Introduction to the Excel Workbook TABULA.xls

Tobias Loga / IWU / 23-12-2009

1 General Remarks / Purpose of the Workbook

The workbook is designed to perform the following tasks:

A.	**"Data Base":**	Frame for collecting and merging the typology data of all countries
B.	**"Programming Template":**	Structure template and data source for the TABULA WebTool
C.	**"Showcase Calculation":**	Display of the common energy performance procedure / check of input data
D.	**"Operative Analyses":**	Energy performance calculation of sets of buildings/systems (calculation sheets with n rows)

Please, keep in mind that the purpose of the common data structure is to facilitate the understanding of typical buildings, supply systems and refurbishment measures in other countries and to lay the basis for scenario calculations on a supranational / European level.

It is not the intention to adapt this Excel workbook to national regulations. For your national calculations you will generally use your own tools (e.g. calculating the energy saving for the National Typology Brochures) and publish the building and system datasets with respect to your national standards.

In consequence there will be two definitions for all national building and system types: a national and a TABULA definition ("two sides of the same coin"). The workbook "TABULA.xls" is representing the European side of the coin. Each partner is responsible for the linkage between these two definitions in his country.

2 Your Task until the Torino Meeting

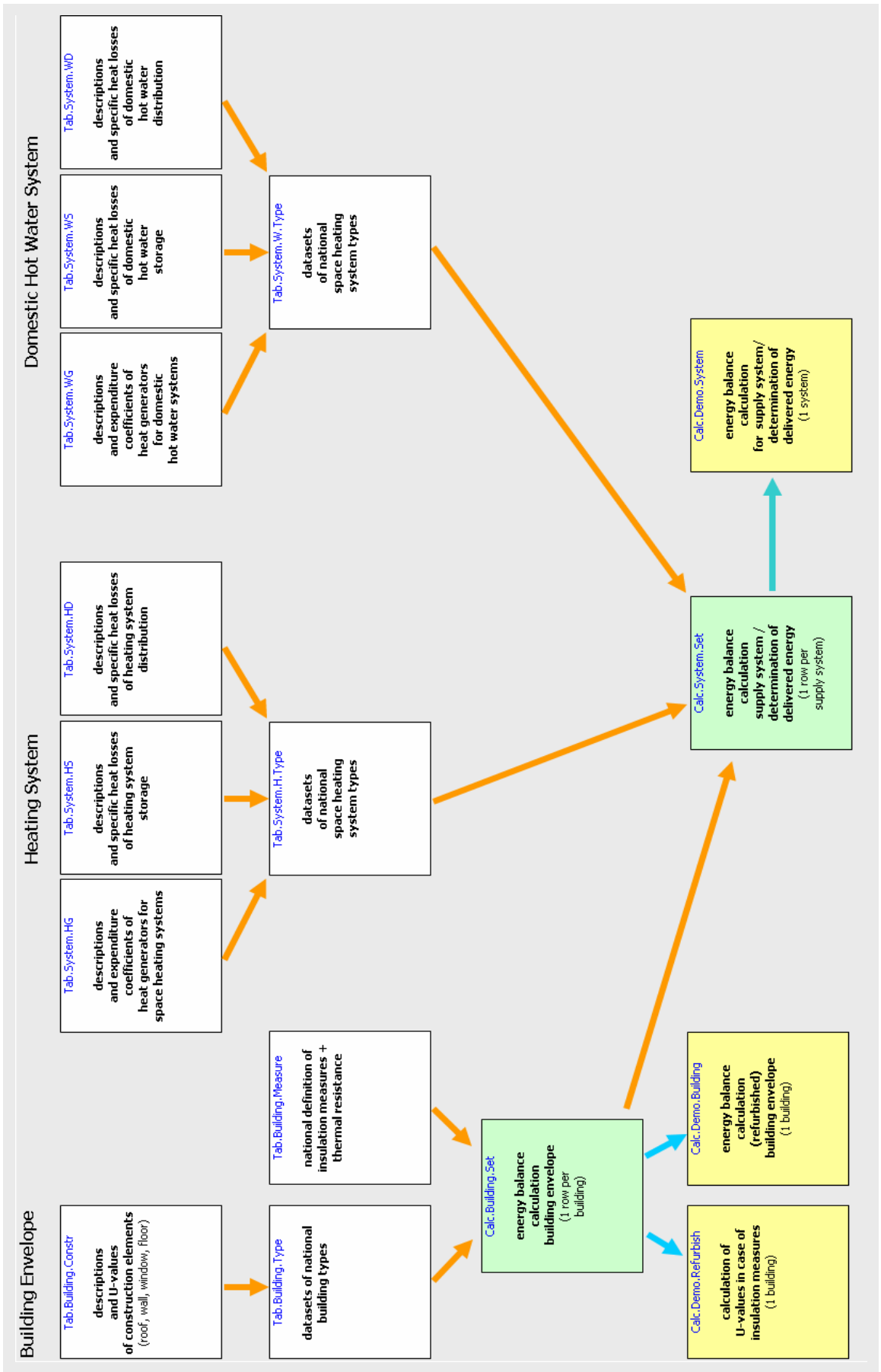
During the Torino project meeting we will discuss the details of the draft typology structure. Therefore we ask you to have a closer look at the Excel workbook in advance. Please, make sure that everything is clearly defined and that the structure is convenient for your building and system data.

For this purpose we ask you to fill in example data for 2 buildings:

- 1 single-family house
- 1 multi-family house

If you already acquired data of typical buildings use them. If not, please type in at least some dummy data.

