

ACIDLOOP

**Sustainable production through
market penetration of closed
loop technologies in the metal finishing industry.**



Introduction to Resource Efficiency (RE)

Dr. Thomas Dielacher, DI Christian Angerbauer, DI Stefan Melnitzky - AREC

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Introduction to Resource Efficiency approach

How companies respond to pollution

Resource Efficiency approach

Strategies to increase Resource Efficiency

Case Studies

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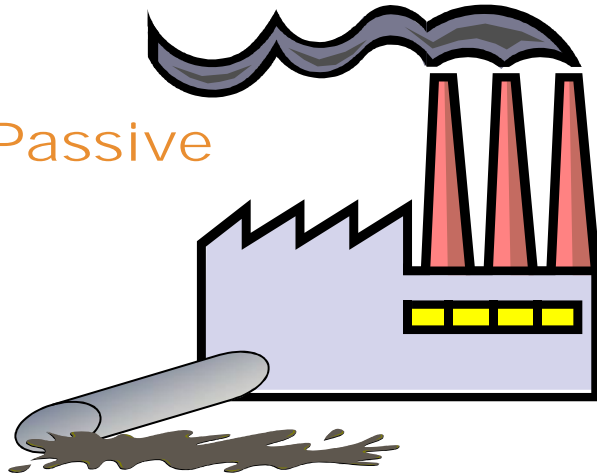


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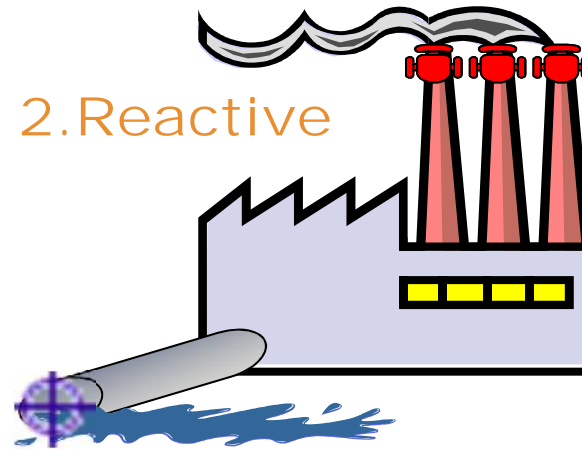


How companies respond to pollution

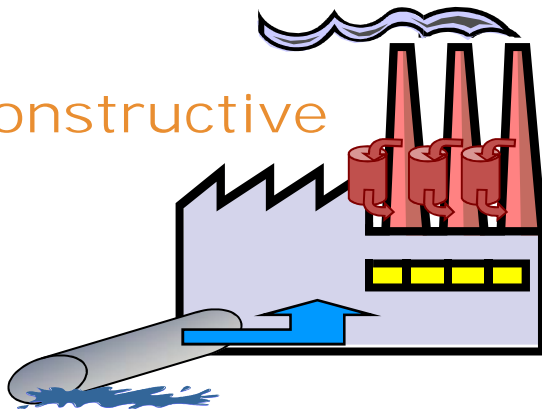
1. Passive



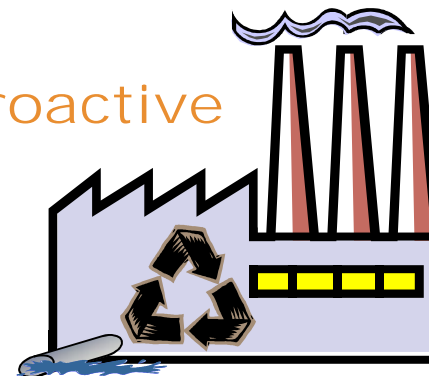
2. Reactive



3. Constructive



4. Proactive



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Resource Efficiency (RE)

Emissions and wastes are raw and auxiliary materials –
which have mostly been purchased by paying money –
and have not been transformed into saleable products.

