These values are used to carry out the calculations automatically. These are averages, i.e. the actual values can vary greatly in some cases.

For example, the demand for non-renewable primary energy to generate one kilowatt hour of electricity can vary greatly, depending on the energy mix on which it is based, or when green electricity is purchased. Primary energy requirements and greenhouse gas emissions in the supply of district heating can also differ greatly from the stored average values. In addition, the actual burning value used depends heavily on technical conditions and user behavior.

For these reasons, it may be advisable for the users of the tool to **overwrite the stored default values before and after retrofit** with individual specifications in order to achieve more precise results (see Fig. 12). Such values can be requested from the respective energy supplier, for example.

mestor V Property	Relationers Trencin	ng 🔪 Madar							RentalCal trigich assess
Where are 1 Help			ion Factors before En	ergy Retrofit					
information Input			Default conversion far renewable Primary En mergy 🖤		Default conversion fa	actors for CO2 equivalan	E Default net calorific values energy carrier	in lowh per unit of	
Project Data		Decisionly.	2.8	kun,kun	617	giam.			
Location Data		C4	3.05	auto, Asim	390	giam.	16	ken, tex	
Investor Data		Dec.	1.05	kan, kan	277	yim.	11.4	km,toe	
Property Description		Coal	1.05	ken, kan	433	y kan	8.3	100,0or	
Energy Consumption		fromans:	0.05	kenden.	40	ykm	4.9	ann.tee	
Conversion Factors		Durinol Newtong	1.2	kan, kan	420	gion	50	kitte line	
Freegy Conts		Other	1.29	ion,ton	361	gian.			
Bunche of Retrolit Measures			alculate the consumption of non-rem				which are connected to the co	noumption of end	
Detailed Energy Proces		energy, depending on the compo							
Ceel Burniery		utility companies.	d above are national averages and mi	git be overwritten if ito	re procese variant and an	ranadra, for example tig	nue coraned your every our	s produced by the	
Detailed Measure Costs		Actual values eright particularly	deviate if the building in question is a	upplied with renewable	anargy.				
Mathematics Costs									
Depreciation		+ Deck		Restore	default values				
Depreciation Plan		_							
Energy Consumption									
	*								
Conversion Factors									
Conversion Factors Energy Costs Detailed Energy Proces									
Conversion Factors Energy Costs									
Conversion Factors Energy Costs Detailed Energy Proces									
Conversion Factors Grange Costs Detailed Energy Prices Prearcial Information	н. Э								
Conversion Factors Energy Dotts Detailed Energy Proces Provided Energy Proces Proce development	•								
Conversion Factors Energy Costs Detailed Energy Proces Free development Tearroy Situation	*								

Figure 12: Sub-module: Individual conversion factors before energy retrofit

4.8. Energy Costs before Refurbishment (Freehand and Assisted Mode)

The calculation of the corresponding annual **energy costs** is based on current default values for **energy prices** per energy carrier (see Fig. 13). The default values for the average energy prices come from the RentalCal partners. The tool automatically calculates the energy cost from the stored energy prices on the basis of the energy consumption entered in Chapter 4.6.. The user can replace the default values with actual energy prices incurred in order to refine the calculation result or to adapt the energy prices by using the **sub-module** ("Detailed Energy Prices").

									RentalCal
westor O Property	Refurbishment O	Financing O Market O							
Where am I Help		Annual Energy Co	osts before Refurbish	nment					
nformation	> î	**	rier and resulting energy expenses a		estic hot water only, inclu	xding all taxes and fees!	The energy price sugg	estions can be or	verwritten
put	-	0							
Project Data		OR	0.59	[4] Builder	0.059	S EURAMA	144.55	(\$)	61A
Location Data		Total					144.55		EV.R
Investor Data		The second se					144.00		CO.
Property Description	3	The default values for energy	gy prices are actually based on the y	ear 2016. Please enter the cu	rent energy prices if nece	eesary.			
Energy Consumption									
Energy Costs		+ Back		Restore def	nit values 🔸			00	etinue + .
Cost Summary									
Maintenance Costs									
Depreciation									
Energy Consumption									
contractions									
Energy Costs									
Energy Costs									
Energy Costs Financial Information Price development									
Energy Costs Financial Information Price development	-								
Energy Costs Financial Information Price development Tenancy Situation Rent Increase Method	3 3 3								
Energy Costs Financial Information Price development Tenancy Situation	2 2 3 3								

Figure 13: Energy costs before refurbishment

4.9. Sub-Module Detailed Energy Prices (assisted mode only)

Energy costs per kWh may vary noticeably for different consumption levels if there are large fixed or demand-based cost components. Thus, average prices may increase if the consumption decreases as a consequence of energy efficiency retrofit. Moreover, if the decrease in demand is not reported to the energy supplier, outdated costs are billed, exaggerating the total and average expenses. This problem might particularly occur with district heating, but also electricity supply. To account for changes in tariff structure and calculate precise average prices, energy tariffs can be modelled individually both before and after retrofit (see Fig. 14). Such values can be requested from the energy bills, for example.

