



PROMOCIJA ISTRAŽIVANJA I INOVACIJA U FUNKCIJI KONKURENTNOSTI



IMPLEMENTATION OF CP CONCEPT IN COMPANIES

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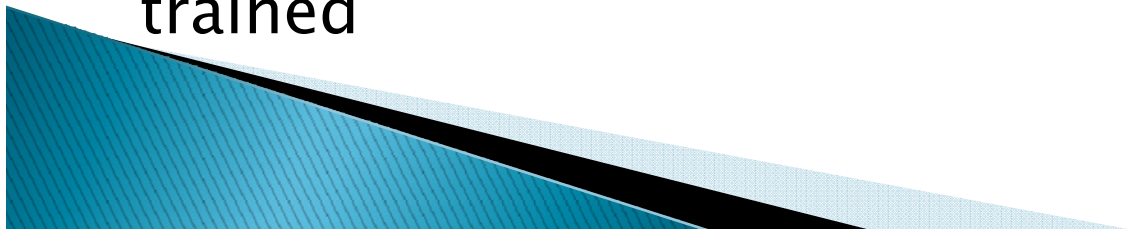


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National Cleaner Production Centre in Macedonia (NCPC MK)

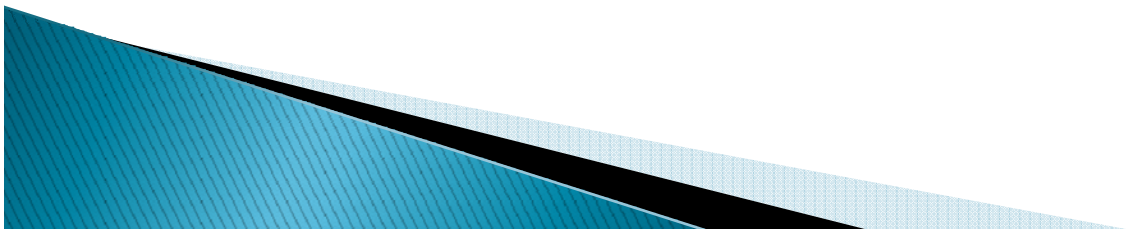
- ▶ Established in 2007 with support of UNIDO
- ▶ The Ministry of Environment and Physical Planning proposed that the NCPC should coordinate the implementation of CP activities at national level
- ▶ Host institution – Faculty of Mechanical Engineering from the University "Ss. Cyril and Methodius" in Skopje
- ▶ NCPC has carried out CP assessments in 36 enterprises, of which 12 enterprises were from the agro–industry
- ▶ 36 national Cleaner Production experts have been trained



What are the main aims?



Enhancing the competitiveness and market access of industry, primarily SMEs, in developing in transition countries



What is the main goal?



The main goal of Cleaner Production concept is to avoid generating waste in production systems while minimizing the use of energy, material, water and other natural resources. Its outcomes are reductions of production cost, energy consumption, pollution and health risks.

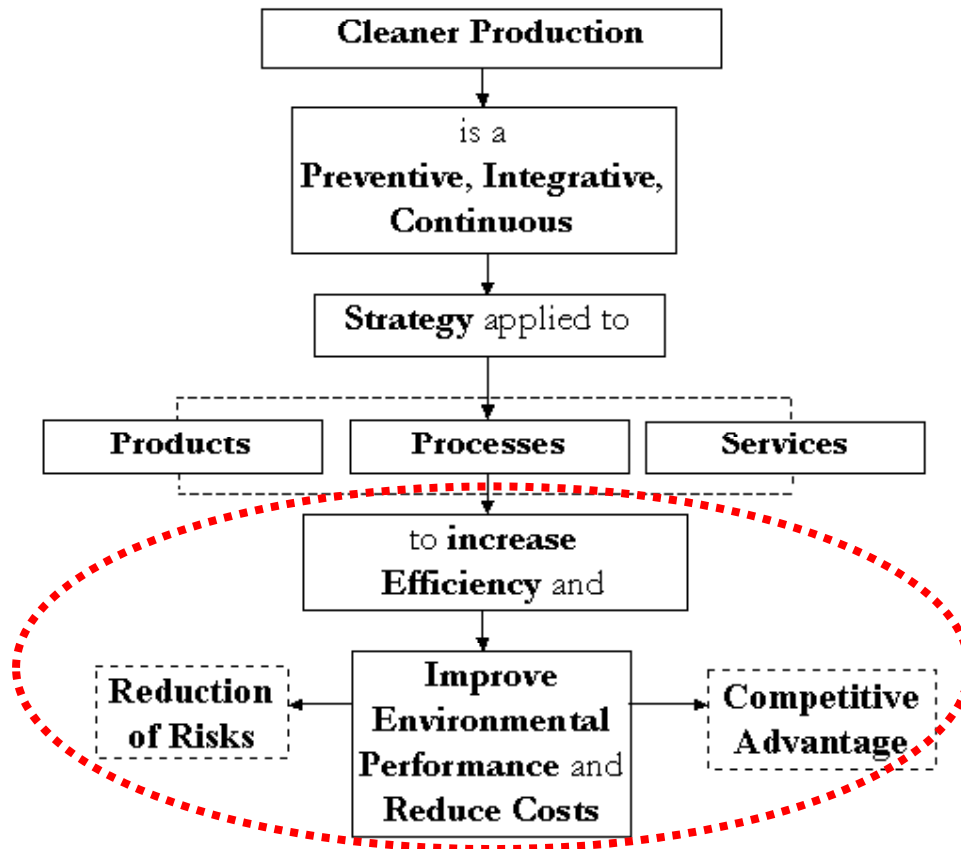


What are the CP aims for production processes?