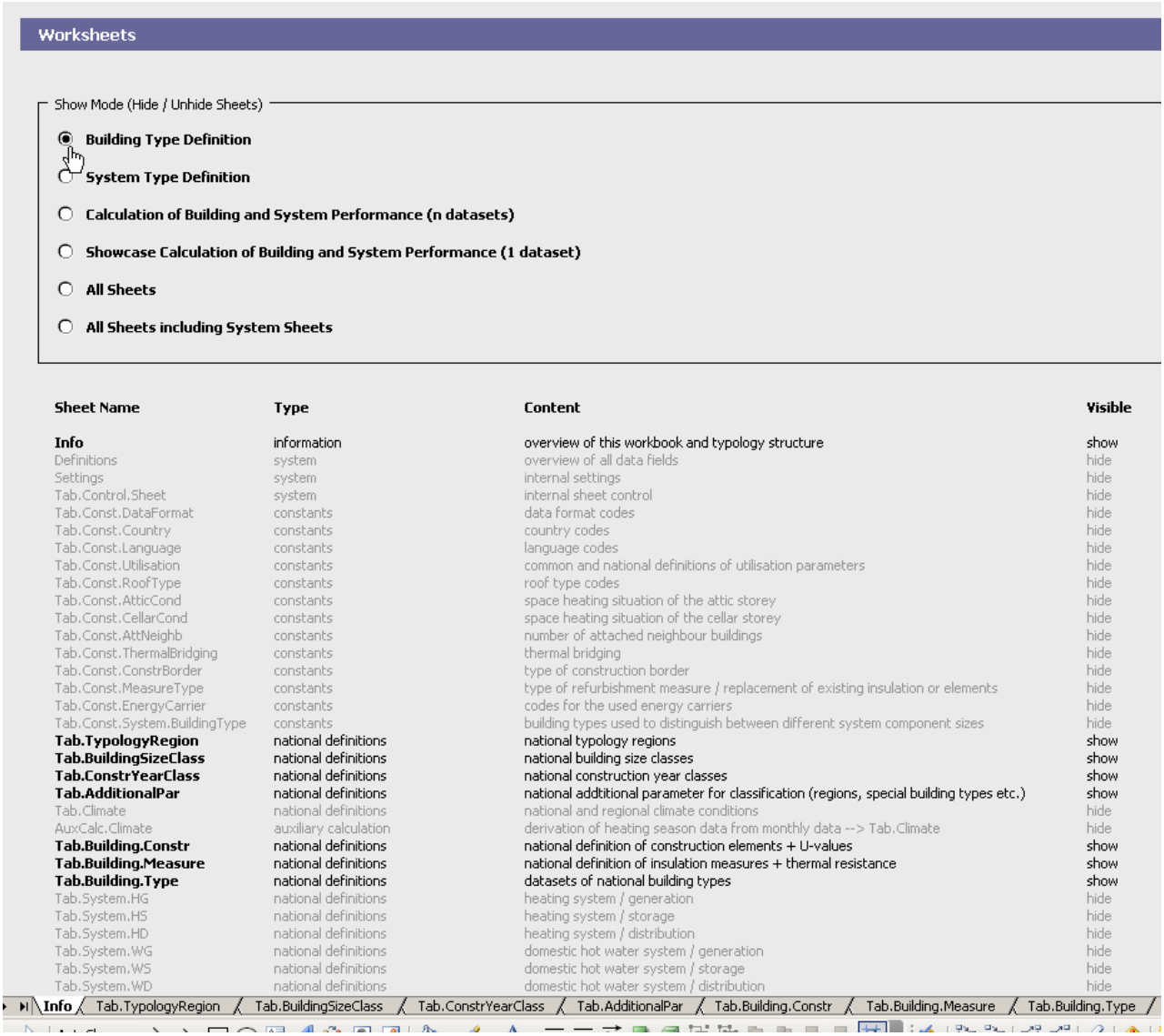
3 Overview of the most important sheets



4 Working with TABULA.xls

Due to the fact that the workbook is the template for the TABULA-WebTool (see above) there are a lot of tables which will serve as a basis for the internet programming work. In order to keep track of the essentials it is possible to hide those sheets which are not necessary for a given task. This can be done by clicking on one of the “Show Modes” at the sheet “Info”.

➢ Sheet “Info”



The colour of the cells indicate the cell type (see below). Please, fill in data only in cells which are highlighted yellow:

Cell types

1001	standard input cell
class1	input by selection of a list
0,001	standard calculation cell (formula or values should not be changed)
0,999	calculation cell, formula can be changed
0	calculation cell with reference to other sheets
0,34	cell with constant (fixed value)
pink font	work zone information / preliminary text or formulas / to be elaborated

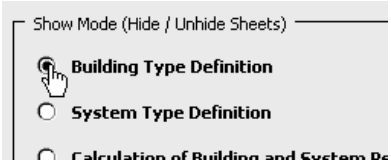
All data tables and calculation sheets are designed in a manner which allows to copy/paste or delete entire rows (with exception of the “demo” calculation sheets). Furthermore each sheet has a header of 10 rows containing datafield names, explanations and references. It is not recommended to make changes in these headers.

5 Definition of Building Types

In the following the procedure will be shown for two example buildings of a test country (country code “xx”). When making the definitions for your own country you should use the respective country code (e.g. “fr” in case of France).

➢ Sheet “Info”

Select the Show Mode “Building Type Definition”



➢ Sheet “Tab.TypologyRegion”

Go to the sheet “Tab.TypologyRegion” and define your national typology region (similar to the example: “xx.n”). For the first test the definition of the national level is sufficient (code: “*.n”)

	A	B	C	
1	**Code_TypologyRegion**	**Code_Country**	**Name_TypologyRegion**	**Code_National_T**
2	code of the typology region for building type classification	ISO 3166-1-alpha-2 code	name of the typology region	code of the typology
3				
4				
5		Tab.Const.Country		
6	VARCHAR	VARCHAR	VARCHAR	VARCHAR
11	**de.n**	de	national	#
12	**de.east**	de	Eastern Germany (former GDR)	NBL
13	**de.west**	de	Western Germany (ancient BRD)	ABL
14	**de.bavaria**	de	bavaria	Bayern
15	**de.hesse**	de	hesse	Hessen
16	**de.nrw**	de	Nordrhein-Westfalen	NRW
17	**de.sh**	de	Schleswig-Holstein	SH
18	**xx.n**	xx	Test Country	
19				
20				

➢ Sheet “Tab.ConstrYearClass”

Select the sheet “Tab.ConstrYearClass” and define the respective periods (see example for country xx in the picture).

