

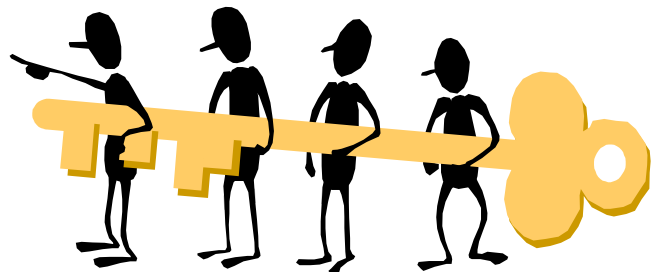
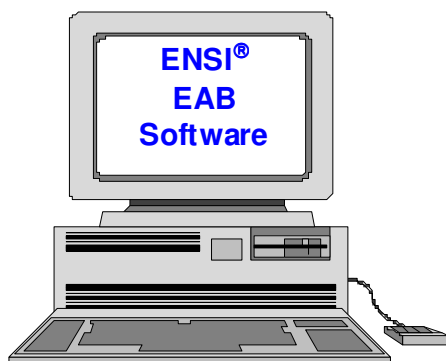
# User Guide

## for

# ENSI<sup>®</sup> EAB Software

Version 8.1

February 2009



[www.ensi.no](http://www.ensi.no)

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## 1 Introduction

The ENSI® EAB Software is tailored for quick energy calculations of the energy performance of existing and new buildings.

The following chapters describe the installation of the software and explain the different windows, functions and possibilities, as well as how to use the software.

## 2 Installation

In order for the software to function correctly, the installation must be carried out from the original compact discs with the ENSI® EAB Software. In order to install the software you need to double click the file “EAB 8.1.exe”.

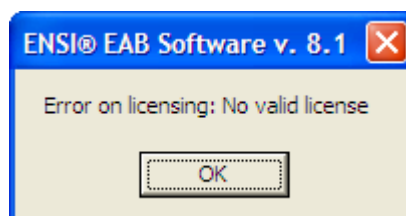
## 3 Start up

To start the program:

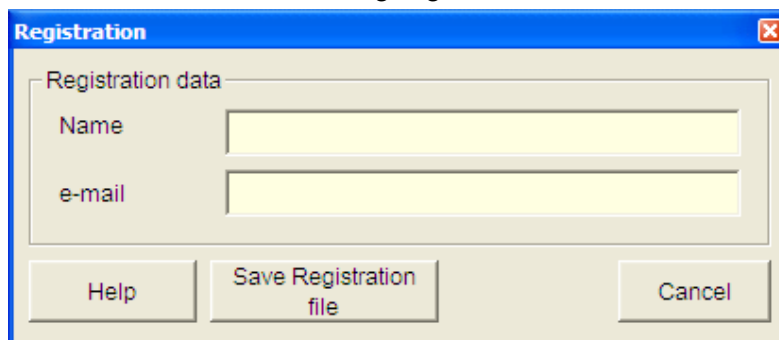
- Click the START button
- Select PROGRAMS: “ENSI EAB Software 8.1”
- Click the icon “ENSI EAB 8.1”. (for **Vista users**, right click on icon and click “Run as administrator”)

## 4 Licence

The ENSI® EAB Software is a software requiring licence. It is necessary to have a special license file in order to run a registered version of the program. The first time you start the program, the following window will open:

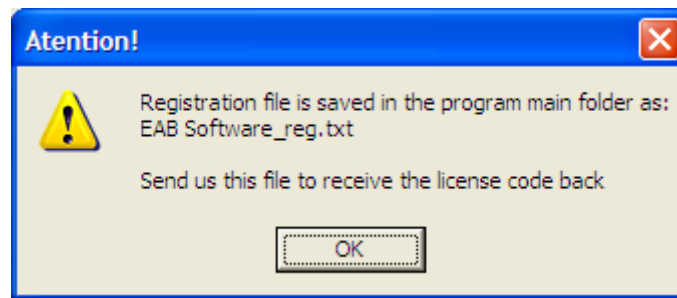


Click “OK” button and continue with the following registration window:



Enter your name and e-mail address correctly and then click the button “Save Registration File”.

In the confirmation window you will see in which folder the registration file is saved:



**NB!** The registration file is stored in the same folder where the program is installed.

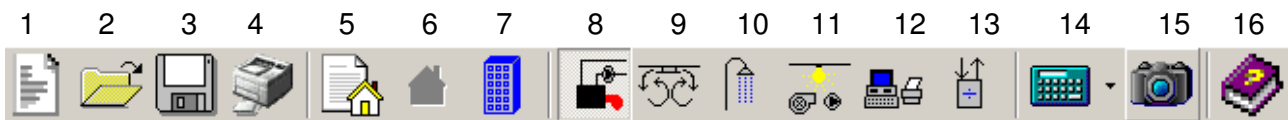
The software will generate a unique registration file that is needed to obtain the licence file. Send the "EAB Software\_reg.txt"-file to ENSI by e-mail and you will receive a license file back.

Save the licence file received from ENSI to the "ENSI EAB Software 8.1"-folder, where you have all the corresponding files.

Next time you start the program it will be a registered version of the ENSI EAB Software.

## 5 Main menu

The icons in the main menu allow you to access various screens in the program. The following figure shows the menu and the corresponding window for each icon.



- |                          |  |
|--------------------------|--|
| 1. New project           | 9. Ventilation (heating)                         |
| 2. Open existing project | 10. Domestic hot water                           |
| 3. Save changes          | 11. Fans & pumps and Lighting                    |
| 4. Print                 | 12. Various                                      |
| 5. General data          | 13. Cooling and Outdoors                         |
| 6. Building envelope     | 14. Energy and power budget / Measures/ ET-curve |
| 7. Building summary      | 15. Capture screen                               |
| 8. Heating               | 16. Help   |

## 6 New project

When starting the program it is possible to select between a “New project” or to “Open project”. This can be done either from the start window or from the main menu.



When selecting “**New project**”, the following window will appear:

Project name	New project	
Country	Norway	
Climatic data	Oslo	← 1
Building type	Office	← 2
Standard condition	1987	
Holiday table	Office	← 3


OK

The calculations can either be based on the **standard** climatic data, standard values and holiday tables that are included in the software, or by creating **user defined** standard values and holiday tables.

