



## Note for the trainer (1/2)

- This training can be carried out 'Live' or as a trainer-led online training event. For online training the following tools could be used: [Mentimeter](#), [Slido](#), [Padlet](#), [Jamboard](#), (collaborative digital whiteboard).
- The training should be **interactive** – with the aim that participants will actively contribute and learn both from you and each others' experience. Interactive elements are marked with the symbol at the right.
- Some slides contain notes with additional explanation and/or extra material to read. The *Instructions to trainer* contain guidance and tips for using the slide.
- You can decide to hide/add slides to fit your presentation and adapt to the context.
- You will find all information about the training in the **Training Unit Information** (duration, target group, goal, etc).





## Note for the trainer (2/2)

- This unit will be of interest not only to Trusted Partners, but also to energy auditors, energy experts, and local energy advisors.
- Do not forget to fill out the **Template Monitoring Training** and to **ask participants for feedback** with the prepared form (included in the document Template Monitoring Training).
- Ideally, participants prepare for this unit with the exercise below.

Before giving this training, ask the participants to think about the following two questions. It will serve as a discussion starting point for the unit:

- examples of Energy Efficiency measures that have been implemented by companies, think of the main arguments why the investment decision was successful
- and other Energy Efficiency measures that failed to be implemented, think of the main reasons.



## Note for the trainer – glossary of terms

EE	Energy Efficiency
TP	Trusted Partner
ESS	Energy Service Supplier
MB	Multiple Benefits
NEB	Non-Energy Benefit
EEM	Energy Efficiency Measure



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# Multiple Benefits

## Unit II How to integrate Multiple Benefits in the company's strategy

Date

Organisers



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**TNO** innovation  
for life

**INDUSTRIELL  
ENERGI**

**certimac**  
certificazione materiali per costruzioni  
ENB GCH



**SERVELECT**  
Energy is money! We save both.



**SYNYO**

MINISTRY OF EDUCATION  
**TECHNICAL UNIVERSITY**  
OF CLUJ-NAPOCA, ROMANIA

**CNA**  
Teritoriale  
di Ravenna

**CLOK**  
Lokaal krachtig  
ondernemen



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# Who are we?

Insert your own  
picture and  
contact info





# Content

## Unit I

Introduction to Multiple Benefits



## Unit II

How to integrate MB in the company's strategy

## Goals of unit II

- You find arguments to link Energy Efficiency measures to the core business of a company
- You know the three parameters of a strategic investment
- You understand how to gather Non-Energy Benefits at process and company level
- You can apply the strategic analysis to concrete examples
- You know the different financial indicators and their limits



# Key elements Unit I





## Definition of Multiple Benefits

Energy Benefits: energy and energy cost savings



Non-Energy Benefits (NEBs): Any kind of **positive environmental, economic or social effects** on all business areas of a company that can occur in addition to the energy benefits  
= other beneficial effects



## Take-aways

- An Energy Efficiency Measure can often have additional positive effects on the production, the operation & maintenance, the work environment or the environment or on the brand image.
- The Non-Energy Benefits (NEBs) are often overlooked in decision process.
- NEBs can be used to get internal support to implement an EEM (well-targeted communication)
- Some NEBs are easy to quantify/monetize whereas others are almost impossible
- Non-monetizable NEBs can contribute to a positive decision in the investment process



# Unit II: How to integrate MB in the company's strategy?



## Discussion

Give an example of Energy Efficiency measure that has been implemented by a company, think of the main arguments why the investment decision was successful

Give an example of an Energy Efficiency measure that failed to be implemented, think of the main reasons



## Problem

- The 'kWh approach' is not sufficient. Process and strategic considerations need to be taken into account for EEM to be prioritized
- Energy people and process/production people, but also top-management people, are not speaking the 'same language'



# Multiple Benefits approach





# Steps to the Multiple Benefits analysis

Identify advantages at:





## 1. Identify MB at EEM level

- ✓ directly linked to the EEM
  - Energy, costs and CO<sub>2</sub> reduction
  - maintenance reduction

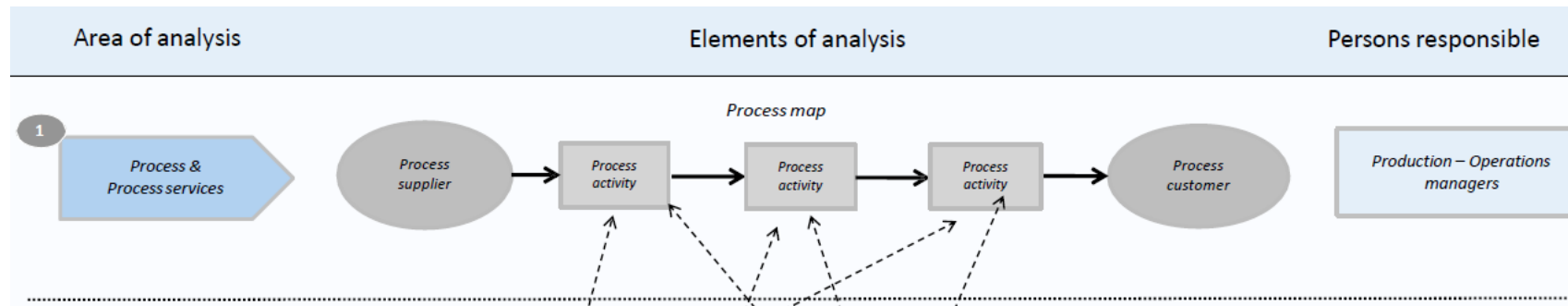
Generally from the **energy audit** (energy people)





## 2. Identify MB at process level

- ✓ **Process people** realize a **process mapping** of the operations





## 2. Identify MB at process level

- ✓ Analyse the source of its **operational effectiveness** (safety, quality, cost, time-to-market)
- ✓ Analyse of **critical-to-quality parameters (CTQ)**



# Operational excellence indicators

## Safety

- number of accidents per year
- number of days of absence per year
- perception of safety by the staff (annual survey)
- percentage of employees trained in good practices

## Quality

- Downtime per day
- Percentage of products conforming to specifications
- Percentage of raw material losses
- Throughput (quantity per unit time)

## Cost

- costs of raw materials per month/year
- costs of raw materials losses per month/year
- cost of energy, gas, water per month/year
- cost of additional hour of line operators

## Time-to-market

- preparation time per day
- production time per day
- machine downtime per day
- number of delivery problems per year
- number of new products developed per year



## 2. Identify MB at process level

- ✓ Focus on **energy services** instead of machines and energy carriers
  - lighting, ventilation, air conditioning, cooling & refrigeration, heating, hot water, automated processing of information & communication, motive power (engines)

