

# GREENPHILIPPINES

Greening the Philippine Industries with the **ECOPROFIT** Approach



A project funded by  
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## Monetary assessment of material flows

## Definition

**Environmental costs are costs that occur in a company**

- **when measures for environmental protection need to be taken, mostly in order to fulfil legislative requirements**
- **When complete plants or parts of plants were acquired due to environmentally relevant reasons**
- **When materials generate waste when they are not supposed to become waste**

## **Purpose of environmental cost accounting**

**Documentation of cost which probably can be avoided**

**Preview upcoming environmentally relevant costs**

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## ECO-EFFICIENCY



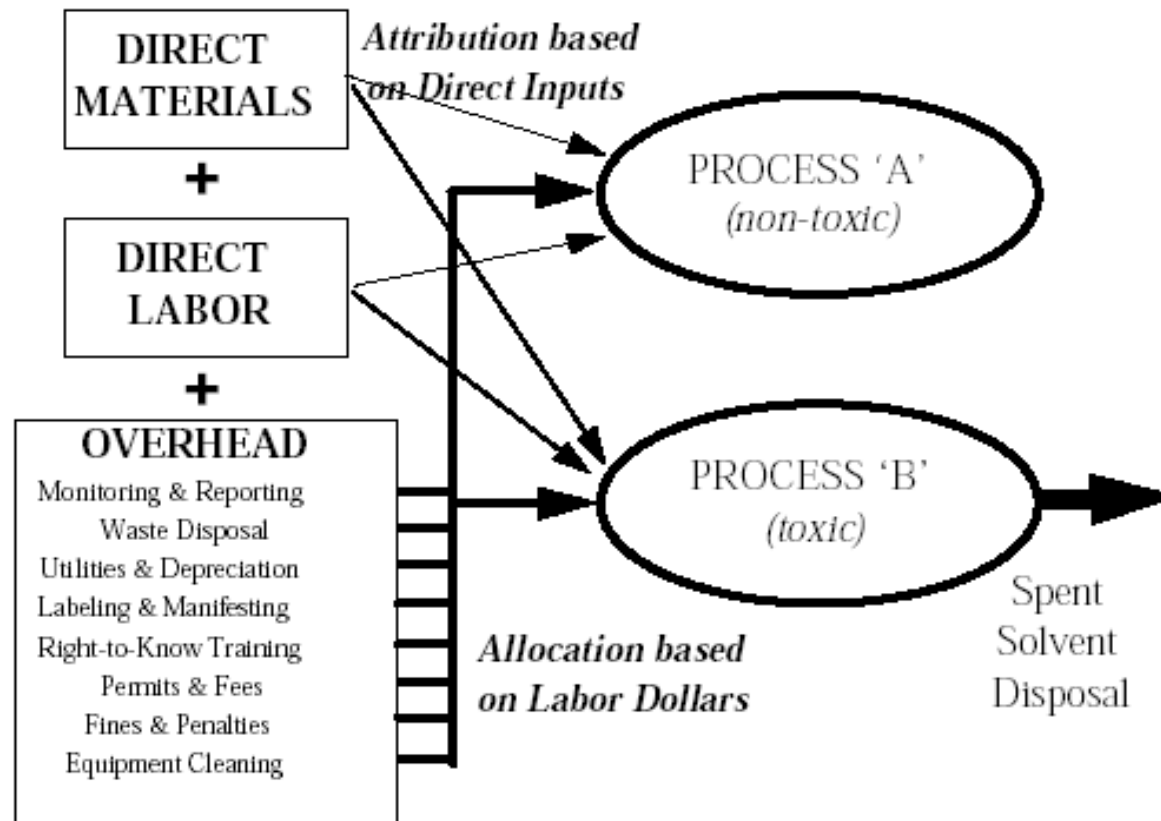
**Waste and emissions are paid and purchased raw materials, auxiliary materials and operating materials that were not transformed into sellable products**

## Purpose of environmental cost accounting

- **Linkage of physical with monetary data**
- **Assigning of costs to the actual process that generated them**

