



BUNDLING

Matti Pykkö

Environmental office of Lappeenranta region

EFFECT4buildings Final Conference

Webinar, 8th Dec 2020



Background

Bundling as a tool is based on deep understanding of Total Concept Method and Total Tool. Bundling is a way to **merge many smaller investments in to a bigger investment package**. By bundling multiple measures, can be reached the **better profitability / bankability** to invest on a larger scale or make a deep renovation instead of a single energy efficiency solution.

Different kind of bundling methods

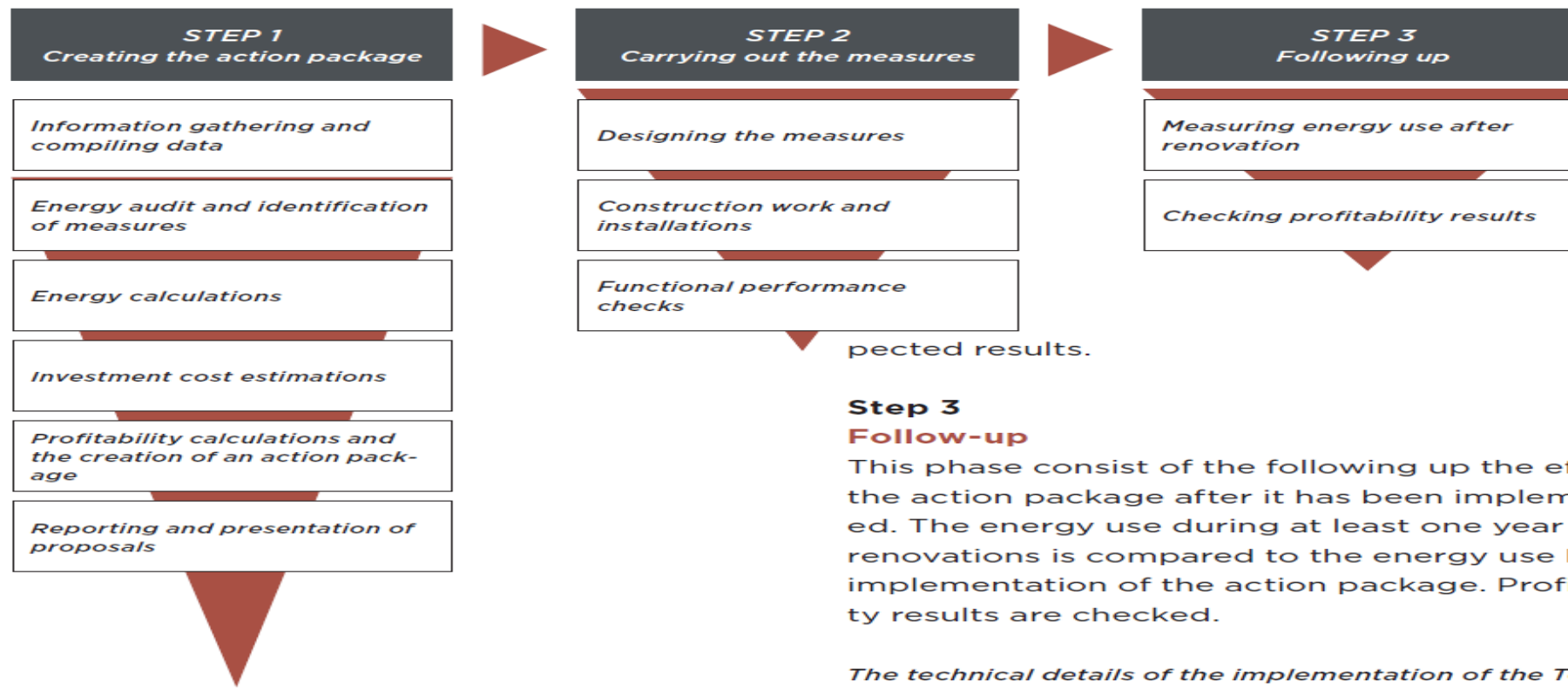
- 1) bundle energy efficiency measures in one building/project
- 2) bundle multiple EE acts of the same type in many building/locations to make investment big enough, ie street lighting, HVAC.
- 3) bundle multiple EE measures of different type in many buildings/locations