It bridges the gap between **process people and energy people**

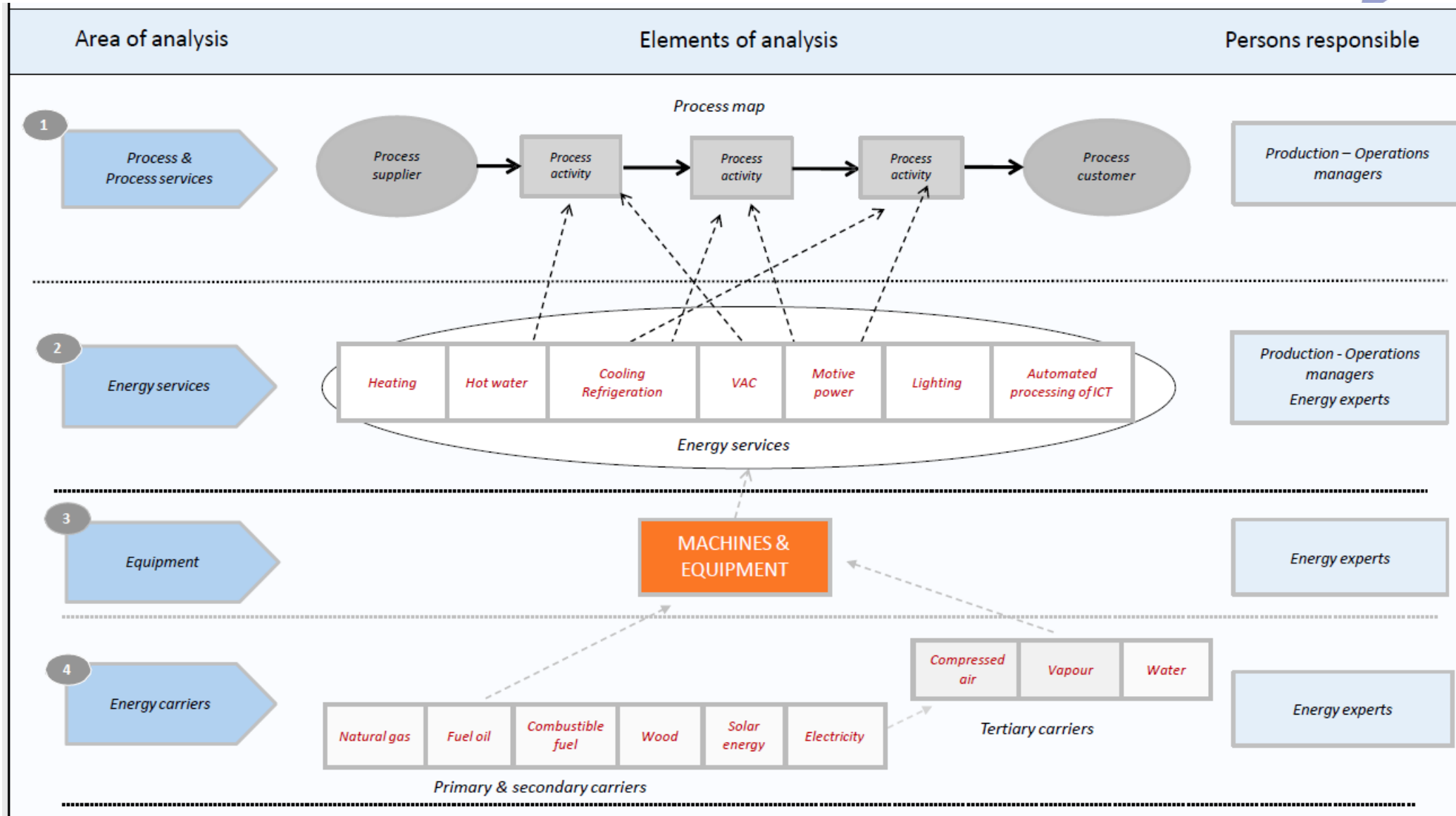
Identify advantages at EEM level

Identify advantages at production level

Identify advantages at company level



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Source: Part of the presentation from U.S DOE, Quantifying the Additional Benefits from Energy Efficiency, 12.01.2020 (Cooremans)



## 2. Identify MB at process level

When focusing on **energy services**, energy people and process people should look for:

- Key energy services (risks, constraints?)
- How to improve energy services quality and reliability
- Machines and equipment producing these energy services
- Identify EEMs that contribute to quality and reliability of energy services and reduce the energy consumption of machines and equipment **at the same time**



### 3. Identify MB at company level

- ✓ Categorize MB in strategic terms

Investment (and EEM) will be seen as strategic if it contributes to the **competitive advantage** of the company

based on three parameters:

- Value proposition
- Cost
- Risk

Identify  
advantages at  
EEM level

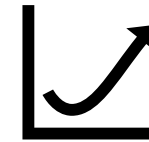
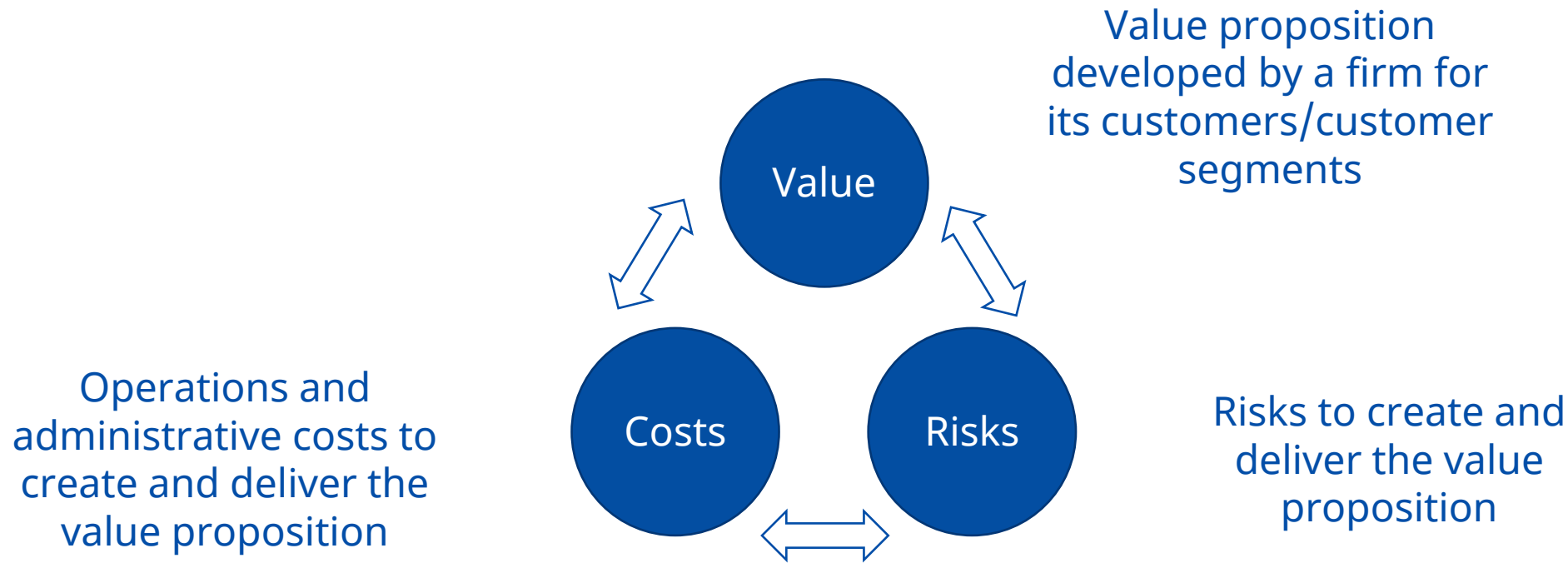
Identify  
advantages at  
production  
level