Resource Efficiency is high when nearly all raw and
auxiliary materials are transformed to saleable products
– **minimised waste**

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Understanding the Resource Efficiency (RE) approach

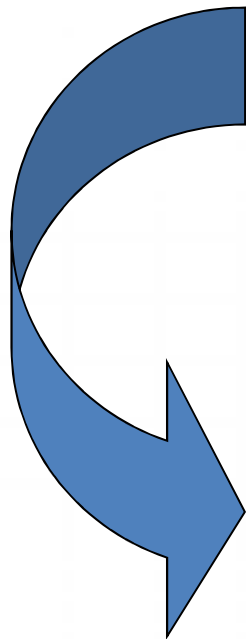
Waste is generated
What is to be done with it ?

End of Pipe thinking:
Waste Treatment approach

Costs money

Waste is generated
Where does it come from ?
What can be done to avoid it ?
What can be done to reduce it ?
Can it be used by someone else?

Saves money!



RE approach

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RE approach - steps

Making mass or energy balances

- overall and specific
- to find losses / inefficiencies of resources in the processes !

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Overall balance – Input/Output

INPUT

Material

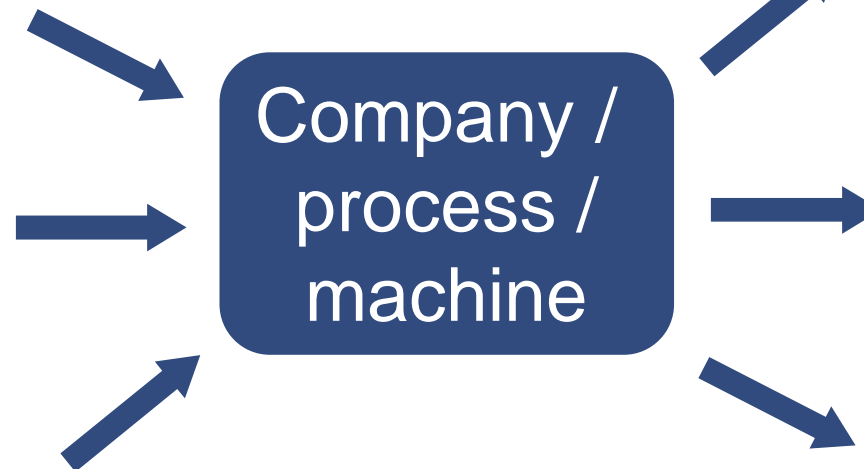
raw materials
auxiliary materials
further materials

Energy

fuels like
LPG, oil, CNG,
diesel

Energy

without mass
like electricity



OUTPUT

Products

products
by-products

Material-related Emissions

waste, exhaust,
waste water

Energy-related Emissions

waste heat, noise

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switchasia

<Veranstaltungstitel oder Logos
einfügen>

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Stahl



RE approach - steps

- Making mass or energy balances to find losses / inefficiencies of resources in the processes
- Focus on optimising existing processes and technologies to increase efficiency
 - Identify weak points - compare with best practice and the best available technology, track material and energy flow
- This leads to cost reduction without big investments