	A	B	C	D	E	F
1	**Code_ConstructionYearClass**	**Code_Country**	**Number_ConstructionYearClass**	**Remark_ConstructionYearClass**	**ConstructionYearClass_FirstYear**	**ConstructionYearClass_LastYear**
2	code of the construction year period for building type classification	ISO 3166-1-alpha-2 code	serial number of national construction year class	internal remark (sources etc.)	first year of period	last year of period
3			consecutive numbers, starting with 1		to be defined according to typical construction or building properties (materials, construction principles, building shape, ...)	to be defined according to typical construction or building properties (materials, construction principles, building shape, ...)
4						
5		Tab.Const.Country				
6	INTEGER	VARCHAR	INTEGER	TEXT	INTEGER	INTEGER
11	**de.01**	de	1		-	1859
12	**de.02**	de	2		1860	1918
13	**de.03**	de	3		1919	1948
14	**de.04**	de	4		1949	1957
15	**de.05**	de	5		1958	1968
16	**de.06**	de	6		1969	1978
17	**de.07**	de	7		1979	1983
18	**de.08**	de	8		1984	1994
19	**de.09**	de	9		1995	2001
20	**de.10**	de	10		2002	-
21	**xx.01**	xx	1	test country	-	1918
22	**xx.02**	xx	2	test country	1919	1945
23	**xx.03**	xx	3	test country	1946	1972
24	**xx.04**	xx	4	test country	1973	-
25						
26						

➢ Sheet “Tab.Additional.Par”

Select the sheet “Tab.Additional.Par” and define at least the generic type (code: “*.gen”). This parameter can later be used to define sub-categories for the building type, for example in order to distinguish between end-terrace and mid-terrace buildings and/or for special building types (e.g. prefabricated).

	A	B	C	
1	**Code_AdditionalParameter**	**Code_Country**	**Name_AdditionalParameter**	**Code_A**
2	code of the additional parameter for building type classification	ISO 3166-1-alpha-2 code	name of the additional typology parameter	national c
3				optional
4				
5	Tab.AdditionalPar	Tab.Const.Country		
6	VARCHAR	VARCHAR	TEXT	VARCHAR
11	**de.gen**	de	generic	#
12	**de.pfs**	de	prefabricated single family house (ancient BRD)	FH
13	**xx.gen**	xx	generic	
14				
15				

➢ Sheet “Tab.Building.Constr”

Select the sheet “Tab.Building.Constr” and define at least 1 roof, 1 wall, 1 floor, 1 window and 1 door and type in the respective U-values. *Later all typical construction elements from your country will have to be mentioned here.*

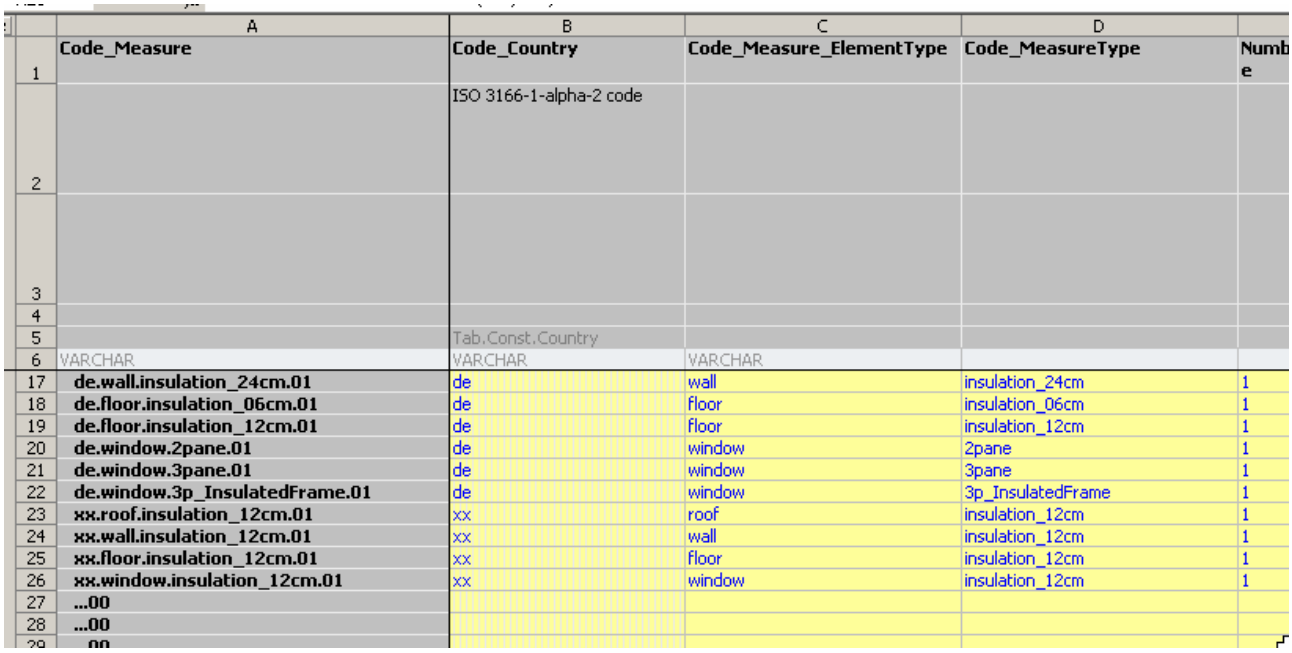
	A	F		O	P	Q
1	**Code_Construction**	**Type_Construction**	**Type_Const**	**truct**	**d_Insulation**	**U**	**g**
2	dataset identification	short characterisation of the construction type	short characte construction t	ie uction	thickness of existing insulation	U-value	g-value / solar energy transmittance
3				y ear	relevant in case of replacement by new measure		
4							
5					m	W/(m²K)	
6	VARCHAR	VARCHAR	VARCHAR		REAL	REAL	REAL
34	**de.door.02.01**	test door 2				4,5	
35	**de.door.03.01**	test door 3				3,5	
36	**xx.roof.01.01**	test roof				0,8	
37	**xx.wall.01.01**	test wall				1,2	
38	**xx.floor.01.01**	test floor				1,5	
39	**xx.window.01.01**	test window				3	0,7
40	**xx.door.01.01**	test door				3,5	

➢ Sheet “Tab.Building.Measure”

Select the sheet “Tab.Building.Measure” and define some refurbishment measures in the way shown by the examples. There are 3 ways for data input:

1. U-value of construction, input in case of element exchange (especially windows)
2. thermal resistance of applied insulation measures, manual input in case that the thermal resistance is calculated by use of other procedures
3. input of insulation layer thickness and lambda / calculation according to EN ISO 6946 (2 layers, 2 ranges)

During the TABULA runtime you will be asked to fill this list with “typical” and “advanced” refurbishment measures.