Identify  
advantages at  
company level



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### 3. Identify MB at company level



Source: Cooremans (2011)





### 3. Identify MB at company level

Example of Value Proposition:

- ✓ Supermarket chain: Provide a great shopping experience that meets consumers' changing needs and builds loyalty
- ✓ Furniture maker: High-quality, custom-made furniture

## Example 1: Industrial bakery



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### Link between Energy Efficiency measure and competitive advantage



Source: [www.fortisa.ch](http://www.fortisa.ch)

Quality is top priority  
Always developing new products  
Production runs 24 hours a day, seven days a week, in shifts. More than 30.000 rolls per hour.  
Every product meets its specifications exactly.



# Link between Energy Efficiency measure and competitive advantage

## EEM (from the energy audit)

- Replacement of the bake ovens
- Lighting improvement
- Hot water usage
- Insulation of pipes
- Recalibration of thermostat

Would save 6,5% of the energy bill



# Link between Energy Efficiency measure and competitive advantage

## EEM (from the energy audit)

- Replacement of the bake ovens → better heating quality of the new ovens
- Lighting improvement → shorter preheating time of the ovens
- Hot water usage → better oven and pipe insulation
- Insulation of pipes
- Recalibration of thermostat



## Example 1: Industrial bakery

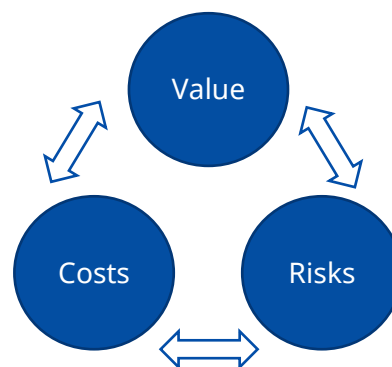


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### Find how the EEMs contribute to the competitive advantage

#### EEM (from the energy audit)

- Replacement of the bake ovens → better heating quality of the new ovens
- Lighting improvement → shorter preheating time of the ovens
- Hot water usage → better oven and pipe insulation
- Insulation of pipes
- Recalibration of thermostat



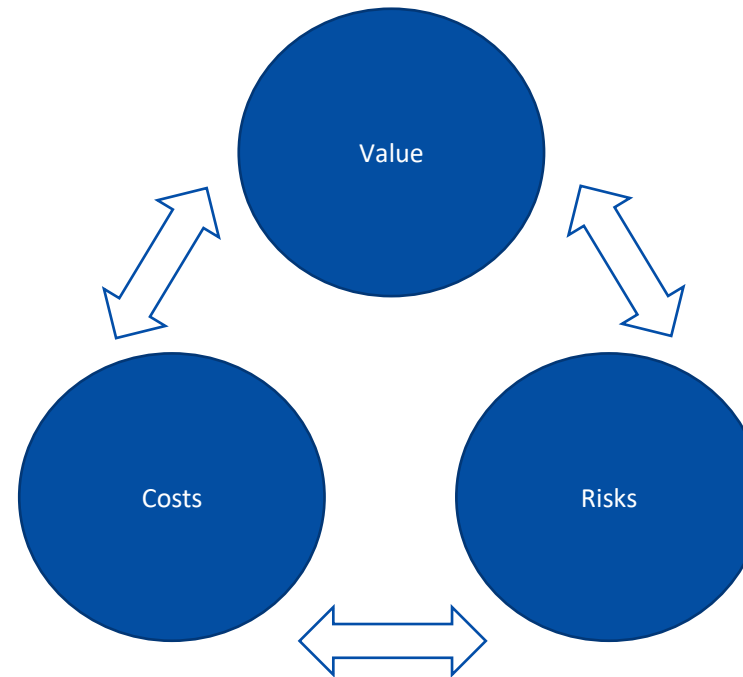
## Example 1: Industrial bakery



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### Find out how the EEMs contribute to the competitive advantage

- Increased workforce productivity (thanks to increased comfort)
- Reduced production time (thanks to reduced oven preheating time)
- Reduced product loss (thanks to better heating quality of the oven)
- Reduced insurance premiums
- Reduces CO<sub>2</sub> costs
- Reduced maintenance costs
- Reduced energy costs



- Improved product quality
- Improved product reliability

- Reduced workplace accident risk
- Reduced commercial risk
- Reduce carbon risk
- Reduce equipment breakdown