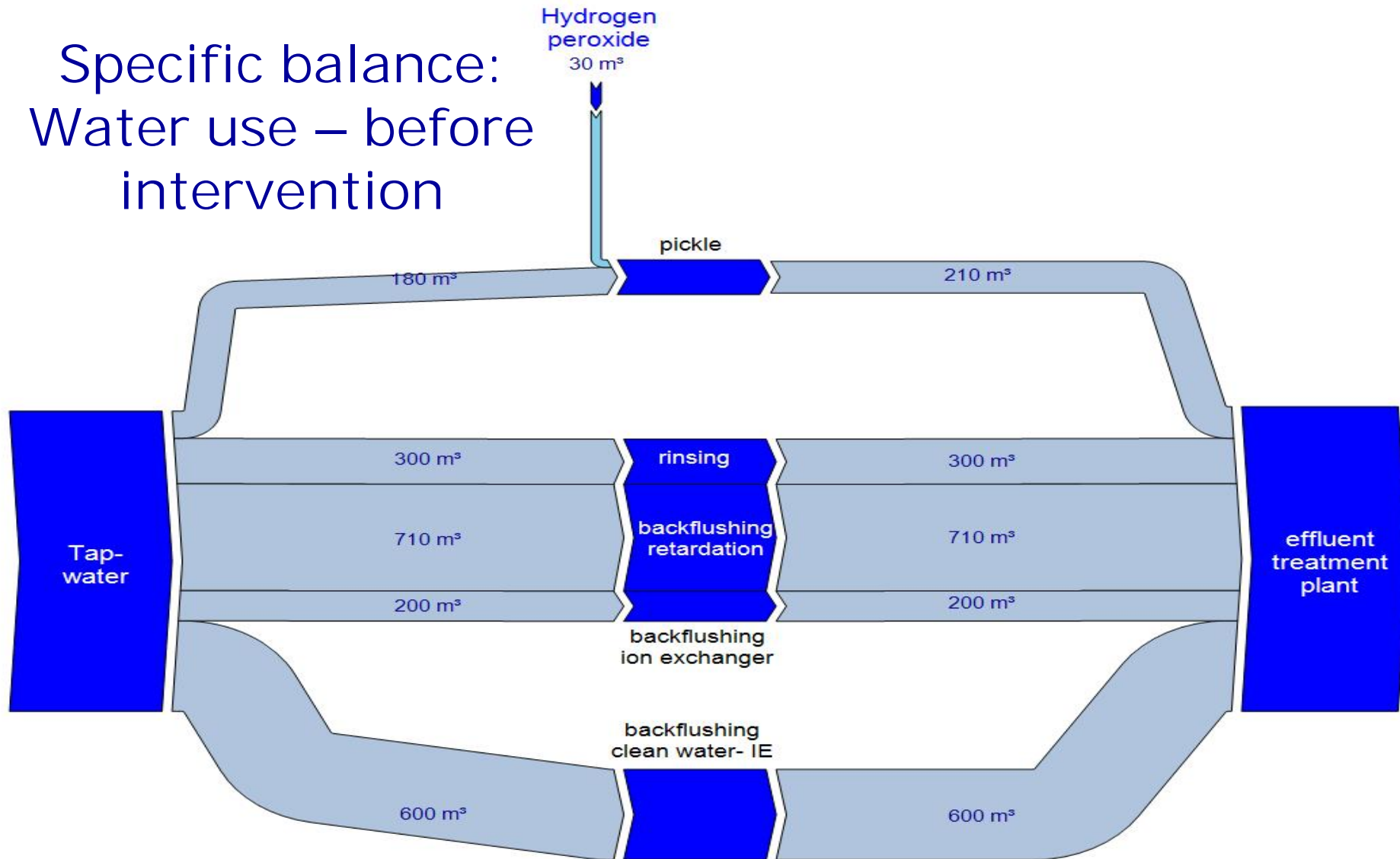
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Specific balance:
Water use – before
intervention



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Intervention

- Training of management and staff
- Monitoring of bath conditions
- Reduced leakages
- Reuse of partial water streams
- Change to efficient new technology