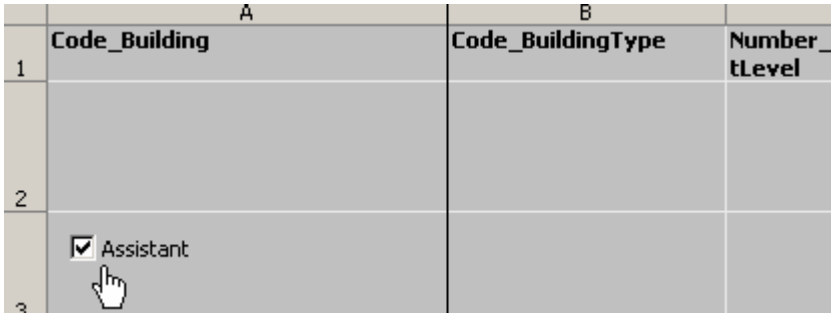
	A	B	C	D	
1	**Code_Measure**	**Code_Country**	**Code_Measure_ElementType**	**Code_MeasureType**	**Numb e**
2		ISO 3166-1-alpha-2 code			
3					
4					
5		Tab.Const.Country			
6	VARCHAR	VARCHAR	VARCHAR		
17	**de.wall.insulation_24cm.01**	de	wall	insulation_24cm	1
18	**de.floor.insulation_06cm.01**	de	floor	insulation_06cm	1
19	**de.floor.insulation_12cm.01**	de	floor	insulation_12cm	1
20	**de.window.2pane.01**	de	window	2pane	1
21	**de.window.3pane.01**	de	window	3pane	1
22	**de.window.3p_InsulatedFrame.01**	de	window	3p_InsulatedFrame	1
23	**xx.roof.insulation_12cm.01**	xx	roof	insulation_12cm	1
24	**xx.wall.insulation_12cm.01**	xx	wall	insulation_12cm	1
25	**xx.floor.insulation_12cm.01**	xx	floor	insulation_12cm	1
26	**xx.window.insulation_12cm.01**	xx	window	insulation_12cm	1
27	**...00**				
28	**...00**				
29	**...00**				

➢ Sheet “Tab.Building.Type”

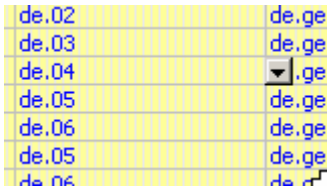
Select the sheet “Tab.Building.Type” and define 2 building types, e.g. a single-family house and an apartment building (in a similar way as the test country xx).

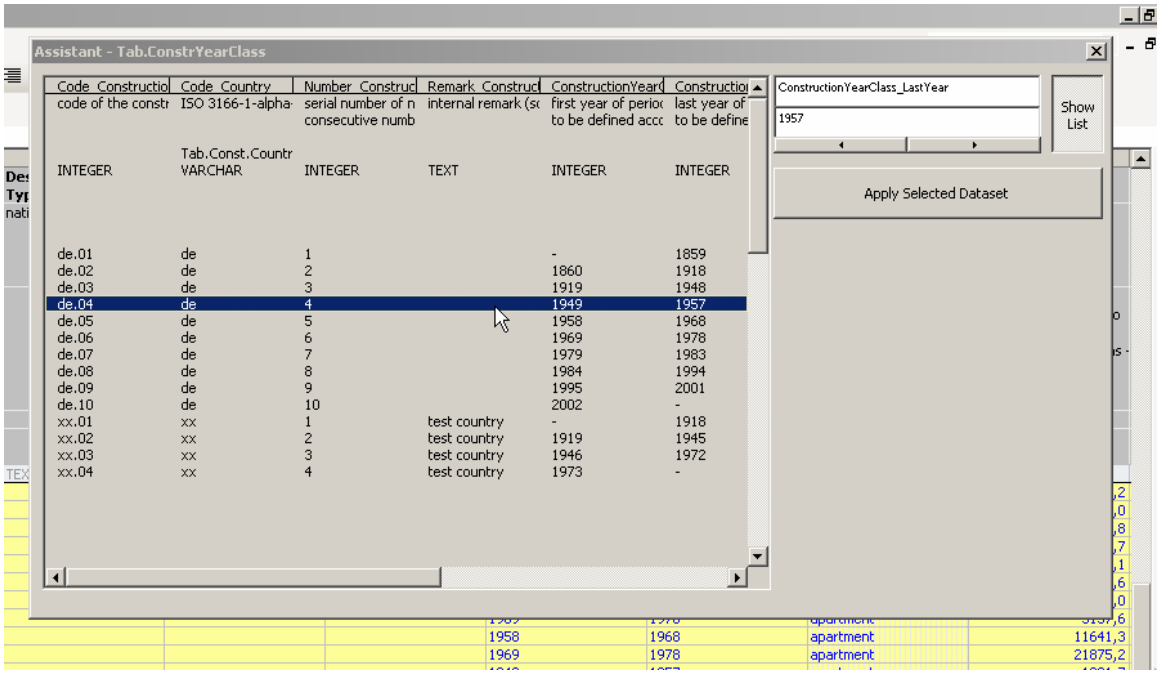
Later this sheet will contain all building types from all countries/regions.