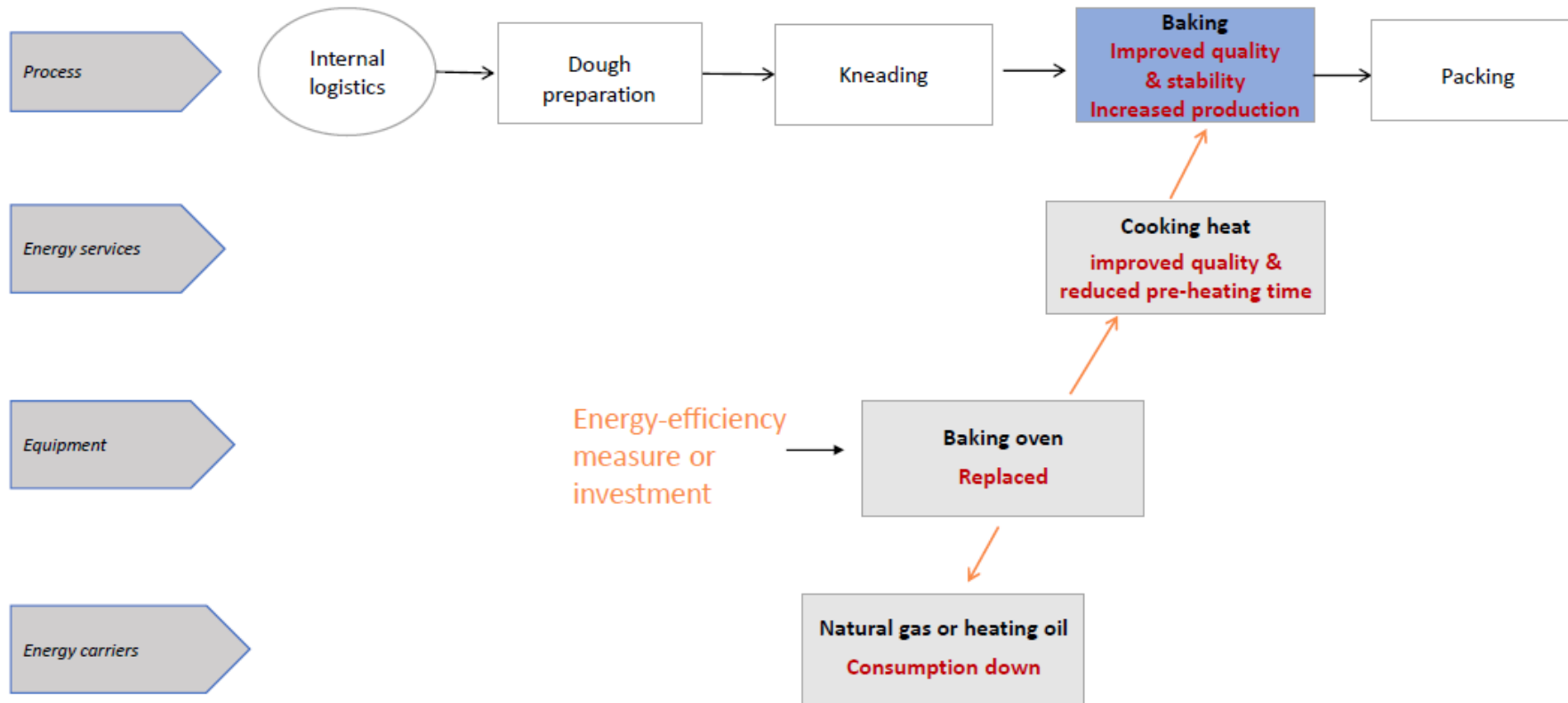
# Example 1: Industrial bakery



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## Example: replacement of baking ovens in an industrial bakery

Step 2 – Energy & operations analysis





# Examples





# New batteries with modern chargers to save time, reduce cost at warehouse operation

## Impacts on operations

### Security

- Better management of batteries for pallet trucks
- Optimize operation of warehouse (space savings).

### Quality

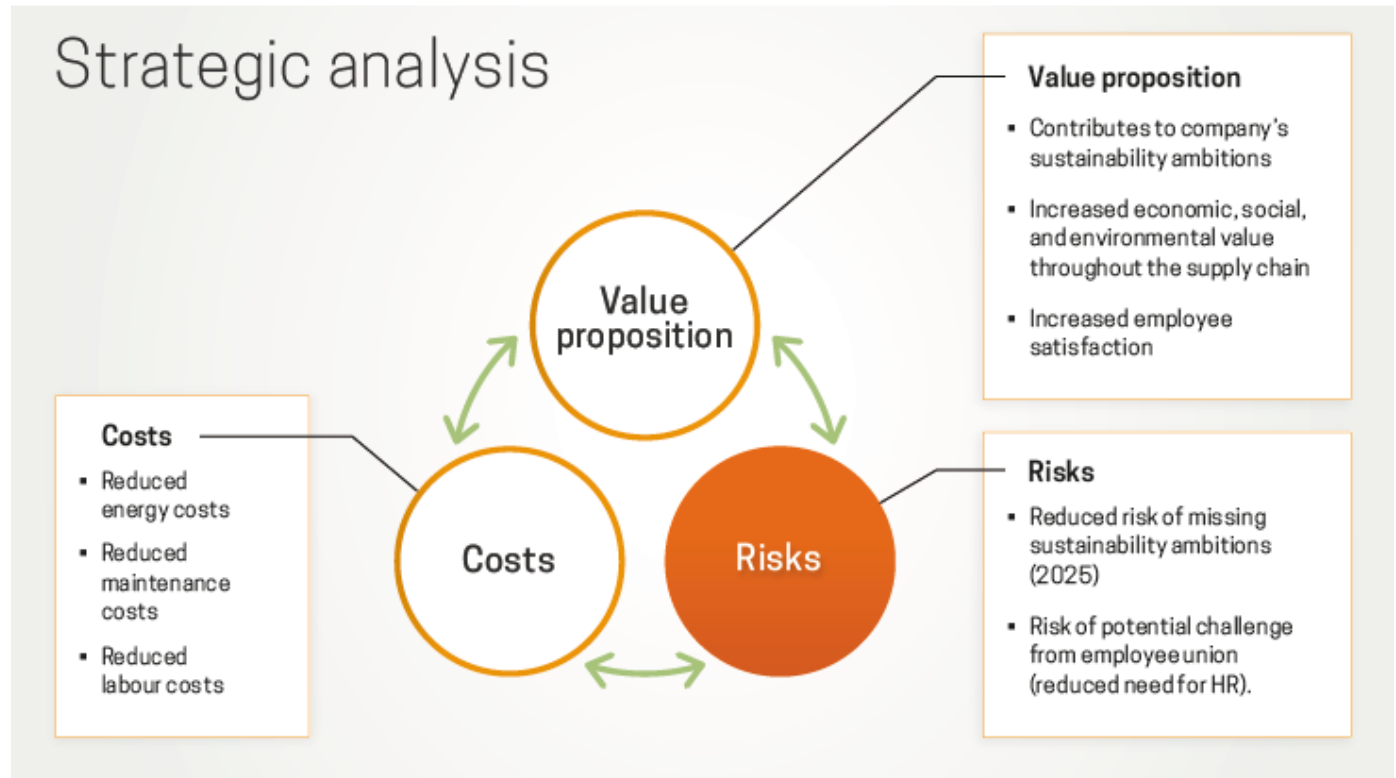
- Improve life cycle of batteries.