The reason to bundling small energy actions is to enlarge the overall project for reaching the minimum project size required in **application for EU funding**. In addition it is **more effective project preparation** regarding the technical and administrative management. It allows reducing of total project costs comparing to small separate activity implementation and gives the possibility to implement energy actions with longer payback time. **Not only the most profitable "low hanging fruits", but also less profitable measures will be included**. The profitability assessment in the Total Concept method is based on **internal rate of return method**. The requirement of **IRR-value** (internal rate of return) for the whole package shall be fulfilled.

TCM / TotalTool / Steps

- **Step 1 – Creating an action package**
- **Step 2 – Carrying out the measures**
- **Step 3 – Follow up**

Work process



pected results.

Step 3 Follow-up

This phase consist of the following up the effect of the action package after it has been implemented. The energy use during at least one year after renovations is compared to the energy use before implementation of the action package. Profitability results are checked.

The technical details of the implementation of the Total Concept is described in the guidebook "The Total Concept."

Preparations

Following issues shall be considered:

- what kind of energy renovation shall be carried out
- engage all relevant stakeholders
- determine the **baseline for energy savings**
 - define an energy usage baseline / reference level. Final savings shall be compared to this.

Observe: check minimum requirements to be fulfilled in the building before any study of possible energy saving measures. The energy usage baseline is needed to be defined correctly. Furthermore the baseline may vary due to different regulations.

Step 1

Basic information of building

Energy audit and identification of measures

Investment cost calculation

Energy calculations

Profitability of the measures

Create an action package

Summary / report / suggestion -> to be presented for decision makers

(Observe: sensitivity analysis may be needed)

Step 2

Carrying out the measures, including:

- Planning and designing the measures
- Construction work and installations
- Functional performance checks

Step 3

Following up, including:

- Measuring energy usage
- Checking profitability results

Conflict between expected vs actual savings

In case of conflict between expected vs. actual results -> following issues shall be analyzed

do all technical systems work as planned (if not, corrective actions needed)

changes in operating conditions and/or use of the building since gathering basic information

difference between calculated / actual costs? Reason for that?

any other issues that could have affected the calculated energy savings (for ex. other works carried out at the same time and they were not connected to calculations)

Before starting to use TotalTool

- identify all the possible energy saving measures in the building
- define required investment cost
- calculate expected annual energy savings for each measure
 - observe also the effects of individual measures to each other
- profitability requirement
 - interest rate requirement given by owner of building
- also needed
 - energy prices
 - estimated energy price increases
 - economic calculation periods for each measure, etc.

Where to find the tool?

-bundling a.k.a Total Concept Method (TCM) & TotalTool
<http://totalconcept.se/>

TotalTool can be uploaded

here ----->

or here ----->

Obs! Access given by your security organisation is needed!


The screenshot displays the website for 'Total Concept' and 'BELOK'. The 'Total Concept' page is titled 'GUIDELINES AND TOOLS' and provides information on how to use the Total Concept method and download the TotalTool. A sidebar on the left lists pages like 'Expected outputs', 'Final Report', 'Home', and 'Login'. The main content area contains text explaining the guidelines and a link to download the TotalTool. Below this, the 'BELOK' website is shown, featuring a navigation menu and a search bar. The 'BELOK Totalverktyg' page is also visible, providing details about the tool and a download link for version 3.1.2.

