Environmental Improvement in the Industries (EII) project

How to successfully implement RECP solutions

Jamnagar, 30 May 2018

Outline

- Introduction to SEIP-EII project and RECP
- Examples of RECP implementation
- Techniques and tools for RECP implementation

Introduction to SEIP-EII project and RECP

What is the EII project?

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

What is SEIP project?

Joint project of Deutsche Gesellschaft für Internationale Zusammenarbeit (**GIZ) GmbH** and the Ministry of Environment, Forest and Climate Change (**MoEFCC)** within the framework of the Indo-German technical cooperation

SEIP project components

- CETP up-gradation
- Online monitoring systems
- **Environmental improvement in selected industries (EII)**
- Skills development for WWTP operators
- Conveyance systems (industrial wastewater/ storm water)
- Waste management
- Others (awareness programmes; environmental technology platform; green rating and certification systems etc.)

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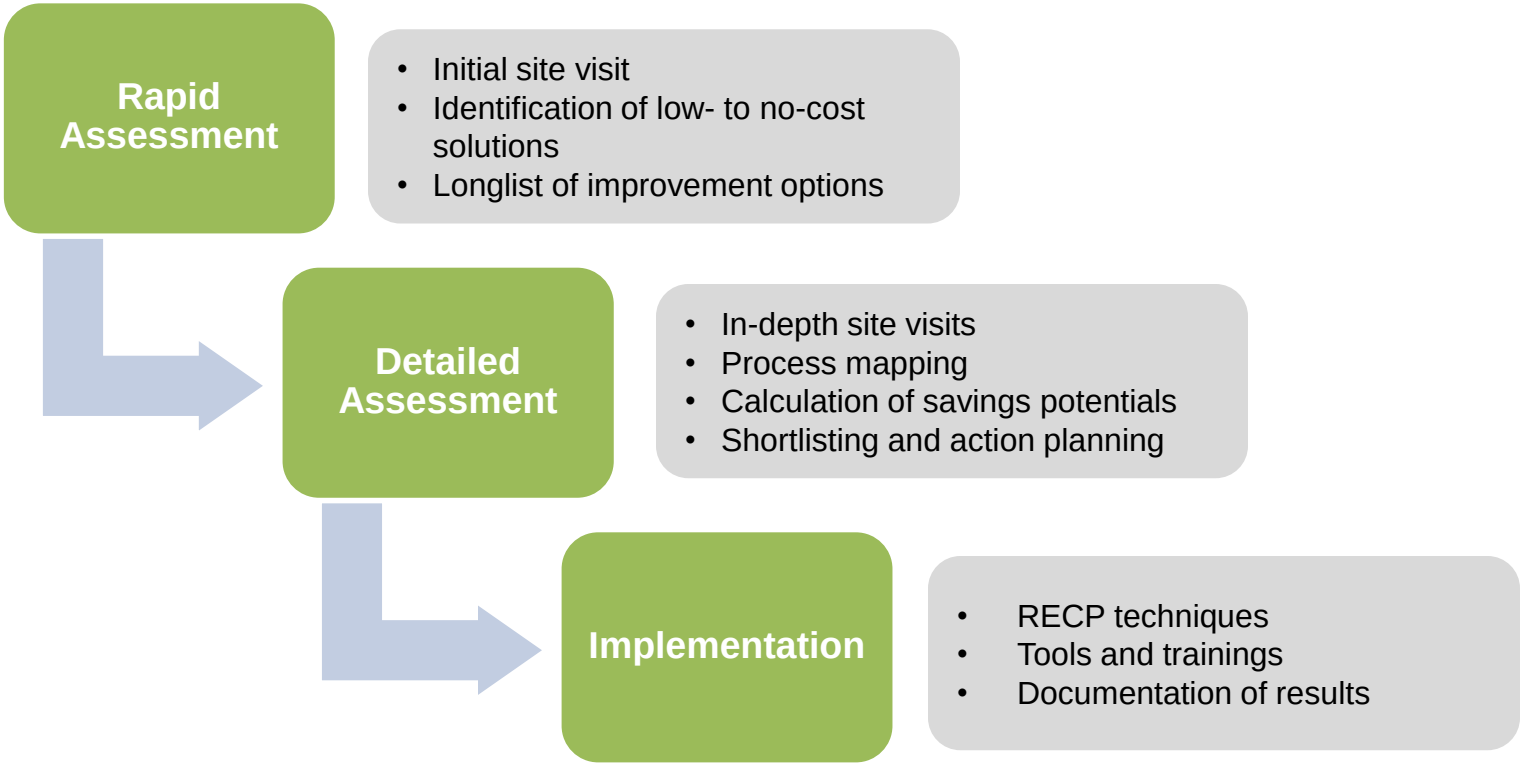
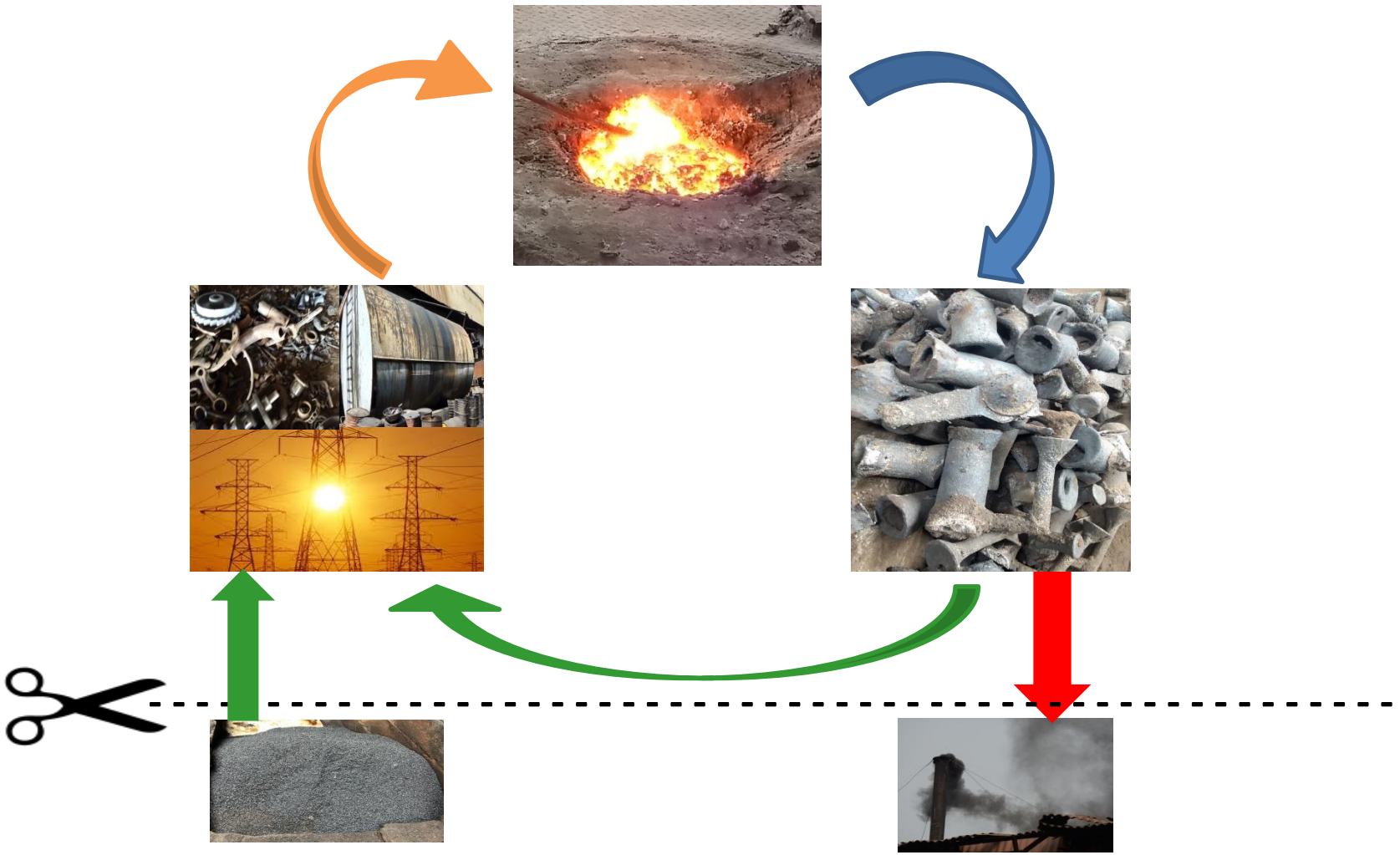
Location and approach to RECP in EII project

- 150 industries in Gujarat (Vapi), Uttarakhand (Haridwar), Delhi (Patparganj, Mayapuri, Lawrence Road) – detailed assessment in 40 industries



What is the Resource Efficient Cleaner Production (RECP) approach?