### Impact on costs

- Reduction of energy and maintenance costs

### Impact on time

- Improved time management during charging and due to
- Employee scheduling



Source: Case Study Mbenefits, <https://www.mbenefits.eu/news-resources/library/>

## Example #2

# Rooftop solar, heat exchanger to deliver on Supermarket chain's sustainability ambitions

## Impacts on operations

### Security

- Reduction of energy demand

### Quality

- Better quality of energy services

### Impact on costs

- Reduction of energy and maintenance costs

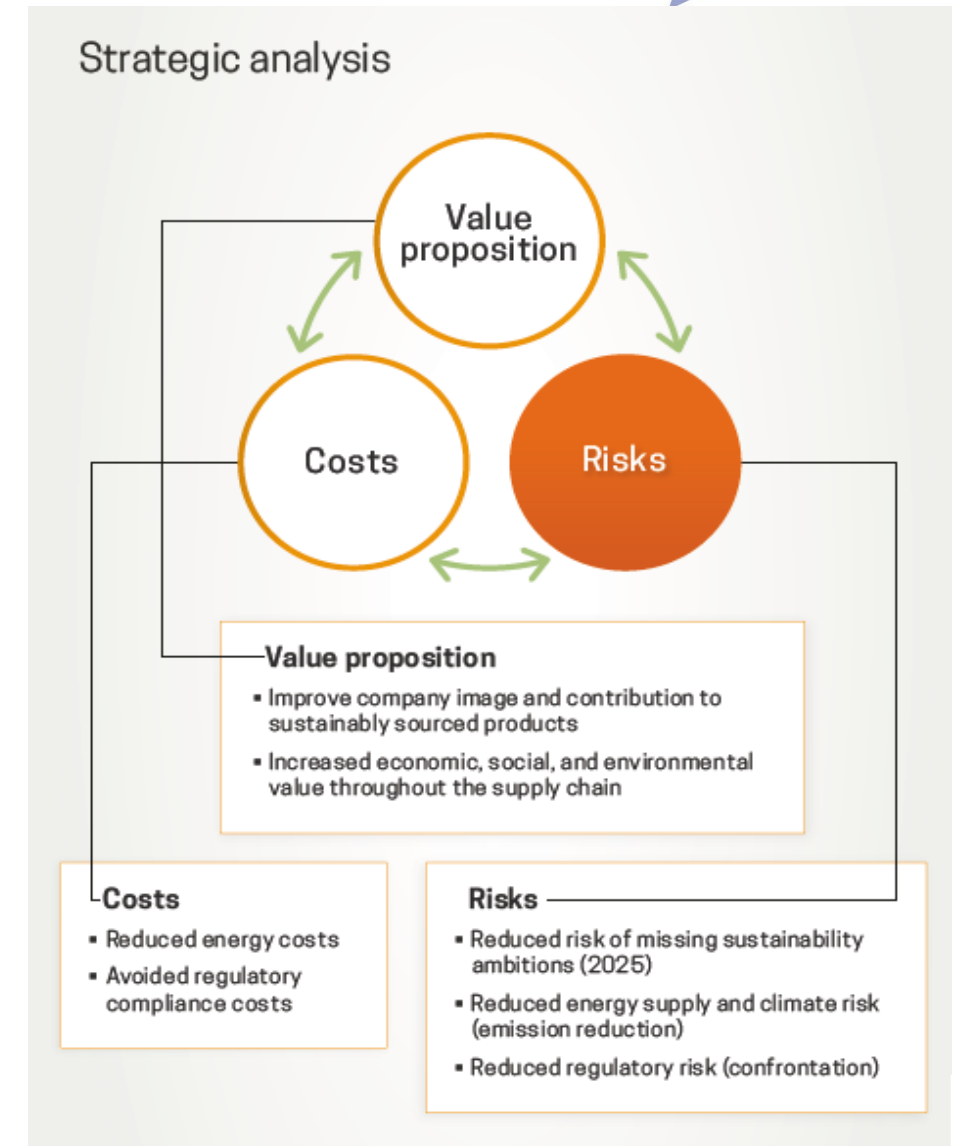
### Impact on time

- Not impacted

24/05/2022



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Source: Case Study Mbenefits, <https://www.mbenefits.eu/news-resources/library>,



