

INTECUS GmbH

Waste Management and Environment-Integrating Management



Cleaner Production in Food Industry – Cleaner Production potentials related to energy

Durango, March 10th, 2011

Agenda

1. Reduced energy consumption by renewal of the compressed air system
2. Energy-efficient oven-technology in bakeries
3. Energy-optimized refrigeration
4. Energy-efficient cooling and heating
5. Resource-efficient production lowers material- and energy costs
6. Reduction of electricity costs
7. Heat recovery

1. Reduced energy consumption by renewal of the compressed air system

- generation of compressed air is an important energy consuming utility process
- energy costs are 60-80 % of the overall costs of compressed air generation
- against this background the prevention of leaks in the system has an important cost saving effect

Hole diameter [mm]	Effluent amount of pressured air at 6 bar [l/min]	Energy losses [kW]	Additional energy costs (at 8,000 operating hours per year and 0.10 EUR/kWh)
1	72	0.3	240
3	666	3.1	2,480
5	1,854	8.3	6,640

1. Reduced energy consumption by renewal of the compressed air system

▪ Organizational measures:

- regularly maintenance, change of filters and control of leaks
- suitable place for compressors, suction of dry, cold and clean ambient air
- pressure in the system has to be as low as possible
- do not use pressured air for cleaning or for drying

▪ Technical measures:

- use of optimized compressors according to the state of art
- use of modern drives
- optimization of pressured air station
- use of suitable pipes (sufficient inner diameter, smooth inner surfaces, wide arches)
- sufficient storage capacity
- economical conditioning of compressed air
- use of heat exchangers to recover the waste heat of the compressors

1. Reduced energy consumption by renewal of the compressed air system

Private Brewery Strate Detmold GmbH & Co. KG

- identified potentials after CP-check:
 - high energy consumption to produce compressed air equipment

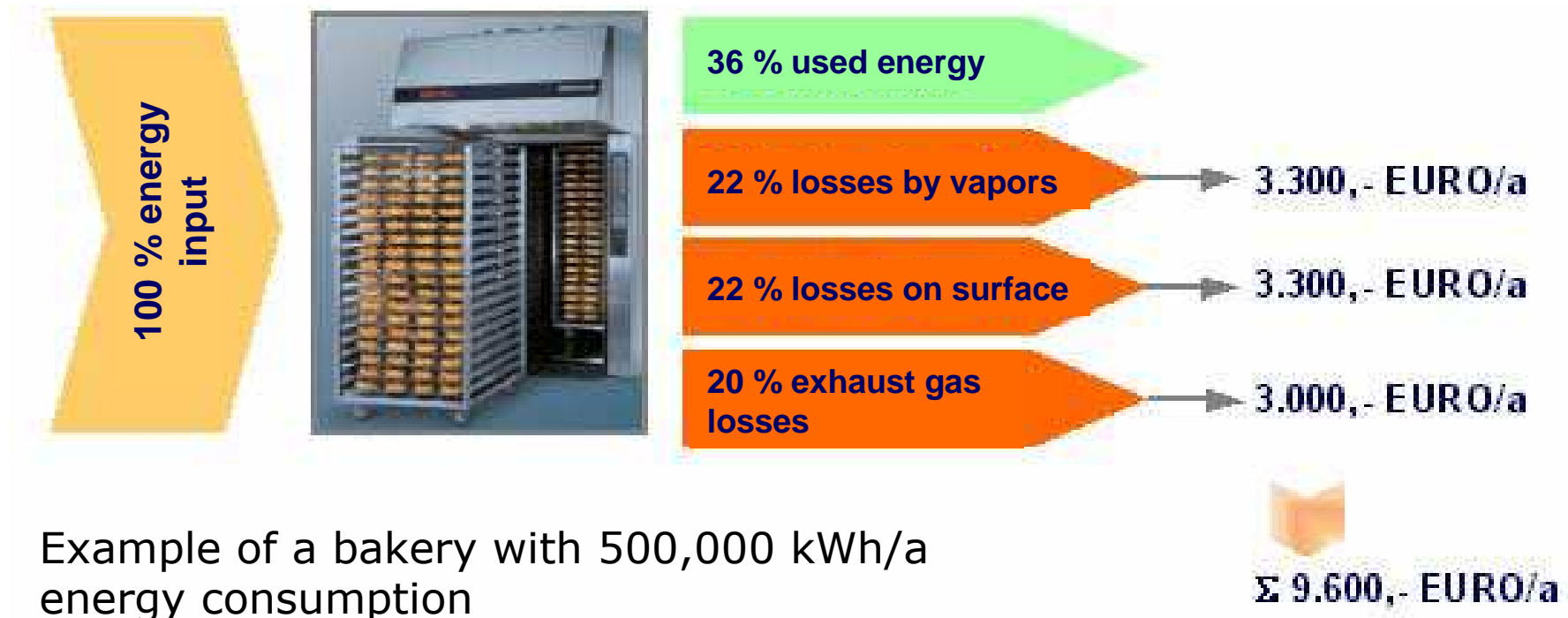
- Measures:



Measure	Investment	Energy savings	Cost savings
renewal of the compressed air system, optimization of the filter system	15,000 EUR	10 % less energy consumption	not estimated

2. Energy-efficient oven-technology in bakeries

- only one third of the whole energy consumption is finally used for baking

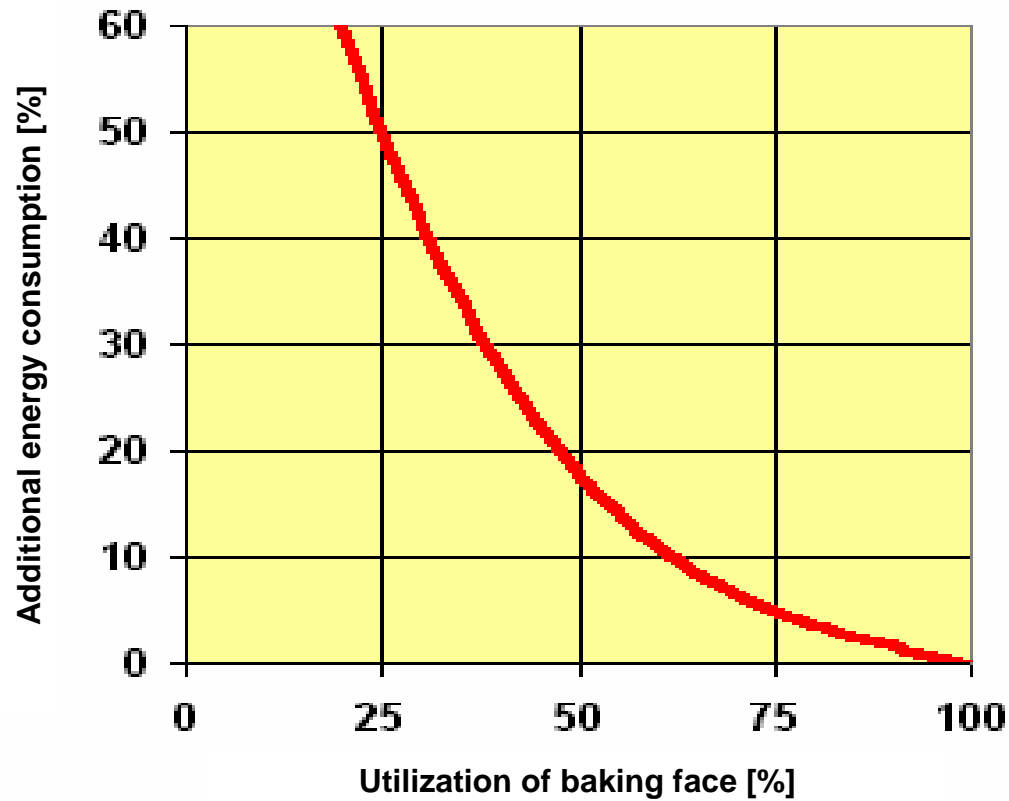


Example of a bakery with 500,000 kWh/a energy consumption

⇒ great potentials for optimizing and energy savings

2. Energy-efficient oven-technology in bakeries

- Options for energy-saving handling and maintenance:
 - optimizing the utilization of the baking face