- Name the project (by default the project will be stored in the “Work” folder where the program is installed, under subfolder with the specified name of the project)

The next step is to select the standard values from the drop-down list:


- “Climatic data”
- “Building type”
- “Standard condition”
- “Holiday table”

Pressing the button  no 1 will lead you to the following screen with climatic data:

Climatic data		Oslo				
Oslo		Solar Radiation W/m <sup>2</sup>				
Tavo °C	Horizonta	North	East	South	West	
January	-4,3	0,0	4,0	8,0	37,0	8,0
February	-4,0	0,0	11,0	25,0	79,0	25,0
March	-0,2	0,0	22,0	61,0	128,0	61,0
April	4,5	0,0	36,0	91,0	133,0	91,0
Mav	10,8	0,0	55,0	124,0	140,0	124,0
June	15,2	0,0	70,0	128,0	126,0	128,0
July	16,4	0,0	59,0	117,0	123,0	117,0
August	15,2	0,0	42,0	102,0	135,0	102,0
September	10,8	0,0	27,0	64,0	113,0	64,0
October	6,3	0,0	15,0	31,0	75,0	31,0
November	0,7	0,0	5,0	8,0	28,0	8,0
December	-2,0	0,0	3,0	4,0	24,0	4,0

Heating season					
DOT	-20,0	Start month	9	Stop month	5
		Start day	15	Stop day	15
					Exit

Pressing the button  no 2 will lead you to the screen “Standard conditions”:


Building data		Heating		Domestic hot water			
Country	Norway	U - wall	W/m²K	0,30	DHW consumption	l/m²a	150,0
Building type	Office	U - window	W/m²K	2,40	Temp. difference	°C	50,0
Condition	1 987	U - roof	W/m²K	0,20	Distribution efficiency	%	98,0
heating h/day weekdays	12,0	U - floor	W/m²K	0,30	Automatic control	%	98,0
heating h/day Saturdays	0,0	Total solar gain		0,55	TBM/EM	%	98,0
heating h/day Sundays	0,0	Infiltration	1/h	0,25	Generation efficiency	%	100,0
persons h/day weekdays	10,0	Indoor temperature	°C	21,0	<b>Lighting</b>		
persons h/day Saturdays	0,0	Setback temperature	°C	18,0	Operation period	h/week	40,0
persons h/day Sundays	0,0	Emission efficiency	%	93,0	Average power	W/m²	16,0
Walls	m²	Distribution efficiency	%	97,0	<b>Fans and pumps</b>		
Walls area north	m²	Automatic control	%	98,0	Fans, power	W/m²	6,50
Walls area east	m²	TBM/EM	%	98,0	Pumps ventilation	W/m²	0,00
Walls area south	m²	Generation efficiency	%	100,0	Pumps heating	W/m²	0,20
Walls area west	m²	Window factor	%	27,1	Pumps cooling	W/m²	1,00
Windows	m²	<b>Ventilation</b>			TBM / EM	%	98,0
Window area north	m²	Operation period	h/week	55,0	<b>Various exploitable</b>		
Window area east	m²	Ventilation rate	m³/m²h	8,00	Operation period	h/week	35,00
Window area south	m²	Supply temperature	°C	21,0	Average power	W/m²	11,0
Window area west	m²	Heat recovery	%	60,0	<b>Various unexploitable</b>		
Roof	m²	Emission efficiency	%	93,0	Operation period	h/week	35,0
Floor	m²	Distribution efficiency	%	98,0	Average power	W/m²	3,00
Conditioned area	m²	Automatic control	%	98,0	<b>Persons</b>		
Conditioned volume	m³	Humidification	<input type="checkbox"/> -	50,0	Cooling	kWh/m²a	0
Thermal capacity	Wh/m²K	TBM/EM	%	98,0			
Compactness ratio		Generation efficiency	%	100,0			

Office

Reference condition 1987

Save Edit Cancel OK

By clicking the “**Edit**” button you can change standard conditions.

Pressing the  button no 3 will lead you to the following holiday table:

Office

Holidays per month

January	2	July	1
February	0	August	1
March	0	September	2
April	2	October	0
May	2	November	1
June	0	December	3

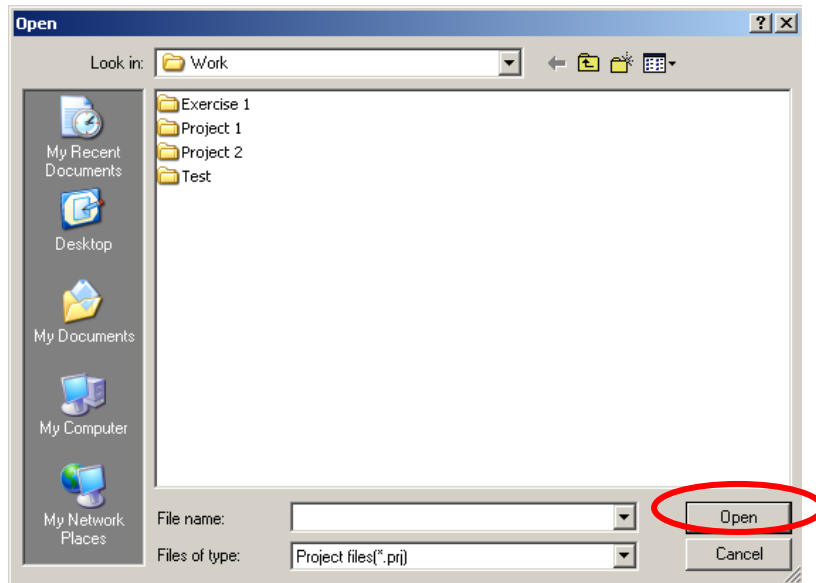
Office

Save Edit Cancel OK

By clicking the “**Edit**” button you can change the holiday data.

## 7 Existing project

To revise the input data, make a printout or make changes to a previously saved project, select **“Open project”** from the start window or from the main menu:



- Choose the desired project from the list.
- If no project is chosen, a new project will start.