Language selection													Renta	ICal English
westor 🖌 Property	Refurbishment Financing	Market												
Where am I Help		Detailed Energy	Prices b	efore Re	furbishm	ent								
offormation	·	Energy costs per kWh m				n levels if the	ere are large fi	ixed or deman	d based cost	components.	Thus, average	e prices may i	increase if the	consumption
nput	-	decreases as a conseque Moreover, if the decreas	e in demand is	not reported t	o the energy s									arly occur with
Project Data		district heating, but also Note that all cost compo			t for changes i	n tariff struc	ture and calcu	ulate precise av	verage prices	, energy tariff	s can be mod	lelled individu	ally.	
Location Data	1 C		En er er en er		Tarked dam		Uncable or		Downood ek		Pasia abar		Deculting	
Investor Data	×		Energy cons logged into		Tasked dem peak	and power		ur / per unit	Demand ch (annual)	arge	Basic charg (annual charg costs)		per kWh /	
Property Description							(weighted av	erage day/night)					costs)	rge / shipping
Energy Consumption		Electricity: O	647	kWh/year	0.324	kW	0.230	EUR/kWh	10	EUR/KW	50	EUR	0.312	EUR/kWh
Conversion Factors														
Energy Costs		OII: O	25000	kWh/year			0.050	EUR/kWh			100	EUR	0.054	EUR/kWh
Bundle of Retrofit Measures	×		2500	litres/year			0.050	EUR/litre					0.540	EUR/litre
Detailed Energy Prices			2300	an en year.			0.050	EUR/Stre					0.540	E CHONORE
Cost Summary		Gas: O												
Detailed Measure Costs			0	kWh/year	0	kW	0.0	EUR/kWh	0	EUR/kW	0	EUR	0.0	EUR/kWh
Maintenance Costs			0	m³/year			0.0	EUR/m ³					0.0	EUR/m ³
Depreciation														
Depreciation Plan		Coal: 🕥	0	kWh/year			0.0	EUR/kWh			0	EUR	0.0	EUR/kWh
Energy Consumption			0	tons/year			0	EUR/ton					220	EUR/ton
Conversion Factors														
Energy Costs		Biomass: O	0	kWh/year			0.0	EUR/kWh			0	EUR	0.0	EUR/kWh
Detailed Energy Prices			0	tons/year			0	EUR/ton					0	EUR/ton
Financial Information			v	tour less.			0	Longton					0	2010100
Price development		District Heating:	0			kW		EUR/kWh		EUR/KW	0	EUR		EUR/kWh
Tenancy Situation			0	kWh/year	0	KYV	0.0	EUROKWIN	0	EORIKW	0	EOR	0.0	EURIKWN
Detailed Tenancy Input			0	m ³ /year			0	EUR/m ³					q	EUR/m ³
Rent Increase Method														
Exit Yield		« Back					Dee	tore default va						
Exit Viald Calculation		A COLA					Hes	tore detault va						

Figure 14: Detailed energy prices before energy retrofit

4.10. Bundle of Retrofit Measures (Assisted Mode only)

The assisted mode offers two pre-defined refurbishment packages from TABULA. The user can choose from a standard bundle ("**Standard Retrofit**"), oriented towards the respective countries' legal minimum requirements in the past years, and an advanced bundle ("**Advanced Retrofit**") with more ambitious measures. The single measures of the bundles are displayed in the middle section of the screen.

Note that the suggested bundle of measures will not necessarily fulfil the current national minimum requirements for energy efficiency refurbishments nor can it take other provisions under building law into account. Moreover, it is not guaranteed that the offered bundle of measures does not harm to the building structure, e.g. due to mould infestation. Seek advice from a professional energy consultant, architect or civil engineer before making any investment decision based on this tool alone!

Language selection		RentalCal Ingini anno
investor 🥜 Property	Refutishment Financing Market	
Where and Help	Bundle of Retrofit Measures	
information		building. The software suggests pre-defined bundles of retroft measures which might be performed. Depending on the user's ambitions,
input		ed lowards the respective countries" legal minimum requirements in the part years, and an advanced bundle with more ambitious measures, are executed together with a netrofit of all building parts involved, thus a share of their total cost is attributed to the sphergy effects by default.
Project Data		t inequectionly, there are no additional costs for scalifoldings for the installation of additional insulation. We in customize the selection of measures by deleting, adding or adjusting individual measures and their cost and cost distribution.
Location Data		(B) a conserved were associated as a fibration from the second fibration of the second s second second s second second s second second se
	Bundle of Retrofit Measures	O Standard Retrofit Advanced Retrofit
mounter Crata		reasures will not recessarily fulli the current national minimum requirements for energy efficiency refurbishments nor
Property Description		ulding law into account. Moreover, it is not guarantized that the offered bundle of measures does not have to the building lon. Seek advice from a professional energy consultant, architect or civil engineer before making any investment decision
Energy Consumption	 Based on this tool alone! 	
Conversion Factors	* Measures regarding	
Energy Conto	, Root/Apper Ceiling:	
Bundle of Rebuilt Measures	singlementation of a manager wool la	yer (30cm)
Detailed Drongy Prices	* web	
Cost Summary	Vial madator (18 cm)	
Dettailed Measure-Corets	7 Peor/Online Colling:	
Mantenance Costs		
Depreciation	x	
Depreciation Plan	born born	
Energy Concurrention	emoval, installation of new insulate	a weap coor
Conversion Pactors	Windows	
Energy Costs	new windows (very efficient)	
Detailed Energy Prices	 Heating Supply System Package: Wood bolier for heating and DHW at 	4h solar thermal DHM, balanced ventilation system
Feancial Information		
Psca development	2	
Tenancy Situation		
Detailed Tenancy Input		Transfer 1
Rent increase Method	x.	
Det vierd	1	
The Rental Consulture 2017.0		Formathy the Landaust John

Figure 15: Bundle of retrofit measures (assisted mode only)

4.11. Investment Costs (Freehand and Assisted Mode)

Energy modernisation involves corresponding investment costs, which can be divided into different cost categories (see Fig. 15). For the calculation of profitability, only the **energy-related additional costs** of an investment are used (last column). Necessary costs for maintenance measures that are due (anyway required retrofit costs) must be deducted from the full costs of energy-related modernisation in order to determine the additional energy-related costs. The so-called "anyway required retrofit" costs are those costs that would have incurred with a "normal" modernisation to preserve the building. In the case of the energetic modernisation of the facade, this would be, for example, the cost of erecting an external scaffolding. If you need further information on the terms, please click here again on the green info bubbles (\rightarrow) .

Please note that all investment costs are stated as **net amount**. The conversion into gross amounts is carried out in the tool. Finally, you will be asked whether you are entitled to deduct input tax. If this is the case, the tool automatically uses the national tax rate.