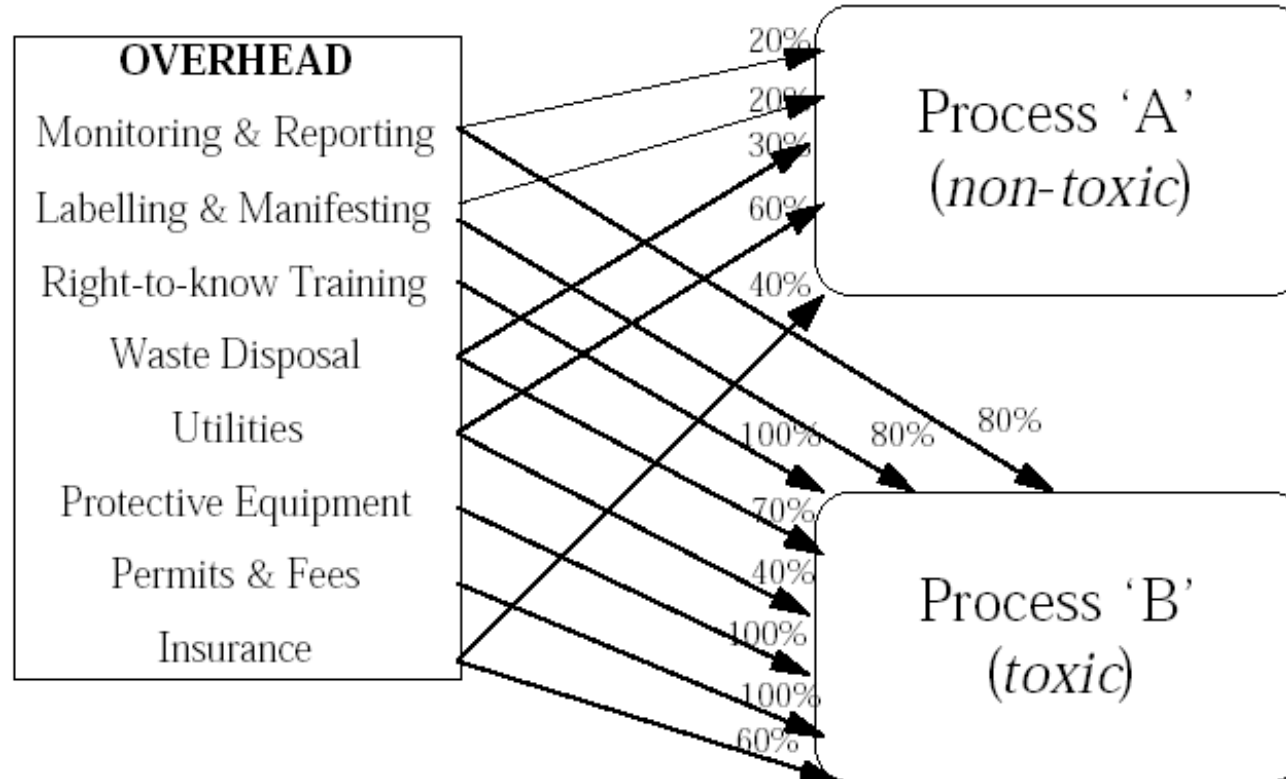
## Determination of product prices

according to conventional cost accounting



## Determination of product prices

according to full costs



## Which costs are environmental costs?

**Environmental costs include** expenditures for environmental protection measures **that fall under the categories of:**

- **Prevention**
- **Elimination**
- **Planning**
- **Monitoring**
- **Evasion measures and**
- **Damage**



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## What are operational environmental costs?

	<b>Costs of environmentally relevant equipment (emission treatment and waste prevention)</b>
<b>+</b>	<b>Costs of non-productive material (losses)</b>
<b>+</b>	<b>Costs of non-productive capital and personnel</b>
<b>=</b>	<b>Overall operational environmental costs</b>

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## Environmental cost scheme

Environmental media	Air / Climate	Waste water	Waste	Soil / Groundwater	Noise / Vibration	Biodiversity / Landscape	Radiation	Other	Total
Environmental cost/expenditure categories									
1. Waste and emission treatment									
2. Prevention and environmental management									
3. Material purchase value of non-product output									
4. Processing costs of non-product output									
<b>Σ Environmental expenditure</b>									
5. Environmental revenues									

Figure 9. Overview on environmental cost scheme

## Calculation of environmental costs

- **Takes into account all relevant cost blocks**
- **“environmental” costs are part of an integrated system of material and monetary flows**
- **Enhancement of an existing environmental cost calculation concentrating on material flows and environmental aspects**

## Categories of environmental costs

- 1. Waste and emission treatment**
- 2. Prevention and environmental management**
- 3. Material purchase value of NPO**
- 4. Production costs of NPO**
- 5. Environmental revenues**

## **1. Waste and emission treatment**

**1.1. Depreciation of equipments**

**1.2. Maintenance and operating materials**

**1.3. Personnel**

**1.4. Fees, taxes, charges**

**1.5. Fines and penalties**

**1.6. Insurance for environmental liabilities**

**1.7. Provisions for clean up costs, remediation...**

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## End-of-pipe environmental protection plants

**The plant was acquired specifically for environmental protection reasons and not necessarily for production itself**



100% environmental relevant costs

## Integrated environmental protection plants

**the plant was acquired into a part X more  
expensive design due to environmental aspects**

Environmental costs =  
Part X



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## Non-BAT-plants

Plants that are no longer up to date with technology and compared to BAT, produce more emissions or waste



