

Ecology of Your Market Workshop

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**Washington
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Association**

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WATER QUALITY
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Introduction

Brant Rogers

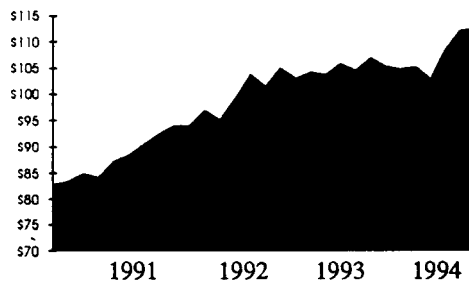
NOTES:

Grocers had an environmental identity crisis for most of the past 25 years. When other businesses were dealing with superfund sites and parts per million of dioxin, most grocers were dealing with customer complaints about garish packaging for canned pudding and requests for recycled toilet paper. The environmental liabilities for grocers paled in comparison with many other businesses. In recent years though, the din of customer and employee questions about such things as packaging, hazardous household cleaners and pesticide residues on foods has increased considerably. The time for development of an environmental consciousness in the grocery business was at hand.

Further impetus for the grocer's environmental ethic came as an open-eyed accounting of the expenses of doing business saw the soaring cost for natural resources. The price of energy, water and garbage service has risen steeply in the last few years and will continue to grow at a considerable clip. In 1991, tipping fees for garbage in much of the Puget Sound area cost less than \$50 a ton. In 1995, the cost per ton will approach \$100 in some areas. Similar or more dramatic increases in the cost of water, sewer, electricity, and natural gas are common. Careful conservation of these once inexpensive resources is becoming a pragmatic business practice.

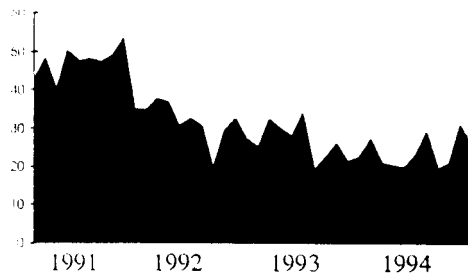
If customer concerns and utility costs weren't enough to stimulate interest in development of environmental programs for grocers, a recent flurry of regulatory issues that impact this relatively clean industry are beginning to demand attention. Among a host of recent regulatory impacts is that EPA has begun

to regulate CFCs in stores' large refrigeration and air conditioning systems; the Federal Trade Commission has guidelines for green marketing claims; various governmental agencies have strict but varying standards for disposal of fluorescent lamps and ballasts; sewer utilities have discharge limits for common substances such as oils and food scraps, and so on. Legislatures and government agencies are apparently hungry for more control of the environmental activities of businesses and more regulations can be expected in the coming years.



The increase in average cost of disposing a ton of garbage from January 1991 until early 1994 at a grocery store in Kirkland, Washington

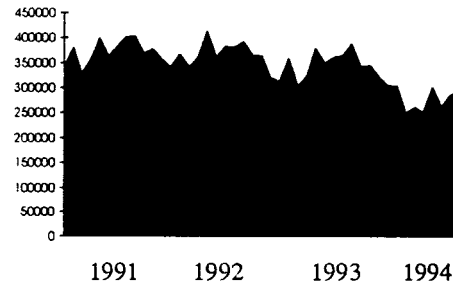
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Number of tons of garbage per month produced by a Seattle supermarket 1991- early 1994. The store began food waste composting in early 1992.

has three grocery chains as major sponsors where only one company supported the Fair in the beginning. In another local milestone, one of North America's first comprehensive food waste composting programs was begun by a local grocery chain in late 1991. Now there are three composting companies handling food waste from a number of Puget Sound area grocers.

Energy is another environmental issue addressed aggressively by grocers in the past few years. Aided by local electric utilities, numerous grocers have begun to retrofit old stores for energy efficiency and build new stores with the latest technologies and management strategies for energy management. There is a growing recognition in the



Number of kilowatt hours used per month by a Bellevue grocery store January 1991 - August 1994. An energy management program began in early 1994 and reduced use by 25%.



industry that conserving energy means saving dollars and good environmental stewardship. Each kilowatt hour conserved means less CO₂ and other gases produced by power plants and less demand upon dwindling hydro power.

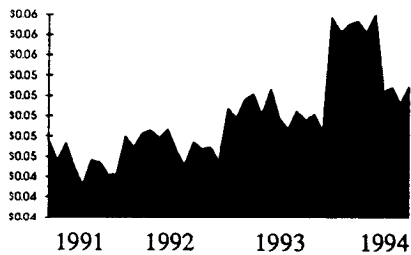
Beyond these, I could recite the litany of other activities such as packaging reduction, surface water management, buying recycled, water conservation, and more that are being addressed by some of the region's grocers. A natural outgrowth of this groundwork has been the development of The Ecology of Your Market Workshop.

Since early 1994, representatives from a number of governmental and private organizations have worked to bring their specialized knowledge of environmental issues into the workshop. Experts on the advisory board for this workshop include representatives of METRO's Industrial Waste Division, Washington State Energy Office, Environmental Resource Services, City of Bellevue Surface Water Utility, King County solid Waste Division, and the Puget sound Air Pollution Control Agency. Beyond this, support has come from the Puget



NOTES:

Organic produce is considered environmentally more acceptable to many customers these days.



Increase in the cost per kilowatt hour paid by a Seattle area grocery store from January 1991 until mid-1994.

Sound Water Quality Authority, Washington Food Dealers Association, and the Washington Retail Association in development of the workshop. Early in the year, focus groups consisting of local grocers gave the advisory board a chance to tailor the workshop to the needs of the grocers.

In keeping with the concept of ecology (or industrial ecology), the Ecology of Your Market Workshop focuses on all aspects of the environmental impact of doing business. Information about the types of environmental issues most important to the grocer such as CFC's, surface water, energy conservation, environmental products, recycling, composting and more are covered. Case studies about how the issues were dealt within other businesses are part of the workshop. Regulations and legislative issues will be covered. Also, enrollees analyze energy, garbage and water bills during the day. The workshop is structured to be a series of practical exercises tailored to the needs of a grocer.

NOTES:

Energy Consumption in Supermarkets

Bill Younger, CEM

Energy Awareness is a growing part of the profit puzzle. As a store manager, one of the expenses you probably consider fixed is the cost of energy. But just as you manage your employees for greater productivity, you can manage your energy expenses for greater profits. Your task is to look for ways to conserve energy without sacrificing the appeal or efficiency of your store.

Effective management comes from an awareness of where and when energy is used in your store, proper operation and maintenance of the store's energy systems, and establishment of an ongoing monitoring procedure to ensure that the store continues to operate at its most effective level.

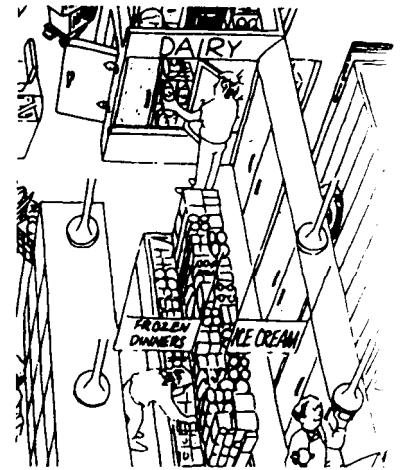
The first step is usually to make simple operational adjustments, such as reducing unnecessarily high light levels and moderating the temperature of the store. But heating, cooling and lighting account for only about one-third of the typical supermarket's total energy use. Refrigeration equipment, including fans and anti-sweat devices, can account for more than 60 percent of the energy budget. Unfortunately, these systems often require more intensive engineering analysis and higher retrofit costs to conserve energy.

Furthermore, a supermarket's energy-consuming systems are related to both one another and the building structure, which means that any adjustment to one system may affect the other system. For example, heat from the lights affects air conditioning requirements and refrigeration. On the other hand, waste heat from the refrigeration units can assist in water and space heating in the store. These interrelationships must be considered when implementing a store wide energy conservation program.

The exact amount of energy a supermarket consumes depends on a number of factors including:

- ◆ *Geographic location*
- ◆ *Building size & orientation*
- ◆ *Age & condition*
- ◆ *Departments*
- ◆ *Operating hours*
- ◆ *Quality of operation and maintenance*

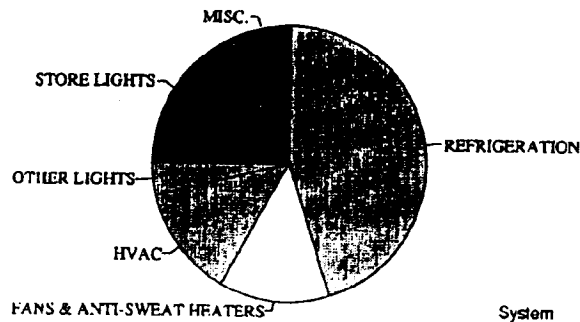
NOTES:



Supermarket Energy Use

Typical End Use

NOTES:



System	Percent
Refrigeration	40 - 50
Case fans & anti-sweat heaters	10 - 15
Case lights	1 - 2
Heating & cooling	10 - 15
Store lights	15 - 20
Outdoor lights	2 - 3
Hot water	2 - 3
Misc. (cash registers, doors)	4 - 8

Only a detailed audit will reveal precisely where and in what quantity energy is used in a particular building, but generalizations can be made from studies involving large numbers of stores. Such a generalization is shown on the pie chart. It is immediately apparent that the greatest portion of a supermarket's energy budget is spent keeping perishable food cold.

Awareness of where the energy is consumed in a particular store is an essential step toward controlling energy use and costs.

Energy Accounting

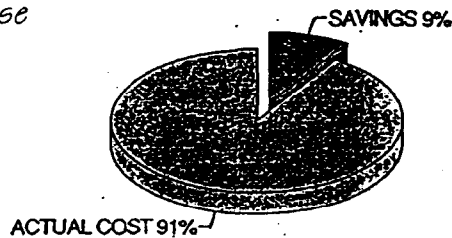
Bill Younger, CEM

NOTES:

Energy accounting is a system for tracking energy use and using that information to control energy costs. The goal is to provide energy data in an organized and usable form so that sound business decisions may be made. By understanding how energy is used in your organization, you can identify and prioritize energy management activities. Along with an energy awareness campaign and an aggressive operations and maintenance plan, energy accounting can help you cut costs without expensive investments in technology. This section will discuss collection, organization and analysis of energy consumption information.

The basis of energy accounting is recording energy-use data. Even minimal record keeping can help you:

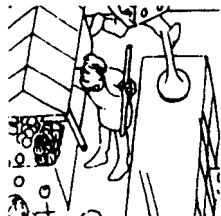
- account for current energy use*
- identify savings potential*
- justify capital expenditures*
- see results of conservation*
- gain management support*
- detect increased consumption*
- identify billing errors*



By analyzing the data further, it is possible to identify relationships between energy use and other factors such as occupancy, sales volume, floor area, and outdoor temperatures. Once seasonal patterns are established, any month's energy use that doesn't fit the pattern will signal that some change in business activity or energy efficiency has occurred. In this way, potential problems such as equipment failures can be identified and remedied sooner.

Organizing Utility Data

NOTES:



Monthly collection of data is usually sufficient to monitor energy management programs for most businesses and institutions. Organize all consumption data and graphs in a dedicated file and keep it up to date. Data must be recorded on a regular basis and made readily available to building operators and administrators as part of your ongoing energy management plan. It's a good idea to assign someone the responsibility of keeping the energy consumption data current.

Gather Information

Before beginning your energy accounting program, several steps must be taken to ensure you have all the information required to do a thorough and accurate evaluation of your energy consumption.

- Make sure you receive copies of all monthly utility bills.
- Sort utility bills by building or by meter, and organize them into 12-month blocks using the meter-read dates.
- Locate all meters and submeters. If numerous meters are used, it is helpful to clearly label them on a master blueprint for each building being monitored.
- Determine which building or space is being served by each meter.
- Calculate heated area (in square feet) for each building.
- Obtain historical energy data to establish a base year. If you don't have this information in your files, it can be obtained from your utility company.
- Obtain degree-day data. This information may be obtained from your utility company, local airport reporting station, National Oceanic and Atmospheric Administration, or your State Energy Office.

Spreadsheet Set-up

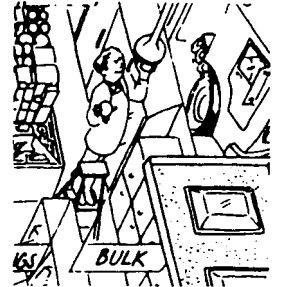
The forms used for recording energy data should be clear and usable to the people entering the data and to the analysts and managers interpreting the data. Record energy units (kWh, therms, gallons, etc.), electric demand (kW), and dollars spent for each fuel type. Units of production (number of units, occupied rooms, persons served, etc.) can also be included in your spreadsheet if such production is directly related to your energy consumption.

Electric Demand

Care should be taken to distinguish between billing and actual demand on your utility bill. Actual demand is the figure registered on your meter and should be used to evaluate power requirements and load factor of the facility. Billing demand is the amount of demand for which you are actually billed.

This figure may be different than the actual demand due to various types of rate schedules. Rate schedules that include a ratchet clause, power factor adjustment, or first block of kW at no charge can cause billing and actual demand to be different. Tracking kWh and kW charges separately can be useful in evaluating the impact of demand on your monthly electric bill. High demand costs can sometimes be lowered by simply rescheduling or alternating run times of particular pieces of equipment.

NOTES:



Energy Accounting Year

The energy-accounting year may be any 12-month period for which energy data is entered. Common years are the calendar year or the July-to-June or October-to-September fiscal years. Choose an accounting year that best suits your needs. Start entering data for the month that begins the accounting year. The same accounting year must be used for all weather and consumption data.

The Energy Use Index

Each energy type will be converted to a common unit (BTUs) for comparison and calculation of total energy consumed. The Energy Use Index (EUI) is the most common means of expressing the total energy consumption for each building. The EUI is expressed in BTUs/Square Foot/Year and can be used to compare energy consumption relative to similar building types or to track consumption from year to year in the same building.

Establish A Baseline Year

In order for energy consumption data to have meaning, a baseline year is needed as a standard for comparison. Typically, the year previous to initiating an Energy Management Program is used in order to show how much progress has been made since that year. If complete records aren't available for that year, use a more recent year or an average of several previous years to obtain typical values.

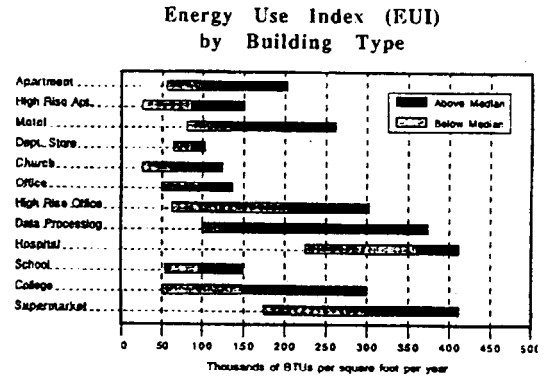
Conditioned Area

NOTES:

To calculate BTUs and dollars per square foot, it is necessary that an accurate assessment of heated area be calculated for each building. This can be done by referring to the dimensions in the blueprints or by measuring the outside dimensions of the building (length x width), and multiplying this area by the number of floors. Generally, basement areas and mechanical rooms are not included as heated areas unless heating units are installed and operating.

Electric Benchmarking

Supermarkets and grocery stores are electric intensive due to refrigeration and lighting needs. An "Electric Efficiency Benchmarking" system can be used by food stores to evaluate their energy efficiency performance compared to other stores.



The Michigan Public Service Commission (MPSC) recently conducted an electric efficiency benchmarking pilot targeted at grocery stores. The Michigan Grocers Association assisted in the pilot by distributing a survey to their 1,500 members. Eighty-three members, approximately 5%, responded to their survey.

Working with utilities who provided electric usage histories for participating stores, the MPSC calculated an annual kwh/square foot statistic for each store and an energy efficiency ranking of the 83 stores. Each participating store was provided their "Energy Efficiency Benchmark," their ranking, a bar chart showing the distribution of stores based on energy efficiency, some energy efficiency ideas, and a supermarket case study.

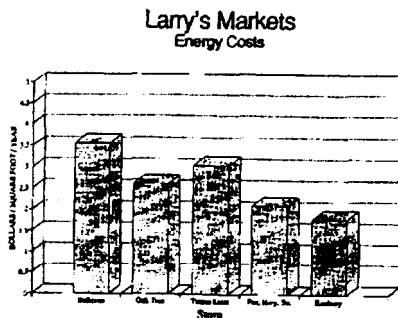
KWhs/square foot/year ranged from 7.07 to 84.62. The average was 45.84 and the median was 45.50. Larger stores tended to use more electricity:

Square Footage	KWh/ Sq. Ft./Yr.
2,000 - 10,000	41.45
10,001 - 20,000	44.48
20,001 - 30,000	47.31
30,001 - 40,000	47.25
40,001 - 50,000	49.29
50,001+	50.38

Graphs and Reports

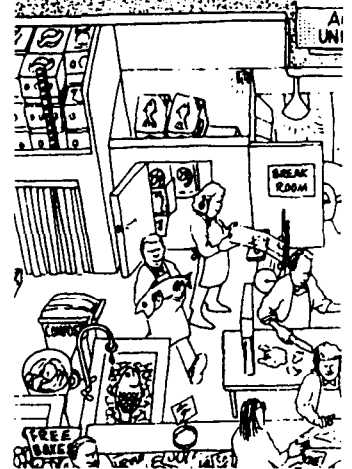
Once energy data has been collected and organized, it must be made comprehensible to those that will use it. This may include administrators, board members, building owner-s or managers and maintenance personnel, as well as accountants and energy analysts. It is important to identify and accommodate each audience that will be using the energy data to make decisions.

In addition to transmitting data, reports may be used to generate awareness, motivate and reward, or serve as a public relations tool. To best convey information it is necessary to get the reader's attention. Colorful graphs, tables and pie charts provide essential information, but in a more visually appealing form than text.



Choose the information for each graph to suit the target audience. For example, actual monthly consumption by fuel type may be of more interest to the maintenance staff while annual costs or dollar-savings information may be more appropriate for the store owner or other administrative personnel.