➢ Utilisation of the Userform “Assistant”



If the checkbox “Assistant” in the top left corner of the sheet is set true you will get more information about the contents of the datafields (those highlighted yellow with vertical grey stripes):

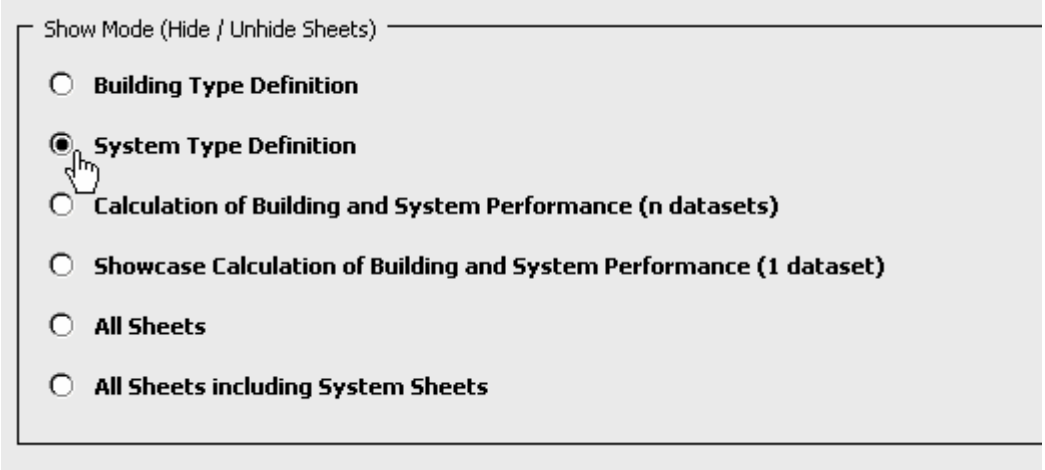




6 Definition of System Types

- **Sheet “Info”**

  Select the show mode “System Type Definition”



Now the following sheets will be visible:

Tab.Building.Type	national definitions	datasets of national building types
Tab.System.HG	national definitions	heating system / generation
Tab.System.HS	national definitions	heating system / storage
Tab.System.HD	national definitions	heating system / distribution
Tab.System.WG	national definitions	domestic hot water system / generation
Tab.System.WS	national definitions	domestic hot water system / storage
Tab.System.WD	national definitions	domestic hot water system / distribution
Tab.System.HA	national definitions	heating system / auxiliary energy
Tab.System.WA	national definitions	domestic hot water system / auxiliary energy
Tab.System.H.Type	national definitions	datasets of heating system types
Tab.System.W.Type	national definitions	datasets of domestic hot water system types
Calc.Building.Set	calculation	energy need for heating (1 row per building type)

You can now define heat generators, heat storages and distribution systems in a way similar to those of the test country xx.

- **Sheets “Tab.System.HG”, “Tab.System.HS”, …**

  Here you define the components (see examples for country xx). You can always decide if the values given for the component are relevant for all buildings (generic: “gen”), or if they are restricted to small buildings (single-family houses: “sfh”) or larger buildings (multi-family houses “mfh”).

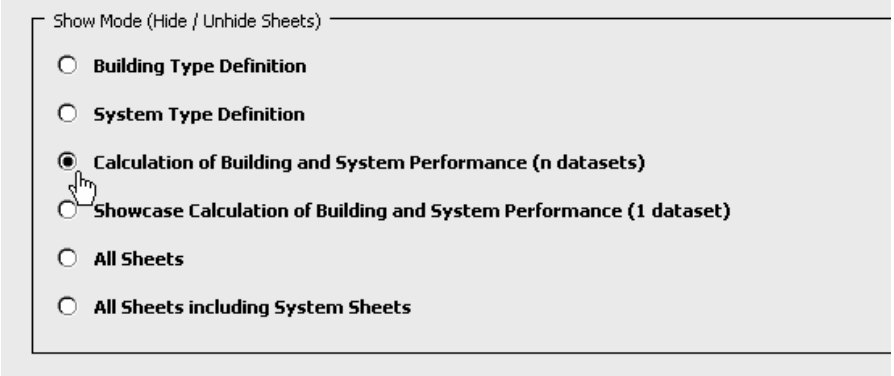
  During the TABULA runtime you will be asked to fill these table with data of typical heating and dhw systems of your country.

- **Sheets “Tab.System.H.Type” and “Tab.System.W.Type”**

  These sheets allow for combining the components to heating systems and hot water systems.

7 Calculation of Energy Performance for a Set of Buildings / Systems

Now you can try the draft of the common energy performance calculation by selecting the show mode “Calculation of Building and System Performance (n datasets)”.



➢ Sheet “Tab.Climate” and “AuxCalc.Climate”

As a precondition for the energy balance calculation you have to define a national or regional climate. If the data required by “Tab.Climate” are not available you can determine them on the basis of monthly data by use of the auxiliary calculation sheet “AuxCalc.Climate”.

	A	F	G	H	I	J	K	L	M
1	**Code_ClimateRegion**	**Theta_e_base**	**HeatingDays**	**Theta_e**	**I_Sol_Hor**	**I_Sol_East**	**I_Sol_South**	**I_Sol_West**	**I_Sol_North**
2	dataset identification	base temperature (standard value: 12 °C)	number of days per year during heating season (average dayly temperature is	average external air temperature during the heating season	average global irradiation on horizontal surface during the heating season	average global irradiation on vertical surface oriented East during the heating	average global irradiation on vertical surface oriented South during the heating	average global irradiation on vertical surface oriented West during the heating	average global irradiation on vertical surface oriented North during the heating
3		if values are not available they can be determined from monthly climate data by	if values are not available they can be determined from monthly climate data by	if values are not available they can be determined from monthly climate data by	if values are not available they can be determined from monthly climate data by	if values are not available they can be determined from monthly climate data by	if values are not available they can be determined from monthly climate data by	if values are not available they can be determined from monthly climate data by	if values are not available they can be determined from monthly climate data by
4		°C	d	°C	kWh/a	kWh/a	kWh/a	kWh/a	kWh/a
5	Tab.Climate								
6	VARCHAR	REAL	REAL	REAL	REAL	REAL	REAL	REAL	REAL
11	**de.n**	12	222	4,4	403	271	392	271	160
12	**de.bavaria**	12	222	4,4	403	271	392	271	160
13	**de.hesse**	12	222	4,4	403	271	392	271	160
14	**xx.n**	12	200	5	500	300	400	300	180
15									
16									

➢ Sheet “Calc.Building.Set”

Here you can combine the building types defined in the sheet “Tab.Building.Type” and the refurbishment measures defined in the sheet “Tab.Building.Measure”.