RECP approach

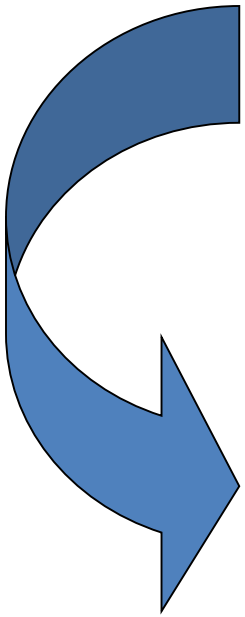
Waste is generated

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 ?

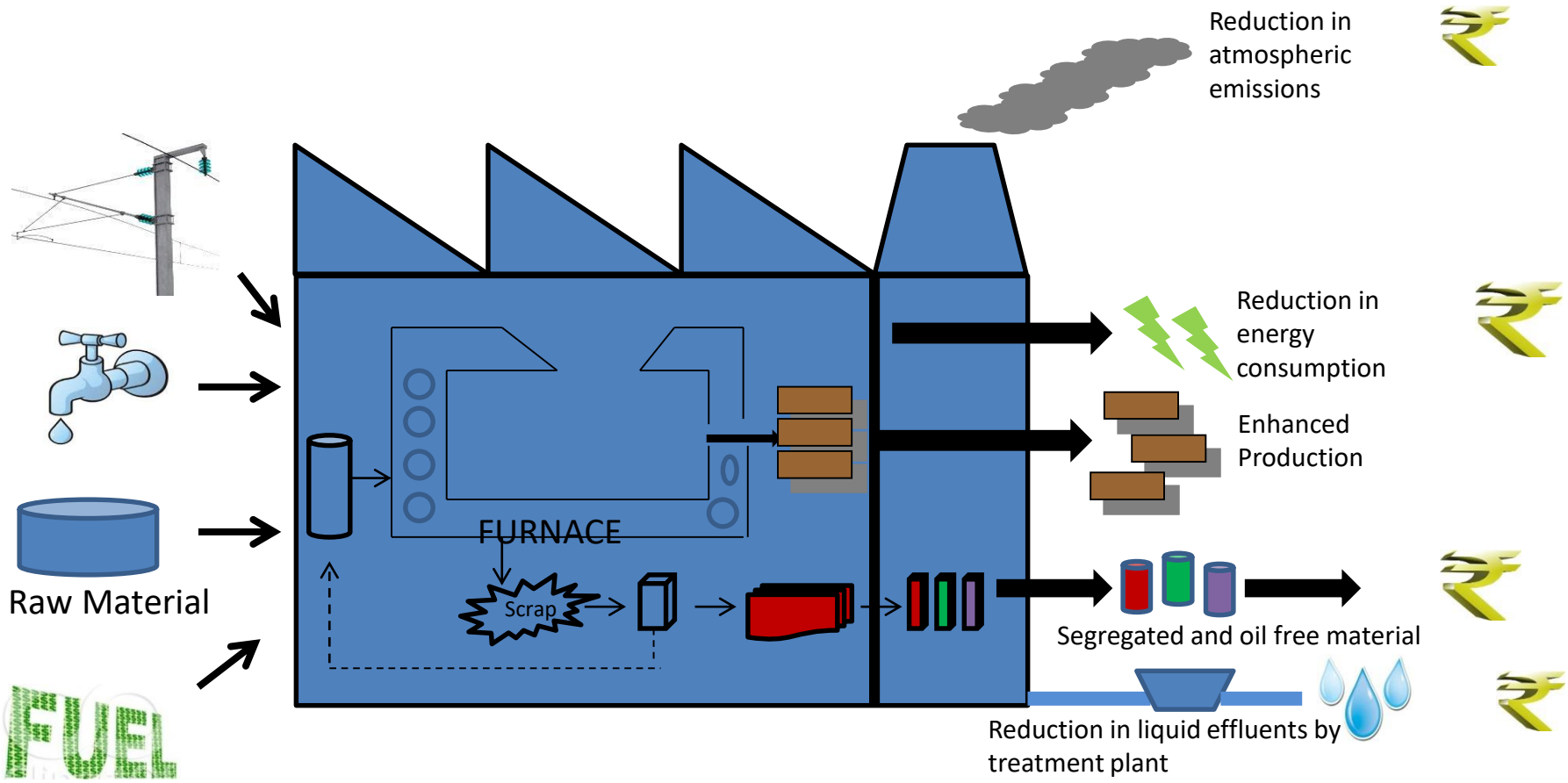
What can be done to reduce it ?