- To reduce the consumption of raw materials and energy used in production of one unit of product,
- To eliminate the use of toxic and dangerous materials,
- To reduce at source the quantity and toxicity of all emissions and wastes generated and released,
- To improve the workplace health and safety.



Cleaner Production



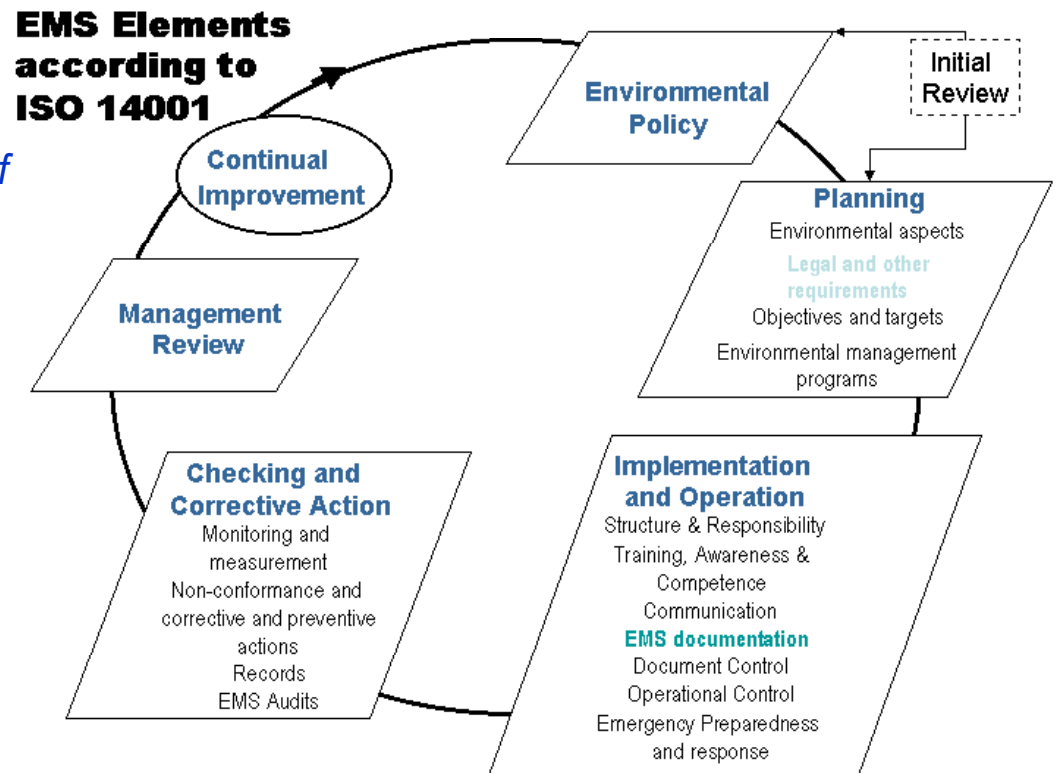
Cleaner Production is defined as the continuous application of an **integrated preventive environmental strategy** applied to **processes, products and services** to increase overall **efficiency**, and reduce risks to humans and the environment. Cleaner Production can be applied to the processes used in any industry, to products themselves and to various services provided in society.

Cleaner Production Options

- Housekeeping → Improving inventory management, material storage, material handling, organization of workplace, awareness and training to staff
 - Process Optimization → Rationalize and optimize production processes or operational practices, modify process sequence, modify operating parameters
 - Raw Material Substitution → Substitute hazardous / banned raw materials with safer and eco-friendly alternatives in the processes
 - New Technology → Replace outdated, inefficient technologies with innovative, more efficient technologies
 - New Product Design → Redesign products & byproducts to lessen damage to environment during manufacturing or useful life of products, improve product packaging
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Cleaner Production and EMS

- ISO 14001 offers a common standard approach based on the PDCA cycle
- While ISO 14001 integrates the *basics of impact assessment* and *scenario building* it *does not* clearly *distinguish* between pollution control and pollution prevention
- Thus, ISO 14001 certification is possible *with end-of-pipe* efforts alone and need not mandate improvement in environmental performance
- Cleaner production places emphasis on *pollution prevention* rather than control with clear improvement in environmental performance



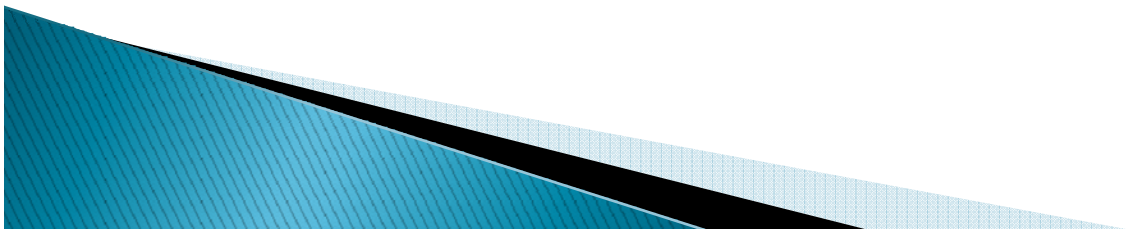
Use Cleaner Production within EMS framework