In case of the test country xx for each of the two building types (single- and multi-family house) a dataset at the original state (*.ref00”) and a refurbishment variant were defined (“*.ref01”).

	A	B	C		EH	EI	EJ
1	**Code_Building**	**Code_BuildingType**	**Number_RefurbishmentLevel**	**A_C_Ref**	**mma_h_gn**	**eta_h_gn**	**q_h_nd**
2				energy refere (conditioned internal dimer			
3	☑ Assistant			mandatory / transformatic area types se evaluation			
4				m²			
5		Tab.Building.Type					
6		VARCHAR	INTEGER	REAL	AL	REAL	REAL
143	**xx.n.sfh.03.gen.ref00**	xx.n.sfh.03.gen	0		0,080	0,95	305,63
144	**xx.n.ab.03.gen.ref00**	xx.n.ab.03.gen	0		0,143	0,94	170,30
145	**xx.n.sfh.03.gen.ref01**	xx.n.sfh.03.gen	1		0,202	0,94	106,38
146	**xx.n.ab.03.gen.ref01**	xx.n.ab.03.gen	1		0,303	0,93	66,58
	.ref00						

You find the result, the energy need for heating, in the datafield “q_h_nd”.

➢ Sheet “Calc System Set”

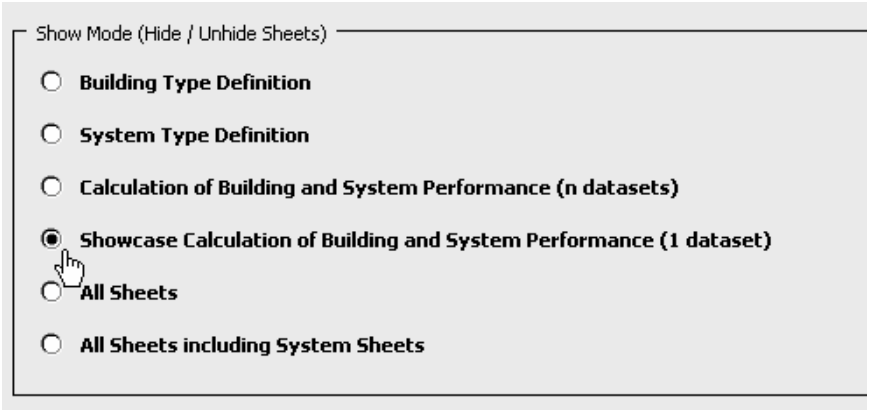
This sheet serves for calculation of the need of different energy carriers for a given building / system combination. The example single-family house was combined with the electric heat pump system, the example apartment building with a central gas heating system and a decentral electric hot water system. The picture shows the delivered energy resulting from the calculation

	A	I
1	**Code_BuiSysCombi**	**Description_BuiSyscombi**
2		
3	☑ Assistant	
4		
5		
6	VARCHAR	TEXT
23	**<xx.n.sfh.03.gen.ref00>.<xx.el.hp.sfh.01>.<xx.el.hp.sfh.01>.01**	TEST: single-family house with electric heat pump for space heating and dhw
24	**<xx.n.sfh.03.gen.ref01>.<xx.el.hp.sfh.01>.<xx.el.hp.sfh.01>.01**	TEST: single-family house with electric heat pump for space heating and dhw / after refurbishment of thermal envelope
25	**<xx.n.ab.03.gen.ref00>.<xx.el.wh.gen.01>.<xx.gas.b.mfh.01>.01**	TEST: multi-family house with central heating (gas) and decentral electric dhw system
26	**<xx.n.ab.03.gen.ref01>.<xx.el.wh.gen.01>.<xx.gas.b.mfh.01>.01**	TEST: multi-family house with central heating (gas) and decentral electric dhw system / after refurbishment of thermal envelope
27	**<>.<>.<>.00**	

CW	CX	CY	CZ	DA
q_del_sum_gas	**q_del_sum_oil**	**q_del_sum_coal**	**q_del_sum_bio**	**q_del_sum_el**
sum delivered energy, energy carrier gas	sum delivered energy, energy carrier oil	sum delivered energy, energy carrier coal	sum delivered energy, energy carrier bio	sum delivered energy, energy carrier el
gas	oil	coal	bio	el
kWh/(m²a)	kWh/(m²a)	kWh/(m²a)	kWh/(m²a)	kWh/(m²a)
0,0	0,0	0,0	0,0	150,2
0,0	0,0	0,0	0,0	70,5
243,5	0,0	0,0	0,0	29,0
108,7	0,0	0,0	0,0	29,0
#N/A	#N/A	#N/A	#N/A	#N/A

8 Calculation of Building and System Performance / Details of the Common Procedure

The details of the common calculation procedure can be visualised by changing to the show mode “Showcase Calculation of Building and System Performance (1 dataset)”:



In the following you find the calculation sheets for the example apartment building with applied insulation measures:

- **Sheet “Calc.Demo.Refurbish”**

Refurbishment Measures — U-values

Building code: xx.n.ab.03.gen.ref01

		Roof 1	Roof 2	Wall 1	Wall 2	Wall 3	Floor 1	Floor 2	Window 1	Window 2	Door 1	
envelope area	A	0	501	6949	0	0	485	270	1947	1947	2	m²