Other relevant material

-training material available in several languages

here ----->

English

 [Total Concept tool-kit -v1.6 \(ENG\)](#)

Dansk/Danish

 [Totalconceptets værktøjskasse-v1.6.zip \(DAN\)](#)

Soumeksi/Finnish

 [Total Concept työkalupakki- v1.6 \(FIN\)](#)

Eesti/Estonian








 [Total-Concept abimaterjalid-v1.6 \(EST\)](#)

Norsk/Norwegian

 [Total Concept tool-kit -v1,6.zip \(NOR\)](#)

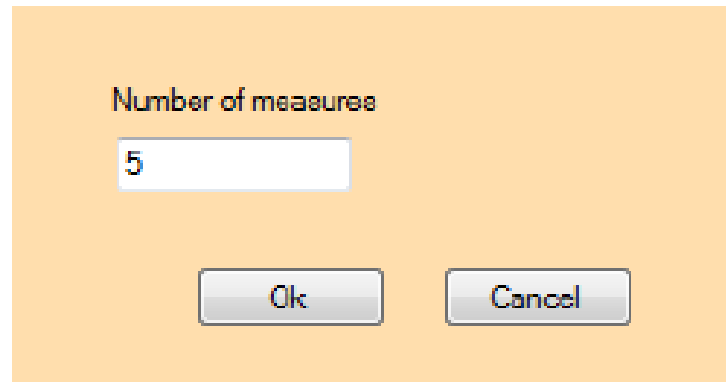
Svenska/Swedish

 [Totalmetodikens verktygslåda-v1,6.zip \(SVE\)](#)

Nimi	Tyyppi	Paka
 Checklist for tender documents for Step 1-v1.1	Adobe Acrobat Document	
 Information checklist for Step 1-v1.1	Microsoft Word -asiakirja	
 Property information for tender docs for Step 1-v1.1	Microsoft Excel -laskentat...	
 Template for measurement and follow up plan in Step 3-v1.1	Microsoft Word -asiakirja	
 Template for reporting the outcomes from Step 1-v1.2	Microsoft Word -asiakirja	
 Total Concept Guidebook-v1.6	Adobe Acrobat Document	
 TotalTool Users Guide-v1.3	Adobe Acrobat Document	

How to use TotalTool 2

Give the number of measures of your action package.
Observe, this is an editable value. You are always able to add or remove measures later.



Number of measures

Ok Cancel

How to use TotalTool 3

Profitability requirements

Energy price including price increases

Economic calculation period

Economy data

Economy data
Package of measures

Calculation interest rate %

Economic calculation period (for LCC only) Year

Energy/resource prices and power tariffs

	Energy Price	Relative price increase above inflation [%]	Power tariff k€/kW
Heat energy	<input type="text" value="0.6"/> €/kWh	<input type="text" value="0"/>	<input type="text" value="0.001"/>
Electricity	<input type="text" value="0.9"/> €/kWh	<input type="text" value="0"/>	<input type="text" value="0.001"/>
District cooling	<input type="text" value="0.7"/> €/kWh	<input type="text" value="0"/>	<input type="text" value="0.001"/>
Water	<input type="text" value="25"/> €/m ³	<input type="text" value="0"/>	
	Other operating costs	<input type="text" value="0"/>	

Linear price increase
 Linear price increase with 1 breakpoint
 Linear price increase with 2 breakpoints
 Fixed price at 2 levels
 Fixed price at 3 levels

Value estimation method

Method of property value estimation
Cash Flow Method

Growing Coef (Cash flow) (Cash Flow Method)

Net capitalization Factor (Net Capitalization Method)

Ok Cancel

How to use TotalTool 4

The building area [m2]

Energy use before the measures (the baseline)

Power demand before measures

Other operating costs

Building data

Building data

Property value before [M€]

Building area [m²]