About Cleaner Production Assessments

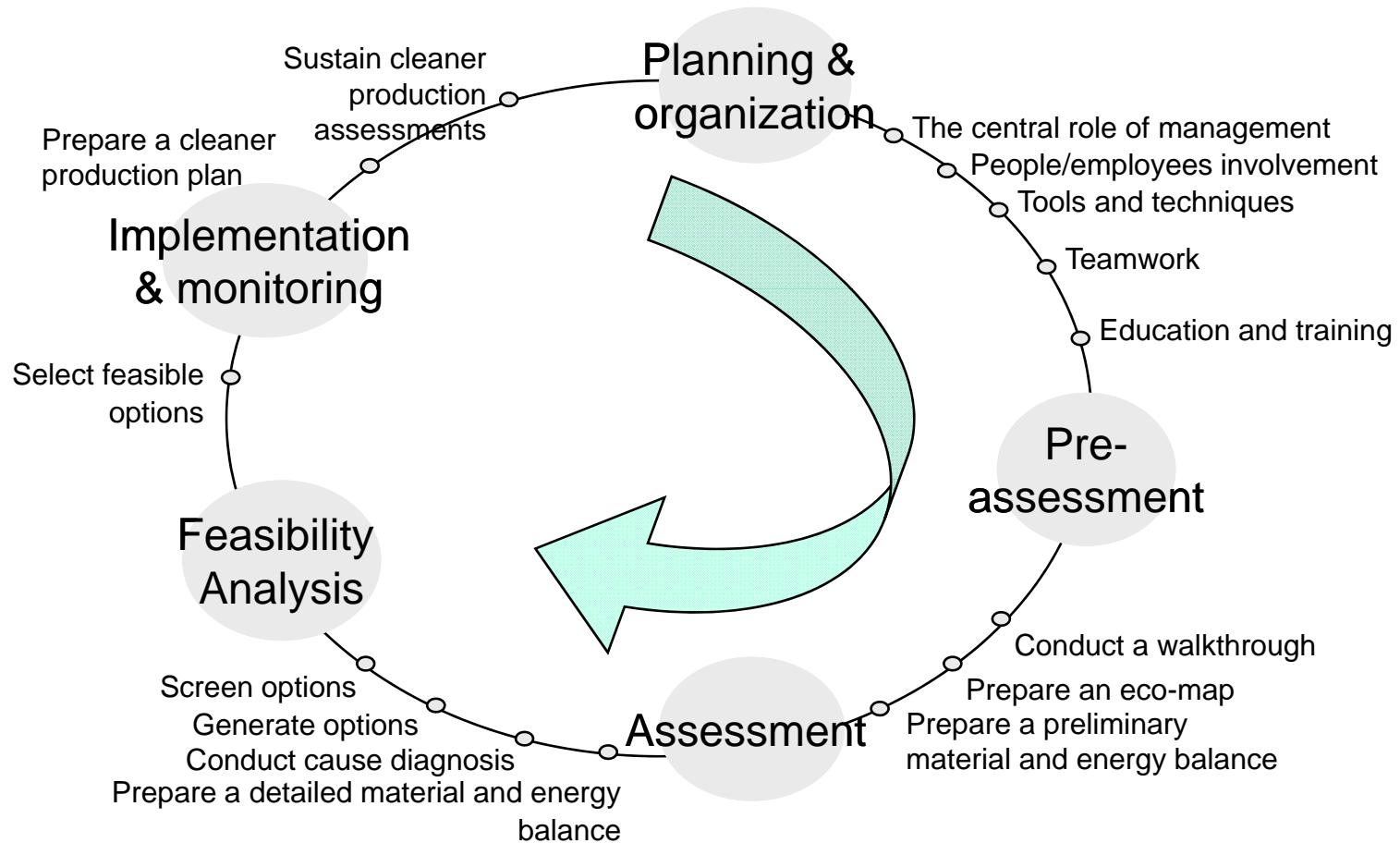
Cleaner Production Assessment (CPA) is a core service of a cleaner production centre. CPAs should be conducted in a *systematic* manner and *not on an adhoc* basis. A structured, systematic approach is essential for getting the best results and ensures that the outcomes of the CPA are consistent with those identified in the organization's broader planning process.

A generic CPA process consists of the following milestones:

1. Planning and Organization
2. Pre-assessment
3. Assessment
4. Feasibility analysis
5. Implementation & Monitoring



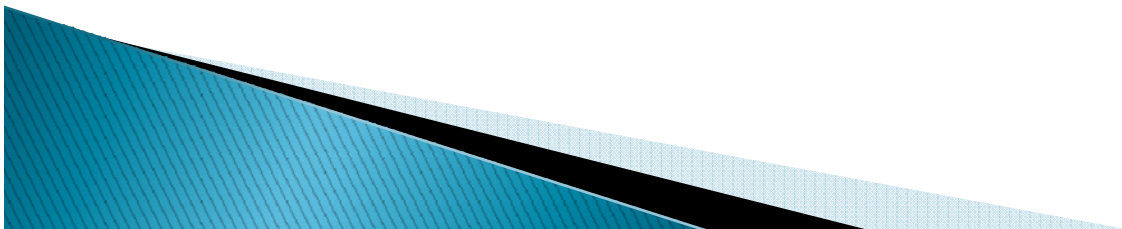
Generic Process of CPA



Benefits of CPA



- *Identification , characterization and quantification of waste streams* and thus *environmental and economic assessments of loss of resources* (material and energy).
- Identification of *easy to implement low cost cleaner production options* which may be implemented immediately.
- Preparation of *investment proposals* to financing institutions that involve high cost cleaner production options of technology or equipment change.