NOTES:



Energy Graphs

Standard graphs include the following:

- ◆ Natural Gas and Electricity use by month (MMBTU)
- ◆ Costs per month by fuel type
- ◆ Natural Gas use by month (CCF or THERM)
- ◆ Electricity Consumption by month (kWh)
- ◆ Electric Demand by month (kW)
- ◆ Degree Days by month
- ◆ Energy Use Index, BTU/Sq.Ft./Year, KWH/Sq.Ft./Year

Other graphs which can be valuable for presentations, annual reports and consumption analysis include the following:

NOTES :

- ◆ *Avoided Costs*
- ◆ *Annual Savings*
- ◆ *12-Month Rolling Summary (MMBTU, kWh, THERM, \$)*
- ◆ *BTU/Sq.Ft./Degree-Day*
- ◆ *Utility Costs/Unit (\$/THERM, cents/kWh, \$/kW)*
- ◆ *Building Comparisons*

These graphs generally require additional computations, but can be well worth the effort to emphasize a particular point or better understand a consumption trend.

Analyzing Energy Data

Analysis of graphs and consumption data is important in understanding how energy is used at your facility and which factors affect consumption the greatest. This is done by identifying energy using systems in your building and determining how each system operates throughout the year. Some systems will operate all year long while others may only operate during the summer or winter months. Annual energy consumption is then broken into base and seasonal loads, and equipment is fit into each category. This helps identify which equipment or systems are most energy intensive so steps can be taken to reduce consumption in those areas.

Base Loads

Base loads are the energy-using systems that consume a continuous amount of energy throughout the year. The base load can be established by drawing a horizontal line across a graph of energy consumption or cost at the average point of lowest consumption for each energy type. The base load is that portion of consumption or cost below the line. Typical base loads include lighting, office equipment, appliances, domestic hot water and ventilation.

High-base loads indicate conservation efforts should be focused in these areas.

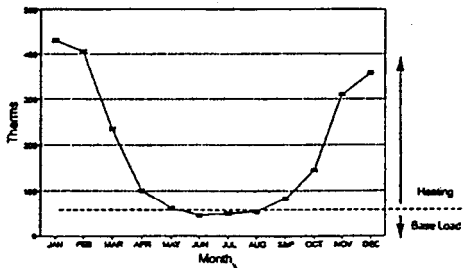
Seasonal Loads

Seasonal loads, such as heating and air conditioning, are identified as the portion of consumption or cost located above the line used to establish base loads on the graph. Seasonal loads can be the result of changes in weather or operation of the building, such as the school season.

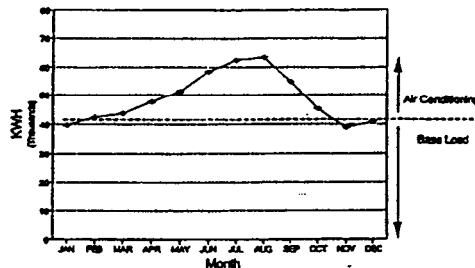
NOTES:

High seasonal loads may reveal an opportunity to reduce consumption by making improvements to the heating and air conditioning equipment, temperature controls, the building envelope, or other systems which are affected by seasonal operation.

Natural Gas Consumption



Electric Consumption



Energy-Using systems

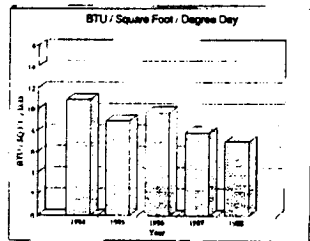
After utility use has been broken down by seasonal and base loads, make a list of the major energy-using systems in your building and estimate when each system is in operation throughout the year. As you develop your list, think about how each system uses energy and where potential savings may exist. You can add more specific components to the list as you learn more about the building.

Typical energy-using systems and areas of potential savings include:

- | | |
|--|---|
| <ul style="list-style-type: none"> ⌘ Lighting <ul style="list-style-type: none"> Lamp efficiency Operation time Light levels ⌘ Cooling (Air Conditioning) <ul style="list-style-type: none"> Economizer cycle Set points ⌘ Refrigeration <ul style="list-style-type: none"> Anti-sweat controls Case covers or strips Case lighting Staged defrost cycles Proper loading | <ul style="list-style-type: none"> ⌘ Heating System <ul style="list-style-type: none"> Boiler efficiency Distribution system Controls Hours of operation Envelope ⌘ Ventilation <ul style="list-style-type: none"> Amount of outside air Night and warm-up operation Exhaust system interaction ⌘ Domestic Hot Water <ul style="list-style-type: none"> Temperatures Distribution system Refrigeration heat recovery |
|--|---|

Consumption Trends

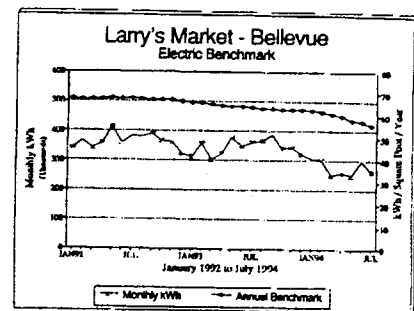
NOTES:



One of the easiest ways to evaluate consumption data is to watch for upward or downward trends in kWh, demand, natural gas or costs. This can be done by graphing two or more years of monthly data on one graph or by graphing only the annual totals for several years.

Rolling 12-Month Method

Another useful method for reporting monthly data is a rolling summary whereby a new 12-month total is calculated each month by dropping the oldest month and adding the newest. This method eliminates widely fluctuating values and allows simple comparison of present year energy use with any previous year. A graph of this type will remain a relatively flat line if no significant changes in energy consumption occur. Even though each monthly figure is an annual total, any sudden change is the result of that month's operation.



Increased Consumption

An increase in annual natural gas consumption can be the result of several factors.

- ◆ Greater number of degree-days (colder weather)
- ◆ Added equipment or floor space (kitchen equipment, space heaters)
- ◆ Problem in operation of heating system (dirty air filters, time clock malfunction, steam trap maintenance needed)

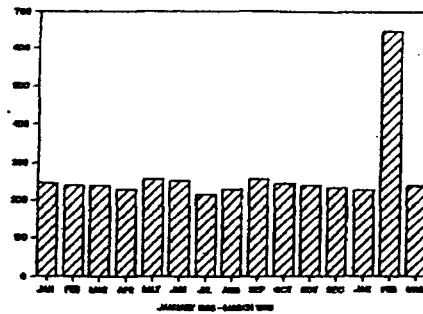
Further analysis can determine which of these factors is most likely the cause of the increased consumption.

- 1) Determine THERM/Degree-Day consumed for previous year.
- 2) Multiply by number of degree-days for current year to obtain estimated natural gas consumption.
- 3) If actual consumption is equal to or less than estimated consumption, the increase is due to weather conditions.
- 4) If actual consumption is significantly greater than estimated consumption, factors other than weather are the cause of this increase.
- 5) Determine if new gas-consuming equipment has been installed or floor space has been added.
- 6) If no new equipment or floor space was added, the increase in consumption is most likely the result of a problem in the heating system. Provide corrective maintenance and continue to monitor monthly consumption.

NOTES :

Unexplained Peaks

Anomalies and unexplained peaks in consumption or electric demand that go unnoticed can cost your organization money. Regardless of whether the peak is caused by equipment malfunction or an error in the monthly meter reading, it demands immediate attention. Malfunctioning equipment can damage other components if left unchecked.



This facility paid an additional \$2,900 in demand charges in February because of an unnoticed error in the demand

If you suspect an error has been made on your billing statement, contact your utility representative immediately. Your utility company can be your best ally in identifying causes for unexplained consumption or demand peaks.

Load Factor

NOTES:

Load factor is the relationship between electric kWh consumption and kW demand. It is commonly calculated by dividing the monthly kWh consumption by the kW demand multiplied by the number of hours in the billing period. This gives a ratio of average demand to peak demand and is a good indicator of cost savings potential of shifting some electric loads to off-peak hours to reduce overall demand.

$$\text{Load Factor} = \frac{\text{Monthly kWh}}{\text{kW} \times \# \text{ Hours}}$$

If a facility were to consume electricity at a steady rate at the highest demand registered on the demand meter, the load factor would be 1.00 (one), the theoretical maximum. This indicates that the facility does not have any variance in consumption or time of day peaks in demand. Other than installing more efficient electrical equipment, little can be done to reduce demand because this facility is already taking full advantage of the demand for which it is being billed.

A load factor below .20 is a good indication that a facility has demand spikes at some point in the billing period. In this case, action should be taken to identify when the spikes occur and operation of non-essential equipment should be restricted at that time or rescheduled for operation during off peak hours.

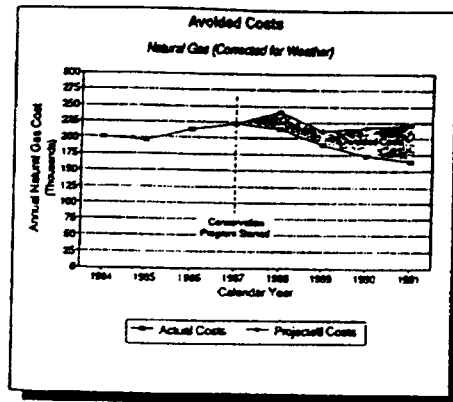
The ideal load factor should be as close to 1.00 as possible. However, most facilities don't operate 24 hours a day, so load factors will typically be considerably lower than the theoretical maximum. If a building operates only 12 hours a day, for example, then a load factor of .50 may be the highest possible for that building. The important thing is to monitor your load factor and establish what is normal for your building, noting any significant changes in the kWh consumption and kW demand ratio. Many energymanagement control systems (EMCS) have demand limiting and load shedding-capabilities which help maintain acceptable load factors.

Submetering

Often the limitation of many energy accounting systems applied to existing buildings is the lack of adequate metering. submetering of individual buildings and energy systems such as lighting, ventilation, computer rooms, etc. must be considered if meaningful energy information is to be readily available for optimum building operation. The latest developments in automated energy accounting systems include-on-line remote data acquisition capability which eliminates most manual data collection and entry.

Avoided Costs

To measure the success of energy management programs, you must convert energy savings to cost-avoidance figures. Avoided costs are calculated by multiplying the difference in current and baseline energy use (corrected for weather if necessary) by the present cost of energy. Consumption relating to base loads such as lighting and hot water does not typically require weather correction while consumption for seasonal loads such as heating and air conditioning should be corrected for weather before calculating avoided costs.



NOTES:

Energy Accounting Software

The advantages of a computer-based energy accounting system are well documented. Once the software has been personalized for a given facility and the monthly data entered, a variety of calculations and reports can be generated with little effort. Numerous software programs exist so a careful study of individual accounting needs is necessary.

Before a computer is able to offer its benefits, the energy accounting procedures used will need to be thoroughly understood.

Finally, someone confident with computers is required to be in charge of operating and maintaining a computerized energy accounting program.

Summary

The first step in maintaining control of your energy costs is to understand how your building uses energy so informed decisions on conservation investments can be made. More energy management programs fail because of lack of information and organization than because of poor design or faulty equipment.

Developing an energy accounting system that works best for you demands taking a close look at the buildings and equipment as well as the people who use them. Energy accounting can be simple or complex, but it must be tailored to the needs and capabilities of the people using the system.

Only by motivating and educating building managers, operators and occupants will energy management programs achieve their intended savings.

The Energy Manager

NOTES:

There is an increasing need in business and industry to manage energy effectively. Efficient management of energy costs can lead to significant savings and increased comfort. Lower maintenance costs and extended equipment life are further benefits of this approach. A successful energy management program requires a designated lead and a realistic plan. This need has given rise to a new and important role - - the energy manager.

The energy manager requires a varied background and is expected to balance several different roles of responsibility. Effectively understanding and communicating energy goals to building owners, upper management and employees make this job a difficult one.

Four major areas of responsibility include:

- ◆ *Management*
- ◆ *Technical Analysis*
- ◆ *Financial Analysis*
- ◆ *Coordination*

This section will look at these different roles, and suggest a plan for setting up an effective energy management program.

Management

In this particular area, the energy manager must develop a level of expertise that builds credibility with top management. This credibility is important, as a recent study showed that 67% of the decisions about energy improvements were made by only one person (usually the owner or president of the business).

At the outset, a review of historical energy usage and a preliminary site assessment are performed which lead to the development of energy management-goals and policies. These goals are prioritized, often listing those actions in order of payback. The list of goals should include energy conservation measures (ECMs) as well as operation and maintenance measures (O&Ms). Operation and maintenance measures are often listed as a first priority because they are easily done and have ability to save energy at little or no cost.

After accumulating a base history of energy costs, the energy manager must develop both written and oral reports for top management as well as others affecting energy usage. This creates important communication which is paramount to a successful program. The reports act as a guideline for later decision making, and give perspective to the overall energy goals.

Furthermore, the reports directly relate to budget considerations for future years. The strategy is to accomplish as many energy goals in one year as the budget allows, and then build on these accomplishments the next year. Energy improvements often overlap from one year to another, and it is important to develop a consistent, steady approach.

Technical Analysis

The second role of the energy manager is technical analysis. An in-depth knowledge of the building system is required. This includes the envelope, lighting, heating, ventilation, air conditioning, refrigeration, electrical equipment and hot water systems. It's also important to understand utility metering and how monthly bills are calculated. Graphs showing energy consumption, with consideration to all fuel sources, are helpful in evaluating energy usage and costs. The energy manager should establish a program to develop technical expertise of facility operations staff members.

New product analysis is important to the technical energy manager in making a wise investment. New energy products should be compared and evaluated based on their savings potential, reliability and convenience. Often, a seemingly high-priced device quickly pays for itself due to fuel and maintenance savings.

NOTES :

Financial Analysis

This role includes knowledge of investment analysis. There are many factors to consider in making a wise energy investment. some of these include:

- ❖ Current Inflation Rate

Generally this is between 3-8 percent.

- ❖ Fuel Escalation Rates

Availability of different fuel types, cogeneration opportunities and increased natural gas purchasing options require continual evaluation of impacts to your fuel costs.

- ❖ Capital Investment

The amount available for energy investment is often balanced with the fuel savings per year. An attractive payback is influenced by the percentage and length of a loan, depreciation, operating costs, availability of utility incentives and marginal tax bracket of the investor. some states offer investment tax credits as further incentives.

- ❖ Life Cycle Cost Analysis

Life cycle costing is a method of calculating the total cost of ownership over the life of an asset. This approach is justified when two or more alternative systems are being compared, efficiency from operation and maintenance changes add substantial savings, investment and energy costs are large, and life of equipment is several years.



Coordination

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In this particular role, the energy manager must put all the pieces together. This involves education of the staff, so everyone understands the roles and responsibilities and is able to implement them.

A checklist of energy-saving tips can be helpful. A procedures manual for all equipment and its operation is also important. A thorough understanding of the procedures will save a lot of time and energy later, and is essential in keeping up with changes in company personnel.

Evaluation and follow-up of past energy decisions allow for constructive criticism and continual adjustment to the energy plan. If an energy policy doesn't work, change it to one that does. Periodically review goals and set new ones as needed.

Continue to report on the status of the energy management program to management, facility staff and building occupants on a regular basis. Include regular reports on operation of new equipment, energy and cost savings, operation and maintenance savings and improvements, comfort improvements, and training activities.

With success in the program, consider making a long-term commitment including ongoing education and training.

Energy Management Program Implementation

The following section will suggest steps in setting up an energy management program. Future items may be added as needed and the plan should be flexible to the particular company or building. For example, "selling the program to top management" (point 4) may in some cases be the first item on the list because management support is crucial for success of the program.

1) Perform an energy audit. The energy audit is a survey which tries to examine the different features of a building. Three steps to the audit are generally followed: Identify all energy systems, evaluate condition of systems and write up a situation report. This report explains the existing conditions of the building(s) in terms of the envelope, equipment, lighting and occupancy.

2) Develop a plan for energy management. From the situation report, certain areas for improvement will become apparent. Identify energy conservation opportunities within each system as well as interactions among systems. Evaluate and prioritize available operations and maintenance items (O&Ms). Certain features in a building, such as replacing bad ballasts reducing water heating temperature and correctly programming setback thermostats, offer ways to economize at low-cost or no-cost with a fast return on investment.

Short-term and long-term goals should be determined, with specific ways to meet these objectives. The energy plan includes both O&Ms and capital investments. A time frame (e.g. 1-3 years, 3-5 years, 5-7 years) is often helpful in scheduling improvements that overlap from one year to the next.

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3) Evaluate staffing needs. Can the existing staff perform the requirements of an energy plan? Will additional personnel or training be required? Will there be an additional time commitment for maintenance and accounting? Most often O&Ms can be performed by in-house staff.

4) Sell program to top management. It is imperative for those who make the energy decisions to understand and support the suggestions in the overall energy program. The financial benefits from such a program can positively influence both the present and future operation budget. Comfort benefits also make a building a more desirable and productive place to work.

5) Determine funding source needed for capital improvements. Grants and loans for energy improvements are often available through local utilities and state energy offices. Some states allow tax incentives (investment credits), to help offset the initial cost.

