

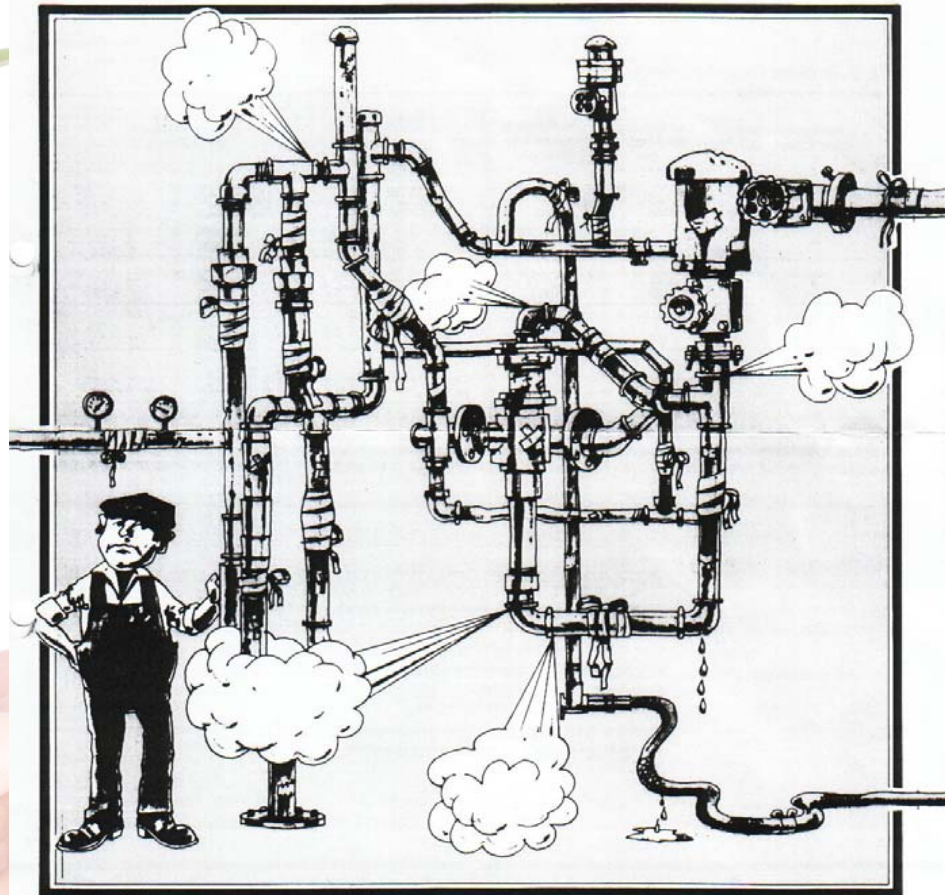
GREEN PHILIPPINES

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



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Energy Analysis Exercise



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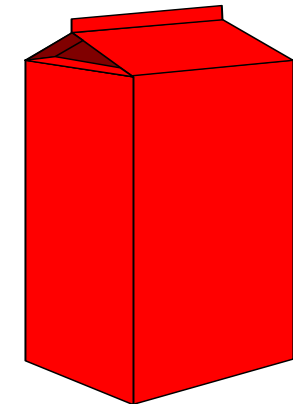
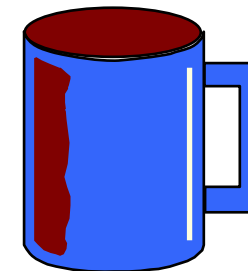
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Actual Situation

- You are a **process engineer** in a coffee shop
- The **process** of coffee cooking needs **too much energy**
- **Equipment:**
 - blue coffee machine with plate
 - blue coffee machine with insulated pot
 - stove with big pot with lid and small pot
 - black water heater
 - white water heater
 - immersion heater



Your Task

The management has put you in charge of analyzing and optimizing the production of a pot of coffee (hot water):

➤ **Measure**

- energy consumption [kWh]
- power [kW]
- duration [min]

➤ **Calculate**

- efficiency [%]
- energy cost [Rs./a for power, for consumption, total]
- specific cost [Rs./jug]

➤ Production of 3 pots of hot water 3 times per day

➤ **Give proposals for improvement**

➤ **Present the results to the management!**



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Your Resources

- **75 minutes** for group work and preparation of the presentation
- **5 minutes** for presentation
- **cooking equipment**
- **energy meter**
- **1** exercise form
- **1** flip chart
- **4** markers



Lessons from the coffee cooking example

➤ **management**

- energy measurement and generation of energy indicators for technology selection and improvement
- selection of adequate apparatus (losses)
- pay attention to demanded energy service
- production planning

➤ **energy supply**

- solar hot water preparation (pre-heating)
- change energy carrier (natural gas versus electricity)
- peak load management (production planning)
- lower power of apparatus

➤ **energy conversion**

- heat coil instead of big cooking plate

➤ **distribution**

- sealing of the filter device

➤ **heat consumer**

- insulation of coffee pot
- sealing of the filter device (steam losses)
- heat recovery (cooling of coffee from 95 °C to 55 °C)
- proper sized equipment (according to production demand)