Planning and Organization

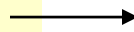


Obtain commitment of top management



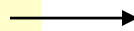
- Signing an MoU with the centre
 - Directing formation of a cleaner production team
 - Making available the required resources and
 - Being responsive to the results of CPA
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Involve employees



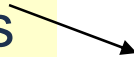
- All staff (top-down, with shop-floor staff)
 - Across all or limited departments
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Organize a cleaner production team



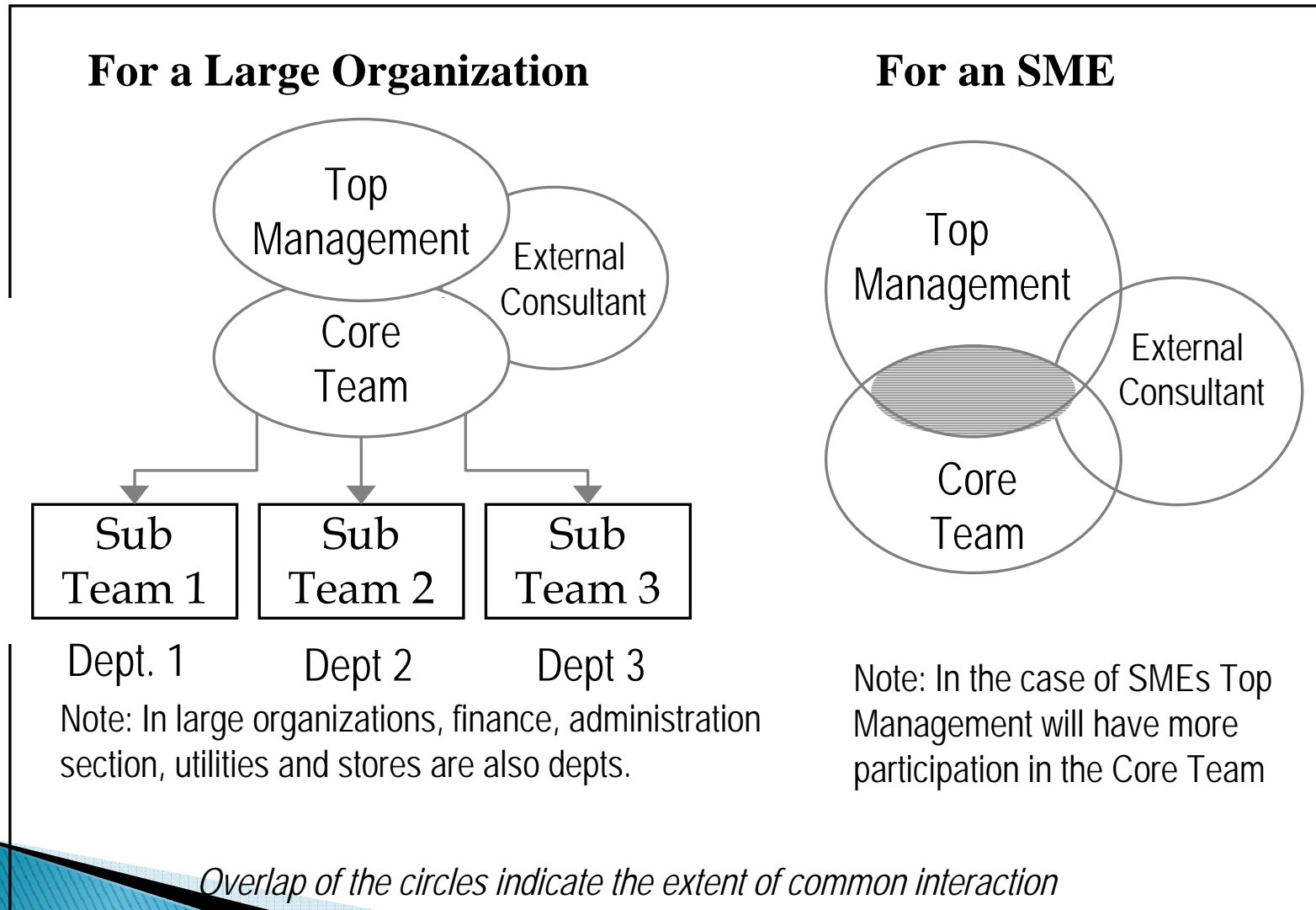
- For larger enterprises – core team plus sub teams
 - For smaller enterprises – owner plus sub team
 - Getting the right mix is crucial
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Identify impediments and solutions to the CPA



- Attitudes
 - Information
 - Technical
 - Financial
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Organizing a Cleaner Production Team



1. The central role of management

CP must first of all have the *active commitment* of top managers. They have to take personal charge, providing vision, forceful leadership and clear direction.