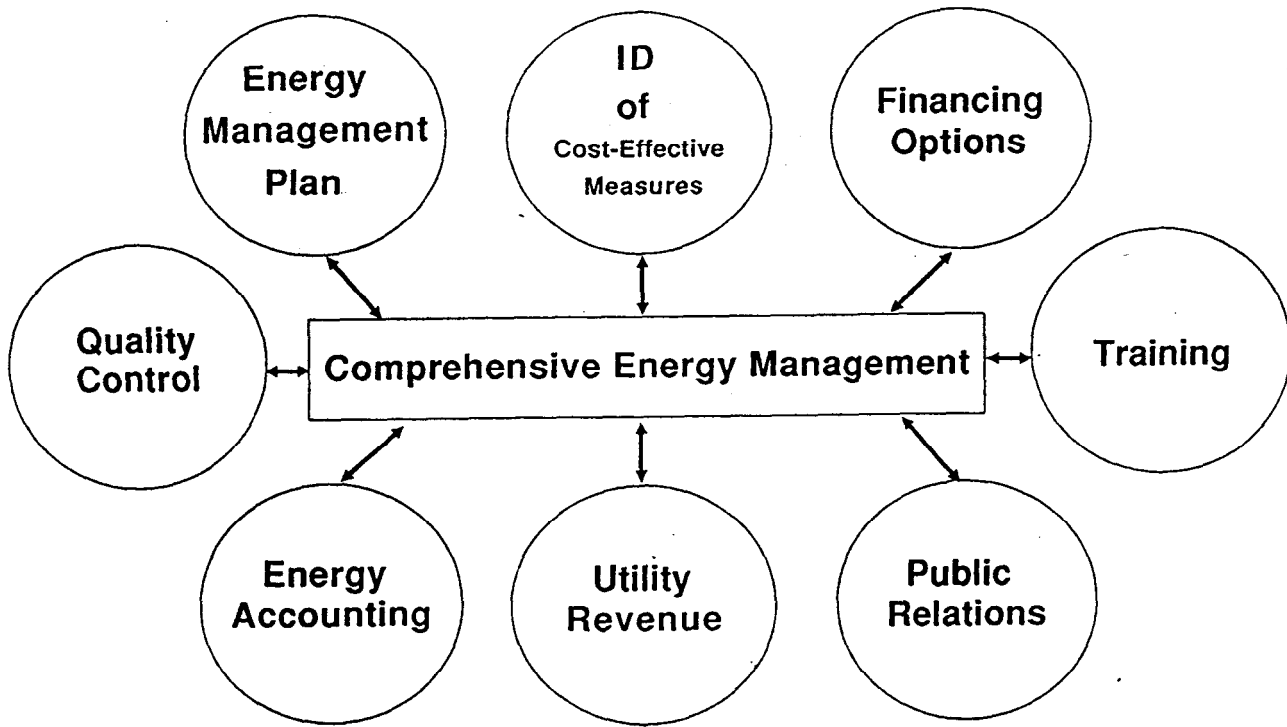
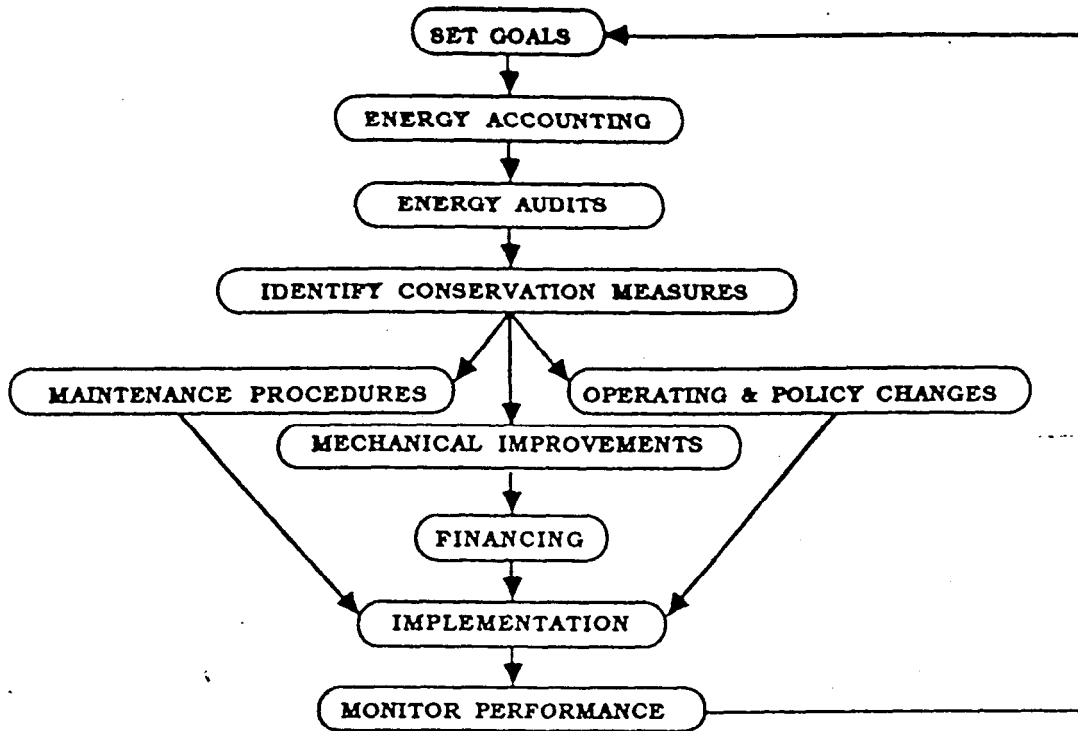
6) Select consultants (beyond expertise of energy manager). For example, certain design or equipment features such as a heating/cooling storage system or computerized energy management system may require complex technical analysis. An energy manager should be able to do a preliminary audit, while a comprehensive energy analysis is often performed by an engineering firm or other technical assistance group.

7) Keep up-to-date. Literature and advice is available on most products and equipment from manufacturer representatives, utilities and state energy offices. To test products before you buy, arrange for a trial demonstration period. Workshops and seminars are offered by utilities, professional associations and state programs on a variety of topics and are usually at low cost. Develop an energy library and product file from material gathered at seminars, at trade shows and from local vendors.

A successful energy management program requires documentation on the equipment and products it uses. Included descriptive information (model number, etc.), maintenance procedures, warranties, manufacturer's representatives (addresses and phone numbers) and repair history.

8) Become a part of the long-term planning process. The energy manager should be directly involved in monitoring the program and remain committed to its future success.

Energy Management Program



Energy Management Plan

A TYPICAL ENERGY MANAGEMENT PROGRAM WITH A HIGH PROBABILITY OF SUCCESS

How have businesses with successful programs done it? This model represents the shared experience of over 500 energy managers in business and industry.

YEARS 1 AND 2

GOAL: To save 10-15 % of base year energy index

PLAN OF ACTION:

- Determine how, when, and where energy is consumed. Use building profiles, energy records, and energy audits as tools.
- Tune systems to peak efficiency.
- Operate systems only when needed.
- Set and follow a maintenance schedule.
- Make no-cost/low-cost modifications.

COST TO IMPLEMENT: 25% of the expected annual savings.

COST TO MAINTAIN: 10% of expected annual savings.

YEARS 3-5

GOAL: To save 15-40% of base year energy index

PLAN OF ACTION:

- Plan and perform energy conservation projects with paybacks of under four years.
- Purchase energy-efficient equipment.
- Revise operations to optimize energy use.
- Determine how energy availability and price changes might affect your business.

COST TO IMPLEMENT: 50-400% of expected annual savings.

COST TO MAINTAIN: 15-30% of expected annual savings.

YEARS 6 AND BEYOND

GOAL: To save 35-50% of base year energy index

PLAN OF ACTION:

- Perform energy conservation projects with paybacks of 5 years or longer.
- Examine indirect energy use of your business product or service.
- Include renewable resources in your building or remodeling plans.

COST TO IMPLEMENT: 400-600% of expected annual savings.

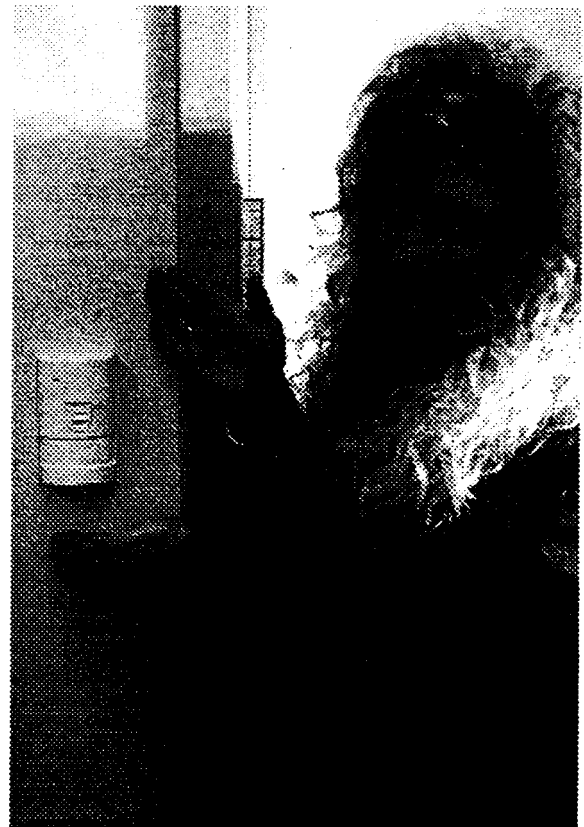
COST TO MAINTAIN: 15-30% of expected annual savings.

Courtesy of Bonneville Power Administration

NOTES:



T8 fluorescent lamps are about 30% more efficient than standard T12 fluorescent lamps.



Occupancy sensors are often a good energy conservation measure.

Water Management in Grocery Stores

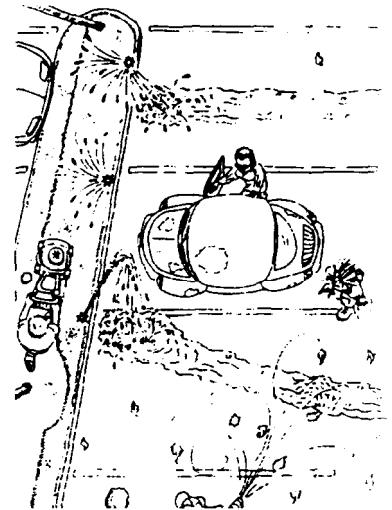
Lee Benner

Historically, water has been rather cheap and plentiful. Today we are finding new water supplies difficult to obtain and water rates, as well as wastewater fees, are increasing. In the 1990s, efficient water management has become analogous to energy conservation in the 1970s. During the oil embargo when prices increased dramatically, many learned that energy conservation was cost-effective. This lesson applies to our use of all of the natural resources. As increased demands for limited water resources challenge supplies, improved water efficiency is essential for indoor and outdoor use.

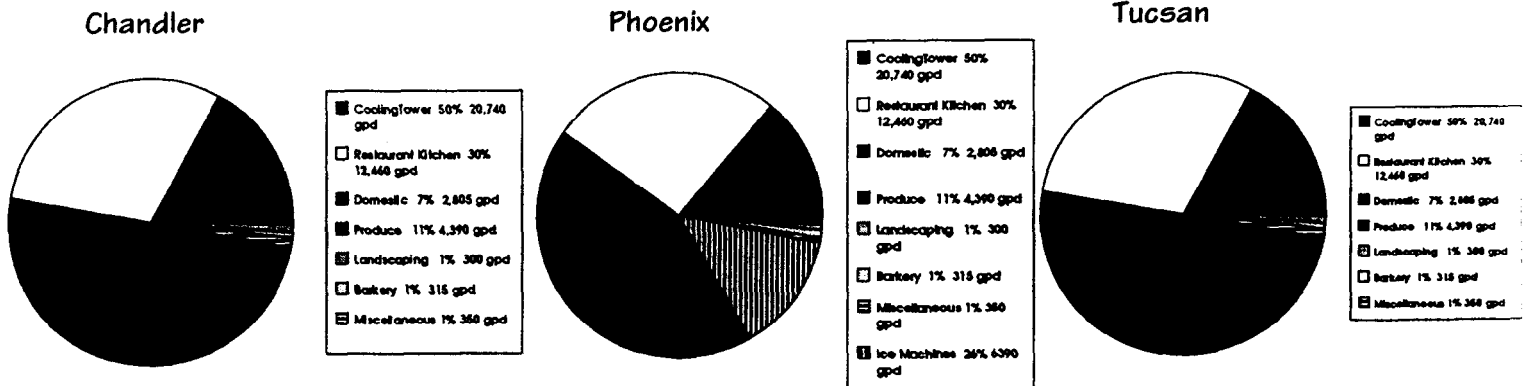
Water Efficiency means reducing water use at your store while continuing to provide quality service and products. This section summarizes information from reports published by the Industrial/Commercial Water Conservation program offered in Arizona. The purpose of the program is to provide site-specific suggestions for water conservation. It will summarize the water use by three supermarkets (Chandler, Phoenix and Tucson, AZ) and describe potential water conservation opportunities and their paybacks.

The three piecharts show the estimated water balance for each of the stores. The average gallons consumed per day (gpd) are: Chandler at 41,560 gpd; Phoenix at 24,897 gpd; and Tucson at 10,120 gpd. Individual uses of water at these stores include: domestic use in public and employee restrooms; single-pass cooling of refrigerators, freezers and ice-making machines; and food, and product preparation and waste disposal in the bakery/deli, produce, meat and floral departments.

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Estimated Water Balances of Three Supermarkets



gpd = gallons per day annual average

Table 1 indicates the water balance and ranking of water conservation opportunities. The rankings are based on annual dollar savings. These will be discussed in turn.

NOTES:

TABLE 1

WATER USES AND RANKING OF CONSERVATION OPPORTUNITIES

	Chandler	rank	Phoenix	rank	Tucson	rank
Cooling Towers	50%	2	34%	2	67%	1
Kitchen/Restaurant	30%	1	9%	—		
Domestic	7%	5	8%	4&5	6%	2 & 3
Produce	11%	3 & 4	9%		9%	3
Bakery	1%		3%		5% (includes deli)	
Meat	—		2%		9%	4
Ice Machines	—		26%	1	—	
Water Vending	—		—		3%	
Miscellaneous	1%		2%		1%	

(Miscellaneous includes Floral for Chandler and Hair Salon for Tucson. Note that the total for Phoenix equals 93% due to average gpd based on estimate which was 91.1% of metered water).

Potential Conservation Opportunities

Domestic Use

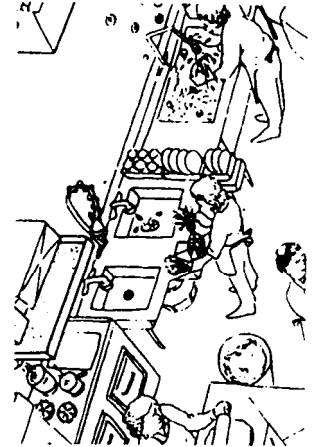
This includes restrooms for employee and public use. Water consumption is estimated to be 4 gallons per flush of toilets and 2 gallons per flush of urinals. Flow rates from faucets will depend on whether the faucets are equipped with aerators, and the type of faucet, such as a metered faucet. In these case studies, the flow rates ranged from 2 gallons per minute (gpm) to 3.5 gpm, while metered faucets were measured at approximately 0.6 gpm.

Determining domestic water use is based on your number of employees and an estimate of public use of the restrooms. Table 2 gives an example of how to calculate Domestic Water Use.

**TABLE 2
DOMESTIC WATER USE**

	Volume per Use	Uses per Day	Volume per Day
Employees, per capita			
Urinals	2 gal/flush	1 flush/day	2 gpcd
Toilets	4 gal/flush	2 flushes/day	8 gpcd
Faucets	2 gpm	2 min/day	4 gpcd
Total			14 gpcd
Public, per capita			
Urinals	2 gal/flush	.5 flush/day	1 gpcd
Toilets	4 gal/flush	.5 flush/day	2 gpcd
Faucets	0.6 gpm	.25 min/day	0.15 gpcd
Total			3.15 gpcd
	Volume per Person	Number of Person	Total gpd
Employees	14 gpcd	178	2,490 gpd
Public	3.15	100	315 gpd
Total			2,805 gpd

NOTES :



Domestic Conservation Actions

Existing flush valves can be retrofitted with insert orifice devices or valve replacement kits to conserve from 0.5 to 1 gallon per flush (gpf). The orifices cost approximately \$5 and valve replacement kits approximately \$20. These case studies used conservative estimates that the orifice devices would save 0.5 gpf. Estimated annual savings for the Phoenix store were 275 gallons per day, an annual savings of 100,375 gallons. Annual costs savings (for both water and wastewater charges) are estimated to be \$340. The simple payback would be two months.

The Washington Water Code has set efficiency standards for new and remodeled buildings. Fixtures and fittings that do not meet the new water use standards are prohibited from sale, distribution and installation in our state. New fixtures should be labeled with either permanent marking labels which state the standard the fixture meets and/or information on the maximum amount of water consumed by the fixture.

Produce

This includes water used for food preparation, garbage grinding, produce misting and ice machines. The average amount used for these three stores was 1,500 gpd. One conservation possibility is to determine the length of time water is run after the grinder is shut off. It may be possible to reduce this cycle without affecting performance. In these

NOTES:

case studies, it was recommended to disconnect the grinder and dispose of produce trimmings as solid waste. The studies did not examine the resulting impact this would have on the stores' garbage bills. Disposing of your produce trimmings as solid waste is NOT a recommended action. A more viable alternative would be to explore the potential for food waste composting. Contact your local solid waste coordinator for more information.

Ice Machines

A significant conservation opportunity is eliminating the use of water for cooling the ice machines. The Chandler store could realize a \$1,445 reduction in water and sewer costs by reducing their annual consumption for these machines by 2,270 gpd. Water could be conserved by:

- ❧ replacing the unit with an air-cooled machine
- ❧ retrofitting the ice machine with a single remote refrigerator unit which provides recirculating chilled water rather than the single-pass cooling water
- ❧ using the market's refrigeration system to cool the ice machine compressor

The cost of replacing the water-cooled machine with an air-cooled model is approximately \$5,000. The cost of routing chilled water to the ice machine depends on the available capacity in the refrigeration system and its proximity to the ice maker. In the case studies for Phoenix and Chandler, the recommendation was to retrofit the ice machines. For Chandler, the estimated cost to retrofit the ice maker with a remote refrigeration unit is \$3,000. The simple payback is 15 months.

Evaporative Condensers/Cooling Towers

In the Phoenix store, one cooling tower serves the central refrigeration system. The Tucson and Chandler stores use evaporative condensers to serve their refrigeration systems. Cooling towers and evaporative condensers reject heat from a system by evaporating a portion of a circulating stream of water. The evaporation process consumes heat energy as water changes phase from liquid to vapor. It is beyond the scope of this workshop to detail the workings of a cooling tower. In reviewing your system for a conservation opportunity, your goal is to improve the water efficiency of the evaporative condenser.

Generally, to determine waterconservation opportunities for your cooling system, you should explore the following options:

- ☞ *reduce any excess overflow*
- ☞ *reduce the quantity of bleed-off by increasing the concentration ratio (CR)*

Although the amount of evaporation can't be changed, the amount of bleed-off can often be reduced. Annual savings should be calculated using reduced water AND sewer charges. In these case studies, taking steps to increase the CR ranked at the top of conservation actions based on annual cost savings. In the case of Phoenix, an annual cost savings of \$1,960 would be realized by increasing the CR(at \$0 cost) and reducing annual water consumption by 573,050 gallons. This action would yield an immediate payback.

