Guideline for Bundling

EFFECT4buildings Toolbox:

Bundling; Annex 1

The project “Effective Financing Tools for implementing Energy Efficiency in Buildings” (EFFECT4buildings) develops in collaboration with public building managers a comprehensive decision-making support toolbox with a set of financial instruments: **Financial calculation tools**; **Bundling**; **Funding**; **Convincing decision makers**; **Energy Performance Contract**; **Multi Service Contract**; **Green Lease Contract**; **Prosumerism**. The tools and instruments chosen by the project has the biggest potential to help building managers to overcome financial barriers, based on nearly 40 interviews with the target group. The project improves these tools through different real cases.

To make sure building managers invest in the best available solutions, more knowledge on different possibilities is needed as well as confirmation from colleagues that the solutions performs well. EFFECT4buildings mapped **technological solutions** for energy efficiency in buildings with the aim to share knowledge and experiences of energy efficiency solutions among building managers in the Baltic Sea Region.

This document includes general guidelines for bundling, Total Concept Method (TCM) and TotalTool.

Bundling is a smart way to merge several smaller investments by creating one bigger, more feasible and more attractive package. Bundling gives an option to invest on larger energy efficiency measures and make a deep renovation or retrofitting instead of one single activity. Bundling is a splendid option, when considering different possibilities how to accelerate and encourage the implementation of energy efficiency measures.

Total Concept Method and TotalTool provides a comprehensive way to create a profitable action plan comprising a package of energy efficiency improvement measures, which fulfils the property owner’s profitability requirements. The profitability assessment in TCM is based on internal rate of return method.

Partners

EFFECT4buildings project is implemented with the support from the EU funding Programme Interreg Baltic Sea Region (European Regional Development Fund) and Norwegian national funding. The aim of the project is to improve the capacity of public building managers in the Baltic Sea Region by providing them a comprehensive decision-making support toolbox with a set of financial instruments to unlock the investments and lower the risks of implementing energy efficiency measures in buildings owned by public stakeholders. More information: http://www.effect4buildings.se/

Bundling

General

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.

Total Concept Method helps building owners and other relevant stakeholders to understand the financial benefits and opportunities with energy retrofitting and making it possible to come much further with energy improvements. The results provided by TCM & TotalTool can be utilized and attached to energy audit reporting templates for testing and evaluating optional action packages. The bundling tools can provide benefits from presenting proposed activities also in this way and method could be used as future standard to present bundled measures in all energy audits.

As a whole Total Concept offers a method and a smart tool that can provide the information required by establishing an informed platform for decisions about investments in energy-saving measures.

To whom is it for

Bundling / TCM / TotalTool is for persons:

- who are planning energy efficiency investments
- who are trying to find optional methods to implement energy efficiency investments
- who are trying to calculate and compare the profitability of different measures
- who should be able to present and prepare plans
- who should be able to clarify and justify further questions regarding energy efficiency investments

For example, following stakeholders can be identified to utilize results provided by bundling / TCM / TotalTool:

- building owners & administrators
- building managers & maintenance personnel
- decision makers
- technical and financial advisors
- energy efficiency consultants
- design engineers and architects
- all companies and developers operating in energy efficiency sector
- public authorities operating with the political, legal and financial frameworks for energy saving achievements

Total Concept Method

General

Following preparations shall be considered before starting the TCM process

- 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.

Also shall be clarified the minimum requirement, which shall be fulfilled in the building before any study of possible energy saving measures. The energy usage baseline is needed to be defined correctly. The baseline may vary due to different legal regulations.

The work process of the Total Concept Method consist of following three steps:

Step 1: Creating the action package, including following details:

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

Measuring energy usage

Checking profitability results

Scorecard templates

When implementing these steps, following scorecard templates can be utilized to proceed in correct structural way. Below the main headings of scorecard 1 are presented. Comprehensive scorecard templates can be found as attached files in the end of this document.

Property name:	Total Concept method
Property owner:	Step 1. Creating the action package
Consultants:	

Building and its use

Year built:

Area:

Type of building:

Indoor climate

The status of the building and its technical systems before measures

Building envelope

Ventilation

Heating

Cooling

Lightning

Equipment

Water supply and warm water

Control and monitoring system(s)

Energy and resource use before measures

Consumption measured in

Baseline of energy consumption in step 1

Identified energy saving measures

Summary of the measures in the action package

Measure (number)	**Measure (Name)**	**Invesment Cost/** keuro	**Cost saving** keuro/year	**Energy saving** MWh/year

(Example table) *+ Internal rate of return- diagram from Total tool*

Results

Provide here the conclusions from the project, carrying out Step 1 of the Total Concept method.