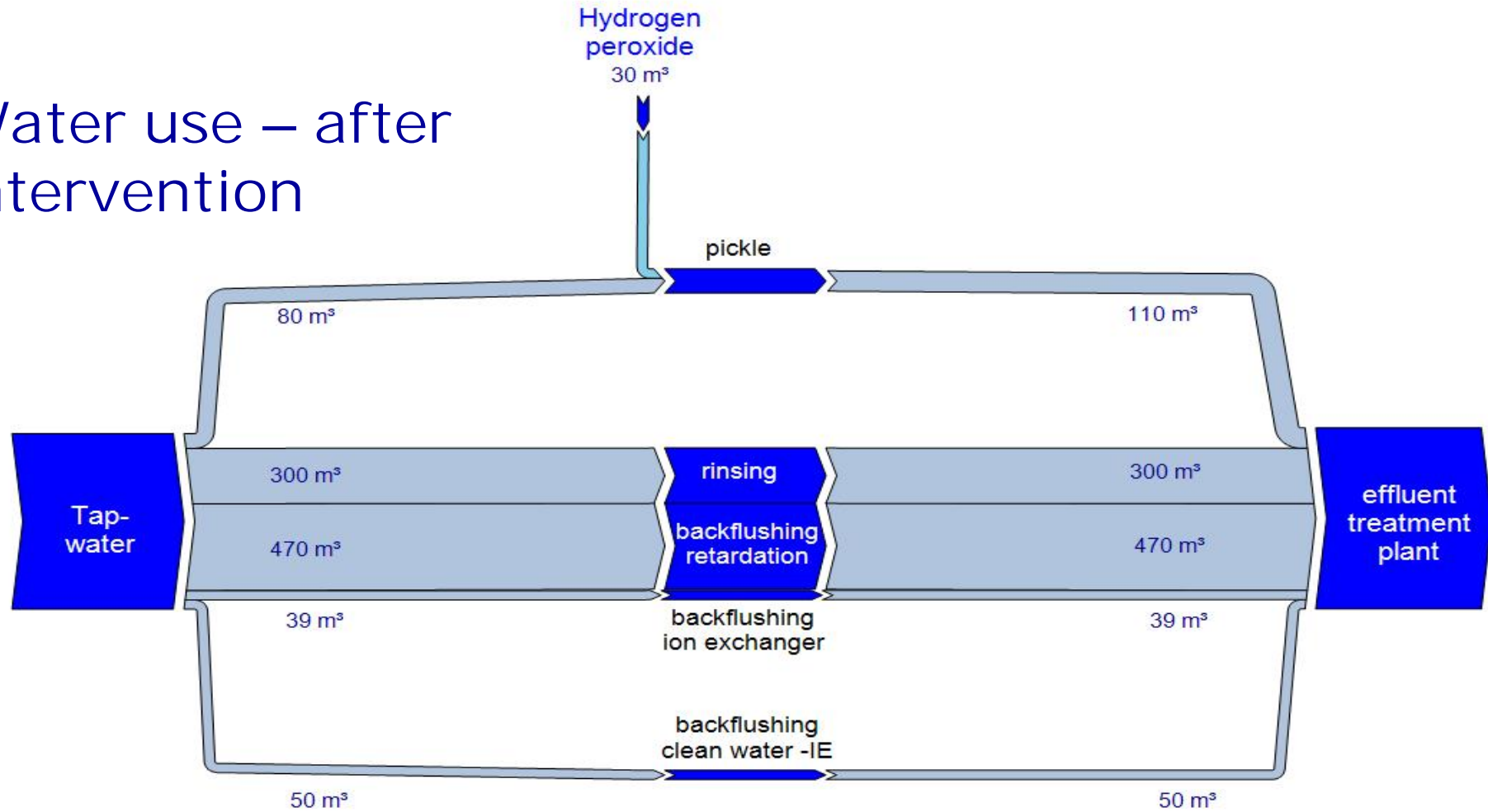
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Water use – after intervention