Who else can use it ?

Saves money!

RECP approach => for Pollution PREVENTION

RECP approach



RECP approach => for Pollution PREVENTION

RECP approach

- RECP is not about specific areas or topics but about a company as a whole
- **First step:** quick wins by improving resource use with its actual equipment and facilities
  - Low and no cost options preferred to mid- and high-cost options
- Low and no cost options have a short “return on investment”.
- **Second step:** consider investments in more costly RECP options

What do you see?

Hot water flowing out of a pipe

What does this mean for RECP?

- An opportunity to save resources!
- A chance to measure the flow rate of the water
- A chance to measure the temperature of the water and the bore well water temperature

What does this mean for RECP?

- Q = m * cp * dT
- Q= 1 [l/s] * 1 [kg/l] * 4.2 [kJ/kg°C] * 70 [°C]
- Q = 294 [kJ/s]
- Consumption of oil = 0.0082 [kg/s]

Result:

Annual loss = INR 36,45,568

What do you see now?

Money flowing out of a water pipe

Examples of RECP implementation

Example: LED lighting

Before: Electrical panel with one CFL and two incandescent light bulbs

After: Electrical panel with LED lights

Problems identified	Solutions	Costs	Results
Inefficient lighting system using CFL and incandescent lights	Replace inefficient light bulbs with energy efficient LED lights	INR 210	- Reduction in electricity consumption of 337 kWh per year. - Reduced electricity consumption translates to cost savings of INR 2,696 per year.

Total investments:	INR 210
Total savings:	INR 2,696 per year
Estimated payback period:	1 months

Example: Using paint to improve lighting

In a cathodic electro deposition (CED) plant a certain amount of non moving waste paint (up to 3% of raw paint) was accumulated over time. This paint though acceptable as ordinary paint could not be used in the CED process line. This non moving paint was used to paint the inner walls of the plant. This action resulted in brighter walls of the plant, thus improving reflectivity of light and **increasing lighting lux level, while utilizing waste paint**.

Example: Brass chip collection

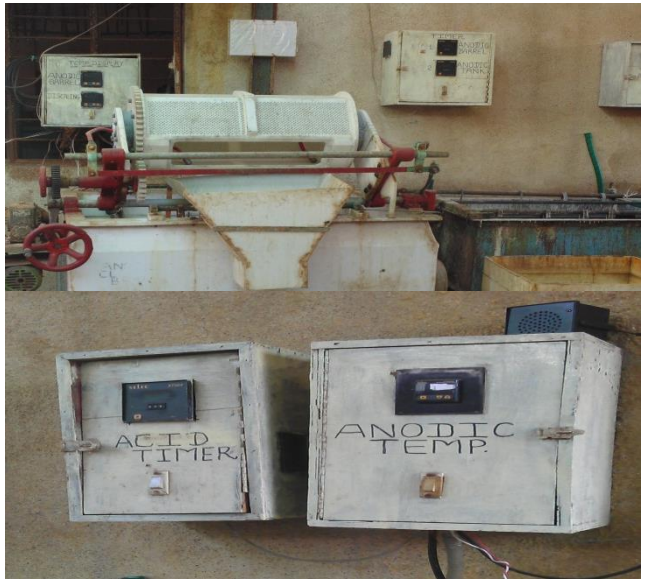
Before: Brass chips in turning process fall to the ground, become dirty and revenue from selling the scrap is lost.

After: Guard provided on machine to avoid coolant spillage and chips on the floor resulting in proper brass chips collection

Annual savings (INR)	Investment (INR)	Payback (Months)
27,600	27,600	12

Example: Timer/buzzer

Before: Operation of process tanks without any timer and buzzer installed



After: Installation of a timer and buzzer at all process tanks, including degreasing and anodic cleaning tanks.

Annual savings (INR)	Investment (INR)	Payback (Months)
312,600	55,140	2.1

Example: Collection of zinc dust

Before: The zinc dust that resulted from machining of parts was collected, but not utilized.