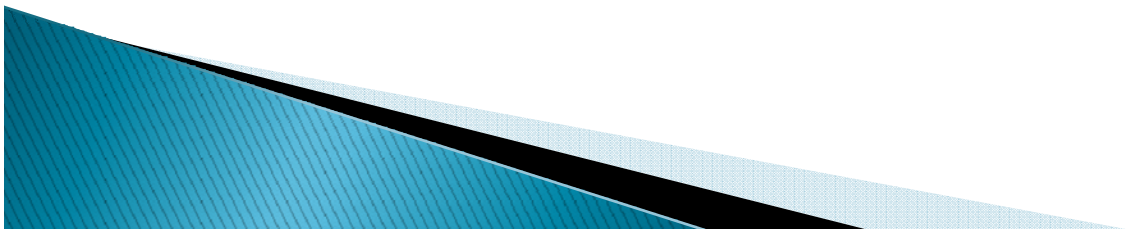
2. People involvement

At the heart of CP is the recognition that a company's most valuable resource is its people. The involvement of all employees in achieving continuous improvement in CP is essential. Equally important is that every employee is a potential contributor to *innovation and improvement*.

3. Tools and techniques

Central to the implementation of CP is the gradual introduction of tools and techniques *with a problem-solving focus*. CP tools include those that are simple to use, those that most employees can be trained to use, and those, such as Statistical Process Control (SPC), that require specialist training.

Such tools must be used within a method of investigation. The typical CP method is the PDCA (plan, do, check, act) Cycle, also known as Deming's Wheel.



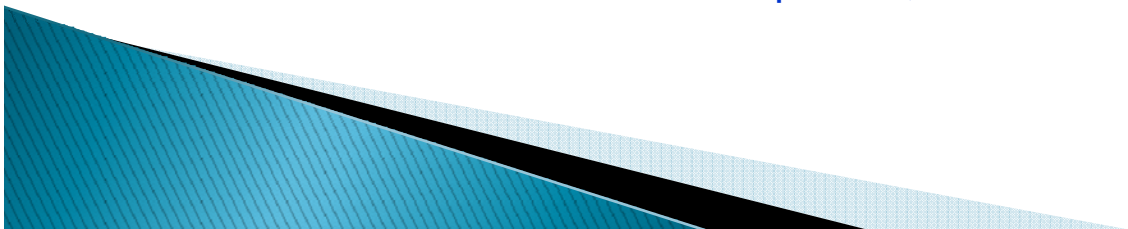
The PDCA Cycle

The PDCA Cycle, is an invaluable strategy for improving any situation, from solving a tiny production problem to introducing CP itself throughout a company. It consists of 4 steps:

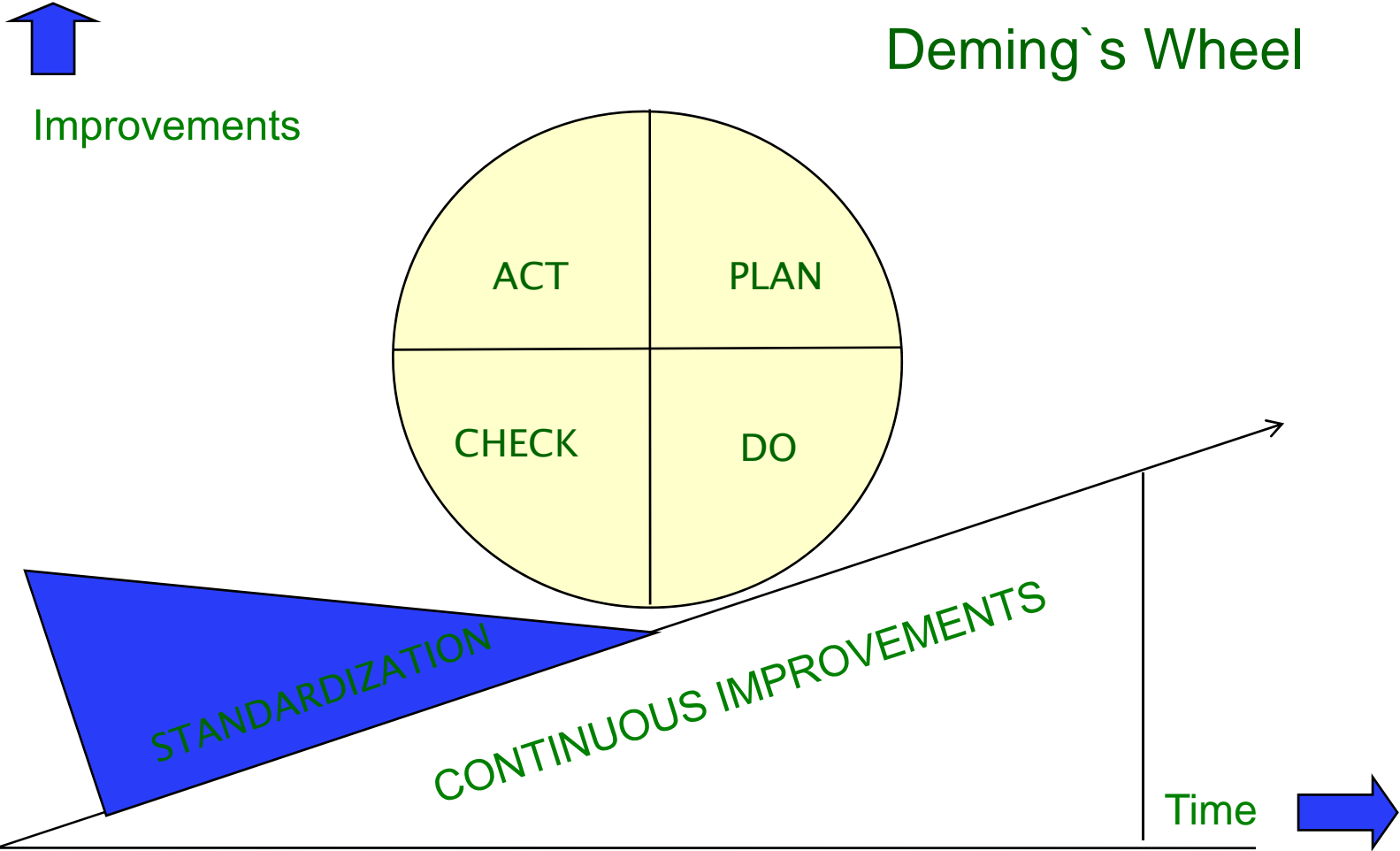
- I. Plan: gather data on the problem, identify the causes, decide on possible solutions or countermeasures, and develop a plan with targets, and tests or standards that will check whether the countermeasures are correct. This should be done systematically and thoroughly.
- II. Do: Implement the countermeasures.
- III. Check: Check the results of the implementation of the countermeasures against the standards established in the plan stage. If the countermeasures do not work, begin the cycle again with `Plan`.
- IV. Act: If the countermeasures are successful, standardize them and put them into regular use. They then become normal practice.