Construction Element

Code		xx.roof.01.01	xx.roof.01.01	xx.wall.01.01	xx.wall.01.01	xx.wall.01.01	xx.floor.01.01	xx.floor.01.01	xx.window.01.01	xx.window.01.01	xx.door.01.01	
U-value original state	U_original	0,80	0,80	1,20	1,20	1,20	1,50	1,50	3,00	3,00	3,50	W/(m²K)
included insulation thickness	d_insulation	0,00	0,00	0,00	0,00	0,00	0,00	0,00				cm
border type		ext	unh	ext	ext	ext	cellar	cellar				
additional thermal resistance	R_add	0,00	0,30	0,00	0,00	0,00	0,30	0,30				m²K/W

Refurbishment Measure

Code		xx.roof.insulation_12cm.01	xx.roof.insulation_12cm.01	xx.wall.insulation_12cm.01	xx.wall.insulation_12cm.01	xx.wall.insulation_12cm.01	xx.floor.insulation_06cm.01	xx.floor.insulation_06cm.01	xx.window.2p-LowE.01	xx.window.2p-LowE.01		
thermal resistance of refurbishment measure	R_ref	3,43	3,43	3,43	3,43	3,43	1,71	1,71	0,83	0,83	-	m²K/W

Result

type of refurbishment		add	add	add	add	add	add	add	replace	replace	replace	
thermal resistance before measures	R_before	1,25	1,25	0,83	0,83	0,83	0,67	0,67	0,33	0,33	0,29	m²K/W
	R_actual	4,68	4,68	4,26	4,26	4,26	2,38	2,38	0,83	0,83	0,00	m²K/W
	U_actual	0,21	0,21	0,23	0,23	0,23	0,42	0,42	1,20	1,20	#DIV/0!	W/(m²K)

➢ Sheet “Calc.Demo.Building”

Energy Balance Calculation — **Building Performance**

Standard Reference Calculation - based on: EN ISO 13790 / seasonal method

Building	xx.n.ab.03.gen.ref01	conditioned floor area	$A_{C,ref}$ 9999 m²	
Climate	xx.n (Test Country)			

code construction element	U-value original W/(m²K)	measure type	applied refurbishment measure	U-value actual W/(m²K)		area (basis: external dimensions) m²		adjustment factor soil b_{tr}		W/K	annual heat loss related to $A_{C,Ref}$ kWh/(m²a)
Roof 1	0,80	add	xx.roof.insulation_12cm.01	0,21	x		x	1,00	=		*0,0*
Roof 2	0,80	add	xx.roof.insulation_12cm.01	0,21	x	501	x	1,00	=	107	*0,8*
Wall 1	1,20	add	xx.wall.insulation_12cm.01	0,23	x	6949	x	1,00	=	1631	*11,7*
Wall 2	1,20	add	xx.wall.insulation_12cm.01	0,23	x		x	1,00	=		*0,0*
Wall 3	1,20	add	xx.wall.insulation_12cm.01	0,23	x		x	1,00	=		*0,0*
Floor 1	1,50	add	xx.floor.insulation_06cm.01	0,42	x	485	x	0,50	=	102	*0,7*
Floor 2	1,50	add	xx.floor.insulation_06cm.01	0,42	x	270	x	0,50	=	57	*0,4*
Window 1	3,00	replace	xx.window.2p-LowE.01	1,20	x	1947	x	1,00	=	2337	*16,8*
Window 2	3,00	replace	xx.window.2p-LowE.01	1,20	x	1947	x	1,00	=	2337	*16,8*
Door 1	3,50	replace		-	x	2	x	1,00	=		*0,0*
thermal bridging: supplemental heat loss				0,10	×	12102	×	1,00	=	1210	*8,7*

Heat transfer coefficient by transmission H_{tr} sum **7780** — *56,0*

Heat transfer coefficient by ventilation H_{ve}

$\dot{v}_{air}$ m³/(h·m²)		$A_{C,ref}$ m³		$c_{p,air}$ Wh/(m³K)		W/K	
1,5	×	9999	×	0,34	=	**5099**	*36,7*

accumulated differences between internal and external temperature

$\vartheta_{i,Soll}$ °C		ϑe °C		t_{HP} d/a		Kd/a
(20	–	5,0	) ×	200	=	3000

Total heat transfer Q_{ht}

	H_{tr} W/K		H_{ve} W/K		x 0,024 kKh/a		Q_{ht} kWh/a	
(	7780	+	5099	) ×	72,0	=	**927.294**	*92,7*

Window Orientation	reduction factors: external shading F_{sh}		frame area fraction F_F	non-perpendicular F_W	solar energy transmittance $g_{gl,n}$	area (basis: external dimensions) m²		solar global radiation kWh/(m²a)		kWh/a	
1. Horizontal	0,80	× (1 -	0,30	) × 0,90 ×	0,60		×	500	=		*0,0*
2. East	0,60	× (1 -	0,30	) × 0,90 ×	0,60	493,8	×	300	=	33598	*3,4*
3. South	0,60	× (1 -	0,30	) × 0,90 ×	0,60	610,1	×	400	=	55348	*5,5*
4. West	0,60	× (1 -	0,30	) × 0,90 ×	0,60	493,8	×	300	=	33598	*3,4*
5. North	0,60	× (1 -	0,30	) × 0,90 ×	0,60	349,5	×	180	=	14268	*1,4*