After selecting an existing project, use the icons to go through the building geometry as well as the different energy budget items to do the calculations, and to print out the results.



## 8 Building envelope

By clicking the  button in the “General data” screen after setting the project, the following table will appear:

North	Northeast	East	Southeast	South	Southwest	West	Northwest	Roof	Floor
<b>Walls</b>		<b>Windows</b>							
A	U	A	U	g	n				
[m <sup>2</sup> ]	[W/m <sup>2</sup> K]	[m <sup>2</sup> ]	[W/m <sup>2</sup> K]	-	-				
554,00	0,46	310,40	2,90	0,60	1				
<b>Total facade area</b>									
864,40		[m <sup>2</sup> ]							
<b>Walls</b>		<b>Windows</b>							
A (net)	U (equiv)	A (net)	U (equiv)	g (equiv)					
[m <sup>2</sup> ]	[W/m <sup>2</sup> K]	[m <sup>2</sup> ]	[W/m <sup>2</sup> K]	-					
554,00	0,46	310,40	2,90	0,60					
<b>Measures</b>									
554,00	0,46	310,40	1,30	0,60	1				
A (net)	U (equiv)	A (net)	U (equiv)	g (equiv)					
554,00	0,46	310,40	1,30	0,60					

Before starting the energy calculations, the building envelope should be described in this screen. First enter actual areas and condition of walls, windows, roof and floor and then enter Measures related to the building envelope.

**NB!** In order to proceed to the “Building Summary” screen at least one orientation plus roof and floor must have data entered.

## 9 Building summary

The conditioned area, conditioned volume and heat capacity must be entered, while the external wall, window, roof and floor areas are transferred from the previous detailed input screen.

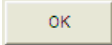
Conditioned area	m <sup>2</sup>	<input type="text" value="2 380"/>	Walls	m <sup>2</sup>	<input type="text" value="1 422"/>
Conditioned volume	m <sup>3</sup>	<input type="text" value="7 830"/>	Windows	m <sup>2</sup>	<input type="text" value="786"/>
Heat capacity	Wh/m <sup>2</sup> K	<input type="text" value="85"/>	Roof	m <sup>2</sup>	<input type="text" value="360"/>
			Floor	m <sup>2</sup>	<input type="text" value="360"/>

## 10 Occupancy and heating schedule

In these fields it is possible to enter metabolic heat from persons and related occupancy schedule plus the heating schedule.

Metabolic heat	W/m <sup>2</sup>	<input type="text" value="4,0"/>		
Occupancy schedule h/day		Heating schedule h/day		
Weekday h/day	<input type="text" value="10"/>	Weekday h/day	<input type="text" value="12"/>	
Saturday h/day	<input type="text" value="0"/>	Saturday h/day	<input type="text" value="0"/>	
Sunday h/day	<input type="text" value="0"/>	Sunday h/day	<input type="text" value="0"/>	

# 11 Heating

After the finishing the previous inputs, the  button in the “Building summary” will lead you to the “Heating” screen.

Parameter	Standard	Actual	Baseline	Sensitivity	kWh/m²a	Measure	Savings
<b>1. Heating</b>		<b>56,0 kWh/m²a</b>					
U - wall	0,30 W/m²K	0,45 >	0,45	+ 0,1 W/m²K = 5,37		0,30 >	-7,53
U - window	2,40 W/m²K	3,00 >	3,00	+ 0,1 W/m²K = 2,96		1,30 >	-45,67
U - roof	0,20 W/m²K	0,20 >	0,20	+ 0,1 W/m²K = 1,35		0,20 >	
U - floor	0,30 W/m²K	0,30 >	0,30	+ 0,1 W/m²K = 1,35		0,30 >	
Compactness ratio	0,33 -	0,33	0,33			0,33	
Window factor	27,1 %	27,1	27,1			27,1	
Total solar gain	0,55 -	0,55 >	0,55			0,55 >	
Infiltration	0,25 1/h	0,40	0,40	+ 0,1 1/h = 10,13		0,25	-14,04
Indoor temperature	21,0 °C	21,0	21,0	+ 1 °C = 8,18		21,0	
Setback temperature	18,0 °C	18,0	18,0	+ 1 °C = 5,65		18,0	
<b>Contribution from</b>							
Ventilation (heating)	kWh/m²a	0,00	0,00			0,00	
Lighting	kWh/m²a	18,16	18,16			16,04	
Various equipment	kWh/m²a	10,92	10,92			9,65	
<b>Energy need</b>	<b>kWh/m²a</b>	<b>81,8</b>	<b>81,8</b>			<b>23,7</b>	
Emission efficiency	93,0 %	93,0	93,0			93,0	
Distribution efficiency	97,0 %	97,0	97,0			97,0	
Automatic control	98,0 %	98,0	98,0			98,0	
TBM/EM	98,0 %	95,0	95,0			98,0	-2,81
<b>Sum</b>	<b>kWh/m²a</b>	<b>97,4</b>	<b>97,4</b>			<b>27,4</b>	
Generation efficiency	100,0 %	100,0	100,0			100,0	
<b>Energy use</b>	<b>kWh/m²a</b>	<b>97,4</b>	<b>97,4</b>			<b>27,4</b>	

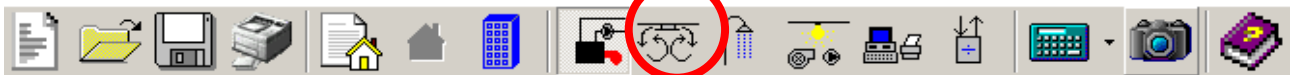
The existing condition of the building to be calculated should be entered into the “**Actual**” column. When starting the software, the default values in “**Actual**”, “**Baseline**” and “**Measure**” are identical with the “**Standard**” values. If the existing condition of the building is different from the standard value, the “**Actual**” values should be changed, either directly or with the help of the spin boxes. After having adjusted the “**Actual**” for all parameters, the calculated energy consumption for heating will appear in the row “**Energy use**”.

If the indoor temperature during the heating seasons has been too low, the mechanical ventilation system has not been operating fully, or if we would like to improve the standard when renovation the building (increased ventilation rate), we might want to take that into consideration when continuing the energy and profitability calculations. This is to be entered in the “**Baseline**” column.