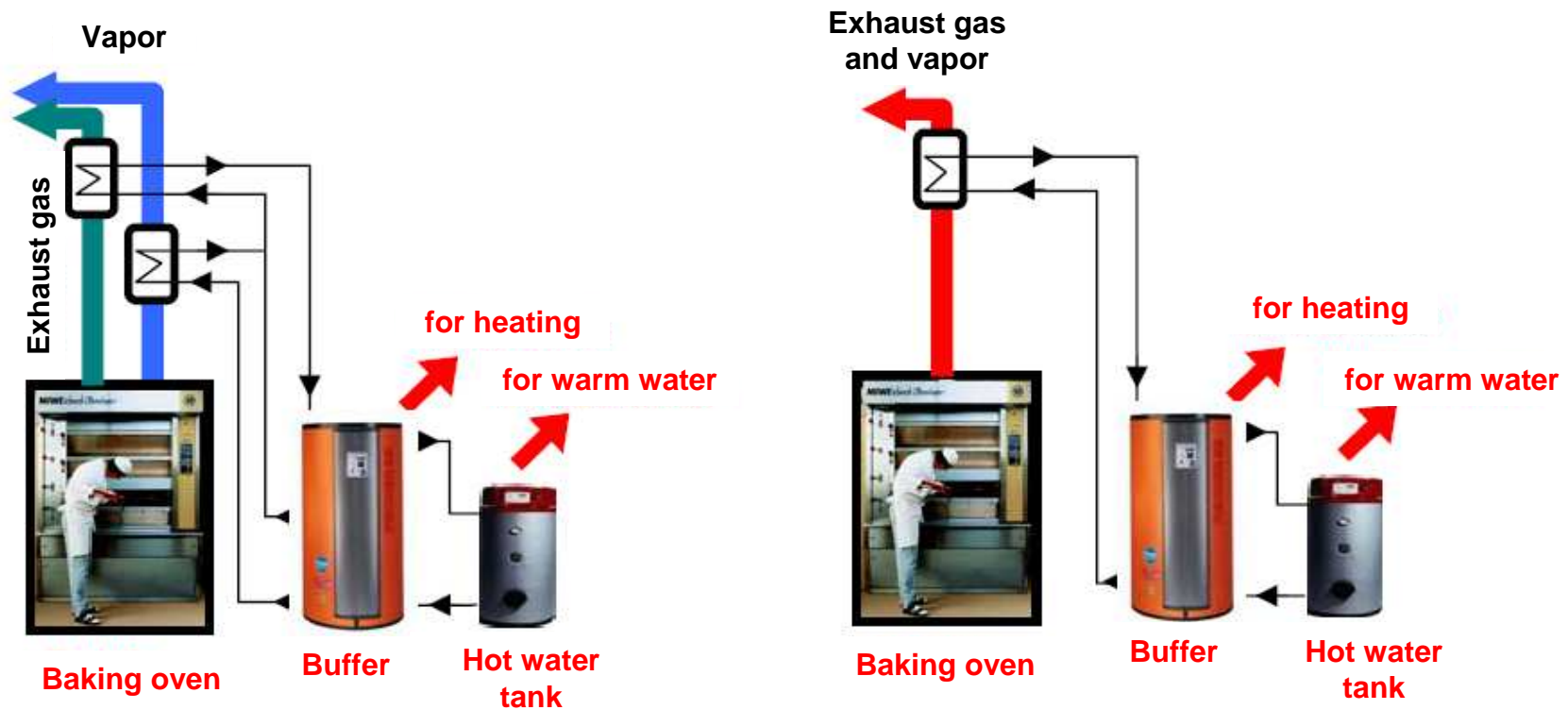


2. Energy-efficient oven-technology in bakeries

- Options for energy-saving handling and maintenance:
 - optimizing of heating-up and switch off
 - optimization of vapor generation
 - regularly maintenance
- Options for energy-saving planning of new installations:
 - optimization of the baking face and oven performance (not more than needed)
 - implementation of proper insulation
 - selection of the most suitable energy source under ecological and economical point of view