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Implementing a Conservation Program

More often than not, water savings are accompanied by energy savings and reduced discharges to sewers. The cost savings in energy and wastewater disposal should be added to the value of water savings. For many grocers, water and sewer charges make up a small percentage of operating costs. The benefits of lower water and sewer costs must be traded off against other operational costs. Some conservation opportunities are not cost-effective as retrofits but are cost-effective as initial purchases.

A typical water conservation program for your store could consist of the following actions:

- ☒ *Installing flow-reducing orifice devices on existing flush valves to reduce flush volumes by 0.5 gallons per flush*
- ☒ *Installing faucet aerators in the restrooms, kitchen/deli and floral departments*
- ☒ *Adjusting garbage-grinder solenoid switch to reduce excess flows*
- ☒ *Increasing the concentration ration (CR) of the evaporative condenser*
- ☒ *Retrofitting ice-machines or installing remote condensers on all ice machines*

In these three case studies, potential annual cost savings were:

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- ◆ Chandler: \$21,235 with capital costs of \$16,230. Simple paybacks ranged from 2 to 15 months.
- ◆ Phoenix: \$9,795 with capital costs of \$6,790. Simple paybacks ranged from immediate to 24 months.
- ◆ Tucson: \$3,990 with capital costs of \$45. Simple paybacks ranged from immediate to 3 months.

Elements for Success

Every conservation program should have three common elements:

- Management Commitment
- An Action Plan
- Employee Involvement

It is important that management communicates its full support of a water conservation program to the staff. Develop specific, measurable and achievable goals for the action plan. Results of the program, both in terms of gallons of water and dollars saved, should be posted. Employee involvement and education is critical if staff are to be motivated to use water more efficiently. To help involve employees:

- ◆ Raise employee awareness by distributing a letter to them from management stating the goals and benefits of the water conservation plan;
- ◆ Use bulletins, newsletters and paycheck stuffers to communicate specific steps in the plan and report on progress;
- ◆ Hold a contest to see who can come up with another creative solution to save water. Initiate a suggestion and incentive system in recognition of water saving ideas; and/or
- ◆ Appoint an employee to serve as water management coordinator and set aside time at staff meetings for progress reports.






Developing an Action Plan

To develop your plan you must first know how much water is used in your store. This information can be collected from your water billings. The following worksheets can be used to calculate and graph out your consumption on a daily basis and for each billing period for one year.

This information is part of the data you will need to conduct a water balance. A water balance is an account of how much water is used for each function. This information can be compared to your utility bill as a check for accuracy. It can help identify costly and/or inefficient water uses. Finally, it will give you the information you need to determine what water conservation opportunities make sense for your store.

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Information Needed to Do a Water Balance

-  Consumption costs for water and sewer
-  At least one year's records of water and sewer bills
-  The number of employees (# of females, # of males)
-  The number of customers (average per day)
-  Identification of all water-using processes (by an audit)

When you complete these worksheets you will have taken the first step to conducting a water balance for your store. To complete the water balance you will need the above information, some of which you already know (# of employees, customers). Collecting data on the amount of water used for all your store's processes (by an audit) may require outside assistance.

A water audit is the process that identifies the quantities, characteristics and uses of all water at your store. Important characteristics include flow rate (gallons per minute), total time of usage, and saving opportunities. There are many levels of audits. Within most time, funding, and staffing constraints, it is usually possible to carry out a basic audit. If you will be doing a partial audit, focus your efforts on areas that are most likely to present cost-effective saving opportunities (using the information from these case studies), or on equipment that may receive utility incentives or support.

Resources

Financial Incentives and Technical Assistance

NOTES:

The Seattle Water Department and its purveyors offer support to Institutional/Commercial/Industrial (ICI) customers. The goal of the ICI program is to increase the efficiency of water consumption in these sectors. A brochure describing the program is included in your materials. You may receive as much as 50% of the installed cost for an approved water efficient technology. Some examples that may qualify for incentives include: cooling tower modifications, efficient flow toilets, reuse applications and irrigation system improvements. Other services include bill analysis, on-site water audits, design assistance and technological information. All eligible customers must submit an application form to your local water utility. You can get an application from Seattle Water or its purveyors to their participating local utility. For more information, call Philip Paschke (206) 684-5883 at the Seattle Water Department, or your local water utility.

Water-Wiser

The Water Efficiency Clearinghouse (1-800-559-9855) will assist with water conservation and reuse questions. Literature searches, information and referrals are just some of the areas the Clearinghouse covers. Additional topics include water reuse, leak detection and education. Most information will be provided at no cost to the caller. although sometimes a materials fee will be charged.

Water Quality and Waste Water

Water Quality and Hazardous Waste

NOTES:

What goes down the drain in your customers homes? And down the drain in your store? Many products that are used commercially and in the home have the potential to harm human health and water quality. These products may be cleaners, pesticides and other products used to maintain homes and businesses. In many cases, small businesses use the same products as those used in the home. In other cases, businesses use a more hazardous ("industrial strength") product.

Why should you care about the products your customers use?

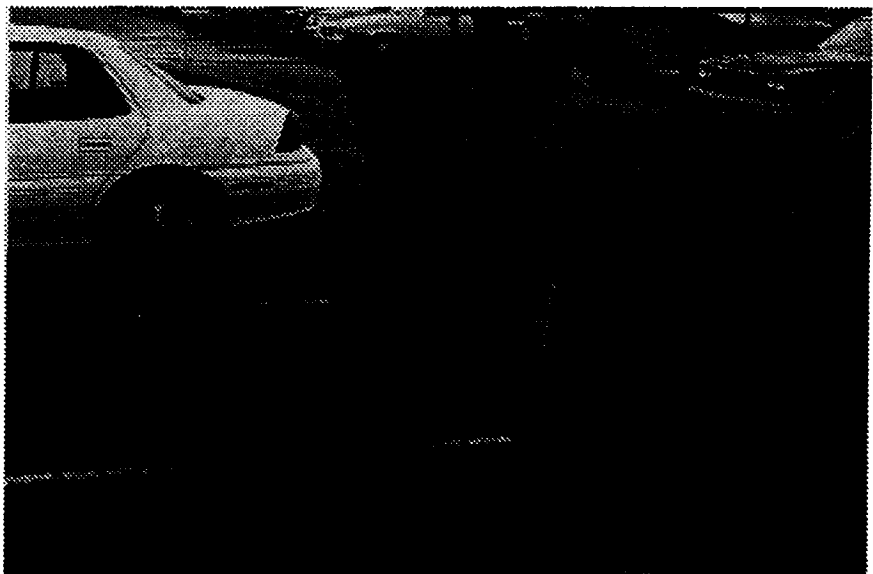
Wastewater from homes is 99.9% water by weight and only 0.02% - 0.03% suspended solids, plus even less of other things. However, that doesn't mean sewage is squeaky clean. Small concentrations of chemicals can be quite detrimental in the liquid waste stream.

A number of studies have found heavy metals and organic chemicals in wastewater from homes. These chemicals include cadmium, lead, mercury, nickel and other metals, plus solvents, paint thinners and degreasers such as methylene chloride and toluene, pesticides such as DDT and lindane, and plastic components known as phthalate esters.

Municipal sewage treatment systems treat wastewater through a biological process. At a minimum, these plants use primary treatment, which relies on gravity settling of solids, and usually secondary treatment, which uses bacteria to further break down organic materials. These treatment processes were not designed specifically for hazardous chemicals. Some do "treat" certain hazardous chemicals, but do so for the most part by shifting them into another medium such as the air or solids.

By offering your customers a choice of less-hazardous products, you can help protect water quality, air quality and health, and reduce impacts on solid waste and landfills.

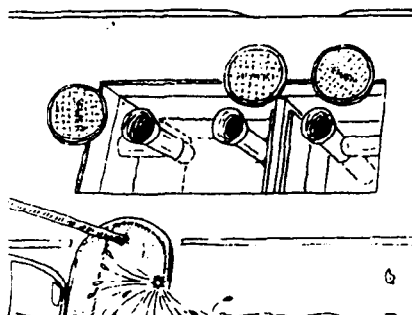
By using less-hazardous products to clean and maintain your store, you can protect your workers' health and the environment.



Recognizing product hazard

What makes a product hazardous? There are four basic properties: flammability, toxicity, corrosivity and reactivity. Hazardous products will have one or more of these characteristics in varying degrees,

NOTES:



Hazard	What it means	Examples of products
Flammable	Catches fire readily	Gasoline, paints, solvents, lighter fluid
Toxic	Poisonous or causes illness	Pesticides, solvents, paint strippers
Corrosive	Causes skin or eye burns	Drain cleaners, oven cleaners
Reactive	Causes chemical reactions	Chlorine bleach, ammonia, acids, bases

How can you know the relative hazard of products? For commercial products, you can request a Material Safety Data Sheet, or MSDS. The MSDS lists hazardous ingredients which make up 1% or more of hazardous products, and describes health effects of exposure.

For consumer products, you can find out the hazards of product use by reading the label. Three agencies determine these hazards and set labeling requirements. Pesticides are regulated by the U.S. Environmental Protection Agency. Food, drugs and cosmetics are regulated by the Food and Drug Administration. Everything else falls to the Consumer Product Safety Commission.

The table below summarizes the three agencies and the products they regulate:

Regulating Agency	Products Regulated
Environmental Protection Agency (EPA)	Pesticides, insecticides, herbicides, fungicides, rodenticides, disinfectants, chlorine bleach, mildew removers, wood preservatives
Food and Drug Administration (FDA)	Food, drugs (medicines), and cosmetics and personal care products
Consumer Product Safety Commission (CPSC)	Cleaners, non-chlorine bleach, wood finishes, other household items except food, drugs, and personal care products

These regulating agencies determine what is a hazardous product and how products must be labeled to identify these hazards. Both EPA and CPSC require signal words on the label that signify increasing levels

of hazard. The signal words must be followed by a statement that specifies the nature of the hazard. FDA does not have a hierarchy of signal words with different meanings. However, FDA, unlike the other two agencies, requires that all ingredients be listed on the label.

Here are the signal words listed on EPA and CPSC labels.

Environmental Protection Agency		Consumer Product safety Commission	
Hazard Category	Signal Word	Hazard Category	Signal Word
Toxicity I	DANGER	Extremely hazardous	DANGER
Toxicity II	WARNING	Hazardous	WARNING or CAUTION
Toxicity III	CAUTION	Not hazardous	No signal word
Toxicity IV	CAUTION	Not hazardous	No signal word

EPA only considers active ingredients, those ingredients used to kill the target pest, in its registration process. Most products contain a high percentage of inert; ingredients such as solvents and propellants. These may be just as hazardous as the active ingredient, but labeling is not required. EPA also requires some labeling for environmental impacts, such as effects on fish, birds and water quality. The other agencies do not require environmental-related labeling.

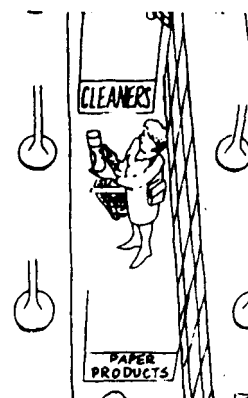
Choosing and using hazardous products

To make it easier to choose less hazardous consumer products, the Washington Toxics Coalition has produced "Buy Smart, Buy Safe: A Consumer Guide to Less-Hazardous Products." The guide, similar to Consumer Reports, rates about 350 name-brand products for their effects on health and the environment. This could be a useful tool for you in selecting products for your store shelves and for your customers in making their purchasing decisions. The guide is included with this workbook.

For hazardous products you use in your store, request MSDSs, and store them near the products so they are accessible to your workers. Store products properly (for example, keep acids, bases and oxidizers separate). Find out if you can substitute less hazardous products. For example, you can use diluted chlorine bleach instead of more hazardous sanitizers and oven cleaner without lye.

Help protect your workers, customers and the environment. Reduce your use of hazardous products, and make less hazardous products available in your store.

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2. Fats. Oils and Grease

NOTES:

Grocery stores also affect water quality and the environment through the fats, oils and grease (FOG) that they discharge down the drain. FOG clogs sewer pipes (imagine a sewer pipe with a thick coating of congealed grease). This increases sewage system maintenance costs.

Pouring fats, oils and grease down the drain without separation is not a good environmental choice. Much of the FOG that enters the sewage treatment plant ends up in sludge digesters and in the sludge. This poses a problem because many sewage treatment systems (including Metro) heat-process their sludge (to make a product called biosolids) and use it as a fertilizer and soil conditioner. The grease increases odor and reduces the usefulness of the product.

As a means of reducing the maintenance and environmental problems caused by FOG, Metro restricts free-floating FOG from discharge into the sewage treatment system. Material that obstructs sewer lines may not be discharged, and FOG control plans are required.

A grease separator is the best means to reduce FOG discharge. Under-sink grease traps are not effective at removing grease because they are too small to retain water. The separator should be large enough to allow a 45-minute retention time. It must be checked regularly for solids buildup, and periodically cleaned and pumped out. The grease that is removed should be sent to a rendering plant. This is the best environmental choice: the grease is recycled for a useful purpose.

Some companies are marketing bacteria-based products to deal with FOG. While these products are useful, they should supplement, not replace, a grease separation system.

3. Food Grinders

Food grinders are a quick and convenient method for moving food waste off-site. But are they an environmentally sound means of dealing with this waste? Metro is funding a study to find out if the agency should restrict, prohibit or charge higher discharge fees to businesses that use food grinders.

Food grinders use large quantities of water to grind and flush food waste. They may increase water pollution through combined sewer overflows during rain storms. They increase sewer maintenance costs and reduce the capacity at sewage treatment plants. On the other hand, the organic matter from food waste may increase the value of biosolids.

The study is assessing the food waste contribution to Metro's treatment plants, the impacts of food waste disposal on the plants and alternatives for reducing food waste disposal to the sewer system. One alternative being discussed is to encourage composting of food waste. The study should be completed in early 1995.

Storm Water Pollution Prevention

Julie Knott

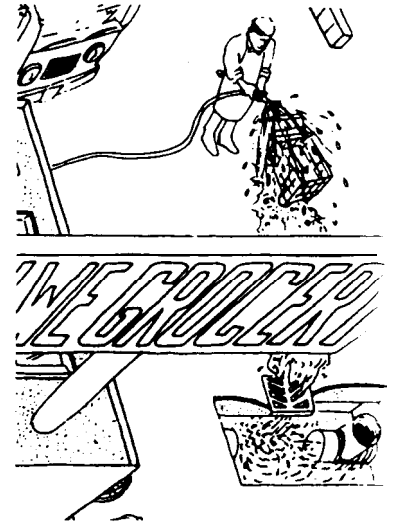
NOTES:

Stormwater pollution: More development = more potential to pollute

☞ Water behaves very differently in a natural, compared to a developed, environment.

☞ In a natural environment, rainwater soaks into the ground, where it is cleansed naturally.

☞ In a developed environment, rainwater runs off streets and buildings, down into storm drains and directly to streams.



Storm drains lead to streams

- ◆ Almost all storm drains lead to streams and lakes in our area.
- ◆ Any pollutant on the ground, such as oil, grease, pesticide and dirt, can travel through storm drains directly to streams and lakes.
- ◆ Many local streams have annual runs of salmon and cutthroat trout which are very vulnerable to pollutants.

Stormwater Pollution: Cooperation and Compliance

☞ The Department of Ecology and some cities and counties regulate stormwater pollution.

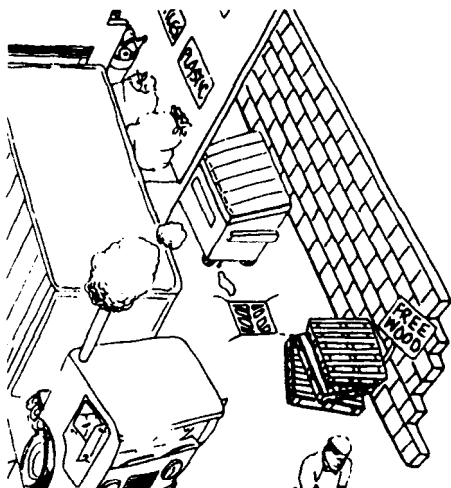
☞ The City of Bellevue, for instance, has a very strict water quality law. Basically, no pollutants are allowed in the storm drainage system.

☞ Other agencies, like King County, will soon enforce their own stormwater regulations.

☞ Regulations help, but because there is so much potential for stormwater pollution, water quality protection depends mostly on the cooperation of people who live and work in our area.

Common Pollutants to Manage

NOTES:



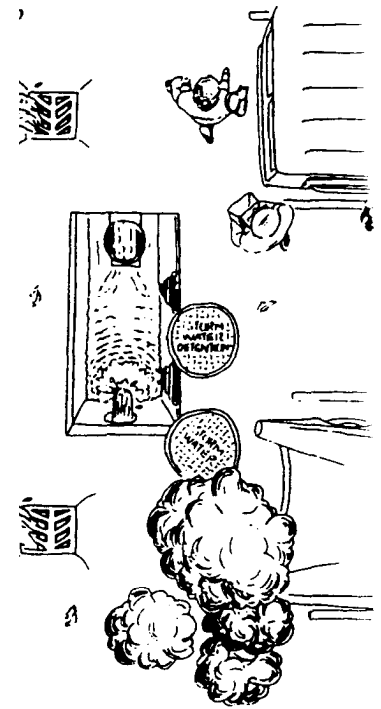
- ☒ vehicle fluids such as battery acid, break fluid, and gasoline
- ☒ pesticides, herbicides and chlorine
- ☒ paints and sealants
- ☒ oil and grease from leaking dumpsters, trash compactors or cleaning equipment stored outside
- ☒ motor oil from roads and parking lots
- ☒ liquids from accidental spills
- ☒ lawn and garden fertilizers
- ☒ detergents containing phosphates
- ☒ eroded soil
- ☒ pet waste and animal carcasses
- ☒ plant debris such as lawn clippings
- ☒ food waste
- ☒ steam cleaning wastes

Preventing Stormwater Pollution: Best Management Practices

1. **Care for your catch basins.** Inspect catch basins regularly and clean out as needed to prevent debris from accumulating in the outlet pipe (which is very expensive to clean).
2. **Keep your work site clean.** Debris and residue on your site can wash into streams and lakes. For instance, sweep (don't hose) dumpster areas and parking lots, and fix leaks on equipment and vehicles.
3. **Watch wastes and materials stored outdoors.** Cover stockpiled materials such as bark and gravel to keep rain from carrying off attached pollutants.
4. **Inspect your dumpster area regularly.** Spills and leaks are common in restaurant and grocery store dumpsters. Consider isolating the area around the dumpster and drain it to the sanitary sewer.
5. **Prevent spills and clean up immediately.** Organize your workplace so spills won't happen. In case of spills: stop the source; cover with absorbent material; report to authorities if help is needed.