# Financial background

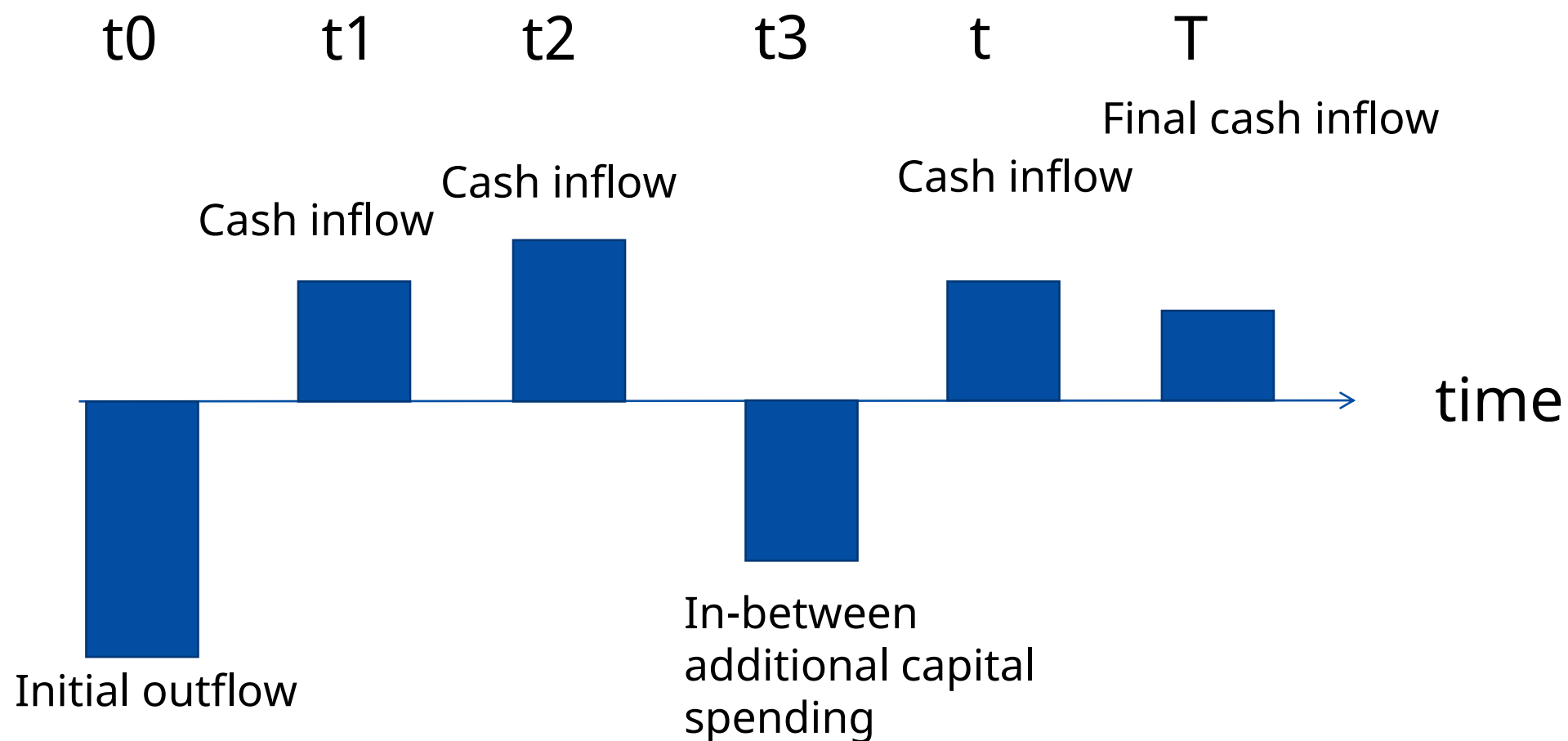


## Parameter for investments

1. Duration
2. Initial capital expenditure, also CAPEX in  $t=0$
3. Expected cashflows (from  $t=1$  to  $t=T$ )
4. Additional capital spending (from  $t=1$  to  $t=T$ )
5. Terminal value ( $t=T$ )



## Cashflows of an investment





# Time value of money

Compound interest

$$1.000 \times 1,07$$

$$\text{Discount factor } (DF) = \frac{1}{(1 + r)^t}$$

r = discount rate

t = investment duration in years

$$DF = 1 / (1 + 0,07)^1$$

Present

1.000

Future

1.070

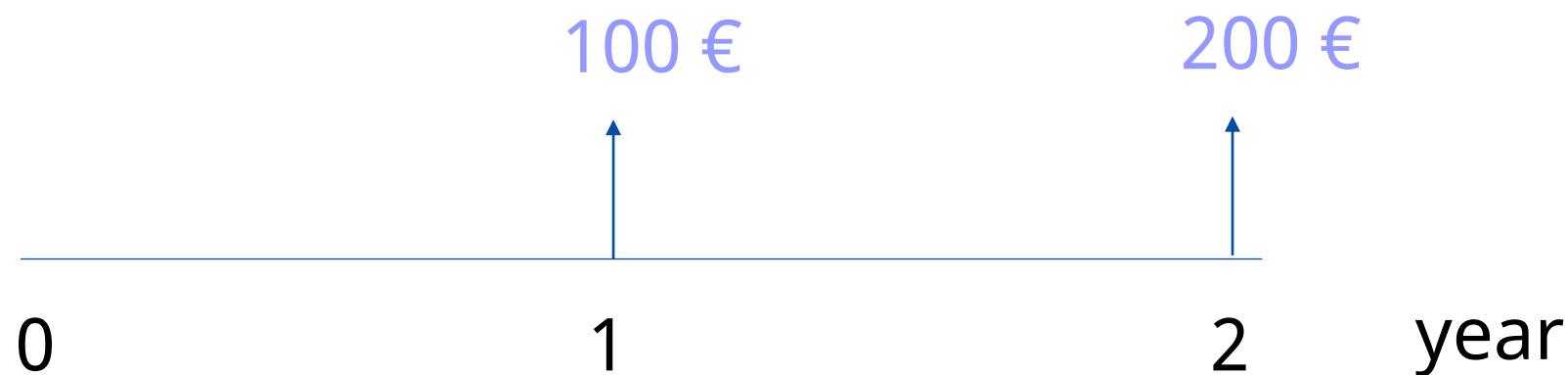
x Discount factor

$$1.070 / 1,07$$

Interest of 7% (present to the future) or  
discount rate (future to the present of 7%  
during one year)



## Example of present value with a discount rate of 7%



Present value

$$100 / 1,07$$

$$200 / 1,07^2$$

$$= 93,46 \text{ €}$$

$$= 172,42 \text{ €}$$

Total

$$= 265,88 \text{ €}$$



## Financial evaluation method

1. Return of investment (ROI)
2. Payback method (PP)
3. Net present value (NPV) – dynamic
  - a) Discount rate
  - b) Duration of investment
4. Internal rate of return (IRR) - dynamic

$$ROI = \frac{\text{Total profit}}{\text{Invested capital}} \times 100\%$$

$$PP = \frac{\text{Invested capital}}{\text{Net cash-flows}}$$





# How to evaluate Non-Energy Benefits?



## Example of indicator



	Measure evaluated by ?
Reduced malfunction or breakdown of machinery and equipment	
Increased production volume	
Improved product quality	
Reduced hazardous waste	
Reduced maintenance cost	



## Example of indicator

	Measure evaluated by
Reduced malfunction or breakdown of machinery and equipment	Number of malfunction or breakdown
Increased production volume	Increased annual quantity x unit price
Improved product quality	Reduction of material costs due to reduced rejects Number of complaints Number of returns
Reduced hazardous waste	Disposal costs
Reduced maintenance cost	Wages x reduced maintenance hours

Source: Multiple Benefits Webinar 1: Einführung und Überblick in die Mehrfachnutzen-Analyse



# Quantifiability of NEBs

High	Increased production, Reduced operating time, Improved equipment performance, Shorter process cycle times, Reduced operational costs, Reduced amount of raw material	Reduced labour costs, reduced maintenance costs, reduced wear and tear on equipment and machinery, extended life of equipment, reduced scrap/rework costs, improved reliability
medium	Productivity gains, improved efficiency, improved product quality, increased capacity, improved capacity utilisation, improved temperature control, lowered cooling requirements	Reduced waste and waste costs, reduced emissions, reduced costs of environmental compliance, reduced need for engineering controls delaying or reducing capital expenditures, decreased liability, increased asset values, improved process control
Low	Improved worker safety, improved work environment, decreased noise, improved lighting, additional space, reduced need for personal protective equipment, improved air quality	Improved public image, increased job satisfaction, improved worker morale, competitive advantage, improved customer satisfaction, reduced risks (legal, energy price, energy supply, commercial), health benefits
	Short term	Long term
	Time	

Source: Rasmussen, J (2014). 'Energy-efficiency investments and the concepts of Non-Energy Benefits and investment behaviour'