Solar heat charge during heating period Q_{sol} sum **136812** — *13,7*

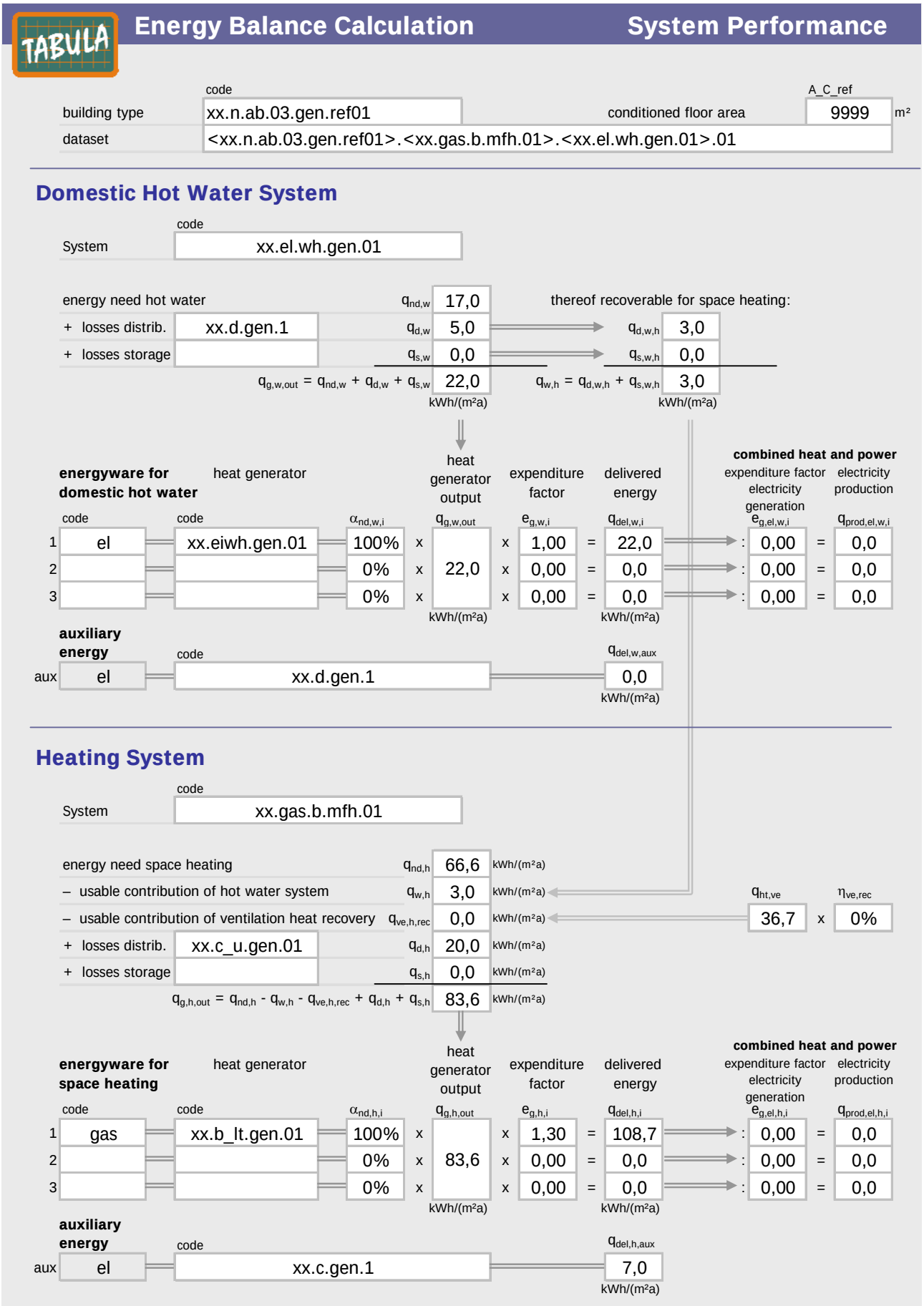
Internal heat gains Q_{int}

kh/d		$\dot{q}_i$ W/m²		t_{HP} d/a		$A_{C,ref}$ m²		kWh/a	
0,024	×	3,00	×	200	×	9999,0	=	**143.986**	*14,4*

internal heat capacity per m² AC,ref	c_m 45 Wh/(m²a)	heat balance ratio for the heating mode	$\gamma_{h,gn} = \frac{Q_{sol}+Q_{int}}{Q_L}$ =	0,303
time constant of the building	$\tau = \frac{c_m \cdot A_{C,ref}}{H_{tr}+H_{ve}}$ = 35 h			
parameter	$a_H = a_{H,0} + \frac{\tau}{\tau_{H,0}}$ = 1,96	**gain utilisation factor for heating**	$\eta_{h,gn} = \frac{1-\gamma^{a_H}}{1-\gamma^{a_H+1}}$ =	0,93

Energy need for heating $Q_{H,nd}$ $Q_{ht} - \eta_{h,gn} \times (Q_{sol} + Q_{int})$ = **665.782** kWh/a — *66,6*

➢ Sheet “Calc.Demo.System”



Total Energywares

energy carrier	delivered energy		
	domestic hot water	space heating	**sum**
gas (no specifiation)	0,0	108,7	**108,7**
gas_E	0,0	0,0	**0,0**
gas_LL	0,0	0,0	**0,0**
liquid_gas	0,0	0,0	**0,0**
oil	0,0	0,0	**0,0**
coal (no specifiation)	0,0	0,0	**0,0**
coal_hard	0,0	0,0	**0,0**
coal_lignite	0,0	0,0	**0,0**
bio (no specifiation)	0,0	0,0	**0,0**
bio_fw	0,0	0,0	**0,0**
bio_wp	0,0	0,0	**0,0**
bio_wc	0,0	0,0	**0,0**
bio_other	0,0	0,0	**0,0**
el (including aux.)	22,0	7,0	**29,0**
dh (no specifiation)	0,0	0,0	**0,0**
dh_gas_no_chp	0,0	0,0	**0,0**
dh_gas_chp	0,0	0,0	**0,0**
dh_oil_no_chp	0,0	0,0	**0,0**
dh_oil_chp	0,0	0,0	**0,0**
dh_coal_no_chp	0,0	0,0	**0,0**
dh_coal_chp	0,0	0,0	**0,0**
dh_bio_no_chp	0,0	0,0	**0,0**
dh_bio_chp	0,0	0,0	**0,0**
other	0,0	0,0	**0,0**

Summary

gas	0,0	108,7	**108,7**
oil	0,0	0,0	**0,0**
coal	0,0	0,0	**0,0**
bio	0,0	0,0	**0,0**
el	22,0	7,0	**29,0**
dh	0,0	0,0	**0,0**
other	0,0	0,0	**0,0**

Produced energy

el	0,0	0,0	**0,0**