6. **Manage vehicle and equipment wash water.** Detergent, oil and other substances are by-products of washing outdoors. Wash at a commercial facility, inside your building over a sanitary Sewer drain, or in an outdoor designated wash area that leads to the sanitary sewer.
7. **Avoid outdoor pressure washing.** Use mechanical methods such as brooms and wire brushes if possible. If you need to pressure wash, use sandbags or another material to divert the wash water to the sanitary sewer.
8. **Use hazardous products carefully.** Minimize the use of hazardous products; store them carefully if you must use them; and dispose of leftovers as hazardous waste.
9. **Consider alternatives to applying pesticides.** Try an integrated pest management approach first. When managing pests, there is often a least hazardous approach to try first.
10. **Minimize wastes.** Buy only what you need, purchase products that last longer, buy the least toxic products available, and see if others can use your leftovers.
11. **Prevent erosion and control sediments during construction.** Exposed soils can cause significant pollution. When clearing land, preserve as much vegetation as possible, cover bare spots with seeding or straw as needed, and install and maintain appropriate controls such as filter fabric fences.
12. **Design landscapes to protect water quality.** Minimize impervious surfaces such as concrete; incorporate vegetated swales into site design; and consider improving stream corridors on your property.
13. **Properly install and maintain landscapes.** Prevent water from running off your soil. Deeply cultivate landscapes; prevent thatch buildup and compact soils on lawns; water only when necessary; don't overspray; and apply fertilizers only at times and in amounts needed.
14. **Educate your employees and your clients.** Participate in workshops and other educational opportunities; provide educational materials to customers; and explain to customers and clients what you are doing to protect the environment.

NOTES :



NOTES:

Waste Reduction & Recycling for Grocers

Rod Pemble

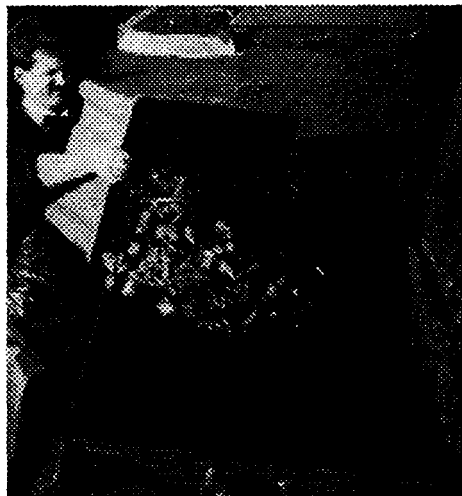
What are the only sure things in life? Death, taxes and your garbage bill, right? Wrong! Costs for waste disposal are not a given as many business people assume. With a little homework and a commitment to success, you can save money while reducing your store's solid waste.

This exercise will help you take your own garbage and recycling records, and analyze your store's potential for additional savings. You will prioritize which materials to work on, and begin to explore what waste reduction strategies will work best for your particular circumstances. The process has three basic stages:

- I Quantify Current Disposal**
- II Quantify Existing Waste Reduction & Potential**
- III Estimate Savings (Cost Avoidance) & Prioritize Actions**

I. Quantify Current Disposal:

While most grocers track product inventory like hawks, they rarely monitor another costly inventory, that of solid waste. In order to compare disposal with reduction, reuse or recycling, you must know the cost per pound and per cubic yard for disposal. Depending on how your garbage service is billed and the type of container used, use the appropriate worksheet below.



Billing Arrangement

- A. Direct Service:** Pay directly for garbage (Sheet 1A)
- B. Shared Service:** Share with other tenants or pay indirectly under a lease (Sheet 1B)
- C. Self-haul:** Take your own garbage to a disposal facility (Sheet 1C)

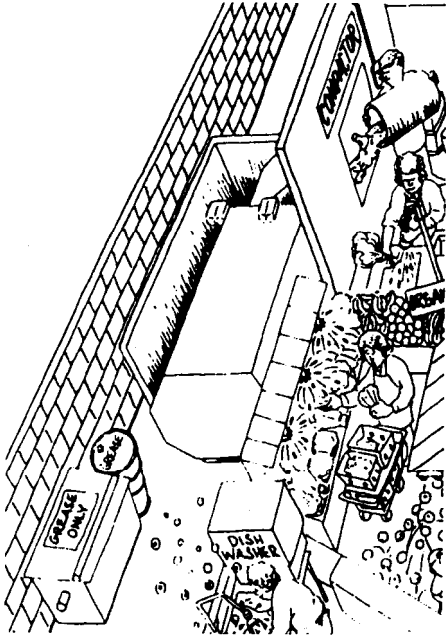
NOTES:

Container Type

A. Compactor:

1. 15-40 cubic yards; sealed units; generally 2.5-3.0:1 compaction ratios.
2. Usually owned by the client business or included in triple net
3. Bill consists of haul charges, usually a flat rate plus excess mileage if any, and a tonnage charge based on local tip fees
4. Equipment maintenance and loan servicing can add another \$2-\$8 per ton.
- s. Recycling saves by reducing hauls per year as well as tons per year.

NOTES:



B. Drop box:

1. 15-40 cubic yards; open top. Store pays for rain/snow weight unless tarped.
2. Generally rented from the refuse company, either directly or under a triple net lease.
3. Bill consists of hauling charges, usually varying by the size of the box, and excess mileage if any, and tonnage charges based on local tip fees. First haul per month typically includes the rent on the box. In some areas there may be a minimum charge even if the box is not hauled that month.
4. Recycling saves two ways: reduced hauls and tonnage

C. Dumpster:

1. 1-8 cubic yards; flip top lids. Not sealed, but protected from the weather.
2. Usually rented from the refuse company, either directly or under triple net.
3. Bill consists of hauling charges and rent. Volume charge only; no tonnage charges. Rates are usually based on average garbage densities, favoring businesses whose garbage is denser than average.

II. Quantify Existing Waste Reduction & Potential: The second step is to estimate what percent of your solid waste stream is now reduced, reused, recycled or composted, and what expansion potential exists. Worksheet 2A calculates existing waste reduction and costs. Worksheet 2B can calculate two figures: total possible diversion using conservative average composition figures and additional possible diversion using actual estimates from an on-site dumpster dive. Of course, actual potential also depends on what recycling services and facilities are available in your community.

NOTES:

Volume Reduction Ratios: When recyclable materials are sorted from garbage, their volume tends to be reduced. This is simply because a container full of just one material tends to pack more densely. Obviously, the gains are largest compared to dumpster service and smallest compared to compactor service. The numbers below are estimates compared to dumpster/drop box service, based on our experience with on-site evaluations. A cubic yard is approximately equal to 200 gallons.

Some Volume Reduction Ratios			
	In Garbage	Sorted For Recycling	Ratio
Cardboard	3 yards (some flattened)	1 yard (all flattened)	3.0:1
Office paper	3 yards	1 yard	3.0:1
Mixed paper	3 yards	1.25 yards	2.4:1
Aluminum	50 gal (uncrushed)	10 gal (semi-crushed)	5.0:1
Glass bottles	50 gal (uncrushed)	34 gal (semi-crushed)	1.5:1

Examples of using ratios above with enclosed weight/volume sheet:

1. 15% of All We Grocery garbage is mixed paper, a total of 2 yards per week (400 gallons). Dividing by the ratio of 2.4:1. that will require recycling pick-up of 167 gallons per week, or a bit less than two 90-gallon totes weekly. Use garbage and recycling rates to calculate avoided cost.
2. All We Grocery is now recycling four 500 lb. bales of cardboard boxes per week, and wants to know what they're saving. The store has a baler free from the recycler, is paid \$4/bale, and spends \$4 in labor to make each bale (30 min.). Using the weight/volume sheet, one 500 lb. bale equals 5 yards uncompacted cardboard in the garbage (not counting any extra volume reduction from list above). If garbage is \$8.71 per yard, that's 5 x \$8.71 = \$43.55 avoided cost per bale, or \$754.29 saved per month!

NOTES :

III. Estimate Cost Savings: While waste reduction and reuse are often direct savings, recycling generally costs something. The key concept here is "avoided costs," or expenses you no longer pay because you are recycling. For example, if cardboard costs you \$12 a cubic yard in the garbage, but only \$2 a yard picked up for recycling, the avoided cost, or savings, is \$10 per yard. If recycling costs less than disposal and implementation is reasonable, simple business sense says "Just Do It."

The last four columns of Worksheet #2B compare the final costs per pound or per-yard from the garbage worksheet (#1) with costs and potential volumes from recycling to determine total possible savings per month. Final results will help direct your efforts to those materials with the greatest potential for savings.

Reduce Your Wasteline

Rod Pemble

As a manager, you know it takes \$50 of sales to generate \$1 of profit. What you may not realize is that it may only take 50 cents of waste reduction or recycling spending to generate that same dollar of profit! Just as it's usually less expensive to stay healthy than to go see the doctor, avoiding the high cost of waste disposal through reduction, reuse and recycling is just common sense.

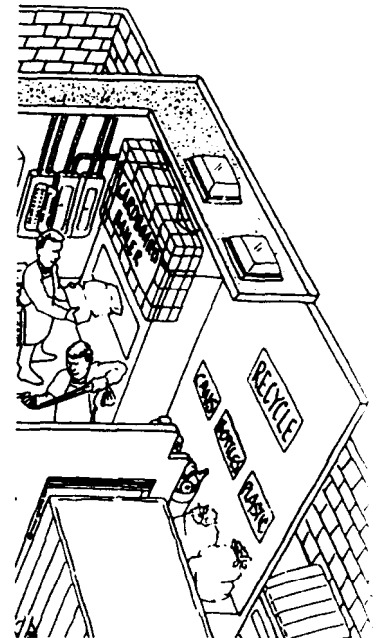
Beyond economic savings, waste prevention and recycling provide other benefits:

- ◆ *improved employee morale & pride in their work*
- ◆ *conservation of valuable natural resources*
- ◆ *reduced energy use & less pollution of the air, water and land*
- ◆ *local job creation & opportunities for local remanufacturing using recycled materials*

This section of the workshop is designed to help you analyze your store's material streams in order to achieve greater savings and intelligent planning for future waste reduction. Before looking at the details of your store's existing and potential waste reduction and recycling, a few general concepts are important to understand.

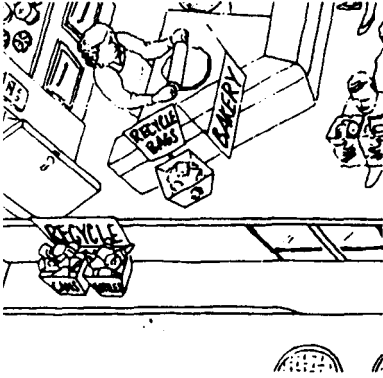
1. **"Wastes" = Resources:** Nature has no wasted material; everything is reused and recycled. Learning to create closed-loop systems where "wastes" are seen as valuable resources is essential to long-term sustainability.
2. **Company Philosophy:** While interest in waste reduction and recycling often starts at the bottom of a company, without leadership from the top it is likely to wither. High-visibility management support is critical for long-term success. As a model, consider the approach that says, "We will succeed, now how do we get there?" instead of "it's too hard (expensive, complex), so the goal is impractical."
3. **Recycling Is Just The Beginning:** While recycling is relatively easy, reuse and reduction are the long-term answers to sustainability and economic payoffs. Even if recycling costs less per ton than disposal, not generating the material in the first place saves the most material, the most money, and the most pollution. From simple office procedures to industry-wide transport packaging, opportunities exist to benefit companies, communities and the environment.

NOTES:



Just Do It!

Once you have made a commitment to a successful program, the next steps are straightforward and clear.



NOTES:

1. **Data Assessment - Disposal and Reduction/Recycling:** The worksheets that follow allow you to use your own garbage and recycling figures to calculate savings and prioritize your efforts.
2. **Planning:** Establish a small committee to oversee the program, meeting as needed to start, and then quarterly. One member from each store department should provide input on separation concerns, issues about bins and so on. If each department feels they have a voice in decisions that affect them, they will be more likely to participate fully, which is essential to success. The group should:
 - A. Develop an explicit company policy in support of recycling, taking into account existing efforts and future goals. I further recommend developing a review system for raises and promotions that includes recycling participation as one criteria. Give people incentives.
 - B. Develop an implementation plan and timeline. see Materials Handling Sheet for more detailed recommendations.
 - C. Work cooperatively with each department on how the program will be implemented storewide.
 - D. Promote and monitor the program. Record keeping is very important.
 - E. Continue to improve the program by implementing additional waste reduction strategies.
3. **Contact Recyclers:** Initiate service based on the targeted materials from Step #1. If you do not have contacts for recyclers in your area, refer to the end of this section for a list of recycling coordinators for each city and county in Washington. For other states, call your local solid waste division or the EPA regional office nearest you (look in the government pages of your phone book).
4. **Organize Staff Presentations:** Each department must be familiarized with how the program works, and what each person's role in it is. I am available to assist with such presentations. It is essential that each person know what materials they will be separating, how and why.
5. **In-store Recycling Containers:** A few suggestions.

Size: Containers that will have to be manually lifted or taken up or down stairs should not be too large. stay around 25 to 30 gallons for central bins, with s to 20 gallon bins at individual work

stations. Recyclers will often provide larger 60 - or 90 - gallon wheeled totes and/or dumpsters, either as part of the pick-up service or for a small rental fee per month.

Type: Containers with wheels are easy to move and less risky for employees. Obviously, durable materials that can be washed if needed are helpful. Rolling, multi-bin carts can be very useful to save time on collection through the store. In general, money spent on attractive, professional looking containers pays off in morale, performance and customer appeal.

Color: Color coordinating all bins for a given material helps employees quickly adjust to the new program and reduces contamination. Labels are still needed, but color helps make recycling a habit.

NOTES :

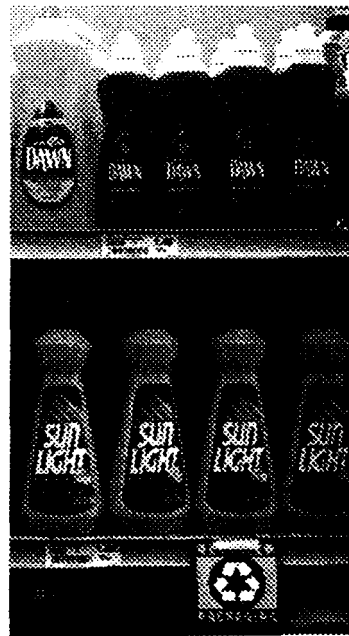
- 6. Program Kick-off:** Choose a Recycle Week, raffle, party or something to boost enthusiasm and participation. Getting people involved and having fun is part of a successful program's start.

- 7. Garbage/Recycling Monitoring:**

A. Monitor garbage containers for targeted recyclables, and re-educate as needed. Record drop in tonnage per month and reduced hauls in order to calculate savings.

B. Monitor recycling bins closely to ensure proper separation and absence of contamination in bins.

- 8. Program Promotion:** Continue promoting the program, encouraging staff and educating customers about the effort. Post savings accrued and ask for ideas to improve the system.



- 9. Waste Prevention/Reuse:** Implement further ideas in a timely manner. see the enclosed pages of strategies for reuse and waste prevention.
- 10. Buy Recycled:** Develop a company-wide policy that supports the purchase of recycled products whenever possible. The enclosed page details Several approaches possible in this area.

Strategies For success

Strategy I

Prevention/Reduction: Don't generate the material in the first place,

Offices:

- ◆ Utilize on-line computer reports and memo routing.
- ◆ Study use of forms for possible paperwork reduction.
- ◆ Eliminate carbon forms by switching to recyclable carbonless forms.

Garbage:

- ◆ To avoid rain and snow weight, place a tarp on drop box lids. Remove before hauling and replace when box is returned.
- ◆ Break down waxed boxes even in garbage - 3:1 volume reduction.
- ◆ Analyze garbage service for greater efficiency by changing container size, type or pick-up frequency.

NOTES :

General:

- ◆ Better forklift training to reduce breakage, wasted products.
- ◆ Switch to non-toxic cleaners and maintenance chemicals to reduce water and air pollution and protect employee health.
- ◆ Use durable mugs and dishes in all employee break areas.
- ◆ Offer cash bonuses for implemented employee ideas that reduce waste and save money. Last year Toyota got 2.1 million suggestions!
- ◆ Work with vendors whose materials end up in your waste stream to change packaging and shipping practices.



- ◆ Encourage distributors to switch from pallet wrap to FDA-approved spray on adhesives for pallet loads (Lock N Pop, Mukilteo, WA).
- ◆ Switch to #1-PET plastic containers For deli and bakery items since this plastic is commonly recyclable while #6-PS is usually not.
- ◆ Purchase supplies in bulk and train employees to mix properly in reusable bottles, pails, etc. Some vendors will service accounts in person to refill cleaning supplies.
- ◆ Switch to roll paper restroom dispensers if you're using C-folds now and save 30-40% on disposal volume. New James River product "Compak" toilet tissue: cat-ton-less shipping/rolls without cores reduce volume and double the number of useful sheets per roll, with no cardboard tubes or roll wrappers to dispose of.

NOTES :

Strategy II

Reuse: It takes less energy to use it again than to make it again.

- ◆ Use plastic shipping crates, pallets and other reusable items.
- ◆ Print signs on both sides so they can be used twice before recycling.
- ◆ Examine delis, bakeries and floral areas for current disposables that could be replaced with washable durable items. For example, plastic lids instead of plastic film to cover food.