Analyse power savings

Energy use before measures Power demand before measures

Heat energy MWh/year ▾

Divide electricity use

Electricity for building MWh/year ▾

Electricity for tenants MWh/year ▾

Building has district cooling

Analyse water savings

Other operating costs k€ / year

How to use TotalTool 5

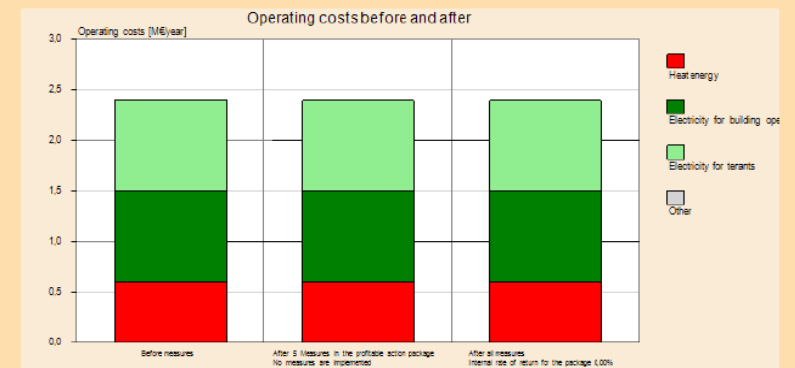
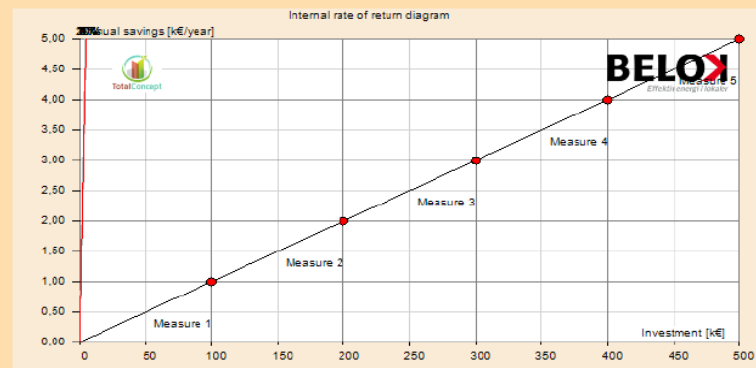
Add input data

Totaltool Version 2

Start Economy Building **Measures data** Graphs Hide Print/Copy Help Data Report-data

Add row Select Columns Print Copy

	Ena.	Nu.	Name	Economic calculation period [year]	Investment [k€]	Internal rate of return [%]	Heat energy saving [MWh/year]	Heat energy cost saving [k€/year]	Electricity saving [MWh/year]	Electricity cost saving [k€/year]	District Cooling energy saving [MWh/year]	District cooling cost saving [k€/year]	Other cost savings [k€/year]	Total energy cost saving [k€/year]	Sum of internal rate [%]	
▶	<input checked="" type="checkbox"/>	1	Measure 1	1	100	-20,00	1,66	1	0	0	0	0	0	1	0,00	Edit
	<input checked="" type="checkbox"/>	2	Measure 2	1	100	-20,00	1,66	1	0	0	0	0	0	1	0,00	Edit
	<input checked="" type="checkbox"/>	3	Measure 3	1	100	-20,00	1,66	1	0	0	0	0	0	1	0,00	Edit
	<input checked="" type="checkbox"/>	4	Measure 4	1	100	-20,00	1,66	1	0	0	0	0	0	1	0,00	Edit
	<input checked="" type="checkbox"/>	5	Measure 5	1	100	-20,00	1,66	1	0	0	0	0	0	1	0,00	Edit
		0	Part result	-	0	-	0	0	0	0	0	0	0	0	0,00	
		5	Sum	1	500	-	8,33	5	0	0	0	0	0	5	0,00	



How to use TotalTool 6

Fill in all specified details

Edit Measures

Data for measure number 1

Name: Improvements in the lighting system

Economic calculation period: 15 Year Investment: 350 k€ Fix place

Energy use Use as input Costs Use as input

	Energy use [MWh/year (Water=m ³ /year)			Operating costs [k€/yr]		
	Saving	Energy before saving	Saving in [%]	Saving	Cost before saving	Saving in [%]
Heat energy	0	935	0,0	0	561	0,0
Electricity for building operation	163,33	382,5	42,7	147	344,25	42,7
Electricity for tenants	0	255	0,0	0	229,5	0,0
Other operating costs				0	54	-

Ok Cancel

How to use TotalTool 7

In the **Measures data** menu by clicking the box in the first column “*Enable*” of the data table in Section 1 the specific measure is included to the action package calculation and shown on the results diagrams.