# Introduction to the GEAR@SME - Business Case Tool

## Multiple (non-energy) benefits

### Indicate

Select benefits that can be expected as a result of implementing the energy efficiency measure

	Alt A	Alt B	
	0	0	Description/specification
<b>Production</b>			
Increased production	<input type="checkbox"/>	<input type="checkbox"/>	
Higher productivity	<input type="checkbox"/>	<input type="checkbox"/>	
Improved equipment performance	<input type="checkbox"/>	<input type="checkbox"/>	
More reliable production	<input type="checkbox"/>	<input type="checkbox"/>	
Better and/or more consistent product quality	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced scrap/rework costs	<input type="checkbox"/>	<input type="checkbox"/>	
Improved capacity utilisation	<input type="checkbox"/>	<input type="checkbox"/>	
Lower product losses / Increased yield	<input type="checkbox"/>	<input type="checkbox"/>	
Shorter processing cycles	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Operation and maintenance</b>			
Lower maintenance needs	<input type="checkbox"/>	<input type="checkbox"/>	
Easier system operation	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced wear and tear on equipment/machinery	<input type="checkbox"/>	<input type="checkbox"/>	
Extended life of equipment	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced cleaning requirements	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced downtime	<input type="checkbox"/>	<input type="checkbox"/>	
Greater control of equipment and temperatures	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced need for engineering controls	<input type="checkbox"/>	<input type="checkbox"/>	
Reductions in labour requirements	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced consumption of utilities/ancillaries	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced back-up requirements	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Work environment</b>			
Better worker safety	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced noise	<input type="checkbox"/>	<input type="checkbox"/>	
Better lighting	<input type="checkbox"/>	<input type="checkbox"/>	
Greater comfort	<input type="checkbox"/>	<input type="checkbox"/>	
Better air quality	<input type="checkbox"/>	<input type="checkbox"/>	

Note that the columns below show examples only, and other indicators may be more relevant for a specific energy efficiency measure or company.

#### Quantify

Examples of indicators, whose expected improvement may be possible to estimate to quantify the benefit

#### Monetize

Examples of economic parameters, which may be known or estimated, that can be used to calculate an economic value for the benefit

units produced	profit per unit produced
units produced per unit of input	revenue per unit sold
share of output that fulfills default specifications	
number of production disruptions, or downtime	cost of production disruption, lost production revenues
number of complaints/returns, share of on-spec. product	
amount of scrap	cost of rework/disposal
utilisation rate/throughput	
losses or yield	revenue per unit sold
number of cycles per day or week	profit per processing cycle
maintenance requirement (personnel man-hours/materi cost of maintenance	
man-hours required for a procedure	
maintenance requirement (personnel man-hours/materi cost of maintenance	
economic lifetime	annulized equipment cost
time needed for cleaning / time interval between cleaning	cost of cleaning
downtime	lost production revenue per hour downtime
share of on-spec. product, measured variations	
number of man-hours needed	salary cost
use of e.g. water, cooling chemicals, facilities needed	cost of utility production
pieces of back-up equipment needed	
days of sick leave, number of accidents	rehabilitation costs, sick leave costs
noice volume, time of exposure	
indoor temperature, humidity etc	
concentration of carbon dioxide, particles, etc	



# Introduction to the GEAR@SME - Business Tool Case

## Help to quantify

### Multiple (non-energy) benefits

#### Indicate

Select benefits that can be expected as a result of implementing the energy efficiency measure

	Alt A	Alt B	
	0	0	Description/specification
<b>Production</b>			
Increased production	<input type="checkbox"/>	<input type="checkbox"/>	
Higher productivity	<input type="checkbox"/>	<input type="checkbox"/>	
Improved equipment performance	<input type="checkbox"/>	<input type="checkbox"/>	
More reliable production	<input type="checkbox"/>	<input type="checkbox"/>	
Better and/or more consistent product quality	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced scrap/rework costs	<input type="checkbox"/>	<input type="checkbox"/>	
Improved capacity utilisation	<input type="checkbox"/>	<input type="checkbox"/>	
Lower product losses / Increased yield	<input type="checkbox"/>	<input type="checkbox"/>	
Shorter processing cycles	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Operation and maintenance</b>			
Lower maintenance needs	<input type="checkbox"/>	<input type="checkbox"/>	
Easier system operation	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced wear and tear on equipment/machinery	<input type="checkbox"/>	<input type="checkbox"/>	
Extended life of equipment	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced cleaning requirements	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced downtime	<input type="checkbox"/>	<input type="checkbox"/>	
Greater control of equipment and temperatures	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced need for engineering controls	<input type="checkbox"/>	<input type="checkbox"/>	
Reductions in labour requirements	<input type="checkbox"/>	<input type="checkbox"/>	
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<b>Work environment</b>			
Better worker safety	<input type="checkbox"/>	<input type="checkbox"/>	
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Better lighting	<input type="checkbox"/>	<input type="checkbox"/>	
Greater comfort	<input type="checkbox"/>	<input type="checkbox"/>	
Better air quality	<input type="checkbox"/>	<input type="checkbox"/>	

Note that the columns below show examples only, and other indicators may be more relevant for a specific energy efficiency measure or company.

#### Quantify

Examples of indicators, whose expected improvement may be possible to estimate to quantify the benefit

units produced  
units produced per unit of input  
share of output that fulfills default specifications  
number of production disruptions, or downtime  
number of complaints/returns, share of on-spec, product  
amount of scrap  
utilisation rate/throughput  
losses or yield  
number of cycles per day or week

#### Monetize

Examples of economic parameters, which may be known or estimated, that can be used to calculate an economic value for the benefit

profit per unit produced  
revenue per unit sold  
cost of production disruption, lost production revenues  
cost of rework/disposal  
revenue per unit sold  
profit per processing cycle

maintenance requirement (personnel man-hours/maintenance cost of maintenance  
man-hours required for a procedure  
maintenance requirement (personnel man-hours/maintenance cost of maintenance  
economic lifetime  
time needed for cleaning / time interval between cleaning  
downtime  
share of on-spec, product, measured variations

number of man-hours needed  
use of e.g. water, cooling chemicals, facilities needed  
pieces of back-up equipment needed

days of sick leave, number of accidents  
noise volume, time of exposure

indoor temperature, humidity etc  
concentration of carbon dioxide, particles, etc

rehabilitation costs, sick leave costs



# Introduction to the GEAR@SME - Business Tool Case

## Help to monetize

### Multiple (non-energy) benefits

#### Indicate

Select benefits that can be expected as a result of implementing the energy efficiency measure