2. Energy-efficient oven-technology in bakeries

- Options for the use of waste heat:
 - use of waste heat by ovens with different systems of exhaust gas and vapor streams



2. Energy-efficient oven-technology in bakeries

Heinz Bräuer & Co. KG

- identified potentials after CP-check:
 - great potential for energy saving measures by heat recovery
- Measures:

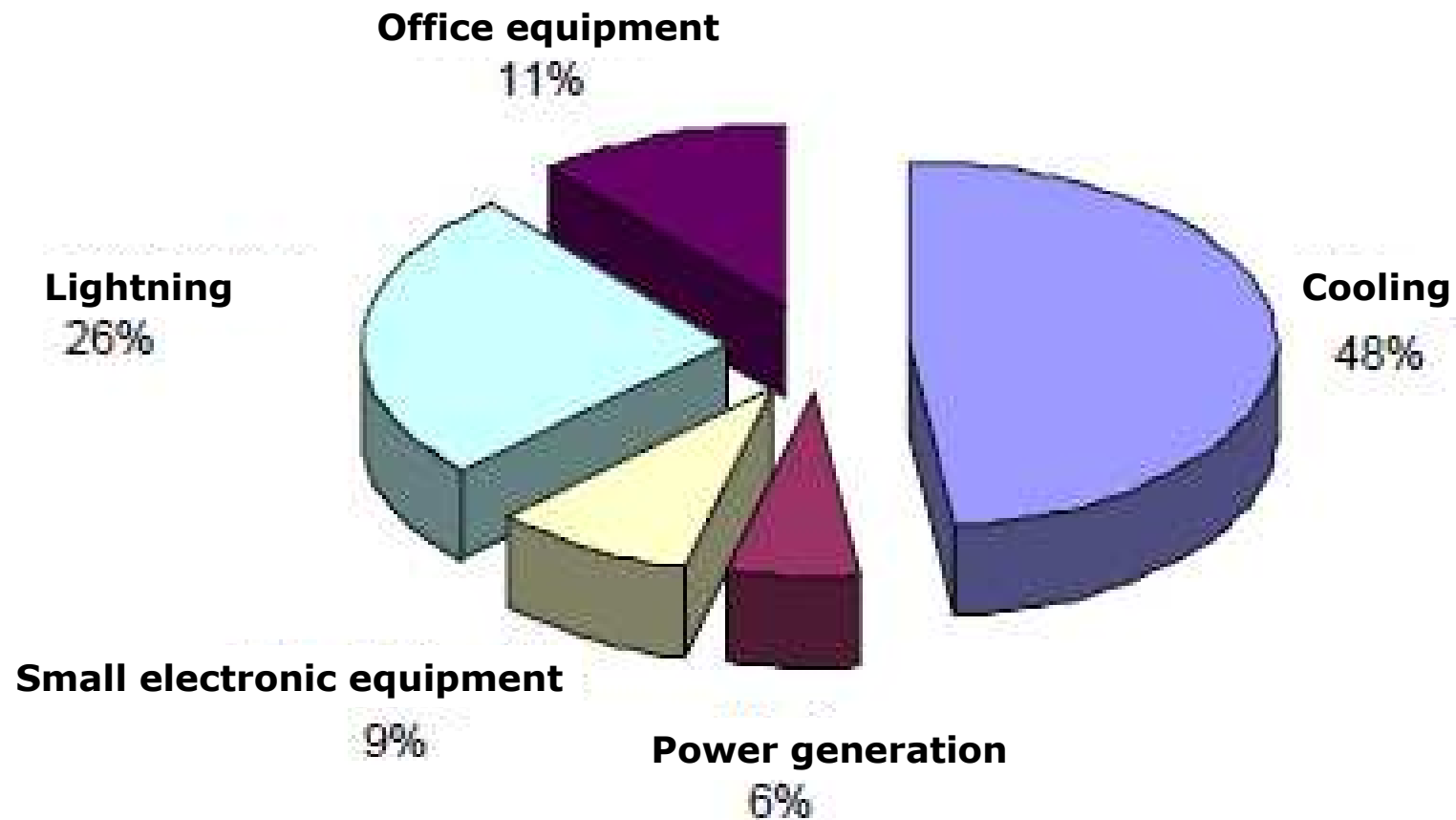


Measure	Investment	Energy savings	Cost savings
installation of heat exchangers to produce hot water for cleaning purposes and heating	72,900 EUR	191,000 kWh thermal energy per year	16,260 EUR/year