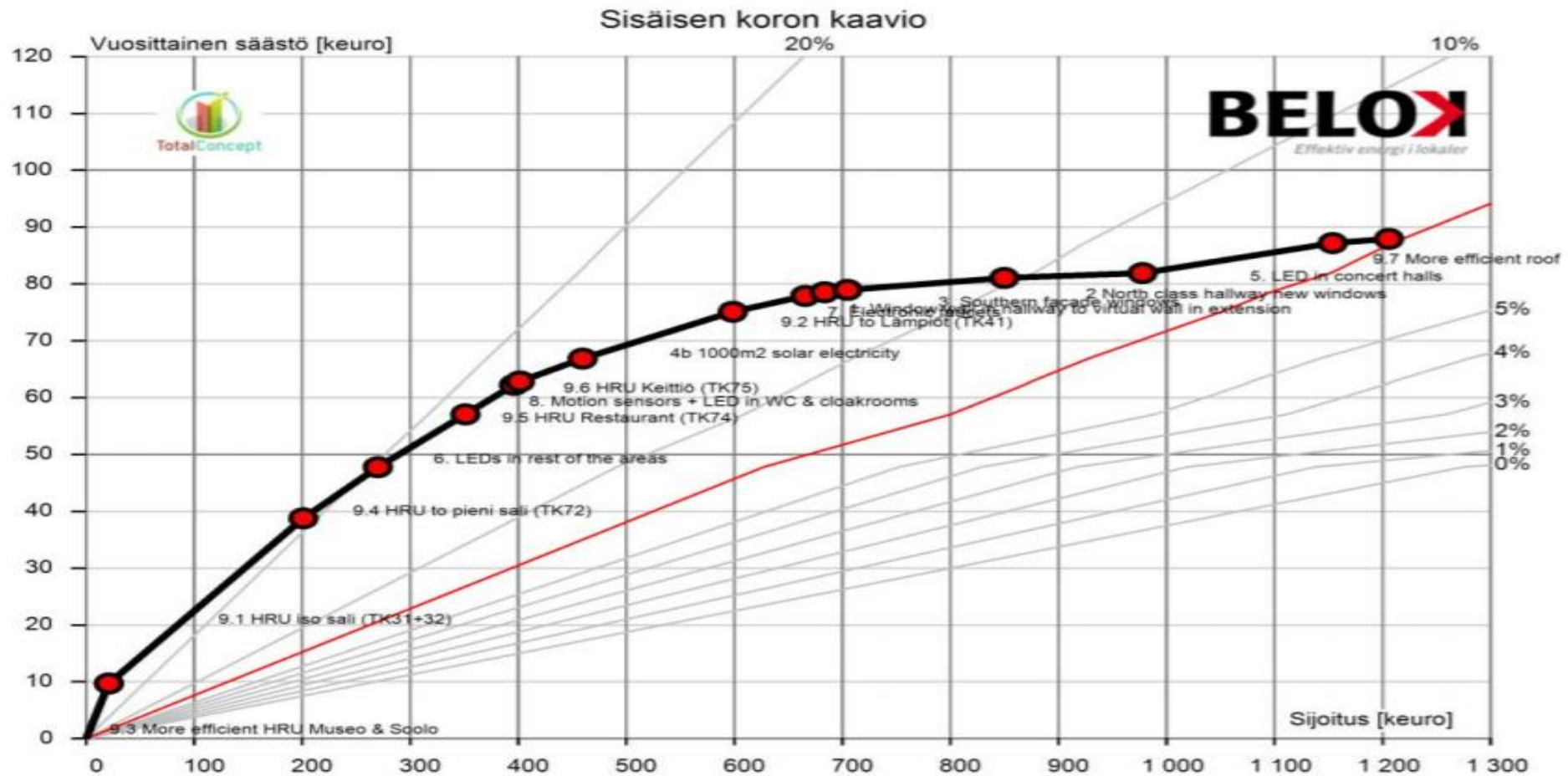
When unclicking the box the measure will be excluded from the calculations, but it still appears in the measures table.