Annual savings (INR)	Investment (INR)	Payback (Months)
23,000	Nil	Immediate

After: Collection and storage of zinc dust. Once sufficient dust was collected, it was sold to recyclers.

Example: Recycling of used resin coated sand

After: The company mixed the used sand with new sand for producing the cores. This resulted in 10% reduction in consumption of new sand.

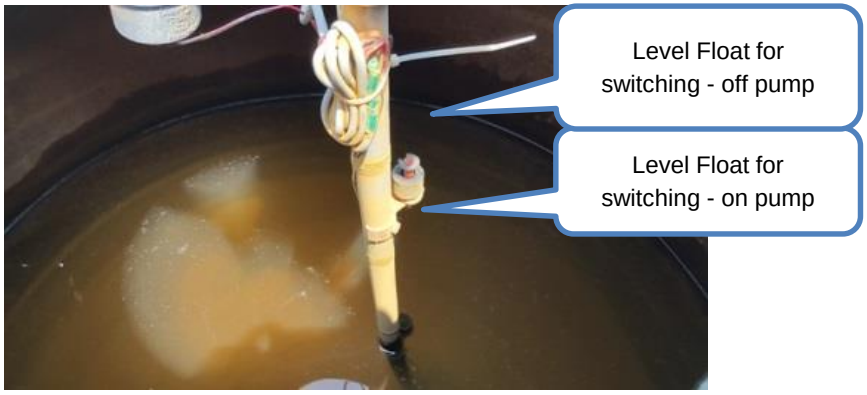
Before: For producing the brass parts, used sand was disposed of and each core was produced with new sand.

Annual savings (INR)	Investment (INR)	Payback (Months)
295,000	Nil	Immediate

Example: Auto cut-off for water pump

Before: A pump filled the overhead tank of the plant. Problems associated with this were as follows:

- When the tank was full, the pump had to be switched off manually.
- Often the employees forgot to switch off the pump which led to an overflow of the tank and thus spillage as well as water losses.



After: installation of a float based auto cut off for the pump of the overhead tank.

Investment (INR)	Benefits
4,500	36,000 litres of ground water saved annually

Example: Storage of materials

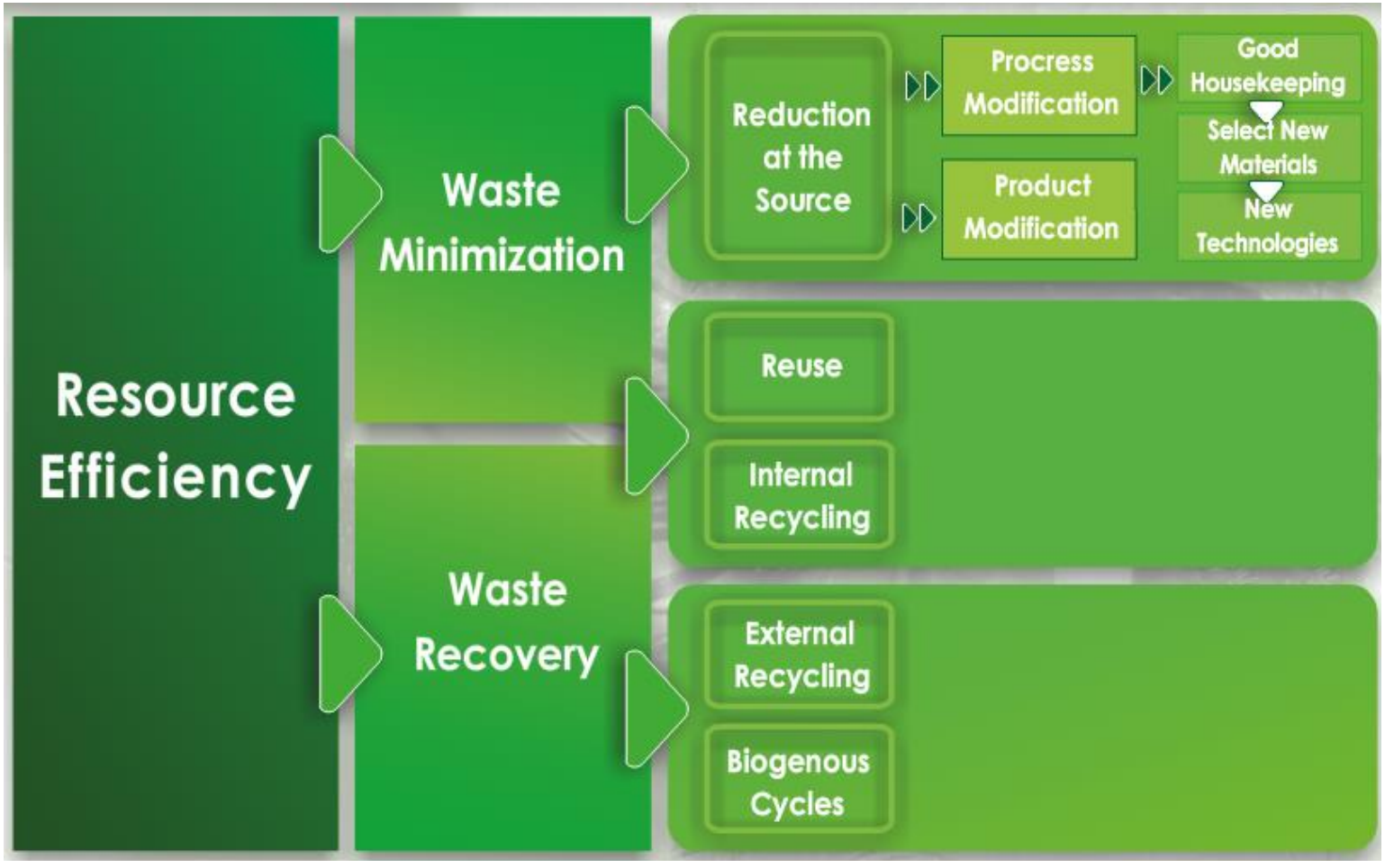
Before:
Offcuts were haphazardly kept in the shop floor.
The cut pieces were sold as scrap.