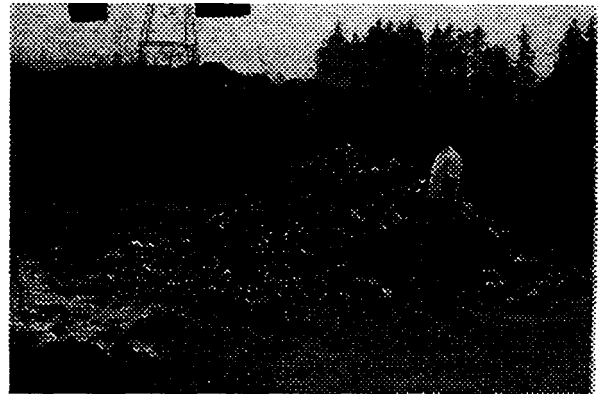
- ◆ When changing shelving, lights, fixtures, etc., contact local recyclers about reuse outlets to save disposal costs. Non-profit retail operations that accept usable building-related items are now operating in several cities in Washington and Oregon.
- ◆ Eliminate disposables in lunchrooms in favor of durable dishware.

Strategy III

Buy Recycled: If you're not buying recycled, you're not recycling.

- ◆ Start with janitorial products like towels and tissue that are often less expensive than virgin products of similar quality.
- ◆ Set a company price preference of perhaps 5-8% for certain recycled commodities like paper, offset with savings from recycling.
- ◆ Set goals for changing over to recycled materials; for example, you might say that the goal by the end of 1995 is to switch 20% of company copier and computer paper to recycled stocks. Don't be afraid to buy products with only some recycled content; some is better than none, especially if it's post-consumer.
- ◆ Set up a Green Consumer aisle (like Larry's Markets in Seattle) to highlight recycled and recyclable products.
- ◆ Examine all purchasing, from building materials for new stores to furnishings to food service items for delis and food courts, etc.

NOTES:



Strategy IV

Recycle: It takes less energy and pollution to make it from used material.

- ◆ Set up a laser cartridge recycling program through local vendor or product manufacturer (check your cartridge carton for details).
- ◆ Expand current recycling to include new materials as they have local services available.
- ◆ Landscaping: Leave grass clippings on the lawn: compost leaves and other organics for use as mulch: use shade trees and vegetation to shield the store from weather and the sun in order to reduce energy needs for heating and cooling.

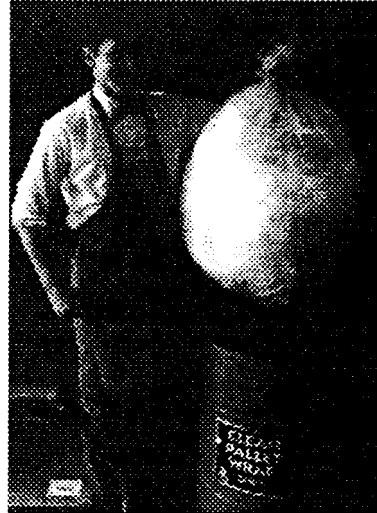


Waste Prevention, Reuse, & Recycling success Stories

This section provides summaries of what several Washington grocers have done to recycle and reduce waste in their stores. For more details, a contact person is included for each. (Contacts marked *will have a 360 area code after 5-1-95.)

NOTES:

Brown & Cole: Ferndale, WA. Chuck Beebe, Waste Reduction Coordinator, (206) 332-8282*. The Thriftway stores in Whatcom County have a variety of recycling strategies. Cardboard is sold to the owner of the balers the stores use, while plastic is backhauled as needed through AG. Source separated organics are picked up daily for local livestock feed, while excess prepared foods are given daily to charitable organizations. A local fiberglass company picks up empty #10 cans for mixing resins, while aluminum and glass are collected by local recyclers. Both stores sponsor a free monthly drop-off for #1 and #2 plastics, providing two of the three locations in the entire county.



Fred Meyer, Portland, OR. Barry Naone, Environmental Affairs, (503)232-8844. Fred Meyer stores throughout their system recycle cardboard, scrap metal, plastics where opportunities allow, and office/mixed paper. Pallets are backhauled to a pallet rebuilder, then repurchased for continued use. Waste reduction and cost savings have also been achieved through increasing use of durable plastic shipping crates. Outside, store nurseries work to provide customers with flowers, shrubs, and trees grown from native regional genetic stocks, reducing costs and pollution from cross-country transportation.

Haggens (Top Foods): Bellingham, WA. David Miller, store manager, (206)676-1996*. The Haggens store at Sehome Village has a storewide recycling program for the following materials: cardboard, mixed paper and film plastics (baled and backhauled through AG); and aluminum, tin and glass are recycled by employees throughout the store as well as by customers in the store's food court (weekly pick-up by recycler). All materials are recycled at a lower cost per ton than for garbage. The office double-sides copies whenever possible, and the company is looking at organics composting for produce and other materials. Haggens corpo-

rate offices have paper reuse policies in place, as well as recycling for confidential documents and other office materials.

International Marketplace: Blaine, WA. Vince Baginski, Recycling Coordinator, (206) 332-5909*. International Marketplace has a baler on free loan from their cardboard recycler who also accepts sorted boxes of office paper and newsprint ad flyers when he picks up cardboard. Store offices used to empty six wastebaskets of paper daily; with recycling, garbage is down to one waste basket a week! The deli rinses 5-gallon buckets for free giveaway to customers, eliminating this problem item from the compactor.

Larry's Markets: Seattle, WA. Brant Rogers, Environmental Affairs Manager, (206) 243-2951. starting with a \$29,000 net savings from waste reduction and recycling in 1992, program savings have increased nearly 40% annually. With the addition of waxed cardboard and expanded organics composting in 1993 and 1994, the program is approaching a total waste stream reduction of 70%! One of the most significant side benefits of composting is the near elimination of in-store food grinders. By turning off these 10-gallon per minute grinders, the community saves almost 200,000 gallons of water per year.

NOTES:



We share the Air...Let's Keep it Clean!

Susan Alotrico

You've come a long way!

Grocery stores used to operate incinerators on location to burn waste. Today, grocers are not a registered source of air pollution. However, if a grocer is conducting an activity that has the potential to create odor and nuisance problems for customers, chances are you are affected by local clean air rules.

For example:

Building or remodeling your store

- ✎ Abrasive blasting
- ✎ Spray painting
- ✎ Asphalt roofing (use aluminum or alternative material)
- ✎ Building demolition
- ✎ Asbestos removal
- ✎ Paving your parking lot

Local clean air laws require best available control technologies to prevent emissions to the outdoor air.

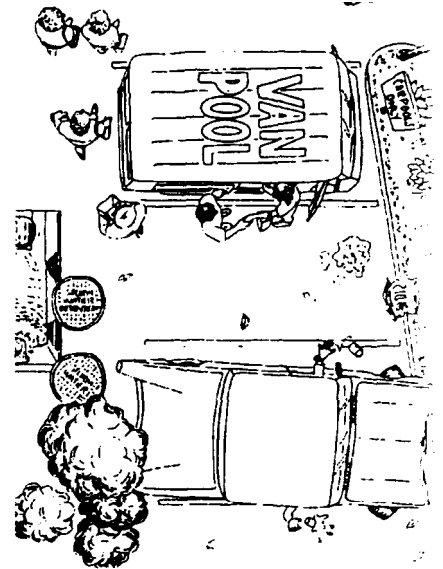
Our regulations, policies and programs are designed to maintain air quality standards, protect human health, prevent injury to plant and animal life and protect Puget Sound's panoramic views today and for the future generations. We regulate any stationary source that emits pollutants or has the potential to emit pollutants into the ambient air: i.e.; smoke, dust, odor and asbestos. Although some pollutants are not detected by either sight or smell, a basic guide is, if you can see it or smell it, notify PSAPCA. PSAPCA can issue fines for non-compliance up to \$11,000 per day per violation.

Being "air aware" is an opportunity to build on your role as a community resource. Here's how to set your self apart from the competition by being responsive to customer needs for "air friendly" choices:

The Transportation Connection

Cars and trucks create over half of the air pollution problem in Central Puget Sound. Most of this air pollution occurs during non-commute hour trips. The average Puget Sound household makes nearly 10 trips per day and 88% of these are in private autos.

NOTES:



Air Friendly Transportation Choices:

☺ Sponsor a "bike to market" week and offer discounts to participants during Oil Smart month in March and Clean Air Week in May.

☺ Provide bicycle racks at stores.

☺ Encourage delivery trucks to switch to clean fuels such as natural gas and to use rerefined motor oil and recycled antifreeze.

☺ Landscape your parking lots with trees; trees filter and absorb pollutants from cars.

☺ Stagger delivery hours for your delivery trucks.

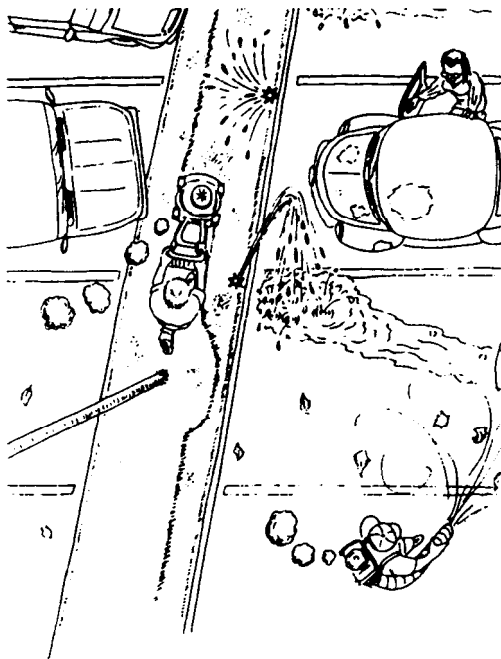
☺ Sponsor a contest that provides discounts to shoppers who combine shopping errands.

☺ Offer reduced prices or bonuses for those shopping during off-hours.

☺ Subsidize employees who take the bus, carpool, walk or ride a bike to work.

☺ Offer employees a discount/bonus if they use alternative transportation choices.

NOTES:



The Wood Smoke Connection

Fall and winter often spell stagnant air and fireplace and wood stove burn bans. Unfortunately, all too often these periods of stagnant air occur around the holidays. Grocers can help wood burners draw the link between stagnant air and burn ban days by providing them with clean, dry fuel for wood-stoves and fireplaces.

Air-Friendly Wood Smoke Choices:

☺ Encourage customers to buy firelogs for their ceremonial burns at Thanksgiving and Christmas, and for romantic evenings.

☺ Conduct promotions saying customers can help prevent a burn ban by burning clean, dry wood like packaged, compressed wood logs and fire logs.

☺ Print clean heating tips on grocery bags.

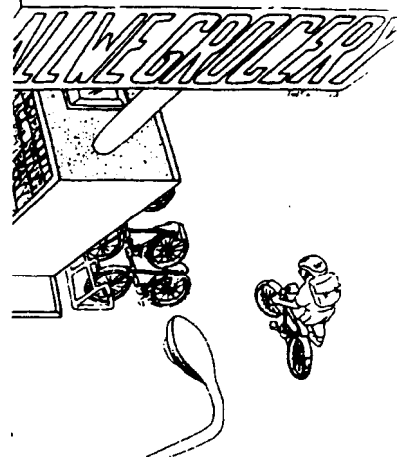
The Product Connection

Any time we reduce the need to manufacture a product we will reduce air pollution.

Air-Friendly Product Choices:

- ☺ Offer customers the choice of buying air friendly products (non-aerosols, pumps and sprays) that do not include propellants, solvents or vapors that can release into the air.
- ☺ Buy from manufacturers who reduce packaging and use environmentally-friendly packaging like starch based peanut packing material or reusable shipping containers.
- ☺ Encourage customers to buy in bulk.
- ☺ Provide customer discounts for using cloth grocery bags.
- ☺ Encourage customers to buy electric starters for their barbecues or gas barbecue grills.
- ☺ Encourage customers to buy paint brushes and rollers instead of spray guns.
- ☺ Encourage customers to buy non-toxic, all-purpose cleaning products.

NOTES:



The Maintenance Connection

Air-Friendly Maintenance Choices:

- ☺ Small gasoline-powered engines contribute to air pollution.
- ☺ Avoid using small gasoline-powered engines like lawn mowers and leaf blowers. Instead, use electric or push lawn mowers, and manual hedge and lawn edgers.

The Bottom Line

Each of us can and do make air quality choices every day. We, as individuals, hold the key to success in the fight against air pollution. Simply understanding the problem isn't enough. We must do something about it. Each one of us can and will make a difference.

NOTES :

ABCs of CFCs for Grocers

Brant Rogers

NOTES:

Background

CFCs (chlorofluorocarbons) are refrigerants that have been common in grocers' stores for the past few decades. Medium temperature refrigeration systems usually had CFC-12 and low temperature systems had CFC-502.

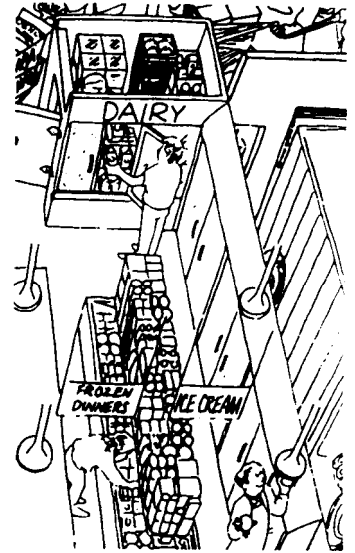
In recent years these CFCs and others used both as refrigerants and cleaning agents have been linked to the thinning of the ozone layer. Since 1987, international conferences agreed to eliminate the use of CFCs and related compounds in an effort to preserve the ozone layer. In the United States, the EPA has put requirements for people who use and handle CFCs and related compounds into law. As of July 1, 1992, it is illegal to knowingly vent CFCs into the atmosphere. After 1995, CFCs will no longer be manufactured and their price is expected to soar.

HCFCs (hydrochlorofluorocarbons) are refrigerants that are similar to CFCs but are much less harmful to the ozone layer. Their use is becoming common in refrigeration systems though they are now usually (and temporarily) more expensive than CFCs. They are also regulated by the EPA in the same manner as CFCs. Production of these refrigerants will cease sometime early in the next decade. Prices for these are expected to rise as the end of their production approaches.

HFCs (hydrofluorocarbons) are refrigerants that are not considered harmful to the ozone layer. They are sometimes considered for use in new store construction because there are no plans to halt their production. They are currently very expensive.

Dealing with the CFC Problem

Development of a CFC plan is pressing for two primary reasons. First, the EPA has issued regulations governing the use and handling of virtually all refrigerants. These regulations are strict with regard to the way refrigerants are used and accounted for. The accounting for refrigerants within the context of the regulations largely assumes that if no records have been kept that the refrigerant was discharged into the atmosphere and amounts to cause for penalty whether discharge occurred or not. In other words, it is required that grocers have easily accessible, tangible records of the use of all refrigerants in their facilities. Record keeping is required as of July 14, 1993.



NOTES:

Fines for discharge of refrigerants (CFCs & HCFCs) are up to \$25,000 per day levied against the owner or director of the company. There is ample proof that the EPA is moving quickly to develop a strong enforcement program for refrigerants. Their method may be to pick a few visible targets for penalty.

The second reason for development of an effective CFC management plan is the economics of the refrigerants. CFCs will not be produced after January 1, 1996. The cost of these refrigerants will be many times their current cost. HCFCs, common substitutes for CFCs, are also being regulated and phased out but at a much slower rate which begins with a consumption cap January 1, 1996, a production freeze in the year 2010 and further restrictions later. The costs for HCFCs is not expected to grow as much as CFCs.

Soon it will be necessary to convert systems to non-CFC refrigerants. Conversions of old CFC - using equipment to HCFCs and other non-CFC refrigerants are occurring at a snail's pace today in most companies. This means that if CFC costs skyrocket and it becomes more rare in the next 3-5 years, there will be a rush to retrofit old equipment by most companies. Many say that retrofitting will become much more expensive as demand for this work grows. Industry experts say that a shortage of trained technicians will mean that stores who wait too long will not be able to meet conversion deadlines no matter what they are willing to pay.

CFC Management Plan

By Law

Knowingly venting ozone-depleting refrigerants is prohibited (effective July 1, 1992).

Refrigeration and air-conditioning servicers and their equipment need to be certified by the EPA (various dates in 1993 and 1994).

Keep records documenting the date and type of service of equipment and amount of refrigerant added to all appliances that contain 50 or more pounds of refrigerant (effective July 14, 1993).

Start Immediately

Appoint a Refrigerant Manager - Assign responsibility for refrigerant management to one person.

Have Records Available - If an EPA investigation happens you need to provide records of service and refrigerant use on your equipment holding 50 lbs. or more of refrigerant. You should have this readily accessible.

Request Certification of Service Companies - Have written documentation of the compliance by your refrigeration service providers of their certification of technicians and equipment by EPA as well as documentation of their methods for informing you of the servicing of equipment and use of refrigerants.

Get an Inventory of Your Refrigerants and Equipment - Compile a complete inventory of all refrigeration, air conditioning and cooling equipment (or systems) that use CFCs or HCFCs. Include an inventory of the CFCs that are being held for you by refrigeration service contractors.

Repair Equipment - Have refrigeration service providers analyze the use of refrigerants by units with 50 lbs. or more of refrigerant and determine clearly if they have used more than 35% of their charge (for refrigeration equipment) or 15% of their charge (for air conditioning equipment) in the past year. If such units exist, they should be repaired or replaced immediately.

Create a Policy - Create a policy for public record that states your commitment and approaches to ozone-depleting substances such as:

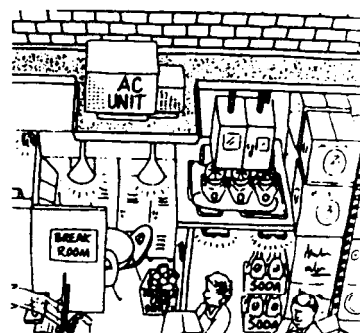
It is the policy of All We Grocery Company that the venting of ozone-depleting substances is strictly prohibited and that all personnel servicing equipment using ozone-depleting substances shall comply with all regulations pertaining to the handling of these substances.

This policy requires that all technicians servicing equipment using ozone-depleting substances shall be certified in accordance with EPA guidelines. All maintenance and service procedures shall be modified as necessary to prevent intentional venting, leakage and, to the greatest extent possible, accidental venting of ozone-depleting substances.

Furthermore, All We Grocery Company is continuing to move toward the elimination of CFCs in its cooling equipment by retrofitting of old equipment and installing new equipment that is CFC-free.

All We Grocery Company is committed to protecting the environment and all personnel are required to take all steps necessary to achieve this goal. Deliberate or verifiable negligent leakage of any ozone-depleting substance by an employee shall be grounds for dismissal.