	Alt A	Alt B	
	0	0	Description/specification
<b>Production</b>			
Increased production	<input type="checkbox"/>	<input type="checkbox"/>	
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Improved equipment performance	<input type="checkbox"/>	<input type="checkbox"/>	
More reliable production	<input type="checkbox"/>	<input type="checkbox"/>	
Better and/or more consistent product quality	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced scrap/rework costs	<input type="checkbox"/>	<input type="checkbox"/>	
Improved capacity utilisation	<input type="checkbox"/>	<input type="checkbox"/>	
Lower product losses / Increased yield	<input type="checkbox"/>	<input type="checkbox"/>	
Shorter processing cycles	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Operation and maintenance</b>			
Lower maintenance needs	<input type="checkbox"/>	<input type="checkbox"/>	
Easier system operation	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced wear and tear on equipment/machinery	<input type="checkbox"/>	<input type="checkbox"/>	
Extended life of equipment	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced cleaning requirements	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced downtime	<input type="checkbox"/>	<input type="checkbox"/>	
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Reduced consumption of utilities/ancillaries	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced back-up requirements	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Work environment</b>			
Better worker safety	<input type="checkbox"/>	<input type="checkbox"/>	
Reduced noise	<input type="checkbox"/>	<input type="checkbox"/>	
Better lighting	<input type="checkbox"/>	<input type="checkbox"/>	
Greater comfort	<input type="checkbox"/>	<input type="checkbox"/>	
Better air quality	<input type="checkbox"/>	<input type="checkbox"/>	

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share of output that fulfills default specifications  
number of production disruptions, or downtime  
number of complaints/returns, share of on-spec. product  
amount of scrap  
utilisation rate/throughput  
losses or yield  
number of cycles per day or week

maintenance requirement (personnel man-hours/materials)  
man-hours required for a procedure  
maintenance requirement (personnel man-hours/materials)  
economic lifetime  
time needed for cleaning / time interval between cleaning  
downtime  
share of on-spec. product, measured variations

number of man-hours needed  
use of e.g. water, cooling chemicals, facilities needed  
pieces of back-up equipment needed

days of sick leave, number of accidents  
noise volume, time of exposure

indoor temperature, humidity etc  
concentration of carbon dioxide, particles, etc

#### Monetize

Examples of economic parameters, which may be known or estimated, that can be used to calculate an economic value for the benefit

profit per unit produced  
revenue per unit sold  
cost of production disruption, lost production revenues  
cost of rework/disposal  
revenue per unit sold  
profit per processing cycle

cost of maintenance  
cost of maintenance  
annualized equipment cost  
cost of cleaning  
lost production revenue per hour downtime

salary cost  
cost of utility production

rehabilitation costs, sick leave costs



# Examples



## Example #1



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# Rooftop solar, heat exchanger to deliver on Supermarket chain's sustainability ambitions

**Sector:** Retail  
(warehouse for grocery chain)  
**Size:** 230 employees  
**Location:** Greece  
**Measure:** Install rooftop PV system and heat exchanger  
**NEBs quantified:** increased economic, social and environmental value throughout the supply chain; avoided regulatory compliance costs; emissions reduction; reduced regulatory risk

**Investment duration** (NPV, IRR): 10 years

**CAPEX:** 797.538 € (Rooftop Solar PV)

	All benefits	Energy-only benefits
Net Present Value	291.408 €	18.314 €
Internal rate of return	17,0%	10,5%
Simple Payback	3,6 years	4,8 years

**CAPEX:** 58.828 € (Heat exchanger)

	All benefits	Energy-only benefits
Net Present Value	48.575 €	29.662 €
Internal rate of return	28,3%	21,6%
Simple Payback	2,8 years	3,1 years



# Complete renovation of an office building

**Sector:** Office building

**Size:** large company

**Location:** Switzerland

**Measure:** Complete renovation

**NEBs quantified:** better space use;  
maintenance cost reduction; CO<sub>2</sub>  
cost reduction; reduction of wear &  
tear of machinery and equipment;  
reduced cost of complaint  
management and adjustments;  
improved employee productivity

**Investment duration** (NPV, IRR): 15 years

**CAPEX:** 24.000.000 CHF (approx 22.700.000 €)

**Discount rate:** 8%

	All benefits	Energy-only benefits
Investment income before taxes	3.390.000 CHF	380.000 CHF
Net Present Value	4.840.000 CHF	-20.170.000 CHF
Internal rate of return	11,0%	-11,7%
Simple Payback	8 years	49 years



# Replacement of rectifiers

Rectifiers obsolete (> 35 years), low performance (50-60%), insufficient capacity which limits the number and size of pieces processed simultaneously, difficult and expensive to repair.

**Sector:** Surface treatment of metal pieces

**Size:** SME

**Location:** Switzerland

**Measure:** replacement of rectifiers (high performance)

**NEBs quantified:** reduced labour costs (fewer overtime hour, fewer pieces to re-make), reduced cooling water costs, less material waste, higher production capacity

**Investment duration** (NPV, IRR): 8 years

**Discount rate:** 6%

	All benefits	Energy-only benefits
Net Present Value	1.904.476 CHF	10.489 CHF
Internal rate of return	118%	6,9%
Simple Payback	0,85 years	6 years



# New batteries with modern chargers to save time, reduce cost at warehouse operation

**Sector:** Retail (warehouse for grocery chain)  
**Size:** 230 employees  
**Location:** Greece  
**Measure:** Deployment of Li-ion batteries and modern charging station  
**NEBsquantified:** reduced maintenance costs

**CAPEX:** 700.427 €

**Investment duration** (NPV, IRR): 10 years

	All benefits	Energy-only benefits
Net Present Value	340.011 €	11.864 €
Internal rate of return	20,4 %	10,4%
Simple Payback	5,8 years	9,9 years



## Barriers to the inclusion of MB in the evaluation of EEM

- Missing data
- Interdepartmental communication
- Average values difficult to determine
- Site-specific factors
- Time and ability
- Often negative risk assessment of MB
- Management and communication deficiency
- Negative impact possible



## Take-aways

- Analysing the process together with energy people and production people lead enables to identify EEMs linked to the core business
- An investment can be seen as strategic if it contributes to reduced costs, increased value creation and reduced risk
- NEBscan contribute to these three aspects and hence to the strategic value of an EE investment
- If an investment does not only provide (energy) cost reductions but can be seen as a strategic investment, it is more likely to be prioritized for implementation
- NEBsrelated to the operational excellence are easier to quantify



# Questions & Feedback



Gear@SME  
Saving energy together

# Thanks for your attention!