The resulting standards may then be improved and refined in further cycles of PDCA. The PDCA Cycle is in fact more than a problem-solving strategy. It is essentially a means to continuous process improvement.

Figure 1 shows how the final standardization after each successful PDCA cycle acts as a consolidator of what has been improved, and as the base for a further cycle.



Deming's Wheel

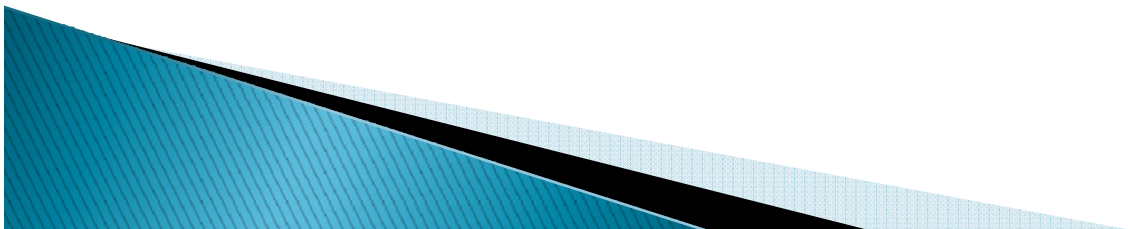


4. Teamwork

Identifying the root causes of problems is not always easy. In addition to tools and investigative methodologies there is an important role for employees working together in teams on shared problems. CP is a group of employees who meet periodically to solve problems and generate cleaner production options.

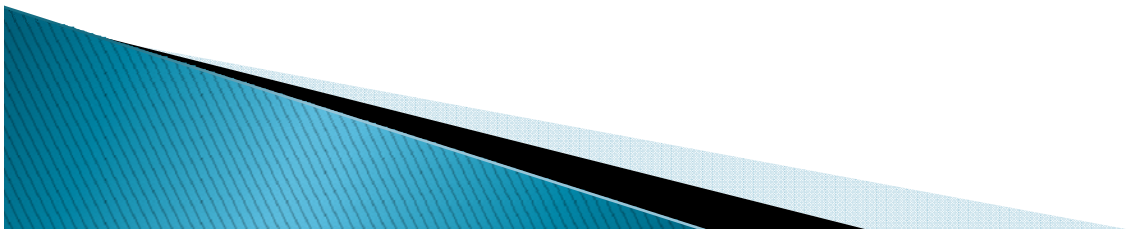
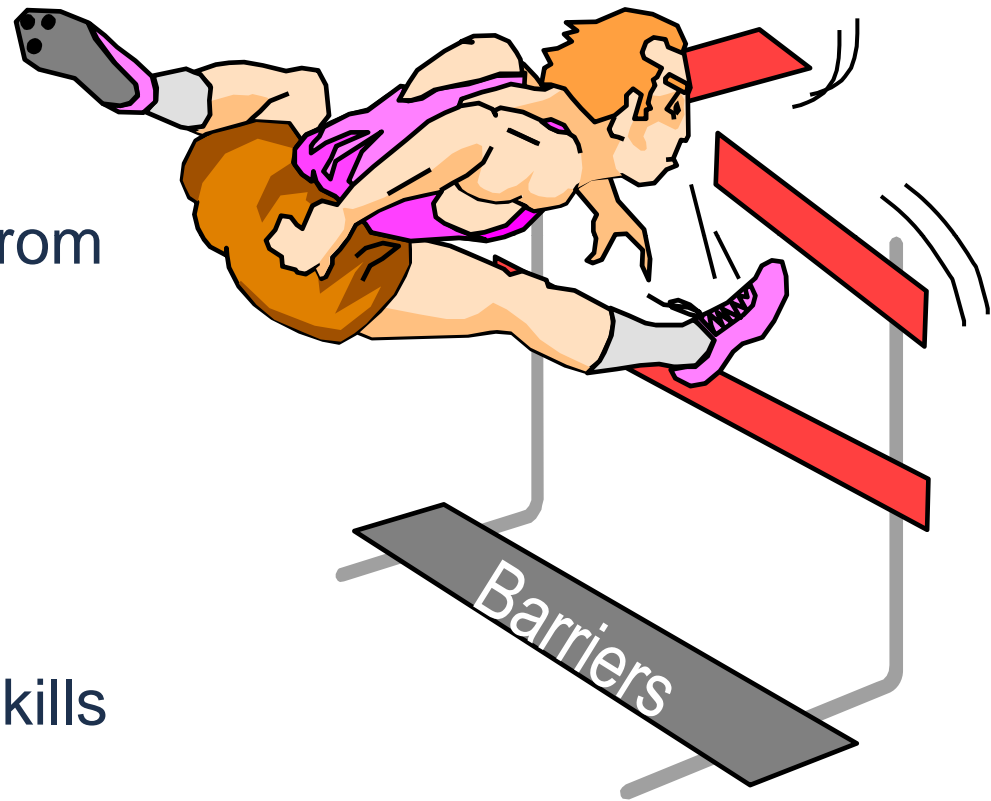
5. Education and Training