TotalTool

Where to find the Tool and how to use it

The practical profitability calculations shall be provided with TotalTool. All the results and outcomes are illustrated in a simple-to-understand way for the decision makers, by using an internal rate of return diagram. The decision maker and other relevant stakeholders can see what impact each measure has in the overall profitability and supports the decision to carry out a package of measures instead of single profitable measures.

TotalTool can be found and uploaded here: http://www.belok.se/totaltool_2_setup.exe

Observe! Before uploading an access given by your security organization is needed.

Before starting to use TotalTool some important preparation shall be conducted

- 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.

Short review of most relevant steps, when using and operating with TotalTool

From the drop down menu Start you can

- start a new project
- open previously saved files
- save your files
- by choosing Import/Export you can also transfer data to/from the program
- edit national settings (=language)

Number of planned measures of action package is needed and this value is editable. It is always able to add or remove measures later. Furthermore profitability requirements (like IRR requirement), energy price including price increases and economic calculation period are needed as basic data. Details of the building under renovation shall also be given (area m^2, energy/power use/demand before the measures, relevant other operating costs). All planned individual measures need some basic details, like economic calculation period and required investment, planned energy savings.

By feeding all required data TotalTool will provide the action package calculation and shown on the results diagrams. Provided charts present

a) total annual operating costs

b) annual energy use

c) estimated property value

before the action package and after the action package. The results are given for two different cases:

- results with the action package that fulfills the profitability demand of the property owner
- results with all measures that are selected as “Enable”

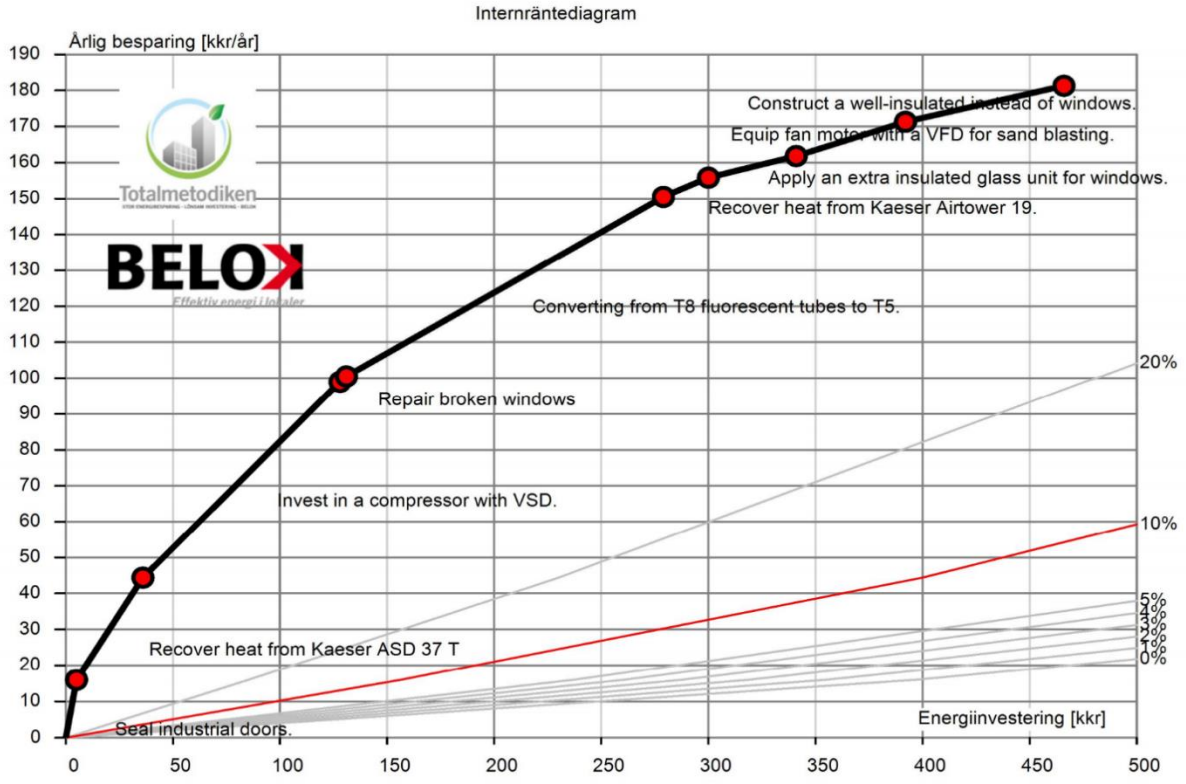
Testing the TotalTool for energy audits

The TotalTool has been tested for presenting proposed energy measured in energy audits.