To add a new measure, click “*Add row*”.

To delete a measure, first activate the measure by clicking on the first cell of the measure line (the line becomes blue) and then click “*Delete measure*”.

Now charts are available ->

How to use TotalTool 8



How to use TotalTool 9

Name	Economic calculation period [year]	Investment [keuro]	Internal rate of return [%]	Heat energy saving [MWh/year]	Heat energy cost saving [keuro/year]	Electricity saving [MWh/year]	Electricity cost saving [keuro/year]	District cooling energy saving [MWh/year]	District cooling cost saving [keuro/year]	Other cost savings [keuro/year]	Total cost saving [keuro/year]	Profit [-]	Sum of internal rate [%]	LCC [keuro]
9.3 More efficient HRU ...	20	13,6	79,14	169	10,14	3	0,27	0	0	0	10,41	8,11	79,16	-160,21
9.1 HRU iso sali (TK31+...	20	180	19,12	520	31,2	0	0	0	0	0	31,2	1,84	23,62	-340,34
9.4 HRU to pieni sali (TK...	20	69	15,33	161	9,66	0	0	0	0	0	9,66	1,48	21,52	-92,04
9.5 HRU Restaurant (TK...	20	43	13,60	90	5,4	0	0	0	0	0	5,4	1,33	20,45	-47,00
6. LEDs in rest of the are...	15	81,3	8,98	-142	-8,52	174	15,66	48	1,44	0	8,58	0,96	18,44	-103,15
8. Motion sensors + LED...	15	5,6	8,10	-7,1	-0,42	10,5	0,94	1,3	0,03	0	0,55	0,91	18,32	-6,55
9.6 HRU Keittiö (TK75)	20	56	7,14	72	4,32	0	0	0	0	0	4,32	0,82	17,05	-15,91
4b 1000m2 solar electricity	25	139	5,73	0	0	90	8,1	0	0	0	8,1	0,68	14,43	-49,96
7. Electronic faucets	25	18,4	2,04	4,9	0,29	0	0	0	0	0	0,68	0,43	14,07	-0,12
9.2 HRU to Lämpööt (TK...	20	67	1,56	50	3	0	0	0	0	0	3	0,47	13,05	17,25
1. Window wall in hallwa...	30	21,2	-0,26	7,3	0,43	0	0	0	0	0	0,43	0,26	12,67	13,89
3. Southern façade wind...	30	145	-1,75	37,7	2,26	0	0	0	0	0	2,26	0,19	10,46	107,27
2 North class hallway ne...	30	128	-5,37	15,4	0,92	0	0	0	0	0	0,92	0,09	8,81	112,58
5. LED in concert halls	15	176	-6,89	-91	-5,46	105	9,45	28	0,84	0	4,83	0,25	7,37	6,34
9.7 More efficient roof ve...	20	52,5	-7,47	0	0	8	0,72	0	0	0	0,72	0,15	6,94	40,71

How to use TotalTool 10

Should **internal rate of return of each individual measures be presented more clearly**? At the moment only the **IRR-summary** of the chosen measures **is presented clearly**.

Building managers, decision makers and other stakeholders may be **confused, how profitable each individual measures are in practice**, if individual IRR's are not presented.

At least the person presenting (or training) Total tool results, shall be prepared to tell all the details behind to charts and how results shall be interpreted.

Samples regarding this issue on the next two slides.

Existing pilot samples

<http://totalconcept.se/method/pilot-buildings/>

PILOT BUILDINGS

[Home](#) / [About the method](#) / [Pilot buildings](#)

Read more about national projects by clicking on the respective country



Denmark



Estonia



Finland



Norway



Sweden

These can be used as exercise cases / work shop themes / also own cases for training purposes.



EUROPEAN
REGIONAL
DEVELOPMENT
FUND



EFFECT4buildings

Any questions & comments?

Thank you!

Homepage: <https://www.effect4buildings.se/>