## 2.3 Dimensions of Waste: It's Not Just in the Dumpster

If business owners identified the costs of basic types of waste they encountered, they would likely cite such waste categories as materials, energy, space, labor, and time. Each can be an unwanted or unnecessary cost. Upon examination, it is likely that business owners will understand the details of many waste sources in each category.

The two waste categories most impacted by regulations and related technical assistance programs are **material waste and energy**. Material waste is often classified by the nature of material and by the environmental medium into which it is released. Table 2.3 lists some material wastes and their potential fate in terms of the environmental medium that could receive the waste:

### Table 2.3 Waste Disposal

| WASTE TYPE | AIR | LAND | WATER |
|---|---|---|---|
| Solid waste | Incineration | Landfill | Landfill leaks |
| Hazardous waste | Incineration | Hazardous waste landfill | Leaks/Spills |
| Sewered waste discharge | | | Direct |
| Smoke stacks | Direct discharge | Landfill | Precipitation |
| Fugitive emissions | Direct discharge | | Precipitation |

Table 2.3 illustrates that although a particular waste stream is intended for one environmental medium, it often ends up in another. This is why the U.S. EPA and state regulatory agencies are emphasizing **multimedia pollution prevention**. The emphasis is to reduce or eliminate waste without transferring the problem between mediums.

To begin with, any one waste material can cause degradation by ending up in several places in the environment. Any of these routes can be a direct cost to the company in terms of disposal charges, permits for releases, reporting requirements, et cetera. Now let's consider material waste from a different perspective. Instead of looking at one waste at a time, consider all of the wastes associated with making one product, and try to determine what potential impact that has on the cost of producing that product or service.

**Here is a partial list of waste streams related to one product.**

**Manufacture of a metal toy or a bicycle**

- **packaging waste** in the receiving department in which the raw materials and parts are shipped.
- **waste coolants and lubricants** from the machining operations.
- metal punching process results in **scrap** generation.
- metals have to be cleaned before painting, resulting in **used cleaning agents and sludges**.
- pre-treat metals for painting, resulting in **sludges and sewer discharges**.
- welding operations release the product to be painted, and waste will be generated from **overspray, air filters, and paint gun cleaning**. The latter may result in a hazardous waste. The paint releases **air emissions or VOCs** (volatile organic chemicals).

Each of these waste streams will have one or more cost element to the company.

**Energy consumption**, like material use, can potentially generate many waste areas. Companies use energy in different forms, and like material use, it can be easy to miss energy-saving opportunities. For example, the toy manufacturer may use electricity and gas, the two most common energy sources. Some companies use coal, fuel oil, waste oil, wood, or diesel generators.

Lighting, building heating, process machinery, paint drying, and parts cleaning are all energy consumers and are possible waste energy sources. Companies can commonly save on energy by using more efficient lighting, heating, machinery motors, and heat recovery and reuse in processes or for building heat.

Sometimes a waste reduction or prevention project results in using a technology that requires more energy. In that case, the company needs to decide what makes the most sense in terms of net cost and company priorities. The important point is that when possible, **use an integrated approach to reducing waste**. To emphasize this, waste materials take up space, time, and labor to process. For example, generating hazardous waste from a painting operation requires storage space, recordkeeping, reporting, handling, employee training, and other potential responsibilities.

The next sections show the many dimensions of cost as related to waste, and show that companies need strategies to improve their understanding of waste and its impact on the bottom line for each product.