Measures are normally presented in a list. Even if there is financial calculations for all measures, it is not presented as a whole investment package. The risk is obvious that the single investments that looks most interesting are chosen, not implementing the rest.

Process	Measure	Savings [kWh/year]	Savings [€/year]	Investment cost [€]	Payback time [year]	Net present value [€]	Internal rate of return
Building	Building 6: Apply an extra insulated glass unit on specified windows and decrease the transmission losses.	14 800$_{n.gas}$	550	4 000	7,3	1 000	11 %
Building	Building 7: Construct a well-insulated wall that replaces specified windows and decrease the transmission losses.	26 800$_{n.gas}$	990	7 200	7,3	3 000	12 %
Building	Building 7: Repair broken window and decrease the transmission losses.	3 500$_{n.gas}$	130	260	2,0	1 000	50 %
Building	Seal industrial doors in Building 2 and 7.	42 000$_{n.gas}$	1 550	500	0,3	10 000	310 %
Lighting	Converting from T8 fluorescent tubes to T5 in production areas, building 3 and 12.	51 400$_{el}$	4 900	14 410	2,9	18 000	32 %
Lighting	Converting from T8 fluorescent tubes to LED tubes and ECO/ES in specified premises.	42 200$_{el}$	4 250	15 560	3,7	13 000	24 %
Ventilation	Sand blasting: equip fan motor with a variable frequency drive, VFD.	25 000$_{el}$	2 200	5 000	2,3	10 000	43 %
Compressed air	Invest and install a compressor with variable speed and use this as the main compressor.	60 000$_{el}$	5 300	8 900	1,7	27 000	59 %
Compressed air	Kaeser ASD 37 T: recover heat to building 3 and fix current air transportation.	1 500$_{el}$ 70 000$_{n.gas}$	2 700	3 000	1,1	15 000	90 %
Compressed air	Kaeser Airtower 19: recover heat to building 12 and replace filter more regularly.	14 000$_{n.gas}$	550	2 000	3,6	2 000	24 %
Production	Furnaces, building 12: Keep gas-fired furnaces instead of switching to electricity. Recover heat from the furnaces through a heat exchanger, without transferring CO_2 to premises where people work.	Not quant.	----	Not quant.	----	----	----

When measures also are presented as a whole investment package, the risk of "cherry-picking" is reduced. The TotalTool presentation shows how many of the measures that can be included in a package and still keep internal rate above required threshold. In this example, the investment package of all measures are well over an internal rate of return of 20 %. But the last investments, in the upper right, are not very profitable alone. So bundling the investments into a larger package makes more investments profitable and possible to implement.


Internräntediagram
Årlig besparing [kkr/år]
Totalmetodiken
BELOK
Effektiv energi i lokaler
Construct a well-insulated instead of windows.
Equip fan motor with a VFD for sand blasting.
Apply an extra insulated glass unit for windows.
Recover heat from Kaeser Airtower 19.
Converting from T8 fluorescent tubes to T5.
Repair broken windows
Invest in a compressor with VSD.
Recover heat from Kaeser ASD 37 T
Seal industrial doors.
20%
10%
5%
4%
3%
2%
1%
0%
Energiinvestering [kkr]
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
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50
100
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200
250
300
350
400
450
500

Useful additional information

Annexes

More additional information available from **external Total Concept Method web-pages:**

More information of Total concept method

Download the profitability calculation tool / TotalTool

TotalTool toolkits are available in several languages, includes also Guidebook of 136 pages

Total Concept pilot buildings and references from several countries

Scorecard template step 1, example pilot building Tampere talo

Scorecard template step 2-3, example pilot building Tampere talo

Youtube provides valuable video presentations of TCM & TotalTool principles and advantages:

- Video_1 / Total Concept Method_Main
- Video_2 / Total Concept Method
- Video_3 / Total Concept – Pawel Ramboll
- Video_4 / Totalprojekt Film 1 Analys och besked
- Video_5 / Totalprojekt Film 2 Genomförande
- Video_6 / Totalprojekt Film 3 Reslutat


For SALE