CP obviously involves major changes in any organization where it is introduced. With the high value it gives to human resources development, a full programme of education and training is essential. Training is needed to develop the practical skills of applying CP tools, education to effect the changes in behaviour and attitude and to ensure understanding of what is involved in the ongoing pursuit of continuous improvement.



Identify Impediments and Solutions to the CPA as a Process

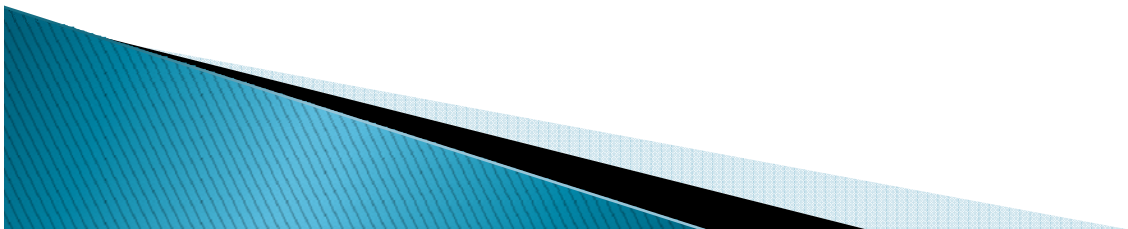
- Impediments in obtaining information from some departments
- Lack of awareness amongst staff
- Lack of appropriate skills amongst staff



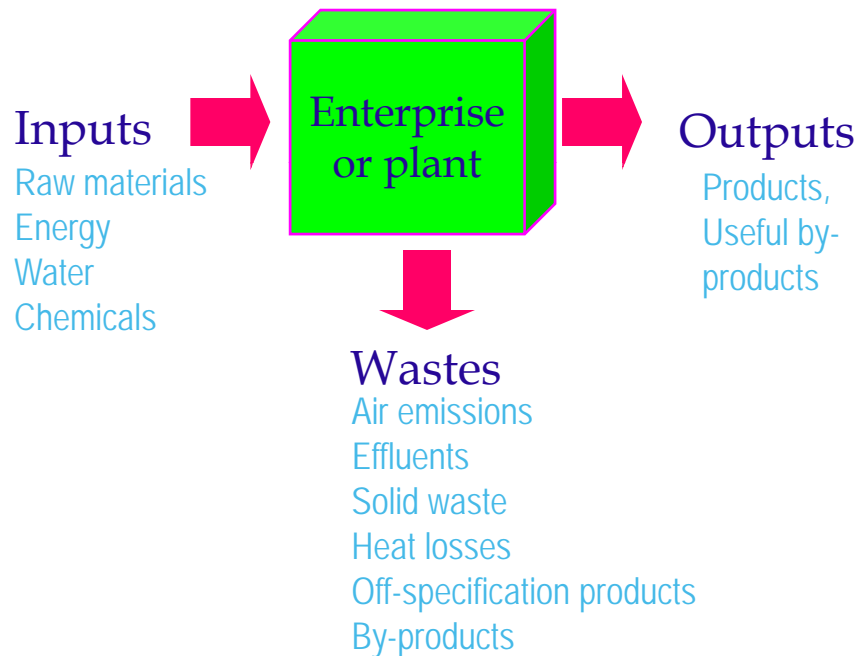
Deciding the Focus of the CPA

Deciding the focus of the CPA involves making decisions concerning:

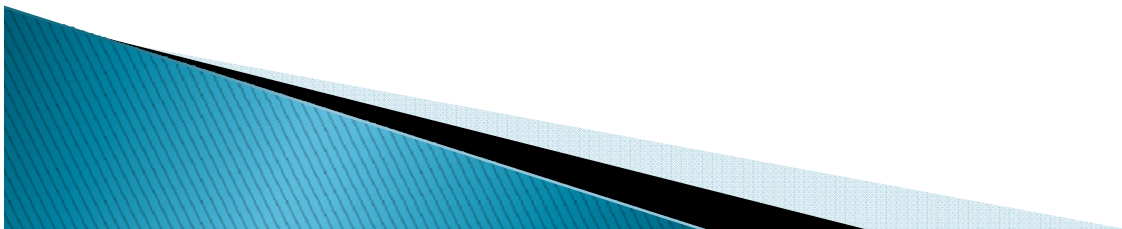
- The **scope**; i.e. whether to include the entire plant or limit it to certain units / departments
- The **emphasis** in terms of materials; e.g. water, energy or chemicals



Preparing Material and Energy Balances



- ▶ A material and energy (M&E) balance is a basic inventory tool, which allows for the quantitative recording of material and energy inputs and outputs.
- ▶ The basis of the material balance is the PFD.
- ▶ An essential step in the M&E balance is to check that "what goes in must come out somewhere."
- ▶ All inputs should thus have related outputs.



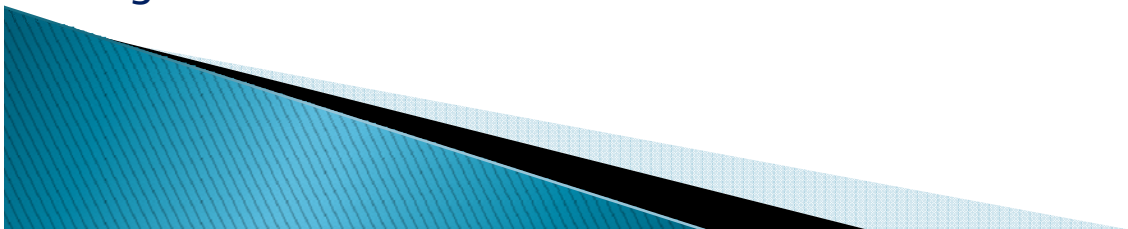
CONCLUSION

Cleaner Production technologies should be implemented and used in everyday life of the companies, followed with technical improvements of the manufacturing process that should be performed on a daily base.

Along the small investments in the current equipment, the managerial team from the companies should start investments in capital equipment which will be followed by the much more savings and will contribute to the sustainability of the Cleaner Production project.

The main concept of the cleaner production technologies and their implementation should be followed by organizing seminars and workshops for the employers, administrations and management staff for the dissemination of the knowledge and improvements of the professional skills which will contribute to the sustainability of the Cleaner Production Project.

Also implementation of CP concept, has a great importance for all companies in their efforts to fulfil the obligations according to ecological and environmental regulations of RM and EU.





Situation before and after the implementation of the CP technologies in company X

THE WORKING PLACE IN THE INTERNAL WAREHOUSE IN COMPANY Y



a) Before starting the project



b) After rearrangement into workshop

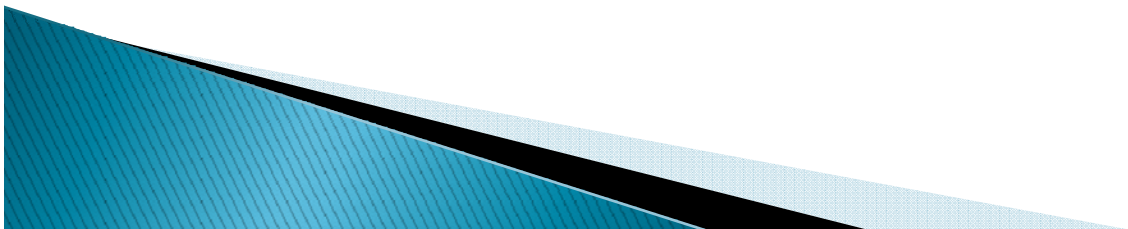
THE EXTERNAL TEMPORARY STORAGE PLACE IN COMPANY Z



a) Before starting the project



b) After rearrangement



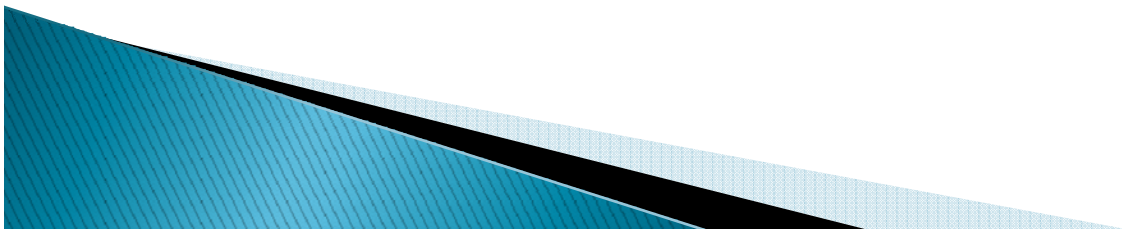
THE “MARKED” PLACE FOR TEMPORARY STORE OF WASTE CHEMICAL MATERIAL



a) Before starting the project



b) After rearrangement



PERSONAL HEALTH AND SAFETY EQUIPMENT FOR THE WORKERS



a) Worker on NC- CM



b) Worker on NC-BM

Thank You!

Q & A

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