**environmental costs =  
costs of waste and  
emissions which could have been  
prevented**



## How much does it cost to produce 1m<sup>3</sup> of wastewater?

**In order to produce 1m<sup>3</sup> of wastewater, you need:**

- **approx. 1m<sup>3</sup> of freshwater**
- **a little bit of the raw materials and products**
- **cleaning agents and other auxiliary materials**
- **energy, in order to warm the water**
- **equipment in which to mix all the substances**
- **personnel**
- **infrastructure**

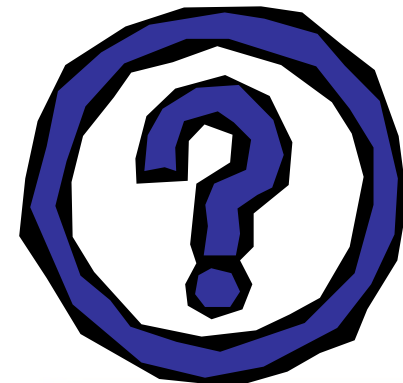
**And, in addition, the disposal fees!**



## How much does it cost to produce 1m<sup>3</sup> of wastewater?

### Waste and emission treatment:

Depreciation for WWTP	56 c
Maintenance and operating Costs	39 c
Personnel	167 c
Fees	78 c



## Categories of environmental costs

1. Waste and emission treatment
2. Prevention and environmental management
3. Material purchase value of NPO
4. Production costs of NPO
5. Environmental revenues

## 2. Prevention and environmental management

**2.1. External services for environmental management**

**2.2. Personnel for general environmental management activities**

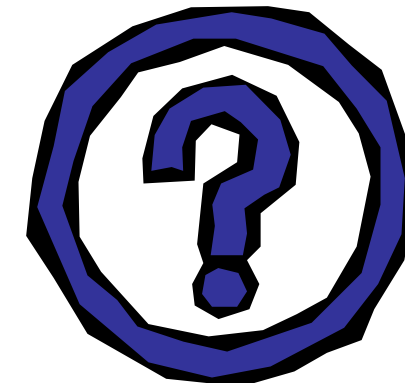
**2.3. Research and Development**

**2.4. Extra expenditure for cleaner technologies**

**2.5. Other environmental management costs**

## How much does it cost to produce 1m<sup>3</sup> of wastewater?

Depreciation for WWTP	56 c
Maintenance and operating Costs	39 c
Personnel	167 c
Fees	78 c



### **Prevention and environmental management:**

R&D-Project for less chemicals use	24 c
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## Categories of environmental costs

1. **Waste and emission treatment**
2. **Prevention and environmental management**
3. **Material purchase value of NPO**
4. **Production costs of NPO**
5. **Environmental revenues**

## 3. Material purchase value of NPO

**3.1. Raw materials**

**3.2. Packaging materials**

**3.3. Auxiliary materials**

**3.4. Operating materials**

**3.5. Energy**

**3.6. Water**



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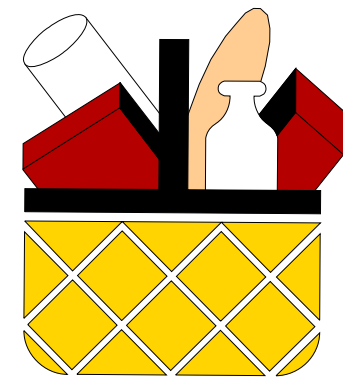


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**Whatever you find  
on the waste heap**

**has previously been in  
the shopping basket**





## Assessment of energy input

### Three types:

- **All energy spent is non product output and therefore environmentally relevant**
- or
- **Only transformation and transportation losses are environmentally relevant**
- or
- **Only avoidable energy losses are environmentally relevant**

## 4. Production costs of NPO

### Costs of

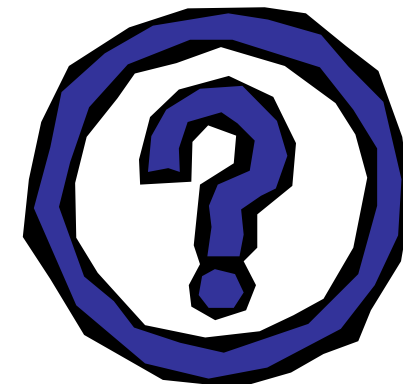
- acquisition
- transportation, storage...
- producing
- disposal

## How much does it cost to produce 1m<sup>3</sup> of wastewater?

Depreciation for WWTP	56 c
Maintenance and operating costs	39 c
Personnel	167 c
Fees	78 c
R&D-Project for less chemicals use	24 c

### **Costs of NPO:**

Losses of raw material	58 c
Auxiliary materials (detergents)	32 c
Operating materials (chemicals)	27 c
ca. 1m <sup>3</sup> fresh water	13 c
Manufacturing cost of NPO	unknown