Assisted mode: All displayed investment costs data are default values from the RentalCal database. It can be overwritten by the user.

istor O Property	Refurbishment	Financing O Market O										
Athene am I Help		Investment costs for the end	ergetic refu	rbish	ment							
formation	<u> </u>	input of total and energy-related costs for the sele below. The investment cost input should not cont										
put	19 A							0			0	
Project Data			Total inve	stment Co	ate		Thereof A	knyway Costs		Thereof energy of	slated Share (of Costs:
Location Data		Envelope-related Measures:	23227		EUR.	+	11614	[0]	EUR	11613	9	EUR.
westor Data		System-related Measures:	17405	(2)	67b	1	8742	<u> \$ </u>	EUR	8743	0	ELR.
Property Description		Overhead Costs (e.g. Planning Costs):	3000		818		1500	[9]	EUR	1500	0	ELR.
Energy Consumption		Total Net Costs (exclusive of VAT):	43712	0	EUR		21856	[0]	ELR	21856		ELR
Inergy Costs	3	Total Net Costs per area metric:	198.69	4	EUR/m ²		99.35	4	EUR/m ²	99.35	4	ELB/m ²
cost Summary		Are you allowed to deduct Value-Added Tax		13			Yes			@ No		
Maintenance Costs		(VAD)?:				1				- m		
Depreciation		National VAT tax rate:	19	•								
Inergy Consumption										Thereof energy	related Shar	e of Costs:
Energy Costs		Total Gross Costs (including WAT):								26008.64	4	EUR
Inancial Information										118.22	4	ELR/m ²
Price development												
Tenancy Situation												
Rant Increase Method		+ Back			Resto	e dela	ult values 9					Continue +
Luit vield												
Disclaimer	2											
tput.												

Figure 16: Investment costs for energetic refurbishment

4.12. Change in Maintenance, Inspection and Repair Costs (Freehand and Assisted Mode)

Costs for ongoing **inspection, maintenance and minor repairs** can change due to an energy efficient modernisation. It is possible to enter the costs before and after the modernisation. Only the difference between both is used for calculation in the tool. Please distinguish between reimbursable and non-reimbursable costs. Only **non-reimbursable costs** are relevant for the calculation. A more detailed explanation can be found in the info boxes (\rightarrow) .

To indicate the share of the annual maintenance, inspection and repair costs, which is nonreimbursable (i.e., attributable to the landlord/investor), the slider for allocating costs can be used.

H Language selection									RentalCal Eng
westor O Property	Refurbishment	Financing O Market O							
Where am I Help		Change in Annual Maintenance, Inspection and	d Repair Costs afte	er Refu	rbish	ment			
formation	2	Annual maintenance, inspection and repair for energy-related building elements (insulation, HWAC) before refurbishment (gross costs including VAT):	400	(d) eue	/# *	1.82	\$	EUR/m ² s	
put Project Data	2 3	Annual maintenance, inspection and repair for energy-related building elements (insulation, HVAC) after refurbishment (gross costs including VAC; if unknown, same value as above):	700	(2) 10.0	/* *	3.18	1	EUR / m ² e	
Location Data		Resulting change in annual maintenance, inspection and repair due to the energy-related refurbishment measures:	300	4 EUR	/= =	1.36	+	${\rm EUR}/m^2 a$	
Investor Data	1	Share of the annual maintenance, inspection and repair costs, which is non-reimbursable (i.e., attributable to the landlord/investor):	-			58	\$		
Property Description	2	Resulting change in annual maintenance, inspection and repair costs, which is non-reimbursable (i.e., attributable to the landlord/investor):	174	3 84	/* *	0.79	:	838/m²s 0	
Energy Costs									
lost Summary		+ Back	Restore default values 🕴					Contin	ue +
Maintenance Costs									
Repreciation									
nergy Consumption									
inergy Costs									
inancial Information									
enancy Situation									
ent increase Method	5								
xit vield									
Naclaimer									

Figure 17: Changes in annual maintenance, inspection and repair costs

4.13. Depreciation (Freehand and Assisted Mode)

This input mask asks for a depreciation rate of the energy-efficiency investment.

Here we are referring to the **Economic Depreciation** as a measure of the decrease in value of an asset/investment over time. In this case, we would like to know how the value of the retrofit investment is depreciated over time.

An overwritable default value is presented from the RentalCal database. Please select a uniform depreciation rate for your investment. This is very important for the calculation of the tax payments.

H Language selection			RentalCal English
rvestor O Property	Refurbishment	Pinancing O Market O	
Where am I Help		Depreciation	
nformation	> î		
nput	11 A	Depreciation of energy-efficiency investment 3 V	
Project Data			
Location Data		Restore default values	Continue +
Investor Data	2		
Property Description			
Energy Consumption			
Energy Costs	5		
Cost Summary			
Maintenance Costs	2		
Depreciation			
Energy Consumption	÷		
Energy Costs			
Financial Information	2		
Price development			
Tenancy Situation			
Rent Increase Method			
Exit Yield	2		
Disclaimer			
Nutput			

Figure 18: Depreciation

4.14. Energy consumption after Refurbishment (Freehand and Assisted Mode)

In the following input masks (see Figs. 18 and 19), all relevant information on **energy consumption** and energy costs **after modernisation** is requested. Please note that this entry is also on an annual basis. Corresponding information can be found in the energy concept. You can leave input fields of unused energy sources blank (corresponds to an input of "0").

Assisted mode: All displayed energy consumption data are default values from the TABULA database. It can be overwritten by the user.