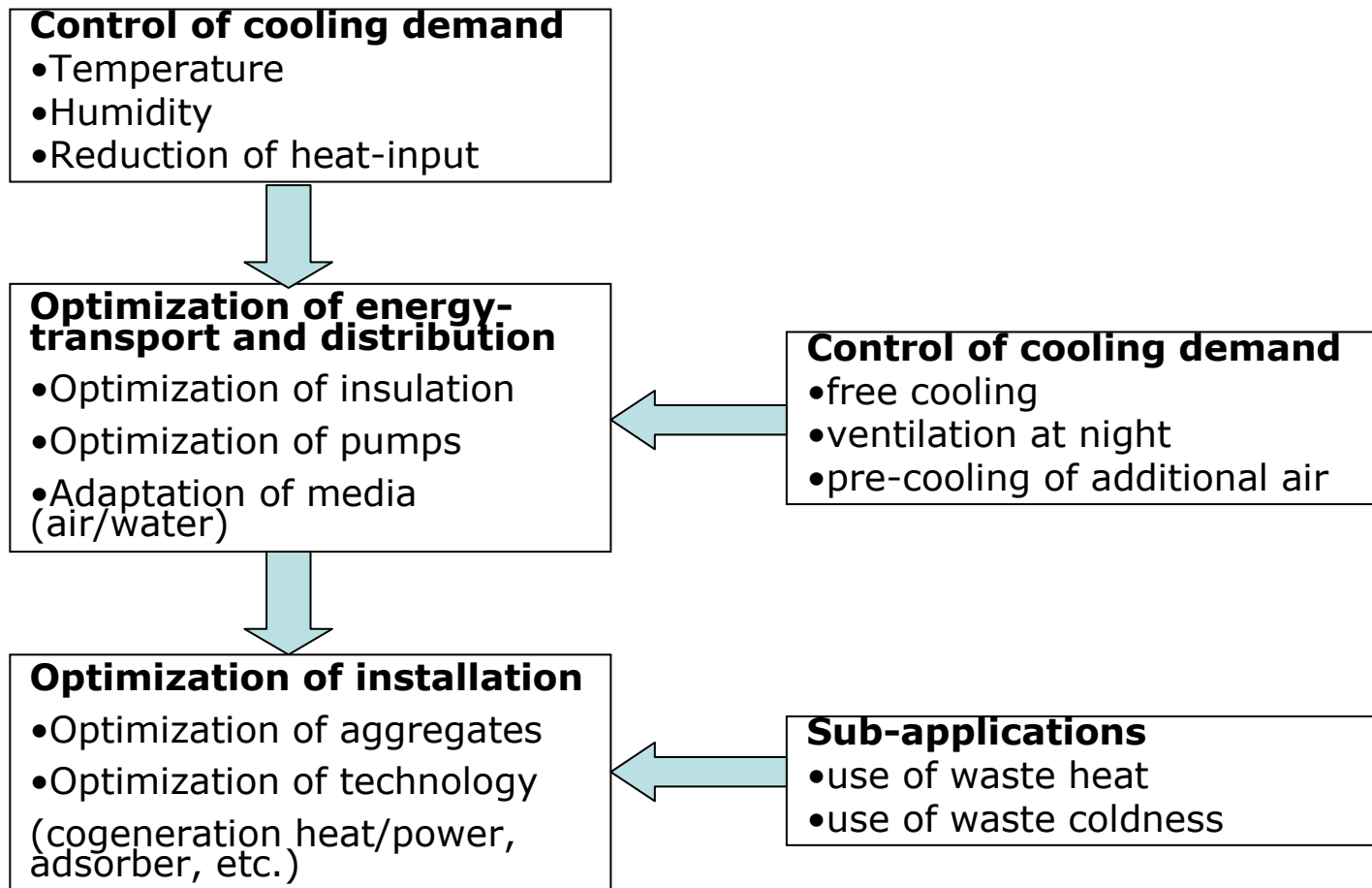
3. Energy-optimized refrigeration

- Energy-consumption in German food trading



3. Energy-optimized refrigeration

- functional chain of cooling-efficiency control



3. Energy-optimized refrigeration

LSG Sky Chefs Deutschland GmbH in Hamburg

- identified potentials after CP-check:
 - great potential for energy savings in refrigeration
- Measures:

Measure	Investment	Energy savings	Cost savings
use of frequency-controlled cooling devices, installation of an overall control system, heat recovery	383,000 EUR	2,330,346 kWh/year	160,343 EUR/year



4. Energy-efficient cooling and heating

Martin Pfaffmann Wine-jelly

- identified potentials after CP-check:
 - to much cooling capacity installed
 - energy saving potential by using renewable energy for wine-preheating

- Measures:

Measure	Investment	Cost savings	Amortisation
improvement of cooling system	5,000 EUR	1,115 EUR/year	4.5 years
wine-preheating with solar-heated water	1,200 EUR	350 EUR/year	3-4 years



5. Resource-efficient production lowers material- and energy costs

Metten Fleischwaren GmbH & Co. KG

- identified potentials after CP-check:
 - CP-assessment prior to the amalgamation of two production sites
 - identification of a high potential of energy-savings in water use

- Measures:



Measure	Investment	Energy savings	Cost savings
replacement of five old autoclaves by three new steam spraying autoclaves, new automatic washing machines instead of hand washing of vessels, new floor-sealing reduces use of cleaning agents, new sewage system	4,965,000 EUR	87,300 m ³ /year fresh water 2,000,000 kWh/year energy	330,000 EUR/year

6. Reduction of electricity costs

Superweck Sandwich Vertrieb

- identified potentials after CP-check:
 - to high energy costs
 - high potential of energy savings

- Measures:

Measure	Investment	Cost savings	Amortisation
electricity-generation by combined heat and power technology (CHP)	25,000 EUR	4,650 EUR/year	4-5 years
Deactivation of an old cold store	0 EUR	500 EUR/year	as of now



7. Heat recovery

Hansen´s Backstube

- identified potentials after CP-check:
 - to high energy costs
 - high potential of energy savings



- Measures:

Measure	Energy savings	CO ₂ -avoidance	Cost savings
installation of a heat exchanger to recover the waste heat of the cooling stores for hot-water generation	60,520 kWh/year	12,3 ton/year	1,500 EUR/year

7. Heat recovery

KOKA Verwaltung GmbH

- identified potentials after CP-check:
 - to high energy costs
 - high potential of energy and water savings

- Measures:



Measure	Energy and water savings	CO ₂ -avoidance	Cost savings
use of the central cooling system also for the cooling of the packaging machine, use of waste heat of cooling for hot-water generation	57,500 kWh/year 1,400 m ³ water/year	37 ton/year	11,400 EUR/year



7. Heat recovery

National Starch Chemical GmbH & Co. KG

- identified potentials after CP-check:
 - to high energy costs
 - high potential of energy savings
 - high potential of avoidance of odor

- Measures:

Measure	Energy savings	CO ₂ -avoidance	Cost savings
installation of a heat recovery system at the evaporation plant to generate hot process-water	5,400,000 kWh/year	2,430 ton/year	approx. 1 Mio. EUR/year

Muchas gracias por su atención!

Dipl.-Ing. Joerg Wagner

INTECUS GmbH

Waste Management and Environment-Integrated Management

Pohlandstraße 17

01309 Dresden

Germany

fon: +49 351/31 82 30

fax: +49 351/31 82 333

email: intecus.dresden@intecus.de

internet: www.intecus.de