NOTES :



Start as Soon as Possible

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Cost Analysis - With the inventory information from service providers (see above), establish a spreadsheet for equipment and refrigerants for the entire company. With this information begin life cycle cost analysis for each of the systems or units that currently use CFCs to determine the desired time for replacement or retrofit. Also, a comprehensive view of your refrigeration systems would provide an opportunity to see how you might standardize what you do from store to store for ease of management.

Personnel Training - a) Learn to become less dependent upon service providers for information and expertise in the area of refrigerants. Develop training and education for personnel who have occasion to deal with refrigerants. More than one person in the company should be familiar with refrigerants and systems. b) Keep abreast of changes in CFC regulation, new refrigerants and people working in the field.

**Please check the Environmental Resources section of the Workbook for more resources and updated information about CFC's

Marketing Opportunities for Greener Grocers

Patty Schwegman

NOTES:



It is extremely important to keep your customers, legislators, community leaders and employees aware of the environmental actions your store is taking. Trends show that more and more people are becoming environmentally aware, and their purchasing decisions are reflecting that. This is not only reflected by the products they buy, but by the store they choose to patronize. Many legislators have no idea how proactive the grocery industry has been in implementing environmentally sound business practices. This level of knowledge has been apparent in some of the legislation that has been introduced.

There are numerous opportunities to get the word out about what your company is doing. This can be accomplished by participating in voluntary challenge programs, informing media contacts, communicating with organizations that your company belongs to and, of course, communicating with your employees and customers.

Employee Education

Keep your employees updated about your store's environmental actions. Not only will it make them feel better about where they work, but they may have great ideas and suggestions. Who knows more about the job than the person doing it? Just keep an update or an environmental fact sheet on your central memo board or in the lunch area. It can also be added to your internal newsletter or distributed with paychecks!

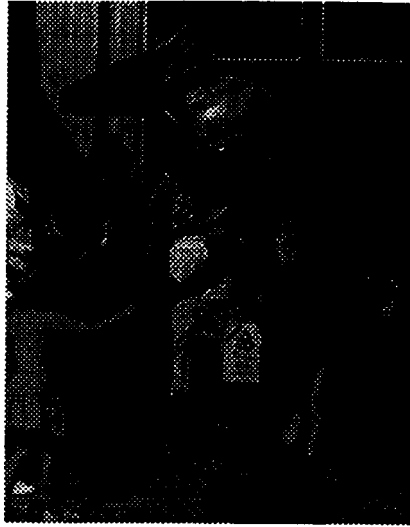
Employees should also stay informed in case customers inquire. Seeking and implementing cost-effective and environmentally-sound business practices should be part of every employee's job description.

In-Store Exposure

A simple brochure stating your company's environmental policy and activities is always appreciated by your environ-



NOTES:



mentally-aware consumers. Do your T-shirt bags contain recycled content? If so, make sure the bag indicates that. Many retailers provide a bulletin board of information about environmental products. Recycling Insight is a newspaper targeted for the environmentally interested consumer and business. For more information on how to provide complimentary copies to your customers, with no charge to you, contact the Recycling Insight Publisher, Loudon Smith, at (206) 240-7976.

Shop Smart Tours

Your grocery store could be a proud sponsor of a Shop Smart Tour. Consumers participate in a one-hour tour through a grocery store, designed to illustrate, aisle by aisle, how their purchasing choices can reduce garbage toxicity and packaging waste. They also learn how to choose less hazardous products, and products that are recyclable and contain recycled materials. Volunteers from the Master Recycler and the League of Women Voters can lead the tours. For more information, contact the your local solid waste coordinator (see resource list), or the Washington State Department of Ecology at 1-800-RECYCLE.

Community Events

Many grocers show their greener side by being a collection site for a day. On selected dates, Red Apple Market collects household hazardous waste for Snohomish County. Stormans provides a once-a-month plastic drop-off program for certain types of plastics. Stadium Thriftway offers a free shuttle service to its store. The regular route includes a neighborhood apartment building that contains a large number of elderly residents. Prior to the service, the riders generally rode individually by taxi. This service reduces air pollution by cutting the number of cars on the road. For more information, contact your local solid waste coordinator.

Meet the Press

There are not many things better than free positive media! A simple, yet effective, action you can take is to write a press release every once in a while. Let your local newspaper in on the good environmental actions your

company is taking. Whether those actions are big or small, it is news! How many tons of material has your company recycled? Is new energy-efficient lighting being installed any time soon? Has your store received an award lately? Are you participating in a voluntary challenge program? Chances are your customers read newspapers, listen to the radio, or watch television. Attached is a list of media contacts and a press release.

NOTES :

National Challenge Programs

Participation in voluntary challenge programs is good public relations. Voluntary programs also keep you informed about new strategies and programs that your store may want to implement. By participating in a national program, you can learn about initiatives and actions that are taking place around the nation. Furthermore, there is no charge to participate in the challenge programs listed below!

Energy Star Buildings

Energy Star Buildings can help cut energy costs in commercial and industrial buildings by 40%. To achieve energy savings, building owners first conduct a comprehensive survey and tune-up. They lower costs by reducing heating, ventilation and air-conditioning (HVAC) loads, in addition to improving fans and air-handling systems. To help plan and implement building upgrades, Energy Star Buildings offers guidance packages, technical manuals, case studies, software to calculate savings, and a database of financing programs for building-efficiency upgrades. For information call the Energy Star Hotline (202) 775-6650.

Green Lights

Green Lights reduces air pollution by promoting energy-efficient lighting. Over 1,150 Green Lights participants include major corporations; state, city, and county governments; environmental organizations; electric utilities; and major members of the lighting industry. They are curbing acid rain and smog while cutting their lighting bills in half. Green Lights works with participants to enhance existing lighting infrastructure and promote energy-efficient lighting which, in turn, reduces pollution. For information call the Energy Star Hotline (202) 775-6650.



National Recycling Coalition's Buy Recycled Campaign

NOTES:

Through the campaign, NRC encourages businesses of all sizes to make purchasing of recycling content products and materials part of their day-to-day operations. NRC provides information and guidance that helps your company save time and money when setting up its own in-house Buy Recycled program. For more information, contact Bill Anderson at (206) 389-7303.

WasteWi\$e



WasteWi\$e promotes cost-effective steps to reduce solid waste from businesses. To participate in WasteWi\$e, companies commit to achieving reduction goals in three areas: recycling, buying recycled products, and reducing waste generation. Typical waste-reduction targets include office paper, food scraps, packaging, corrugated cardboard and wood pallets. WasteWi\$e encourages participants to prepare an annual report on progress toward their goals. The EPA provides recognition for member companies as well as technical assistance via publications, a hotline and referrals to other sources of waste reduction assistance. Tidyman's, Larry's Markets and Giant Foods are just a few of the grocers participating in this program. For more information call 1-800-EPA-WISE.

State and Local Challenge Programs and Awards

Business Partners for Clean Water (Bellevue)

The City of Bellevue's Storm and Surface Water Utility created Business Partners for Clean Water. The program helps businesses understand (through workshops and manuals) their water quality role and gives free publicity to business that fully participate in the program. For more information, call (206) 451-4476.

Business Pollution Prevention Program (Thurston County)

This county-wide program emphasizes education, voluntary compliance and equitable enforcement when necessary as they put into practice the County's Non-point Source Pollution Ordinance. The ordinance requires businesses to recycle or properly dispose of the hazardous and petroleum wastes they generate. Contact Chris Judge at (206) 754-4111 or Michael Kent at (206) 786-5457.

NOTES:

EnviroStars (King County)

To receive a star, a staff member of the local hazardous waste management program will visit your site to ensure you are managing your hazardous waste properly. The number of stars you receive depends on how proactive your hazardous waste reduction program is. When you receive a star you will be able to display the seal of approval on your store window, use the EnviroStars logo in your marketing efforts and receive a certificate of recognition. This exciting new program will kick off in Spring 1995. To be one of the first businesses in line for recognition, contact Aimee Beckwith at (206) 609-3050.

Governor's Awards for Outstanding Achievement in Pollution Prevention (State)

This is a competitive award program that recognizes outstanding effort and achievement by business and public entities to prevent pollution by going beyond traditional pollution control techniques to reduce pollutants at the source. Applications are evaluated by a panel of waste reduction experts representing industry, small business, government, academia and the environmental community. Contact Lynn Helbrecht with the Department of Ecology's Waste Reduction, Recycling and Litter Control Program at (206) 438-7512.

Green Seal Program (Walla Walla and Columbia Counties)

This is an integrated waste management program that not only incorporates the safe handling and disposal of hazardous chemicals, but also includes solid waste management, recycling and procurement of recycling content products. To apply for a Green Seal, contact the Regional Waste Reduction and Recycling Office of Walla Walla and Columbia Counties at (509) 527-3282.

Green Works (King, Kitsap and Snohomish Counties)

NOTES:

Green Works is an award program that recognizes businesses that prevent waste, purchase recycled products and recycle. Businesses that qualify for Green Works become "Business in the Green" and receive positive public recognition for their efforts. Through this program, businesses are rewarded for their sound waste management practices. For more information, contact the appropriate county. King County (206) 296-8800; Snohomish County (206) 388-6488; and Kitsap County (206) 895-3931.



King County's Get in the Loop Campaign (King County)

This is a campaign to encourage consumers to buy recycled products. The minimum requirement to participate is to place shelf markers by recycled products. These markers are provided at no charge, as are posters, the campaign logo, door signs and clerk buttons. Participating companies receive a tremendous amount of media exposure. For more information, contact the King County Commission for Marketing Recycled Materials at (206) 296-4439.

Operation Water Works (Olympia)

This program helps businesses learn how to keep pollutants off the ground and out of the water supply. This ensures that local businesses are not the source of pollution that endangers the health of our water bodies. The program provides education and technical assistance to businesses whose activities have the potential to pollute our community's surface and ground water. The program provides workshops discussing BMPs and regulations applicable to each business category, along with workbooks, self-assessment checklists for each industry and site visits. Contact Liz Hoenig, City of Olympia, at (206) 753-8494; Michael Brewer at (206) 753-8314; or the 24-hour hotline at (206) 753-8598.

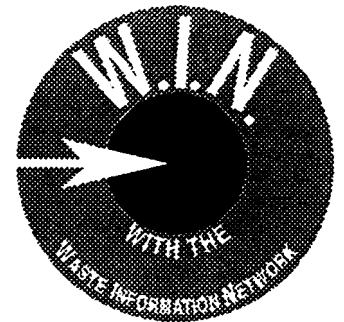
Preferred Packaging Procurement Guidelines (State)

Retailers that are committed to reducing the overall impact of packaging on the environment are invited to endorse the Preferred Packaging Procurement Guidelines. Companies that endorse the guidelines work with their vendors and suppliers to eliminate or minimize the amount of packaging used for products. These retailers are also striving to reuse, recycle and purchase packaging made with recycled content materials. For a copy of the Preferred Packaging Procurement Guidelines, or for more information about the program, contact Patty Schwegman, Washington Retail Association at (206) 943-9190.

NOTES:

Waste Information Network (WIN) Environmental Achievement Awards (State)

The Environmental Achievement Awards recognize leaders who take practical steps to keep the environment safe. Award winners minimize the use of hazardous materials, develop less hazardous materials and foster an ethic of personal responsibility for the environment among staff, colleagues and the public. For more information, call (206) 689-3050.



Whatcom County Wastewise Business Award Program (Whatcom County)

This program recognizes those local firms, agencies and institutions that demonstrate leadership in waste reduction initiatives. Winning applicants satisfy at least three of nine identified categories including recycling at least 35% of the waste stream, using less hazardous chemicals, composting organics and providing-public education. Winners receive a window sticker, a certificate and free publicity. For more information, contact Rodd Pemble at (206) 676-5723.



This by no means is a comprehensive list of awards and programs. The Association of Washington Businesses, the Seattle Rotary Club, Washington State Recycling Association, and Renew America are just a few of the other organizations that recognize businesses' environmental achievements. Cities and counties are also eager to highlight the good deeds of businesses located in their areas. You may also want to check with organizations such as trade associations that your company belongs to.

NOTES:

Laws and Regulations

Patty Schwegman

NOTES:

Background

Environmental management in this county is evolving. Twenty-five years ago, government focused on basic issues such as air, water and land pollution and contamination, and enacted broad federal laws directed at industry and local governments to address the problems. Today, the same issues exist. There is still a desire to have cleaner air, cleaner water, less pollution and less contamination. However, the focus is changing. It has broadened to include human health and the environment, and in the process there is a more complex set of issues.

With this more complex set of issues, methods to deal with them are evolving as well. slowly, government is moving from a costly and reactive "command and control" approach to a science-based "risk assessment" approach. Examples include market-based incentives for reducing pollution, such as tradeable credit permitted under the Clean Air Act. However, the progress toward less command and control is slow, and in the meantime, grocers are left to contend with complicated and costly laws.

Listed below are a few of the laws and regulations that affect grocers. Remember that there are federal, state and local laws and regulations. Local laws may be stricter than state and federal ones. For specific information, contact the Department of Ecology, the county, the Washington Food Dealers Association or the Washington Retail Association.

Clean Air Laws and Regulations

Federal

The Clean Air Act Amendments of 1990 set in motion some of the most sweeping environmental reforms ever to come out of Congress. New clean air requirements affect everyone from the largest industrial complex to the corner store. State and local governments are responsible for developing and implementing regulations to reduce both stationary and mobile source emissions.

The Clean Air Act Amendment of 1990 is divided into six titles or sections. Titles One, Two, Five and Six are the ones that have the most direct impact on the supermarket industry.

NOTES :

Title One: non-attainment areas, which addresses primarily ground level ozone or smog, as well as carbon monoxide, nitrogen dioxide, lead and more

Title Two: mobile sources, which addresses volatile organic compounds, nitrous oxide and carbon monoxide.

Title Five: operating permit regulations

Title Six: stratospheric ozone, which deals with the phase-out of CFCs.

Titles One and Two, non-attainment areas and mobile sources, contain program provisions that many grocers are aware of, including inspection and maintenance requirements for automobile emission systems, alternative fuels and employee commute option programs. Title One authorized the EPA to designate areas that are failing to meet national air quality standards for ozone and to classify them according to the degree of severity. Employers who employ one hundred or more people in these areas, as well as other areas of the country that may opt into the program (Washington being one of them), must develop, submit and have approved compliance plans for reducing the amount of trips their employees make to and from work.

Another major area of the Clean Air Act that affects grocers is Title Five, permitting. This section of the Act requires states to adopt programs to curb pollution from stationary industrial and business sources. Many states currently operate permit programs from some stationary emission sources, however these programs may need to be updated to comply with the EPA's new regulations. Businesses that are required to obtain permits under Title Five are "major sources," or facilities that emit more than ten tons per year of some pollutants and more than one hundred tons per year for others, depending in part on the type of pollutant. One operation of particular concern to grocers is bakeries. If they emit more than ten tons per year of certain compounds and are in a non-attainment area as so designated by the EPA, they will be required to go through the costly and time-consuming process of obtaining a permit under Title Five.

The last component of the Clean Air Act that grocers need to be aware of is Title Six. It deals with the phase-out of CFCs. CFCs have been at the center of debate for nearly twenty years. Initial concern about possible depletion of the earth's ozone layer by CFCs was raised in 1974 with the publication of research that theorized that chlorine released from CFCs could migrate to the stratosphere and reduce the amount of ozone. In response to these concerns, the EPA and the FDA acted in 1978 to ban the use of CFCs for aerosol propellants, in all but a

few essential medical aerosols, by the year 2000. However, in 1993, the EPA proposed a rule to accelerate the Clean Air Act schedule for phase-out of CFCs and HCFCs. It includes a one hundred percent phase-out by 1996, and allows HCFCs to be used in critical refrigeration, air conditioning and foam insulation, solvent and medical uses until 2030.

NOTES :

State and Local

The Puget sound Air Pollution Control Agency (PSAPCA) was created in 1967 to enforce clean air laws established by state and federal government. Under state legislative authority, the PSAPCA has major responsibility for control of stationary sources of King, Kitsap, Pierce and Snohomish Counties. Control responsibility also extends to off-highway vehicles.

Local clean air laws require best available control technologies (BACT) to prevent emissions to the outdoor air.

When building or remodeling a store, grocers would need to employ BACT practices for the following activities:

- ◆ *Abrasive blasting*
- ◆ *Spray painting*
- ◆ *Asphalt roofing (use aluminum or alternative material)*
- ◆ *Building demolition*
- ◆ *Asbestos removal*
- ◆ *Paving your parking lot*

Odors and nuisance regulations also fall under local clean air laws. Violations of local clean air laws carry civil penalties up to \$11,000 per day for each violation.

Excerpts for PSAPCA Regulation I

Section 9.03 Emission of air contaminant visual standard

(a) It shall be unlawful for any person to cause or allow the emission of any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour.

Section 9.04 Deposition of particulate matter

It shall be unlawful for any person to cause or allow the emission of particulate matter which becomes deposited upon the property of others in sufficient quantities and of such characteristics and duration as is, or is likely to be, injurious to human health, plant or animal life, or property, or which unreasonably interferes with enjoyment of life and property.

NOTES:

Section 9.12 Odor and nuisance control measures

- a) It is the policy of the Board that effective control apparatus and measures shall be installed and operated to control the emission of odor bearing contaminants and thereby prevent air pollution.
- b) It shall be unlawful for any person to cause or allow the emission of odor-bearing air contaminants unless such person used the best available control technology to connote the emissions.

Section 9.25 (a)

Prohibits fugitive dust emission unless the best available control technology is employed. Some examples of fugitive dust control techniques are:

1. Demolition projects should employ water sprays to prevent visible emissions of dust during wrecking. Materials removed during a renovation should be either carefully lowered to the ground or transported to the ground via chutes into dust-tight containers. All demolition and renovation projects involving asbestos should be done in accordance with Article 4 of Regulation III.

Article 4 states in part, it shall be unlawful for any person to cause or allow work on an asbestos project or demolition unless the owner or operator has obtained written approval from the PSAPCA control officer.

2. Abrasives blasting and spray painting operations should be performed inside a booth designed to capture the blast grits or over spray. Outdoor blasting or painting of structures of items too large to be reasonably handled indoors should employ control measures such as curtailment during windy periods and enclosure of the area being painted or blasted with tarps. Blasting should be performed with either steel shot or an abrasive containing less than 1% (by mass) which would pass through a #200 sieve. All abrasive blasting with sand must be performed inside a blasting booth or cabinet.