Alternational Inclusion			120					
Where and I may		on after Refurbishme						
view we are referring to the Economic Depreciation as a measure of the		r space heating and domentic hot we	(er only for the building	after refurbishment.				
decrease in value of an asset/investment over time, in this	•							
case, we would like to know how the value of the notrolit investment is	Dectricity			465.55	1010	4.29	anty print	
depreciated over time	OR.		Inch		inter-in-		100v(m ¹ 4)	
	Dan		10		inter		100/04/6	
	046		1073		surva.		\$100(10-3)	
	Coel:		Agin .	4	ket/w		kithv(m ² s)	
	Bonass	1272.13	hgia	8232.44	antra .	64.2	kativ(sela)	
	Diatrict Heating:		refra	0	100.0		Life/(of)(
	Other				107,0		10%(m ² 4)	
					toria.		(arc)(r.4)	
	Total End Energy			\$405.99	ANT-CO.	68.99	service/st	
		otion of non-renewab						
	Annual consumption in non-rener			Ring from this among com			Long (sering	
	Annual consumption in non-reme	while Primary Energy and ententions	of CO ₂ equivalents, see	Alog from this among com	semption, calculated fi	r average values.	servicenta) servicentaj	
	Annual consumption in non-rener Ten-renervable Primary Energy	while Primary Energy and ententions	of CO ₂ equivalents, we	Alog from this energy com	samption, calculated fi	r average values.		
	Annual consumption in non-enver Rein-nenerable Primary (nargy Use user-supplied non-nenerable	value Prenary Dongy and entestions Primary Energy value:	ef CO ₂ equivalents, see	Alog from this energy com 1982 44 536 58	samption, calculated fr	n annage values. 14.23	anto(or/a)	
	Annual consumptions in non-enver Rechromowable Minnary (marger Une sam-supplied non-renevable CO ₂ equivalents	value Prenary Dongy and entestions Primary Energy value:	et CO ₂ equivalents, res	Alog from this energy com 1982 44 536 58	samption, calculated fr kenne kenne kgra	5.53	1001(10 ¹ 4) 142 ^(10²4)	
	Annual consumptions in non-enver Rechromowable Minnary (marger Une sam-supplied non-renevable CO ₂ equivalents	while Prenary Deergy and extensions Prenary (Deergy value:	et CO ₂ equivalents, res	Alog from this energy com 1982 44 536 58	samption, calculated fr kenne kenne kgra	5.53	1001(10 ¹ 4) 142 ^(10²4)	
	Annal consumption in non-result Technisereadile Primary Brurger Use user-suggitief non-renewable COg equivalents Use user-suggitief COg equivalent Techniserean Factors	while Prenary Deergy and extensions Prenary (Deergy value:	af CO ₂ equivalents, res	Ang Sun Ha marg con 1882.44	samption, calculated fr kenne kenne kgra	5.53	2000;0140 240(0140) 240(0140)	
	Annad consumption in non-result Reprintmentable Primary (burger Uter sum-suggified non-renewable CO ₂ equivalents Uter sum suggified CO ₂ equivalent	while Prenary Deergy and extensions Prenary (Deergy value:	af CO ₂ equivalents, res	Alog from this energy com 1982 44 536 58	samption, calculated fr kenne kenne kgra	5.53	1001(10 ¹ 4) 142 ^(10²4)	
	Annal consumption in non-result Technisereadile Primary Brurger Use user-suggitief non-renewable COg equivalents Use user-suggitief COg equivalent Techniserean Factors	while Prenary Deergy and extensions Prenary (Deergy value:	af CO ₂ equivalents, res	Ang Sun Ha marg con 1882.44	samption, calculated fr kenne kenne kgra	5.53	2000;0140 240(0140) 240(0140)	

Figure 19: Energy consumption after refurbishment

Again the user has the possibility to enter individual values for primary energy consumption and CO2 emissions after refurbishment or to adapt the conversion factors by using the **sub-module** ("Individual Conversion Factors", see 4.7.).

4.15. Energy Costs after Refurbishment (Freehand and Assisted Mode)

When calculating the corresponding energy costs **after modernisation**, reference is made to default values for energy prices (see Fig. 19). The user can replace the default values with specific cost specifications to make the calculation result more precise.

									RentalCal
estor O Property	Refurbishment	Financing O Market	0						
there am I Help		Annual Energy (Costs after Refurbishn	nent					
ormation	>	The kWh prices per energy of	carrier and resulting energy expenses a	re for space heating and Don	estic Hot Water only, including all ta	ires and fees, i	ther refurbishment.		
ut		It may be necessary to reca	ículate the average kWh-prices, as ene	rgy costs per kWh vary notice	ably in case of energy savings if then	e are large fixe	d or demand based of	cost components	
01			prices may increase if the consumptio osts could be billed, exaggerating the t		e of energy efficiency refurbishment	. Moneover, if t	he decrease in dema	nd is not reported	d to the
roject Data			arly occur with district heating, but als						
ocation Data	3		lues are based on the prices before ref		neritten if the structure of energy tar	ffs results in a	Ared average costs		
nvestor Data		0							
Property Description		0ax							
Energy Consumption		Own.	0.74	EUR/m ³	0.065	EUR/SHIN	897.39		DUR.
		Total					897.39	4	ELR.
Energy Costs									
Cost Summary	2	The default values for en	ergy prices are actually based on the y	ear 2016. Please enter the cu	rent energy prices if necessary.				
Maintenance Costs	2								
Depreciation		+ Back		Restore def	ault values 🕴			00	ntinue -
Energy Consumption									
Energy Costs									
Financial Information									
Price development									
Tenancy Situation									
Rent Increase Method									
	1.5								
ixit Yield	1								
xit Yield Kisclaimer									

Figure 20: Energy costs after refurbishment

Again the user has the possibility to enter individual values for energy prices by using the **sub-module** ("Detailed Energy Prices", see 4.9.).

4.16. Financial Information

Please fill in all input fields with appropriate values. **Undescribed** input fields automatically correspond to an **input of "0"**. The entry for "Term of the credit" must be an integer in the range from 1 to the maximum of the **observation period** (limited to 30 years). Fields with gray background are fields that contain a calculated value that is displayed for information purposes. They cannot be overwritten.

H Language selection								R	tent
estor O Property	Refurbishment	Financing Market							
Where am I Help		Financial Information							
ormation	- i	Energy-related gross investment costs:		26008.64	0	0.4			
J.		Debt Portion.	-	70			0		
voject Data		Investor's own Equity amount for the energy investment:		7802.59	0	616	0		
ocation Data	1	Required debt amount for the energy	-	18206.05		0.0			
vestor Data		investment: Expected volume of subsidised loans:	-		0				
roperty Description	2	interest rate of subsidised loans:			10				
nergy Consumption		Term of the subsidised loans:	-		0	years			
nergy Costs out Summary		Initial payback pause of the subsidised loans:			0	years.			
laintenance Costs		Repayment bonus (if any):				64			
preciation		Remaining Financing volume (market loan):		18206.05	\$	8.8			
ergy Consumption		Expected amount of eligible grants:		6000	(\$)	EUR.	0		
nergy Costs		Repayment method market loan (structure of principal/ interest ratio over time):		Annuity loan		×	0		
inancial Information		individual interest rate on market loan:		1	(0)		0		
Vice development		Current borrowing rate fixed or variable:		® fixed O variable			0		
enancy Situation		Current Savings Interest Rate:		0.05	<u>(2</u>)		0		
ent increase Method									
alt Vield		+ Back						Continue +	
Disclaimer	2								
dput © The RentalCar Con	> ¥							Punded by the European Union	

Figure 21: Financial information

4.17. Market Environment

Please enter your **market expectations** in this input mask (see Fig. 21). For example, you can find information on developments in the reports of the national central bank or the assessments of your bank advisor. Corresponding information texts are stored with the respective entries (\rightarrow). The selection of scenarios is intended to facilitate input. Default values can be overwritten manually.

