

Air Pollution: Pollution Prevention (P2)

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P2

- For decades, air pollution professionals have been so consumed with how to *control* and *eliminate* air pollution that little thought was given to *preventing* its creation.
- Pollution prevention (P2) emphasizes the reduction or elimination of waste production before it is emitted into the environment.
- P2 strategies are designed to equip industry with cost-effective tools to combat the production of unnecessary waste and pollution through every phase of the production process.
- Pollution prevention [vs. control] offers important economic benefits and at the same time allows continued protection of the environment.
- While most pollution control strategies cost money, pollution prevention has saved many firms thousands of dollars in treatment and disposal costs, as well as, P2 increases productivity.

What is P2?

- Pollution prevention is the elimination or prevention of wastes (air emissions, water discharges, or solid/hazardous waste) at the source. In other words, pollution prevention is eliminating wastes before they are generated.
- Pollution prevention approaches can be applied to all pollution generating activity: hazardous and nonhazardous, regulated and unregulated. Pollution prevention does not include practices that create new risks of concern.

Pollution Prevention Act

In 1990, the US Congress established federal policy on pollution prevention by passing the Pollution Prevention Act. The Act states:

1. Pollution should be prevented or reduced at the source whenever feasible (i.e., source reduction),
2. Pollution that cannot be prevented should be recycled in an environmentally safe manner whenever feasible,
3. Pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible, and
4. Disposal or other release into the environment should be employed only as last resort and should be conducted in an environmentally safe manner.

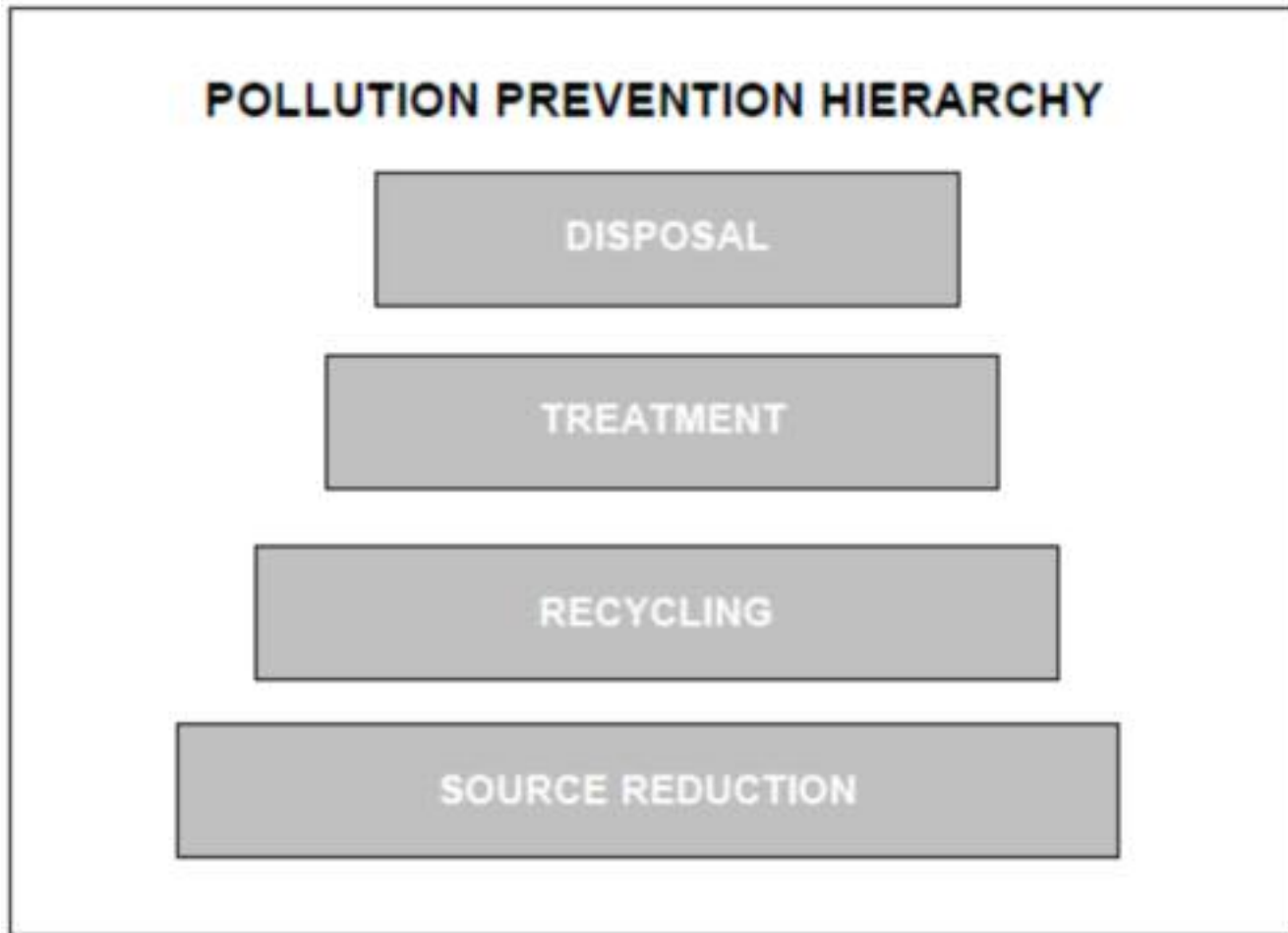
The Pollution Prevention Act defines pollution prevention as **source reduction**. Recycling, energy recovery, treatment and disposal are not considered pollution prevention under the Act.