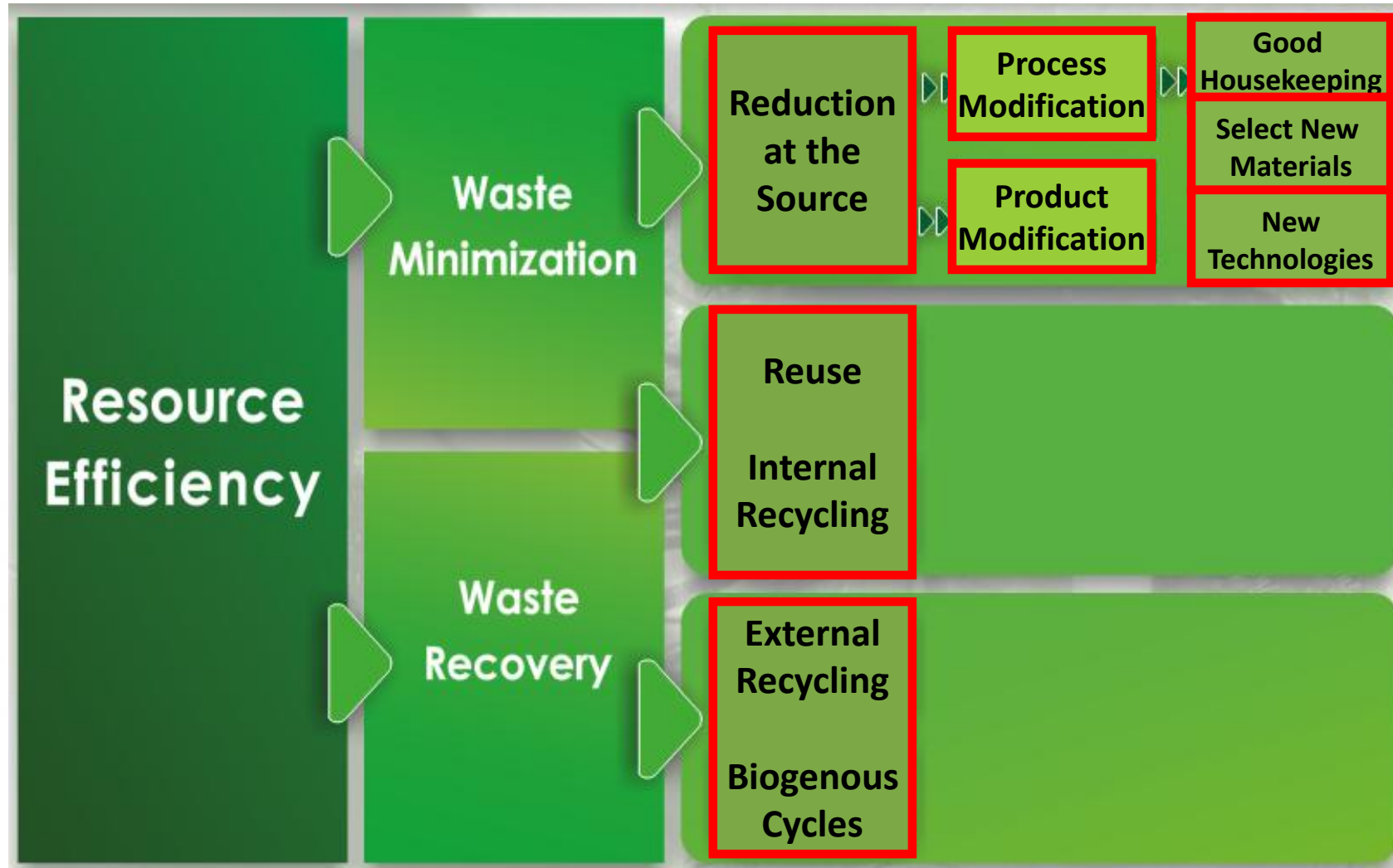
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Strategies to increase Resource Efficiency



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Case Study 1: Reduced waste – auto parts SME in Gurgaon



Before



After

Problem: Losses of brass chips in turning process

Measure: Guard provided on machine to avoid coolant & chips on floor. This results in proper brass chips collection.

Savings/a: 27,600 INR

Cost: 27,600 INR

ROI: 1,0

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Case Study 2: Reduced energy and water consumption – auto parts SME in Bhiwadi

Improvement actions:

Result: 80% energy and water saving;
ROI: 5

- Insulated top surface of tanks
- Saved 43,200 kWh/yr (Approx. Rs. 2 lakhs/yr)
- Fresh water saved 67,000 liter/yr

Heat and water losses from open top of degreasing, acidwash and blackening tanks													
Tank	L	W	H	Surface Temp		Ambient Temp		Uninsulated		Insulated with balls		Savings	
				°C	°F	°C	°F	Water loss	Heat loss	Water loss	Heat loss	Water	Heat
				ft	ft	ft	kg/hr	kW	kg/hr	kW	kg/hr	kW	
Degreasing	1.5	1.5	1.5	80	178	30	88	1.2	0.9	0.3	0.2	0.9	0.7
Acid wash	1.5	1.5	1.5	150	302	30	88	8.5	5.4	1.8	0.9	6.7	4.5
Blackening	1.5	1.5	1.5	155	311	30	88	9.1	5.8	1.9	1.3	7.2	4.5