H Language selection							RentalCal Eng
vestor O Property	Refurbishment	Financing O Market O					
there am I Help		Market scenarios					
ormation	2	Expected growth rate for net rent: (exponential growth):	3	8		Ð	
л	1 C	Annual average percentage at which expenses					
voject Data	1	for inspection, maintenance and repair of the heating system increase:	1.5			0	
ocation Data	×	(exponential growth) Expected development of the borrowing rate:					
westor Data	2	(interest rate increases linearly by the selected percentage points annually)	Sidewards (+0,05%/a)			0	
operty Description	×	Individual expectation of annual borrowing					
nergy Consumption		rate development: (interest rate increases linearly by the entered percentage points annually)	0.05	۲			
nergy Costs		Expected development of the savings rate:					
ost Summary	÷	(interest rate increases linearly by the selected percentage points annually)	Sidewards (+0,05%/a)			~ 0	
aintenance Costs		individual expectation of annual savings rate					
epreciation	×.	development: (interest rate increases linearly by the entered percentage points annually)	0.05	8			
ergy Consumption		Expected development of the energy price: (exponential growth)	Moderately Upwards (1,5%/a)			. 0	
wergy Costs		Individual expectation of annual energy price					
nancial information	2	development (exponential growth):	1.5	9			
ice development							
mancy Situation		+ Back	Restore default values 🕴			Continu	
ent increase Method							
ott Vield							
isclaimer	1						
	s •						
@ The RentalCal Com	ortium 2017				Funded	t by the European Union	0

Figure 22: Market scenarios

4.18. Rental Structure

At this point, you are asked to enter the rent (EUR/m²) and the actual billing method (gross/net rent). Please use the rent indicated in your lease contract(s). Additionally, indicate the current vacancy and the expected long-term vacancy after modernisation. (see



4.19. Types of rent increase

Depending on the selection of the rent increase method, the corresponding entry fields are activated or automatically filled with the corresponding input values. For an explanation of the individual methods, please refer to the info boxes (\rightarrow). Note that only the selected method is used.

H Language selection				
vestor O Property	Befurbishmen	t O Financing O Market O		
Where am I Help		Rent Increase due to Refu	rbishment	
formation	. · · · ·	Planned method of rent increase:	According to Legal Standard	- G
put		Resulting rent increase:	1.08 (2) EUR/(m ² - month)	 12 : % met increase
Project Data		washing intercenter.	C Con S conta count	Is . SHERONA .
Location Data				
nvestor Data		+ Back	Restore default values 9	Contri
Property Description	2			
Energy Consumption				
Energy Costs				
Cost Summary	2			
Maintenance Costs				
Depreciation				
Energy Consumption				
Energy Costs				
Financial Information				
Price development				
Tenancy Situation				
Rent Increase Method				
Exit Yield				
Disclaimer				
utput				

Figure 24: Rent increase due to refurbishment

4.20. Capital Gains from Sale

The RentalCal tool allows you to integrate a planned sale into the calculation of the economic efficiency of an energy modernisation. It is assumed that the sale of the property will take place in the **last period** of the observation period. For more information on the selection of the analysis period, refer to Chapter 4.3.. The gain in value from modernisation is thus reflected in the sales price. In the real estate language, the corresponding value is calculated using an exit yield or initial yield. You can find more information in the corresponding help boxes (\rightarrow). If you intend to sell, please select "Yes". Then select the initial yield, a buyer would provide you with (\rightarrow). The overwritable default value for the initial yield for the buyer is part of the RentalCal database. It consists of a country-specific prime yield and a risk premium that represents a low risk of the property (e.g. location risk). If you would like to specify your entry, please use the **sub-module** ("Exit Yield Calculation"). Otherwise, click on continue to go to the **output pages**. The input by the user is hereby finished.

Language selection					RentalCal English armount
Investor 🗸 Property	Refutivement Financing Mo				
Where are (Help		Consideration of capital ga	ains (due to changes of risk profil	le)	
Information	- 1	At the end of the calculation period, it is assur	red that, due to the energy efficiency relationly rees	ares, the tailding's value is higher than it would have been otherwise.	
Input	-	This increase in value might not only result for building parts, or other real estate valuation p		racancy, but also from decreases in various miks, extended economic life span	a of
Project Data			might be assessed by calculation of the lixit. Held for a po	stantial buyer.	
Location Data		When the Exit Yield of an asset is discussed in	the market, it usually refers to the net initial yield a new b	uper would pay or has paid for the asset. In general, the Exit Yield (in %) is defi	
Investor Data				initiam a buyer can expect. As a seller, it is important to understand, that a lowe and in market reports or at your rearest local agent, who is probably happy to	
Property Description		assist.			
Energy Consumption		The Exit Yield will be applied to calculate the	capital game due to the rent increase associated with the e	energebic nebulik,	
Conversion Factors	*	thould Exit Held be taken into account for calculation?	· · ··	0 10	
trange Costs		Initial Yield for the Buyer.	E 45		
Dundle of Retrofit Measures		Please role that this input value has subst	antial impact on the results, thus it needs to be as precise	as possible	
Detailed Unergy Prices					
Cell Summary	* x	East Visid Calculation -			
Denaled Mousure Costs					
Maintenance Costs					
Depreciation		(Back	Restore default value	-	lontinue +
Depreciation Plan		1			
Energy Consumption					
Conversion Factors					
Energy Coats					
Detailed Drarge Prices					
Financial Information					
Price development					
Tenancy Disation	•				
Detailed Tenancy Input					
Park Increase Method					
Exil Yield	* L				

Figure 25: Consideration of capital gains

4.21. Sub-Module Exit Yield Calculation (assisted mode only)

Since it is very difficult for experts to estimate the additional sales revenue without further assistance, the tool uses the evaluation of the risk profile of your property after modernization (**Exit Yield**). Here, you will be asked how you think the risk changes with modernization. If you have any problems with the terminology, please read the help boxes (\rightarrow) .