The “in-process recycling” may qualify as pollution prevention. Recycling that is conducted in an environmentally sound manner shares many of the advantages of prevention—it can reduce the need for treatment or disposal, and conserve energy and resources

Pollution prevention means “source reduction,” as defined under the Pollution Prevention Act, and other practices that reduce or eliminate the creation of pollutants through:

- increased efficiency in the use of raw materials, energy, water, or other resources.
- protection of natural resources by conservation. [The Pollution Prevention Act defines “source reduction” to mean any practice which reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal.]
- reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants.

P2 Strategies



Source Reduction

- Source reduction is defined as any activity that reduces or eliminates the generation of waste at the source, usually within a production process.
- Ideally, the opportunity to employ one of the many options of source reduction occurs before a pollutant is even generated. The advantage of reducing or eliminating waste before it occurs is that it altogether avoids the need to later process or dispose of it.
- Source reduction options can frequently involve only minor procedural changes during processing, rather than the expensive retooling required of control technology solutions.
- Two of the most useful methods of source reduction are materials substitution and source control.

Material substitution occurs when a fuel source or raw material is replaced by a less toxic or volatile substance that is equally suitable for manufacturing.

- An effective example of material substitution would be the replacement of chlorofluorocarbons (CFCs) with hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs) that are less disruptive to stratospheric ozone.
- Another good example of material substitution is the process washing of coal and other ores before subjecting them to heat and other processes

A second method of refining pollutant emissions is through **source control**. Sometimes a change in the equipment or operational settings of a plant can greatly affect the quantity or toxicity of a pollutant.

Physically segregating toxic chemicals from one another can also avoid dangerous spills or fugitive emissions produced by chemical mixing.

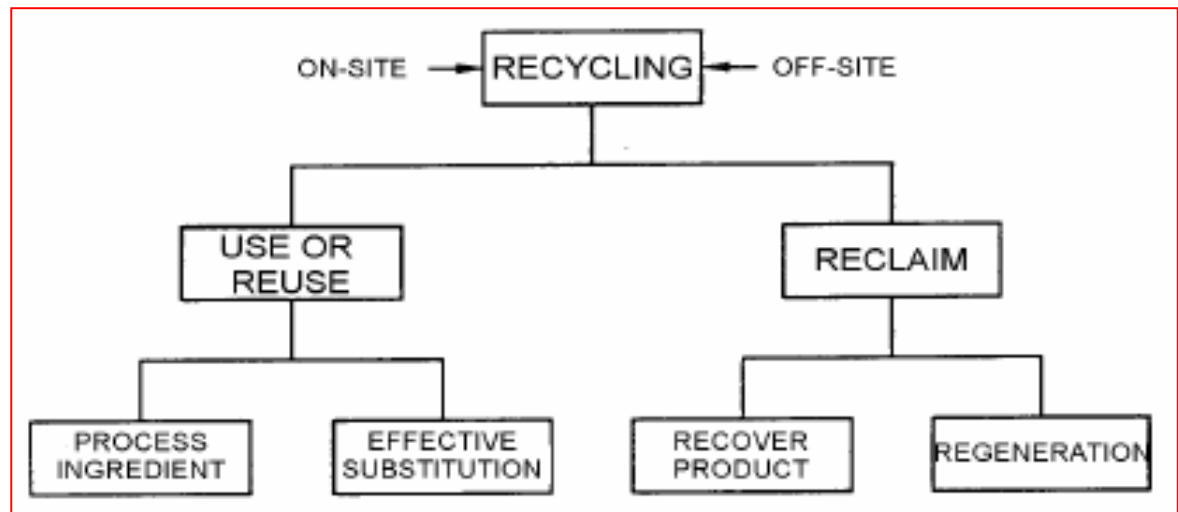
Regardless of which methods may be suitable for a specific industry, changes to plant design and operations or material handling practices can generally be an effective way to reduce the number of catastrophic public health episodes hastened by air pollution

Recycling

Although recycling techniques are also an important means of pollution prevention, they should be used only when other source reduction techniques have been exhausted.

On-site recycling of waste is especially effective when a waste product can be used as a fuel supplement or substitute to power a plant's manufacturing operation. Some waste by-products, in fact, have a high enough energy value to serve as a primary fuel source for many industrial operations.

Waste exchange between industries is both economically advantageous and ecologically sound since industry profits from the redistribution of its waste.



Treatment

- Occasionally, however, a pollutant will have a chemical composition that cannot be reduced, substituted, or effectively recycled. Usually these substances are extremely toxic forms of waste and represent one of the biggest challenges to the pollution prevention specialist.
- Treatment of hazardous materials can include incineration, chemical alteration, or biological and physical treatment.
- The overall goal of any treatment process is to reduce the amount and toxicity of a substance that cannot be eliminated or recycled

Disposal

- Waste disposal can often be the last opportunity to safely shield humans and the environment from the toxic effects of pollution.
- Four methods commonly used in hazardous waste disposal include land-farming, deep-well injection, landfilling, and ocean dumping.