After:
A rack was build using the in-house materials for storage of offcuts.
Reuse of cut pieces which were sold as scraps before intervention. Resulting in annual material savings of 50 tonnes.

Investment (INR)	Benefits
Negligible	50 tonnes material **(900,000 INR)**

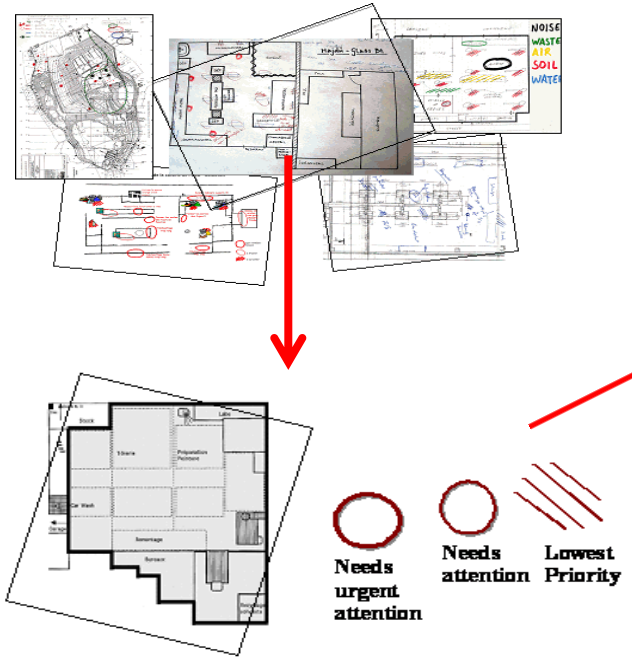
Techniques and tools for RECP implementation