The Exit Yield is split up in different components. This is due to the fact that Yields in general are dependent on the underlying risk. Therefore, the Exit Yield expresses the required return for a given level of risk. An asset is subject to several different risks, which are explained in the info bubbles. Risks can be different for each asset, but all assets are subject to a so called Prime Yield, which displays the return to bear the risk of an asset that has the lowest risk of all (Prime Risk). Those assets are also known as Prime Assets. They are seated in the best location, are fully let and accommodate tenants with highest creditworthiness. Prime Yields are not calculated by individuals, but market reports can be used to extract a suitable figure.

Language selection									RentalCal (right) and and
Investor 🖌 Property Refubilitionent Fina	ning Statut								
Where am I Halp	Detailed Estimat	ion of Exit Yield							
The return of properties is often. displayed in Yarids. And Yarids are	At the end of the calculation; notestary is assess the risk		uliding is sold to another investo rolit.	To calculate the additional	value created by the	energy effici	iency retrofit, it is		
nothing sha than a wead for taking reak. Rinks can be drilewent for each aset, but if all asserts are subject to a so called introe Yeek, which displays the extern to beau the reak of an assert their	required return for a given lev all assets are subject to a so Prime Assets. They are seate	el of risk. An asset is subject t called ihime Held, which dispi d in the best location, are fully	to the fact that vields in general o several different risks, which an ays the return to bear the risk of a let and accommodate tenants wi	explained in the following in accet that has the lowest	nfo bubbles. Roks ce risk of all (Prime Risk	n be differe). Those as	nt for each asset, b sets are also known		
has the lowest risk of all (Prime Risk). Those assets are also known as Prime	market reports can be used to	s extract a suitable figure.							
Assets. (lipitzerrendite)	Prime Veld			3.25					
	(The case initial yield of prime properties						Translation to 1	female	
	10	WEST LOWER	SAME	HOHER	HOHEST		metrics		
	Please provide your opinion on	the general risk profile of your	property compared to prime prop	ortex					
	Location Risk:	0	0	0	0		8.25		•
	Vacancy Rolk (due to Location):	0	0	0	0		6.25		•
	Please provide your opinion on	the new (after retrofit) not pro	tie of your property:						
	Vacancy Relk (during Retrofit)	0	0	0	0		6.25		•
	Rok of Atemative Use and Remaining Useful * Ufe:	0	0	0	0		8.25		•
	Rink of Value, Contract and Tenant:	0	0	0	0		0.25	5	•
	Exit Vield But of al doors mentioned take			4.8					
	+ Back to the parent form						-	ore default	values
di Tre Renalce Construm 2017, 2018 2019									unteren inten

Figure 26: Sub-Modul: Exit yield estimation

5. PRESENTATION OF RENTALCAL TOOL RESULTS (OUTPUT)

No data can be overwritten in the output area. Only the display of the results can be adjusted by the user. After the display of the results on the desktop, all results can be downloaded individually or as a conglomerate in PDF format.

5.1. Disclaimer

Before you can access the calculation results (output) and evaluations, you must agree again to the conditions of use described in detail in Chapter 2.3. After pressing the "Confirm" button, you reach the output area.



Figure 27: Disclaimer

5.2. Investor-Perspective (Selected KPIs)

Depending on the type of investor, most relevant indicators (KPIs) are selected for the user. If you are interested in further KPIs and rates of change, please click on "Display all Investor KPIs". The corresponding **sub-module** with further indicators appears. From here you can also switch to the display of the entire VoFI. To do this, click on "Go to VoFI".

> Language selection			RentalCal English
investor O Property C	Pefurbishmen	Financing Market	
Where am I Help		Key Performance Indicators (KPIs) – Investor Perspective	
Information	>	Payback Period (without Green Value): 📋 9 👶 years 🗿	
Output		Payback Period (including Green Value):	
Selected Results		Additional Exit Value (Oreen Value) 🗾 96598.38 👶 858	
AB KPts VoFt	3	Additional Net Rental Income (annual,	
Tenant perspective		9332.98 2 EUR 🚱	
Environmental Effects Non-Monetary Effects	3	Click the button below to display further KPIs: Display all Investor KPIs.	
Print-Report configuration		The tool's results are based on a 'volf' (Visualisation of Financial Implications), which calculates the cash flows for every ye individually. Click the button below to display the the entire VoFI:	ear of the calculation period
		(Tack)	Continue +
@ The RentalCal Contac	* 1000 2017		Funded by the European Union

Figure 28: Key Performance Indicators (KPIs) - Investor Perspective

5.3. Investor Perspective (All KPIs)

The sub-module shows all results calculated by the tool (from the investor's point of view).

After viewing, please click on "Back" to continue with the display of the results.

Investor 2 Property Relationment Fin	org Maket	
Where art 1 I Help	Key Performance Indicators (KPIs) – Investor Perspective	
The Visualization of financial impact.	lotal Parm ¹	
Inancial plan that accounts for all cash flows of an investment, in every time	Additional Net Rental Income Cannual,	
period of the investment. These cash flows can be divided into two basis:	612235 RA 62.66 RA 0	
categories: cash flows for the eventment project itself and cash flows	first year)	
for the financing, respectively. The former is also known as the original cash flow, whereas the latter is known	Return on Equity (annual, excluding	
user trong whereas the array is broken as derivative cash flow. The financial plan is typically standardised with a	Negative %	
wries of assets divided into-several categories. A typical financial plan	a ser rave)	
contains the cash flow along with subordinated categories such as the	Naturn on Equily (annual, including	
cash flow profile of the investment, the internal funds and their changes,	3.09 %	
apayments, amortisation and interest payments for loans, exit payments and		
nterest transactions of financial needsments.	Payback Period (excluding Grean	
	Value	
	Playback Particial (Including Dreen Value): 32 years	
	Additional Exit Value (Dreen Yalue) 2202/8 20 e.u. 228.46 e.u. 9	
	Expected Reduction in Vacancy Rate: 1 V	
	000R (Debt Service Dowrage Ratio) 118.1 %	
	Change in non-reimbursable Impection	
	475.00 tol 4.65 tol 4.65	
	- flast	

Figure 29: Additional KPIs - Investor Perspective

5.4. Representation of the Visualisation of Financial Implications

Since a complete presentation of the Visualisation of Financial Implications (VoFi) on most screens will not be possible, please use the scrolling elements for navigation. At this point you have the possibility to download the calculation of the Visualisation of Financial Implications. If you want to print the Visualisation of Financial Implications, we recommend the A3 format. To return to the regular workflow, please press "Back".