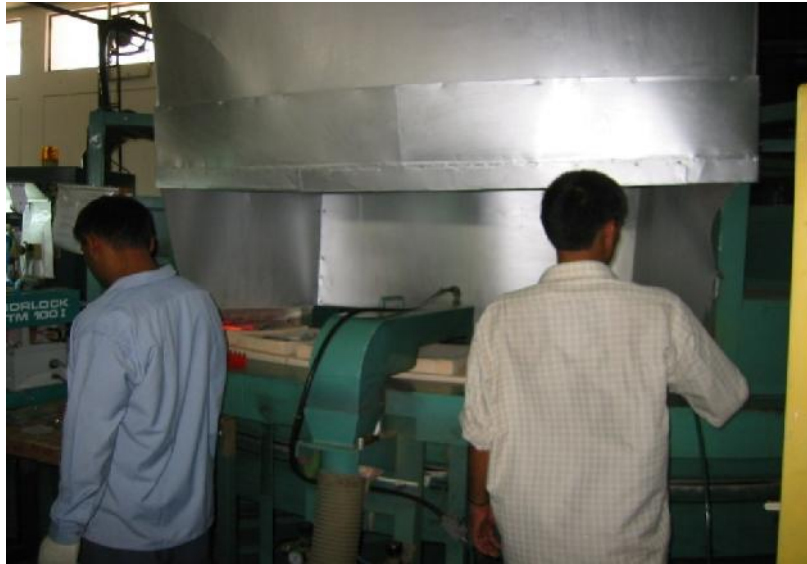
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Case Study 3: Reduced energy consumption – auto parts SME in Manesar



Process: 36 pieces of mirror are placed on a standard brick for convex process in an oven.

Measure: Number of pieces increased from 36 to 39 per slot. Size of brick altered within the possible regime to occupy more pieces thus saving energy on one hand and enhancing productivity on the other.



After



Savings/a:	207,000 INR
Cost:	33,120 INR
ROI:	6,25

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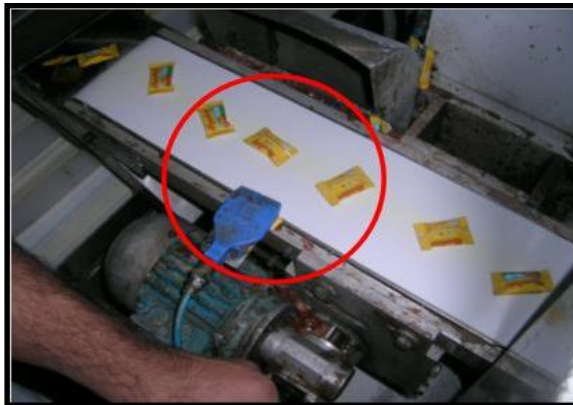


Case Study 4: Reduced energy consumption – sweets production in Manesar

Improvement actions:

Compressed air was used to blow away empty pouches from the packing line. A simple low voltage micro-blower was installed to do the job

Result: >90% saving; ROI: 118



TECHNO-ECONOMICS	BEFORE	AFTER
Orifice size	3	NA
Pressure	5	NA
No. of orifices	40	40
Operation hours	7,200	7,200
Compressed air (cfm/year)	4,059,102	NA
Energy needed (kWh/year)	608,865	7,200
Energy saved (kWh/year)	0	601,665
Equipment cost	0	40,000
Savings	0	4,738,112
Payback period / ROI	NA	2.5 d / 118

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Case Study 5: Reduced water consumption – electroplating SME in Gurgaon

Improvement actions:

- Conductivity profile of rinse tanks monitored over 3 months
- Based on this, optimum water flow rate implemented
- Operators trained to measure conductivity as a basis for flow rate

Result: 25% saving, ROI

Parameters	Before	After
Water flow rate # 1	300	250
Water flow rate # 2	300	200
Operation hours	7200	7200
No. of plating lines	5	5
Water consumption (kl/year)	21600	16200
Reduction (kl/year)	0	5400 (-25%)

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Lesson learned:
Mission Impossible is possible
Thank you!

Email:

dielacher@acidloop.in

angerbauer@acidloop.in

stefan.melnitzky@acidloop.in

malinib@acidloop.in

rajat.batra@acidloop.in

www.acidloop.in

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