The relevant measures should be described through new parameter values in the “**Measure**” column. The total calculated energy use after measures will appear in the “Savings” column in the “Energy Budget”.


For each of the budget items (Ventilation, Domestic hot water, Fans and pumps, Lighting and Various), the program operates in the same way as for Heating. For the budget items Cooling and Outdoors, the energy use should be entered directly into the program to obtain complete energy and power budgets.

## 12 Ventilation (heating)



For ventilation, it is possible to either use the main window and the total amount of ventilation rate or choose to enter data for each ventilation system in the building.

Parameter	Standard	Actual	Baseline	Sensitivity	kWh/m <sup>2</sup> a	Measure	Savings
<b>2. Ventilation (heating)</b>		43,1		kWh/m <sup>2</sup> a			
Operation period	55,0 h/week	45,0	45,0	+5 h/week = 4,13		45,0	
Ventilation rate	8,00 m <sup>2</sup> /hm <sup>2</sup>	8,00	8,00	+1 m <sup>2</sup> /hm <sup>2</sup> = 4,65		8,00	
Supply temperature	21,0 °C	21,0	21,0	+ 1 °C = 4,83		21,0	
Heat recovery	60,0 %	60,0	60,0	+ 1 % = -0,93		60,0	
<b>Energy need</b>	<b>kWh/m<sup>2</sup>a</b>	<b>31,6</b>	<b>31,6</b>			<b>30,3</b>	
Emission efficiency	93,0 %	93,0	93,0			93,0	
Distribution efficiency	98,0 %	98,0	98,0			98,0	
Automatic control	98,0 %	98,0	98,0			98,0	
Humidification	No	No	No			No	
TBM/EM	98,0 %	95,0	95,0			98,0	-2,62
<b>Sum</b>	<b>kWh/m<sup>2</sup>a</b>	<b>37,2</b>	<b>37,2</b>			<b>34,6</b>	
Generation efficiency	100,0 %	100,0	100,0			100,0	
<b>Energy use</b>	<b>kWh/m<sup>2</sup>a</b>	<b>37,2</b>	<b>37,2</b>			<b>34,6</b>	
<b>Contribution to heating</b>	<b>kWh/m<sup>2</sup>a</b>	<b>0,0</b>	<b>0,0</b>			<b>0,0</b>	


  
**Ventilation systems**

If the "Ventilation Systems" tab is chosen, a new window will open enabling you to enter data for each ventilation system in the building.

System name		System values		
		Actual	Baseline	Measure
Ventilation system 1				
Ventilation system 2				
Operation period	h/week	44	44	44
Ventilation rate	m <sup>2</sup> /hm <sup>2</sup>	8,00	8,00	8,00
Ventilation rate adj.	m <sup>2</sup> /hm <sup>2</sup>	7,81	7,81	7,81
Heat recovery	%	60	60	60
Fans, power	W/m <sup>2</sup>	9,00	9,00	9,00
Fans, power adjusted	W/m <sup>2</sup>	8,78	8,78	8,78
		Average		
		Actual	Baseline	Measure
Operation period	h/week	45,1	45,1	45,1
Ventilation rate	m <sup>2</sup> /hm <sup>2</sup>	9,98	9,98	9,98
Supply temperature	°C	20,2	20,2	20,2
Heat recovery	%	47	47	47
Fans, power	W/m <sup>2</sup>	10,20	10,20	10,20

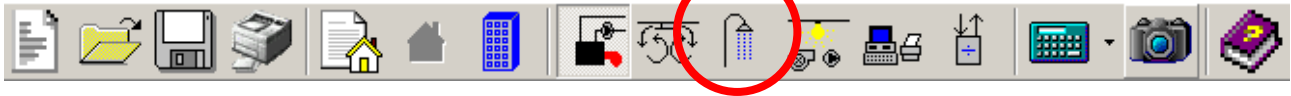
System name		Ventilation system 1		
		<b>Actual</b>	<b>Baseline</b>	<b>Measure</b>
Operation period	h/week	49	49	49
Ventilation rate	m <sup>3</sup> /hm <sup>2</sup>	2,0	2,0	2,0
Supply temperature	°C	21,0	21,0	21,0
Heat recovery	%	0	0	0
Fans, power	W/m <sup>2</sup>	1,30	1,30	1,30
		Cancel		OK

Data for the operation period, ventilation rate, heat recovery, supply temperature and the fans power should be entered for each specific ventilation system. The entered data will be adjusted to one average system and transferred to the main ventilation window. Based on this data the program will calculate the energy use for Ventilation (heating).

If the building does not have mechanical ventilation, the input value for the “Operation period” should be 0. The energy demand is then automatically given as 0 kWh/m<sup>2</sup>, and the other parameters cannot be adjusted.

If you would evaluate installation of new mechanical ventilation in case of non-existing ventilation in the building, enter the parameter values directly in the column “Baseline” and the energy demand will be automatically calculated, taking in account increased energy demand in ventilation system.

## 13 Domestic Hot Water



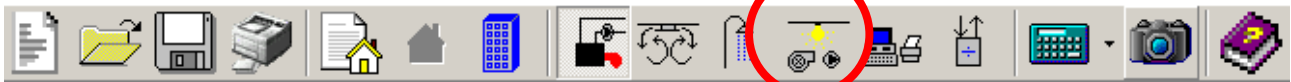
The screen Domestic Hot Water (DHW) is presented below.