Tanguage selection																RentalC	al Englis
westor O Property	0 R	elubishment O Financing O	Market O														
Where am I Help		+ Back Print report															
nformation		0															
Juge		Time Series	from t=0 to t=30 max.		10	- 11	62	13	14	15	- 16	17	- 18	19	£10	111	t12
utput	É	Property Retrofitting Cost Effects	Investment Cost for Measure (including planning costs and VAT)	EUR	-26008.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selected Results	,		Projection of Energy Price Development	1/0	0.00	0.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
All KPIs			End Energy Savings Overall (Property Perspective)	EUR	0.00	-752.84	-764.13	-775.59	-787.23	-799.04	-811.02	-823.19	435.54	-848.07	460.79	473.70	-895.8
VoFt			Sustainable Additional Rental Income per sq.m. and month	EUR/m ² month	0.00	1.08	1.11	1.15	1.18	1.22	1.25	1.29	1.33	1.37	1.41	1.45	1.49
Tenant perspective			Grants	EUR	0.00	6000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Environmental Effects		Property Income Effects	Change in non-reimbursable total maintenance cost (higher costs: minus, lower costs: plus)	EUR	0.00	-174.00	-176.61	-179.26	-181.95	-184.68	-187.45	-190.26	-193.11	-196.01	-198.95	-201.93	-204.0
Print-Report configuration			Measure-Related Decrease of Vacancy Rate		0.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
			Continuing Effects Owner Perspective (Cash in flow) - here: net of	EUR	0.00	9332.98	3414.19	3497.88	3564.12	3672.99	3764.57	3858.93	3956.17	4056.37	4159.62	4266.00	4375.
			Comment Line: Continuing Effects Property Perspective (including total operating cost according to energy mix)	EUR	0.00	578.84	587.52	595.34	605.28	614.36	623.58	632.93	642.42	652.06	661.84	671.77	681.8
			Additional Sales / Exit Value	EUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Equity	EUR	5201.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Debt	EUR	20806.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Financing at Market Rate	EUR	20806.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Susidised Financing	EUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
			interest payments	EUR	0.00	-208.07	-200.70	-193.26	-185.75	-178.16	-170.49	-162.75	-154.93	-147.03	-139.05	-130.99	-122
			Tax payments (or savings if	610	0.00	.870.63	.844.78		.079.45	-94.1 13	AD 200.	.snan sn	-1089 89	.1176.00	.1173.09	-1991 10	.1971
@ The RentalCar Cone														by the Europ		-	

Figure 30: VoFi representation

5.5. Tenant Perspective

The tool not only looks at the investor perspective but also examines the impact on tenant burden. The user can select between several different metrics (Rent display). Absolute as well as relative changes can be seen in the presentation. No changes in values are allowed (grey boxes).

		Refurbishment	Financing O Market O									
pril 2 dpt 2 dstorde finaulita 3 Alabita 3 Alabita 3 Alabita 3 Alabita 0 Alabita 0 Alabita 0 Alabita 0 Alabita 0 Veri 0 0 05 0.00 (here am I Help		Key Performance Inc	dicators (KPI:	s) – Tenant F	Perspecti	ive					
ppl > dpj.d. > dpj.d. > selected Results > AKR's > AKR's > AKR's 0.5 Selected Results > AKR's 0.5 AKR's 0.65 Selected Results 0.65 <t< th=""><th>ormation</th><th></th><th>Rent display:</th><th>m2/m8</th><th>n</th><th></th><th></th><th></th><th>~</th><th>0</th><th></th><th></th></t<>	ormation		Rent display:	m2/m8	n				~	0		
Not Rest: 9 0.05 <	ut.	2										
All SPis > All SPis > Vol7 > Tenart pringective 0.05 0:05 0:05 (0:00, 00, 00, 00, 00, 00, 00, 00, 00, 00	tput	-			Before		After:	Absolute	Change:	Relat	ive Change:	
Normal State N	belected Results		Net Rent:	9	1 EUR/m ³ mar	n 10.08	[1] BUR/m ¹ manth	1.08 🔅	ELR / m ³ month	12	÷ •	
ofice > Onese Rent: % 05 © 05 0.07 © 0.05	l KPis	- F	Energy Expenses:	0.05		0.34	 DR/m²month 	0.29	EUR / m ³ month	580		
Conversionshild Effects > Non-Monitory Effects > Priss Report configuration >	VoFI											
Apportionable maintenance and inspection costs: 0.05 Q EUR / emission Non-Monetary Effects > Prior Report configuration >	lenant perspective		Gross Rent:	9.05	DR/m ³ mor	m 10.47	(1) EUR / m ¹ month	1.42 🔅	EUR / m ² month	16	* *	
hird-Report configuration	invironmental Effects	3	Apportionable maintenance and in	spection costs:				0.05 0	EUR / m ³ month			
			1 m m m m m m m m m m m m m m m m m m m								1. A. A. A.	