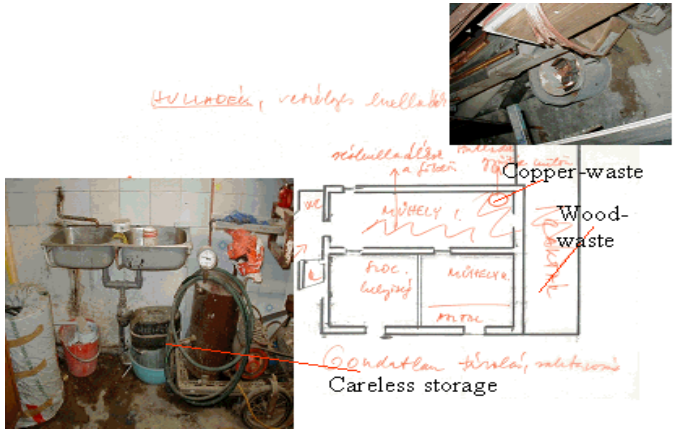
Key RECP techniques



How to identify RECP improvement potentials

- Simplify systematic monitoring and involve your workers with Ecomapping





1. Visualise
2. Identify
3. Measure
4. Manage
5. Monitor and report

How to identify RECP improvement potentials

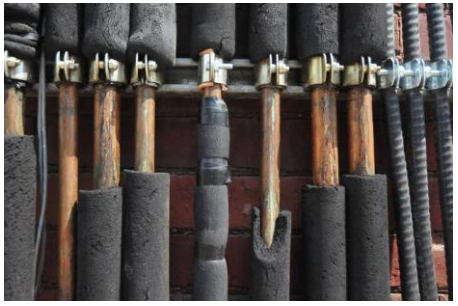
- Energy analysis

Improving power factor

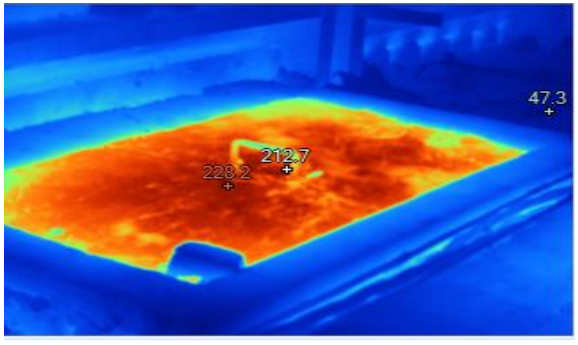
kVAr Rating = kW [tanΦ1 – tanΦ2]

Φ1 = Existing (Cos^{-1} PF_1) and Φ2 = Improved (Cos^{-1} PF_2)

Insulation analysis

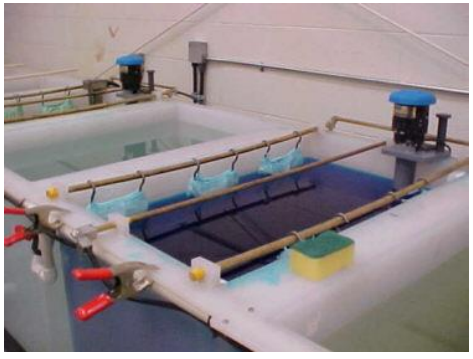


Heat loss calculation



Compressed air analysis

Process bath analysis



How to map material flows

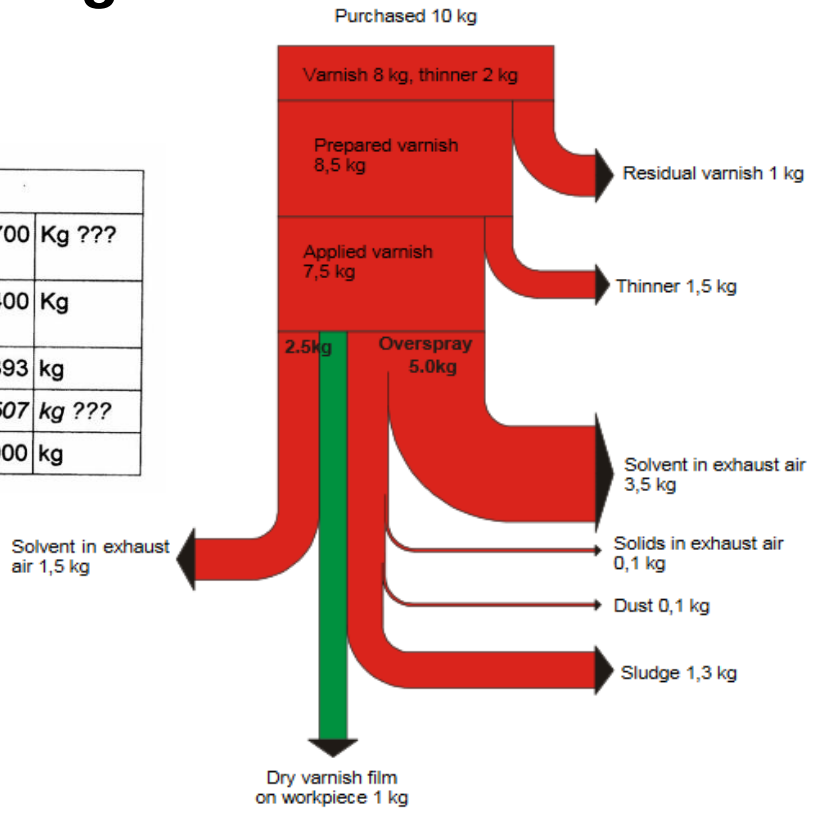
- Material flow analysis

Input mass = output mass + storage

e.g. balance for solvents:

Input			
E10	Solvent in paint	2000	Kg
E11	Solvent	3000	Kg
Total		5000	kg

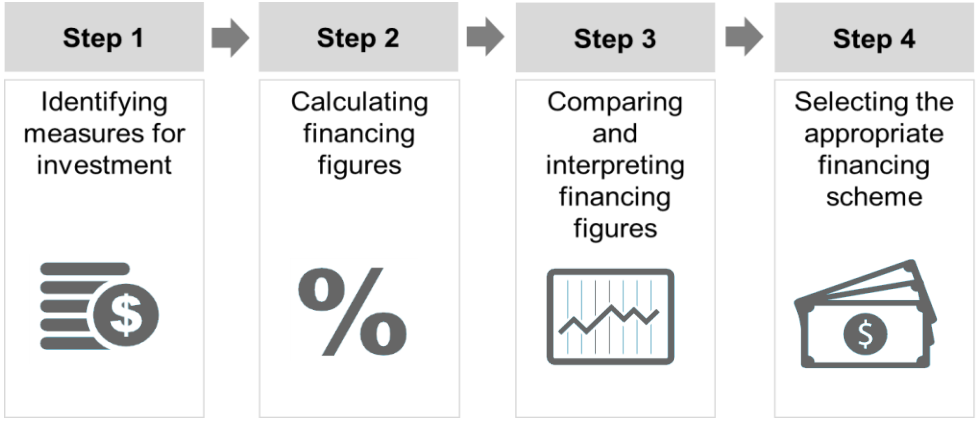
Output			
A2	Solvent in exhaust air	2700	Kg ???
A6	Spent cleaning solvent	1400	Kg
A8	Paint sludge	393	kg
	Losses	*507*	*kg ???*
Total		5000	kg



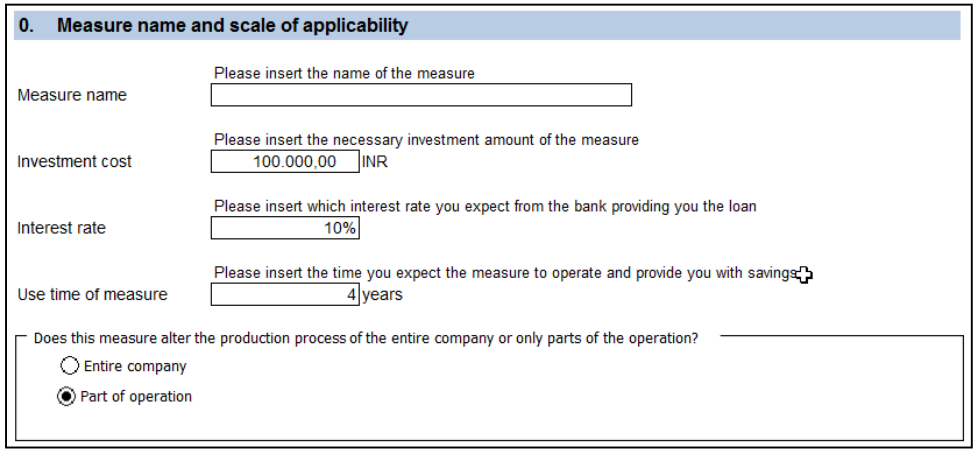
How to calculate savings potentials

- Financing toolkit

Step-by-step guide



Decision Making Tool



How to access resources

- Access resources via GIZ website
  - Success stories from EII project
  - Download EII tools and training materials on RECP
  - Explore case studies on ACIDLOOP website (EU-funded project)
  - Get informed at RECPnet
  - For advanced information, see EU BAT reference documents

For further information on how to explore the resource efficiency/savings potential in your company, contact the EII project team.

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Thank you!

RECP options (intent to implement)

- LED lighting
- Proper collection of brass chips for remelting
- Proper measurement of parameters and process control in melting/extrusion (automation)
- Collection of dust for selling to recyclers
- Recycling of foundry sand
- Proper storage of materials