Parameter	Standard	Actual	Baseline	Sensitivity	kWh/m²a	Measure	Savings
<b>3. DHW</b>		9,2			kWh/m²a		
DHW consumption	150 l/m²a	150	150	+ 10 l/m² = 0,63		100	-3,07
Temp. difference	50,0 °C	50,0	50,0			50,0	
<b>Hot water per year</b>	m³	435	435			290	
<b>Energy need</b>	kWh/m²a	8,6	8,6			5,8	
Distribution efficiency	98,0 %	98,0	98,0			98,0	
Automatic control	98,0 %	98,0	98,0			98,0	
TBM/EM	98,0 %	95,0	95,0			98,0	-0,28
<b>Sum</b>	kWh/m²a	9,5	9,5			6,1	
Generation efficiency	100,0 %	100,0	100,0			100,0	
<b>Energy use</b>	kWh/m²a	9,5	9,5			6,1	

Maximal simultaneous power for DHW can be entered in the following table:

DHW power demand	
Max. simultaneous power	W/m²

## 14 Fans, Pumps and Lighting



This screen is covering 2 budget items (“Fans and Pumps” and “Lighting”) as shown below:

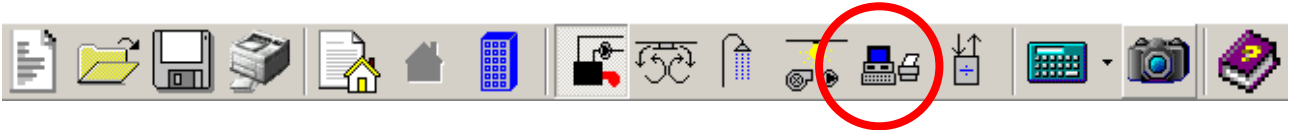
Parameter	Standard	Actual	Baseline	Sensitivity	kWh/m²a	Measure	Savings
<b>4. Fans and pumps</b>		20,5	kWh/m²a				
Operation period	55 h/week	45,0	45,0	+5 h/week = 2,51		45,0	
Fans	6,5 W/m²	10,00	10,00	+1 W/m² = 2,26		6,00	-9,23
Pumps ventilation	0,0 W/m²	0,00	0,00	+1 W/m² = 1,48		0,00	
Pumps heating	0,2 W/m²	0,20	0,20	+1 W/m² = 5,83		0,20	
Pumps cooling	1,0 kWh/m²a	1,00	1,00			1,00	
TBM/EM	98 %	95,0	95,0			98,0	-0,74
<b>Energy use</b>	kWh/m²a	26,0	26,0			16,0	
<b>5. Lighting</b>		32,1	kWh/m²a				
Operation period	40 h/week	40	40	+1 h/week = 0,00		40	
Average power	16,00 W/m²	16,00	16,00	+1 W/m² = 0,00		10,00	-12,03
<b>Energy use</b>	kWh/m²a	32,1	32,1			20,1	

**NB!** Pumps cooling must be entered in kWh/m²year.

Maximal simultaneous power for lighting is entered in the following table:

Lighting power demand	
Max. simultaneous power	W/m²

## 15 Various exploitable and unexploitable



The budget item “Various” is divided in two; exploitable and unexploitable.

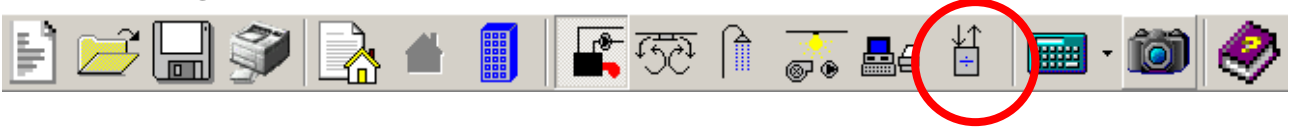
Parameter	Standard	Actual	Baseline	Sensitivity	kWh/m²a	Measure	Savings
<b>6.1 Various exploitable</b>		19,3	kWh/m²a				
Operation period	35 h/week	35	35	+5 h/week = 0,00		35	
Average power	11,00 W/m²	11,00	11,00	+1 W/m² = 0,00		11,00	
<b>Energy use</b>	kWh/m²a	19,3	19,3			19,3	
<b>6.2 Various unexploitable</b>		5,3	kWh/m²a				
Operation period	35 h/week	35	35	+5 h/week = 0,00		30	-0,75
Average power	3,00 W/m²	3,00	3,00	+1 W/m² = 0,00		3,00	
<b>Energy use</b>	kWh/m²a	5,3	5,3			4,5	

Maximal simultaneous power for various is entered in the following table:

**Various power demand**

Max. simultaneous power W/m²

## 16 Cooling and Outdoors



Parameter	Standard	Actual	Baseline	Sensitivity	kWh/m²a	Measure	Savings
<b>7. Cooling</b>		0,0	kWh/m²a				
Cooling	kWh/m²a	4,0	4,0			4,0	
<b>Energy use</b>	kWh/m²a	4,0	4,0			4,0	
<b>8. Outdoor</b>			kWh/a				
Outdoor	kWh/a	0	0			0	
<b>Energy use</b>	kWh/a						

In the budget item “Cooling” and “Outdoor” the energy demand should be entered directly.

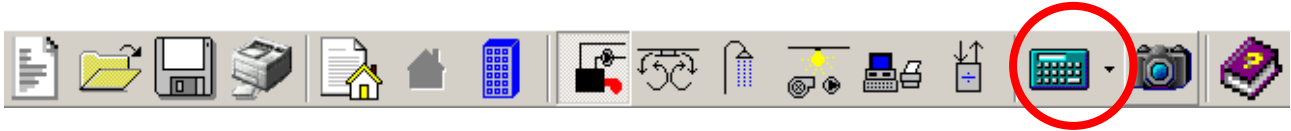
For detailed calculations of these budget items, specialised software programs or other calculations should be used.

Cooling will be included in the next version of the ENSI® EAB Software.



## 17 Results

### 17.1 Energy and power demand budget



When “Actual” and “Measure” for all budget items are filled in, click the icon “Energy and power budget” to obtain the results.

The “Energy Budget” includes the energy use for the standard building and calculated energy use for “Actual”, “Baseline” and “After Measures”. The “After Measures” values summarize all the savings from the “Measure” columns for each budget item.