Figure 31: KPIs - Tenant Perspective

5.6. Environmental and Resource Perspective

The tool shows you a comparison of energy consumption inputs (before and after modernisation) and their effects on environmental parameters. Absolute and relative changes are displayed.

restor O Property	Refurbishment	Financing O Market O													
Mere am I Help		Key Performance Indica	tors (KPI	s) -	Environ	mental a	nd F	Resour	ce Perspec	tive					
formation	>	0													
nt															
tput	10 C			Before:			After:		Absol	ite Char	nge	Relat	ive Char		
		0H0 emissions (Total):	8085	1	2 kg/a	3824.25		8 Agia	-4260.75		kg/a	-52.7		•	
Selected Results	2	GHG emissions (Per area metric):	36.75	19	2 kp/(m ² s)	17.38	1	l latin's	-19.37		$kp(m^2 a)$	-52.71		•	
AB KP1s		Consumption of non-renewable primary energy (Total):	25725	3	kina l	14496.27	3	E kinh/a	-11228.73		kvin/a	-43.65	. 18		
ruFt Tenant perspective		Consumption of non-renewable primary energy (Per area metric):	116.93		kmt/(m ² a)	65.89		kuth/(m ²)	0 -51.04		$k W h_{V}(m^{2} \mathbf{x})$	-43.65		•	
Environmental Effects	100														
Non-Monetary Effects		Final energy consumption per energy carrier	Before	ć.		After:			Absolute (hange		Change pe	r area n	netric:	
Print Report configuration	3 5	Electricity.		¢ 1	oWb/a		ē.	koth/a	0		kith/a	0	(b)	$k W h_{\rm f} (m^2 {\rm g})$	
		OR 24	500	e i	000/9		æ.	kWh/a	-24500		kothula	-111.36		$k W h_{V}(m^{2} q)$	
		Gas:		¢ k	own/a 13	1805.97	e	koth/a	13805.97		koth/w	62.75	(\$)	$k \partial \theta_{i} (m^{2} q)$	
		Coat		¢ 1	ohh/a		ŧ.	kWh/a	0		kolfs/a	0	101	$kWh/(m^2 e)$	
		Biomass:		@ k	own/a		¢.	kwh/a	0		kothula	0	0	$k w h_{\ell}(m^2 a)$	
		District Heating		• •	Why is .		0	kith/a	0		kithia	0		$kWh_\ell(m^2 a)$	
		Other:		¢ i	White -		¢.	kWh/a	0		kolh/a	0		$k W h_{\ell}(m^2 a)$	
		+ Back												Continue	

Figure 32: KPIs - Environmental and resource perspective

5.7. Additional non-monetary Impacts of the Refurbishment

The effects of improving the energetic quality of the European rental housing stock go far beyond the immediate reduction of the final energy consumption, decreased heating costs and the reduction of primary energy consumption and GHG emissions.

Improving the energetic performance of the existing building stock is likely to contribute to other impacts and benefits, which are so far often difficult to monetize. This raises the question which benefit can be attributed to which actor and how these benefits could possibly influence the economic approach, respectively be expressed economically.

Finally the tool presents a set of possible **non-monetray impacts** after refurbishment.

Language selection		RentalCal English annuan
investor 🗸) Property) Relationment) R	ening) Market	
Where an 1 Pulp	Additional non-monetary Impacts of the Refurbishment	
the effects of improving the energetic	· · · · · · · · · · · · · · · · · · ·	
quality of the European rental housing stock go far beyond the immediate	Profiler impact on local air quality	
reduction of the final energy	 Protective replace on local air queery 	
consumption, decreased heating costs and the reduction of primary energy	Positive impact on indicor air quality	
consumption and QHD emissions.		
improving the energetic performance of	 Positive impact on reliability of InIAC systems 	
the axisting building stock is likely to contribute to other impacts and	Positive impact on noise protection (from outside)	
benefits, which are so far often difficult to monetize. This raises the question	a construction from the second second from the second s	
which benefit can be attributed to which	 Positive impact on thermal constant in winter 	
actor and how these benefits could possibly influence the economic		
approach, respectively be expressed	 Profiles impact on thermal comfort is summer 	
aconomically.	Positive impact on mould prevention	
	 Positive impact on inhabitants' health 	
	Prositivy reduced risk of vertireduction	
	 Positive impact on socio-economic status of the building occupants and prevention of area deprivation 	
	· Positive impact on environment as a result of reduced residential energy usage	
	+ Back	Continue +
8 The Rental Dar Generatives (2017, 2018 & 2019		Fundad by the European street.

Figure 33: Additional non-monetary impacts

5.8. Sensitivity Analysis (assisted mode only)

With regards to the investment cost, the tool risk module calculates the sensitivity of the equity return based on pre-estimated changes in the investment cost. These estimated changes (delta) in the investment cost parameters are expressed in the risk module as percentage changes from the existing investment cost used in the scenario. The sensitivity results are therefore expressed in increments of 5% changes in both directions from the existing input amount and range between minus 20% to plus 20%. Furthermore, the rent increase due to energetic refurbishment is also expressed in increments of 5% changes in both directions from the existing input amount and range between minus 20% to plus 20%. Furthermore, the rent increase due to energetic refurbishment is also expressed in increments of 5% changes in both directions from the existing input amount and range between minus 20% to plus 20%. Furthermore tax rate sensitivity parameters are fixed between 0% and 60% to present all probable upper and lower bounds of potential changes in the income tax. Similarly, the loan-to-value ratio for the investment is also fixed between 0% and 90% to capture a wide range of potential scenarios that vary in increments of 10%. Finally, the expected vacancy rate upper and lower bound parameters are set at 12% and 0% respectively, to capture the extremes of potential changes in occupancy, during changes in the financial cycle.



Figure 34: Sensitivity analysis

5.9. Print-Report Configuration

By clicking on the respective blue buttons, the printable PDFs are displayed. For readability reasons, it is recommended to print the VoFI report on A3.

Tenguage selection					RentalCal English
investor O Property C	Refurbishment	Financing O Market O			
Where am I Help		Print-Report configurat	ion		1
Information	<u> </u>	Print project data input	This print report contains the most relevant input data for the profitability calculation (entered by the user).		
Input	3	Print investor specific KPIs	This print report contains all output data from an investor perspective (calculated by the RentalCal tool).		
Output		Print Vol1	This print report documents the underlying financial plan with all relevant cash flows of the investment.		
Selected Results					
All KPts		+ Back			
VoFt.					
Tenant perspective					
Environmental Effects					
Non-Monetary Effects					
Print Report configuration					
	-				1411
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Figure 35: Print-report configuration

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