## How much does it cost to produce 1m<sup>3</sup> of wastewater?

**Total**

**€ 4,94**

From the total is

➤ Price of raw material

€ 0,13

➤ Waste water fee

€ 0,78



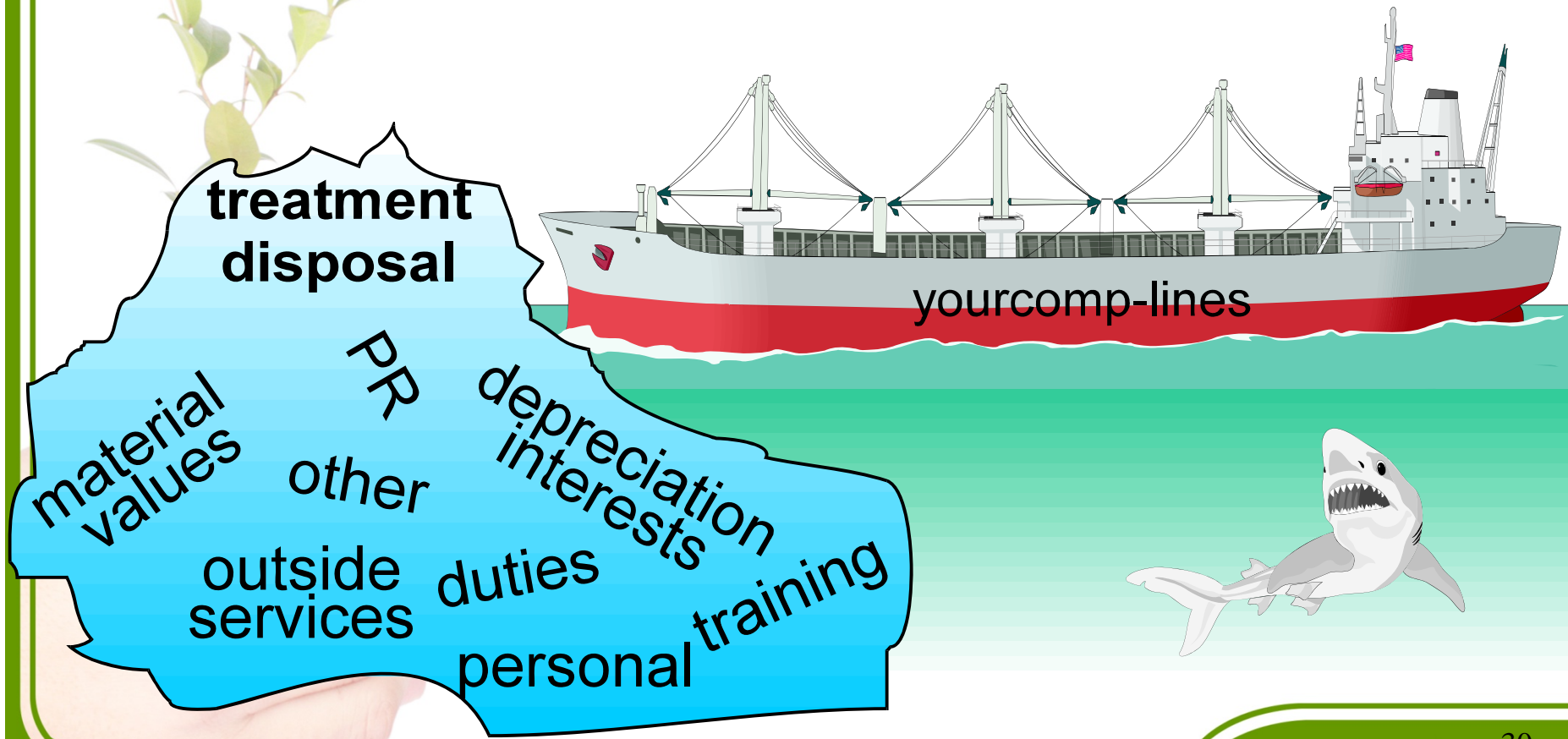
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## Apparent and Hidden Environmental Costs



According to Dimitroff

## Less waste by less raw materials

Instead of

- Additional expenditure for disposal

better

- Production integrated pollution prevention means utilization of raw materials as completely as possible

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## Pollution Prevention Pays

*Managing for a better environment*



## Recommendations

- **Material losses:**  
**outdated figures or estimated or up-to-date?**
- **Distinct account groups for materials or overall account?**
- **Consistent system borders (cost centre = process unit)?**
- **Record saving potentials!**




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**Production integrated measures for environmental relief and cost reduction can only be taken when the material and energy flows, along with their corresponding amounts, values, and costs are transparent.**