Energy budget | Measures | Power budget | ET curve | Annual energy use | Heat losses

<b>Project</b>	Building type	Office	
user guide	Standard condition	1987	
	Climatic zone	Oslo	
	Heating season	15.9 - 15.5	

Budget item	Standard kWh/m <sup>2</sup>	Actual		Baseline		After Measures	
		kWh/m <sup>2</sup>	kWh/a	kWh/m <sup>2</sup>	kWh/a	kWh/m <sup>2</sup>	kWh/a
1. Heating	56,0	98,3	284 968	98,3	284 968	32,5	94 207
2. Ventilation (heating)	43,1	37,2	107 970	37,2	107 970	34,8	100 977
3. DHW	9,2	9,5	27 442	9,5	27 442	6,1	17 735
4. Fans and pumps	20,5	26,0	75 341	26,0	75 341	16,0	46 415
5. Lighting	32,1	32,1	93 065	32,1	93 065	20,1	58 166
6. Various	24,6	24,6	71 253	24,6	71 253	23,8	69 072
7. Cooling	0,0	4,0	11 600	4,0	11 600	4,0	11 600
<b>Total</b>	<b>185,4</b>	<b>231,6</b>	<b>671 640</b>	<b>231,6</b>	<b>671 640</b>	<b>137,3</b>	<b>398 171</b>
8. Outdoor			0		0		0

By clicking “Power budget”, the corresponding budget for maximum simultaneous power demand for each budget item will appear.

Energy budget | Measures | **Power budget** | T curve | Annual energy use | Heat losses

Project: user guide

Building type: Office  
 Standard condition: 1987  
 Climatic zone: Oslo  
 Heating season: 15.9 - 15.5

Design outdoor temperature: -20.0

Budget item	Actual		Baseline		After Measures	
	W/m <sup>2</sup>	kW	W/m <sup>2</sup>	kW	W/m <sup>2</sup>	kW
1. Heating	60,0	174	60,0	174	32,4	94
2. Ventilation (heating)	44,6	129	44,6	129	44,6	129
3. DHW	0,0	0	0,0	0	0,0	0
4. Fans and pumps	10,2	30	10,2	30	6,2	18
5. Lighting	0,0	0	0,0	0	0,0	0
6. Various	0,0	0	0,0	0	0,0	0
7. Cooling	0,0	0	0,0	0	0,0	0

Both specific and total power demands are presented in the columns “Actual”, “Baseline” and “After Measures”. The kW’s is the specific value multiplied by the conditioned area of the building, defined in the “Building envelope” window.

It is possible to change the default design outdoor temperature (DOT), by using the scroll bar. Power demand for heating and ventilation will automatically be recalculated. The difference between the standard DOT and the entered DOT should not exceed ± 20%.

**NB!** Changes of the DOT will not be saved in the project file.

## 17.2 Measure

By clicking “Measure”, an overview of the calculated measures and the specific and total savings for each measure is given. Sum savings for all measures are also calculated.

Energy budget
Measures
Power budget
ET curve
Annual energy use
Heat losses

**Project**

user guide

Building type: Office

Standard condition: 1987

Climatic zone: Oslo

Heating season: 15.9 - 15.5

Parameter	kWh/m <sup>2</sup>	kWh/a	Real kWh/a
1. Vykurovanie: U - stena	-7,72	-22 376	-22 376
1. Vykurovanie: U - okno	-46,60	-135 131	-135 131
1. Vykurovanie: Infiltracia	-14,39	-41 730	-41 730
1. Vykurovanie: TBM/EM	-3,01	-8 726	-8 726
2. Vetrание (vykur.): TBM/EM	-2,41	-6 993	-6 993
3. TV: Spotreba TV	-3,07	-8 891	-8 891
3. TV: TBM/EM	-0,28	-817	-817
4. Ventilatory a cepadla: Ventilatory	-9,23	-26 772	-26 772
4. Ventilatory a cepadla: TBM/EM	-0,74	-2 155	-2 155
5. Osvetlenie: Priemery prikon	-12,03	-34 899	-9 456

**Total savings**

-100,23

-290 670

-265 227

**Measure**

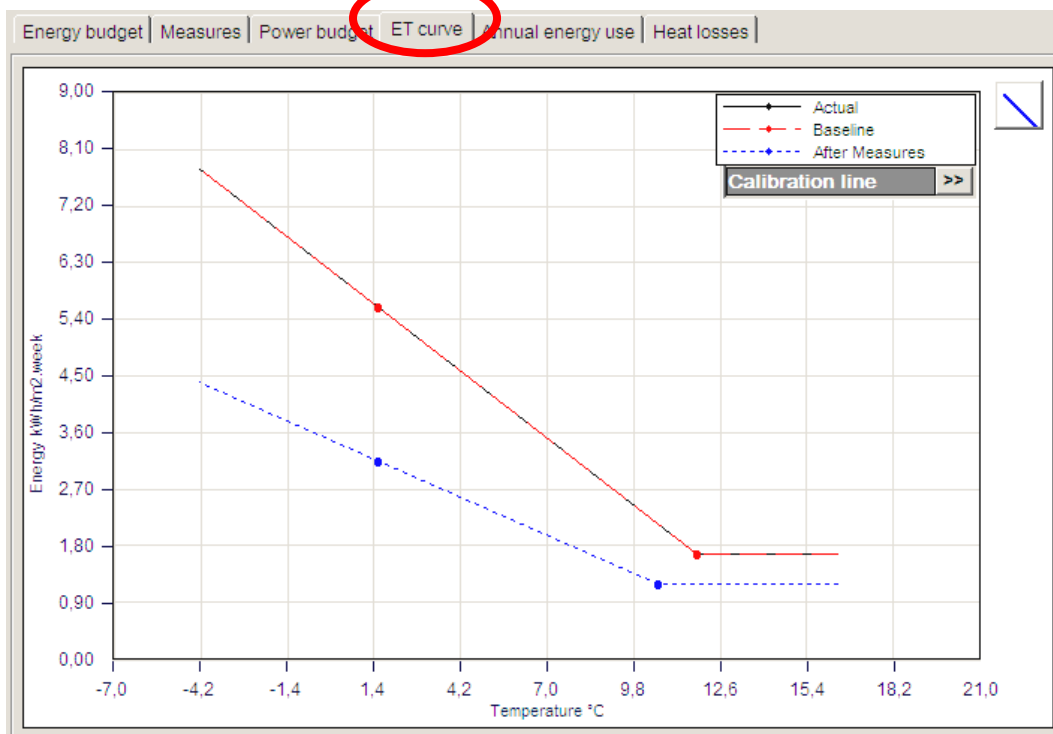
Change text

Measures on lighting and various equipment will also influence the energy use for heating. Net savings (kWh/a) are presented as Actual.

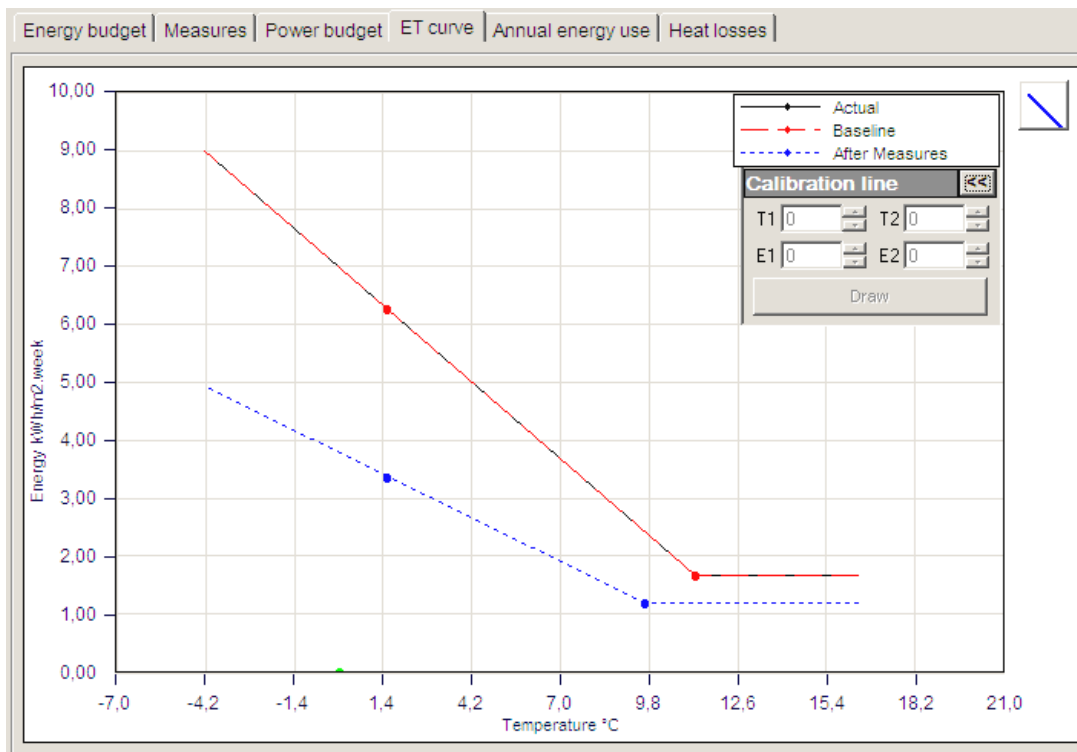
If highlighting one measure in the column “Parameter”, the measure can be renamed or described in the “Measure” box. This description will be included in the printed reports.

### 17.3 ET - curve

The EAB Software calculates ET-curves to be used for energy monitoring, for 3 situations; Actual, Baseline and After Measures.

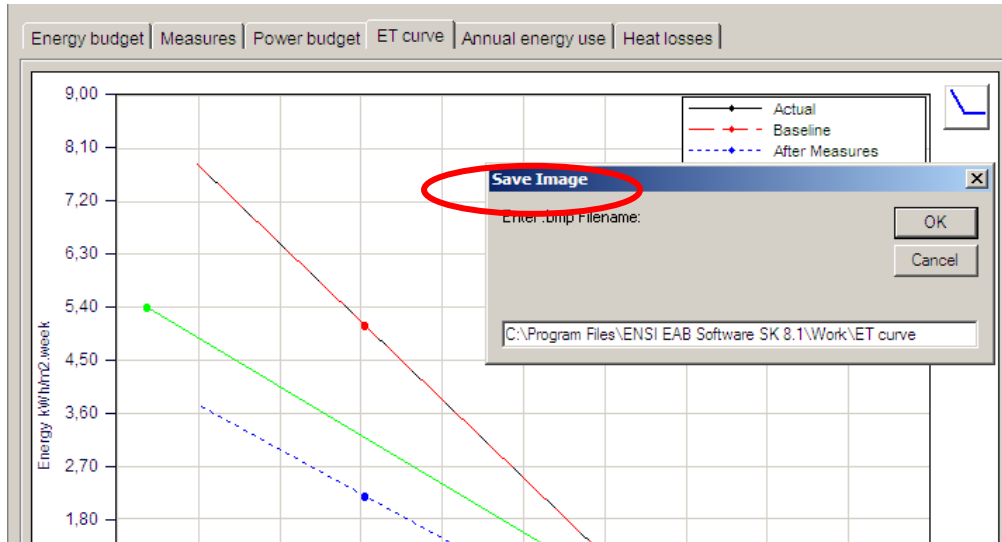


The calculated energy use for heating and ventilation can be compared with an entered "Calibration line" (for instance based on measurements), and various calculation parameters changed to until the calculated line follows the calibration line:



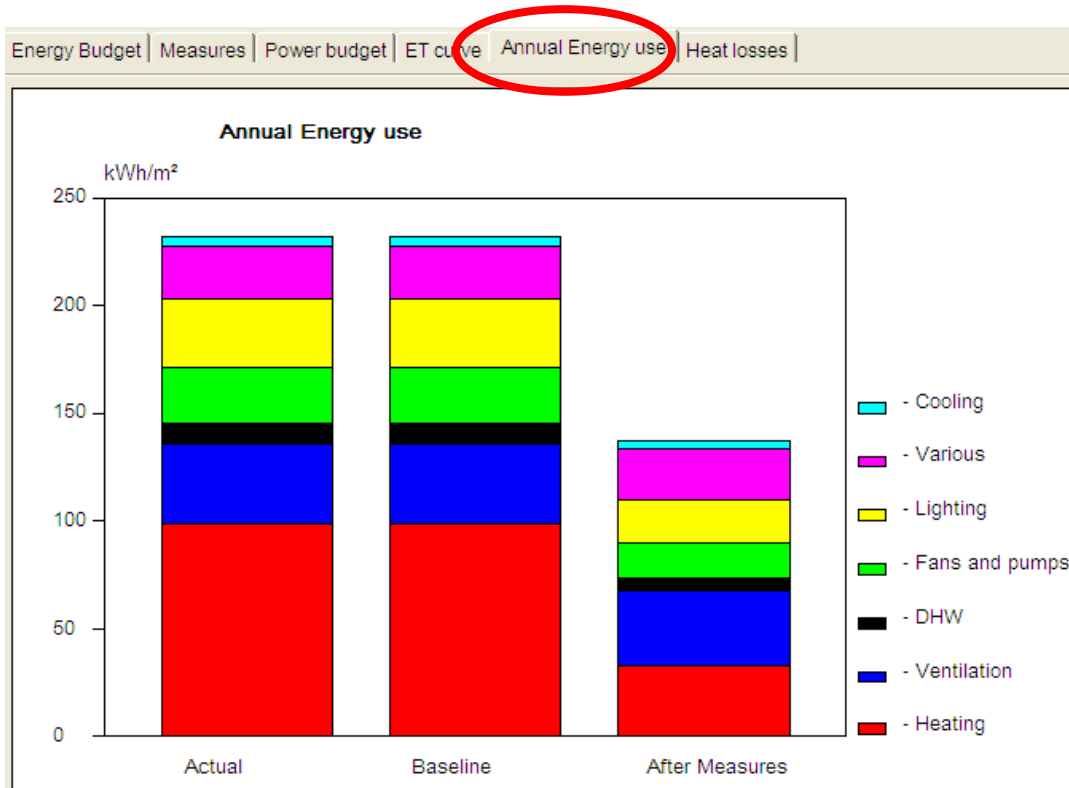
It is possible to read exact values when pointing the crosshair on the ET curve. The floating textboxes shows outdoor temperature and weekly energy consumption for the corresponding point.

By right-clicking in the diagram area you will be able to save the ET curve. Image will be saved as a bmp-file at your desired path (By default in the “Work” folder where the program is installed):



## 17.4 Annual Energy use

The “Annual Energy use” shows the annual energy use for Actual, Baseline and After Measures, divided into the relevant budget items.



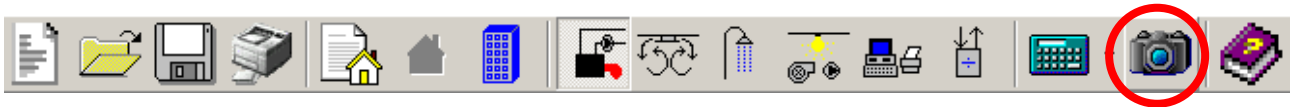
## 17.5 Heat losses

The screen “Heat losses” presents heat losses through various components. The heat loss coefficient  $H$  and specific heat loss coefficient  $H'$  is presented, in columns “Actual” and “After Measures”.

Project		Building type		Office	
user guide		Standard condition		1987	
		Climatic zone		Oslo	
		Heating season		15.9 - 15.5	
Heatloss component	Actual		After Measures		
	H W/K	H' W/m²K	H W/K	H' W/m²K	
Walls	640	0,22	427	0,15	
Windows and doors	2 358	0,81	1 022	0,35	
Roof	72	0,02	72	0,02	
Floor	108	0,04	108	0,04	
Infiltration	1 065	0,37	666	0,23	
Ventilation	2 113	0,73	2 113	0,73	
<b>Total</b>	<b>12 131</b>	<b>4,18</b>	<b>10 182</b>	<b>3,51</b>	

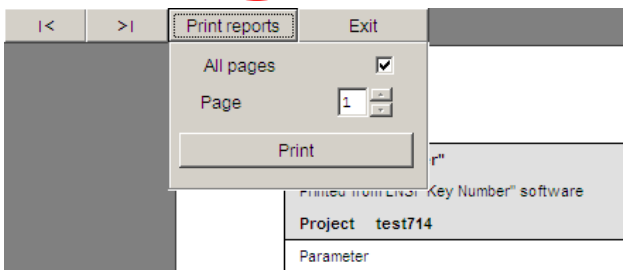
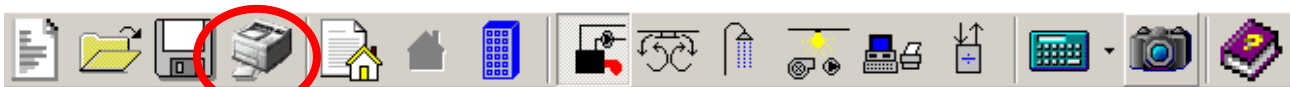
## 18 Print and save project

### 18.1 Capture screen



A “Capture screen” icon is to be used to save a selected part of the screen. The picture will be saved by default in the “Work” folder where the program is installed, under subfolder with the name of the current project.

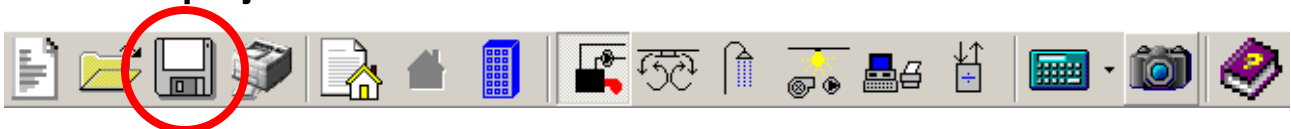
### 18.2 Print reports



To print out click the “Print Reports” button, then the climatic data, holiday data, building geometry and all calculations will be printed.

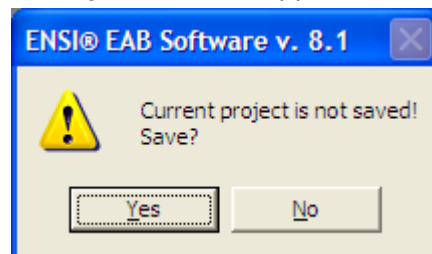
It is also possible to choose printing of one specific page of the report.

### 18.3 Save project



To save changes to a project click the “Save” button in the main menu. The project will be saved by default in the “Work” folder where the program is installed, under subfolder with the name of current project with extension \*.prj.

When closing the program the following window will appear:



By default the program will save all the projects in the “Work” folder where the program is installed, under subfolder with the name of current project. This path can be changed by the user.