Refrigeration, Air Conditioning and CFCs

Any appliance containing CFC coolants (air conditioning or refrigeration system) must be processed for disposal in a special manner, by qualified professionals. Appliances must be CFC-free before they are disposed of or recycled. King County landfill and transfer station operators will not accept these appliances.

Commute Trip Reduction

Employers who have 100 or more employees per work site must help workers commute in ways other than driving alone. Employers are encouraged to offer such things as flex time, ride matching, telecommuting,

alternative work schedules, bicycle parking and lockers and a "guaranteed ride home" for family emergencies or times when employee must work late.

Fleet vehicles

Though not required by law, many private fleet operators are switching to alternative fuels to power their fleet vehicles. Alternative fuels include compressed natural gas (CNG), propane, methanol, ethanol, reformulated or oxygenated gasoline, liquified petroleum gas, electricity and hydrogen. You can also help by making sure your employees and fleet operators are car-smart.

NOTES :

Clean Water Laws and Regulations

Federal

The Federal Clean Water Act of 1972 replaced 1965 statute and put in place a discharge permitting system, with additional provisions governing, among other things, storm water runoff. Because many people feel there is a long way to go toward cleaning up the water supply, efforts are currently underway to overhaul the Clean Water Act. The Senate Environmental and Public Works Committee has reported out a bill, S.1114, and a bill has been introduced in the House, of which the key issues include water program funding, toxic pollution prevention and control, new source performance standards, watershed planning, point source pollution control, programming and enforcement, wetlands, storm water discharges, phosphates in detergents and permitting and enforcement.

Potential impacts on the grocer include:

- ◆ *Significant increases in permit fees*
- ◆ *EPA authority to mandate specific process changes within the food processing industry or a specific facility in an effort to meet zero-discharge for point sources*
- ◆ *Construction of expensive and duplicative treatment facilities*
- ◆ *Investment in additional controls for toxic pollutants*
- ◆ *Installation of costly removal technology for trace contaminants in sewage*
- ◆ *Addition of significant controls and expenses for point and non-point source discharge*
- ◆ *Increases in penalties for violations, even minor ones*
- ◆ *Broad citizen suit authority*

State and Local

Discharge to Sanitary Sewers

NOTES:

A business must have approval of the local sewer district authority to discharge storm water into a public sanitary sewer. The Revised Code of Washington Chapter 13.08.300 has provisions covering the use of grease traps where oily matter escapes into the sewer. However, Metro prohibits the concentration of fats, oils and greases of animal or vegetable origin, petroleum, non-biodegradable cutting oil or mineral oils to exceed 100 mg/L. The State of Washington also prohibits discharge of material into the public sewer that may interfere with the operation of the municipal treatment plan or of the sewer collection system.

Storm Water Regulations

Storm water regulations are kicked into effect when pollutants are released into the storm drainage system or other bodies of water. The mandate to prevent storm water pollution starts with the federal governments. The Environmental Protection Agency's Clean Water Act (PL 92-500, Water Pollution Control Act of 1972 and PL 100-4, Water Quality Act of 1970) sets standards for improving and maintaining the water quality of our streams, lakes and other navigable waters. This federal statute authorizes states to carry out the provisions of this act.

The Washington Department of Ecology's Washington State Water Pollution Control Law (RCW 24.06) sets water quality standards and enforces water quality laws throughout Washington state. Violations of this law can lead to violations notices, injunctive actions, civil penalties with fines up to \$10,000 or criminal proceedings.

Cities and counties are mandated by the federal government to control the quality of storm water runoff. In response to this mandate, some local jurisdictions have adopted their own quality laws. For instance, Bellevue's City Code (BCC 24.06) prohibits people from allowing pollutants to enter the storm drainage system or surface waters. Violating Bellevue's code is a civil offense with fines up to \$500 per day.

In November, 1992, King County passed King County Code 8.12 - Water Pollution. King County will soon be producing a water quality best management practices manual, which will provide detailed information on requirements to reduce contamination of surface waters.

Upcoming Legislation:

- ◆ Many local governments are considering the adoption of water quality regulations.
- ◆ The Clean Water Act may be reauthorized soon, but probably not this year.

NOTES:

Hazardous Waste

State Regulation of Hazardous Waste

The Washington Administrative Code Chapter 173-303 has provisions covering accumulation, storage, transportation, treatment and disposal of hazardous wastes regulated by state law. Wastes are considered hazardous (called dangerous by the state) which are (1) acutely toxic, ignitable, corrosive, reactive, persistent, carcinogenic or specifically listed as such in state regulation or (2) leach hazardous constituents. Examples include, but are not limited to, pesticides, acids, paint strippers and antifreeze.

Possible Change in Management of Mercury-Containing Lamps

This summer, the U.S. Environmental Protection Agency (EPA) published a proposal addressing the management of mercury-containing lamp waste. Under current federal law, mercury-container lamps, such as fluorescent and high intensity discharge lamps, are generally considered hazardous waste under the Resource Conservation and Recovery Act (RCRA), because of their mercury content. Therefore, such lamps must currently be disposed of as hazardous waste, unless they are generated by households or conditionally exempt small generators.

Disposal of items classified as hazardous under RCRA is regulated, in part, according to how much of the waste is generated. Generators are classified according to how much hazardous waste they produce in one month, and are divided into three categories: those generating less than 100k (about 220 pounds), those generating between 100kg and 1,000 kg, and those generating over 1,000 kg. The size of the generator determines how the waste must be handled, stored, documented and disposed of.

Many retail grocery stores will be classified as small generators under RCRA, producing less than 100 kg of hazardous waste per month primarily in unsaleable products (dented or broken containers, discontinued products) and unused portions of products. Small generators are "conditionally exempt" from certain RCRA requirements. EPA requires conditionally exempt generators to take the hazardous waste generated

on their premises to an off-site facility registered and/or licensed to process, recycle or dispose of it.

NOTES:

Upgrading and maintaining mercuric lamp systems often means that businesses replace all of their lights at once. As a result, some businesses, like grocers, become hazardous waste generators of mercury-containing lamps, when they normally are exempt from RCRA regulations.

To date, the EPA is reviewing two proposals addressing this issue. The State of Washington will most likely follow the EPA's decision. However, counties may have stricter requirements for disposal of mercury-containing lamps.

Legislative Update for Washington State Solid Waste

Background

In 1989, the "Waste Not Washington Act" was created by the Legislature. The bill established the state's 50% recycling goal by 1995. The bill also prohibited local governments from banning particular products or product packaging materials from April 1, 1989 to July 1, 1993. During that time frame, the state had exclusive authority to impose such prohibitions or bans. As of July 1, 1993, local governments have this authority as well.

In April 1994, a conference was held for the Western Washington solid Waste Advisory Committee. At the conference, there was a session to discuss product and product packaging options (bans, taxes, fees, economic incentives, etc.) for state and Local Government.

Funding

The solid waste management system is funded from three sources: the Solid Waste Management Account (SWMA) which will expire on July 1, 1995, the State and Local Toxics Account, and the Model Litter Control Account. The SWMA, which is funded by a tax of 1% on services of solid waste collections, totals about \$5 million annually. Over half this amount, combined with funds for the state & Local Toxics Account, provide grants to local governments to assist in developing and implementing solid waste management programs, including landfill closures, waste reduction and recycling programs, recycling facilities and household hazardous waste cleanup events.

The Washington state Department of Ecology funds 34.8 staff positions from its portion of the SWMA, with the majority located in regional offices. They provide service to local governments, the public, environmental groups and the private sector. In addition, a portion of the SWMA and the Model Litter Control Account funds market development

activities of the Clean Washington Center of the Department of Trade and Economic Development. If local governments, with the assistance of state agencies, are to continue these programs, a continuing stable funding source is needed.

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Summary

- ◆ Grocers need to continue to implement aggressive voluntary programs to reduce the solid waste stream. This should be accomplished for internal operations as well as for waste created by products sold at the store level. Furthermore, grocers need to work with their vendors. Communication about efforts to protect the environment should be increased.
- ◆ Grocers and manufacturers should expect more pressure by state government to fund solid waste management activities and to meet the reduction and recycling goals set by state and local communities.
- ◆ Local governments are looking to industry to be a funding source.
- ◆ Voluntary efforts have worked effectively so far, but it is extremely important to continue them.

Solid Waste Legislation Around the Nation

Legislative action to manage solid waste continues to be taken primarily at the state level. As states continue to grapple with how best to manage solid waste, thousands of bills concerning mandatory deposits, packaging restrictions, bans, fees and taxes, environmental labeling, household hazardous products disposal and more are being debated again this year.

Since legislation in Washington State is influenced by legislation in other states, it is wise to stay informed about activities in other areas of the nation.

Packaging

Mandatory packaging restrictions have been hot at the state level and typically call for all packaging to meet strict guidelines for recyclability, reusability, recycled content or source reduction. Supporters of these so called "rates" and "dates" laws have introduced over 50 bills in at least 15 states this year. For example, a bill introduced in Illinois would ban the use of "environmentally unacceptable packaging,"

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impose minimum recycled content standards on plastic containers and prohibit the disposal of recyclable packaging. Environmentally unacceptable packaging would include any packaging that did not meet recyclability, reusability, recycled content or source reduction standards by 1996. Minnesota packers face tough rate and date proposals again this year. One would have required manufacturers to reduce their use of packaging by 30 percent and would have imposed disposal bans on transport packaging beginning in 1997. A dangerous provision of another Minnesota bill held that retailers could be called upon to prove that a decision not to carry a given product was not influenced by the reusability of the package.

Similar restrictive rates and dates proposals for packaging were introduced in Colorado, Connecticut, Maryland, Massachusetts, New Jersey, New York, Utah, Virginia, Vermont and Wisconsin.

In the meantime, California and Oregon are working to develop and implement regulations governing their rates and dates laws, passed in 1991. Both laws mandate recycled content/recyclability/reusability rates for, among other things, plastic food/beverage containers.

In California, manufacturers of products in bottles or "bottle like" rigid plastic containers eight ounces to five gallons must assure their containers either contain 25% recycled content, are reusable five times, meet a 25% aggregate statewide recycling rate or meet a one-time 10% source reduction requirement over the previous five years. Although the effective date is January 1 of the next year, food and cosmetic manufacturers were granted a compliance extension until 1997.

In Oregon, manufacturers of product in rigid plastic containers eight ounces to five gallons must assure that their containers either contain 25% recycled content, are reusable five times, meet a 25% statewide recycling rate in aggregate or by specific package type or meet a one-time five year 10% source reduction exemption. The enforcement date for food and cosmetic manufacturers is January 1, 1996. The plastics industry has filed suit against the Oregon Attorney General who recently ruled that the definition of "recycling" does not include pyrolysis, a new plastics recycling technology.

It is important to note that in both California and Oregon, the regulatory definition of product manufacturer as currently proposed includes wholesalers and/or retailers under certain conditions, including private label brands and packages filled at point of sale.

New packaging bans were introduced this year in at least six states including Georgia (plastic ring connectors), Maryland (plastic ring connectors), Massachusetts (plastic ring connectors, plastic bags), Vermont (polystyrene packaging), and Washington (plastic ring connectors). Two Wisconsin bills that would have restricted the sale and distribution of all plastic containers except PET and HDPE died in Committee.

Toxics Reduction

In March, Virginia became the seventeenth state to adopt the Model Toxics Reduction in Packaging Legislation developed by the Coalition of Northeast Governors (CONEG) Source Reduction Task Force. The legislation aims to reduce the presence of mercury, lead, cadmium and hexavalent chromium in packaging. The legislation is also under consideration in Iowa, Massachusetts, Minnesota, New York and Pennsylvania.

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Advance Disposal Fee

Advance disposal fees (ADFs) continue to be touted across the country, not only as a method for obtaining funds to offset the costs of solid waste management, but also for deterring consumers who might otherwise buy products/packaging that are difficult or costly to dispose of. ADFs are also being applied to put pressure on material producers to increase their recycling rates or use more recycled materials in their products.

Numerous states are considering ADFs, and in fact for years, many such fees have been applied to items such as major appliances, batteries and tires. In addition, several states, including Nebraska, New Jersey, New York, Ohio, Rhode Island, Virginia and Washington, have had ADF-type laws in place for the purpose of funding litter prevention.

Although 27 states already impose various forms of ADF, Florida remains the only state so far to implement one that applies to packaging. The first copycat legislation appeared this session in Kentucky, followed by California, Colorado, Illinois, Massachusetts, Michigan, New York, North Carolina and Utah. Legislation was passed in Hawaii this year to apply a 1.5 cent ADF on all glass containers.

Labeling

Environmental labeling laws have been passed in many states, and even in light of the guidelines for environmental marketing issued by the Federal Trade Commission (FTC) in 1992, have gone into effect in six states: California, Indiana, Maine, New York, Rhode Island and Wisconsin. State that have passed laws not yet in effect include Florida, Iowa, Minnesota and New Hampshire. Labeling issues include use of the recycling emblem, statements regarding recycled content, ozone friendly, biodegradable, photodegradable, recyclable and recycled.

Two states, Iowa and Vermont, currently have programs in place that require retail shelf labeling for specific household products deemed to require special disposal. A 1993 Minnesota law requires certain hazardous products to be labeled by the manufacturer by the year 2000 if the interim federal labeling standards are not established. In Iowa and

Massachusetts, retailers must pay a permit fee in order to sell "hazardous" products. Currently, Florida and Washington impose taxes on certain hazardous household products.

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New hazardous household product labeling and management legislation was introduced in at least four states this session, including Indiana, Massachusetts, Michigan and New Jersey.

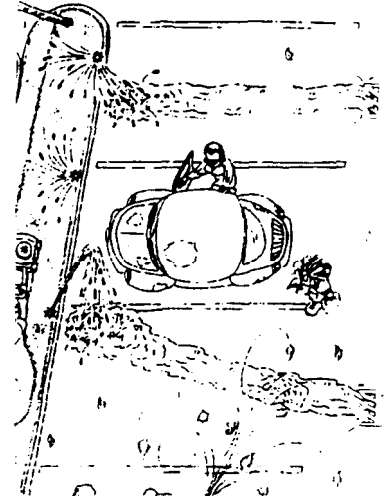
On Your Market: The Water Game

Julie Knott & Annette Fromm

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About the Game

On Your Market is a fast-paced, exciting game designed to reveal useful information about sanitary sewers, stormwater pollution prevention and water conservation to grocers and other retailers ages 3 and up.



Game Components

- ☺☹ Two teams
- ☺☹ Gameboard, dice, noisemaker or bell, shopping carts
- ☺☹ Interesting questions
- ☺☹ Big prizes
- ☺☹ Barbie Supermarket Kit (optional)

How to Play

- ❖ Game host/hostess reads a question from the stack.
- ❖ The team that hits the bell first answers the question and rolls the die.
- ❖ If the correct answer is given, move forward the amount on the die.
- ❖ If the wrong answer is given, move back the amount on the die.
- ❖ If a wrong, but very creative answer is given, move forward half the amount on the die rounding up (if 5, move 3; if 3, move 2). Game host/hostess decides if bluff is point-worthy (all decisions are arbitrary, capricious, subjective and final).

Object of the Game

- ✂ Whoever reaches the gilded shopping cart in the sky first wins big prizes.
- ✂ Second place team receives fine parting gifts.

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Environmental Resources for Grocers

General Information on Environmental Issues for Washington Grocers

NOTES:

Patty Schwegman
Environmental Projects Coordinator
Washington Retail Association
P.O. Box 2227
Olympia, WA 98507-2227
(206) 943-9198

Food Marketing Institute
Environmental Affairs
1750 K Street N.W.
Washington, D.C. 20006
(202) 452-8444.

Bio Cycle, 419 Stave Avenue, Emmaus, Pennsylvania, 18049, (215) 967-4135 - Monthly journal of composting and recycling issues. \$63 per year.

Garbage, The Blackburn Tavern, 2 Main Street, Gloucester, MA, 01930, (508) 283-3200 - Quarterly publication on wide range of environmental topics. \$39 per year.

CFCs in Grocery Refrigeration and Air Conditioning systems

Air Conditioning Contractors of America
1513 16th St., N.W.
Washington, D.C. 20036
(202) 483-9370

Washington State Department of Ecology
Air Programs
P.O. Box 47600
Olympia, WA 98504-7600
Carol Piening
(206) 407-6858

U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue, AT-082
Seattle, WA 98101
Misha Vakoc
(206) 553-8578

Ozone Information Hotline
U.S. Environmental Protection Agency
(800) 296-1996 (7am to 1pm PST)

Guidelines *for* the Use of Alternative Refrigerants in the Supermarket
Food Marketing Institute, Publications Department (202) 452-8444

Your best source of information about CFCs and refrigerants is a reputable refrigeration and air-conditioning provider who can work with you to develop a CFC management plan.

Transportation Issues

NOTES:

Motor Vehicle Emission Maintenance
Washington State Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008-5452
Carey Swayne
(206) 649-7101

Alternative Fuels
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue, AT-082
Seattle, WA 98101
Misha Vakoc
(206) 553-8578

Commute Trip Reduction
Washington State Energy Office
809 Legion Way SE
P.O. Box 43165
Olympia, WA 98504-1211
Kristine Burton
(206) 956-2062

Indoor Air Quality

Indoor Air Quality information Clearinghouse
U.S. Environmental Protection Agency
P.O. Box 37133
Washington D.C. 20013-7133
(800) 438-4318

Local Clean Air Laws

Puget Sound Air Pollution Control Agency
110 Union St., Suite 500
Seattle, WA 98101
Mike Schultz (206) 689-4060
Susan Alotrico (206) 689-4040

NOTES:

Sewer Information

Metro Industrial Waste Small Business Regulations (206) 689-3050

Metro Industrial Waste, general information (206) 689-3000

Your Local Sewer Utility

Recycling/Waste Reduction Information

Recycling/Waste Reduction Hotline - Department of Ecology (800) 732-9253

Materials Exchanges - You can list your surplus materials to sell or give away or find surplus materials you may need.

IMEX (Industrial Material Exchange) - (206) 296-4899

Pacific Materials Exchange - (509) 623-4244

British Columbia Materials Exchange - (604) 754-7036

Stretch Wrap Recycling: A Guide for Retail Grocers

Composting Workbook, Reducing Waste Disposal Costs: How to Evaluate the Benefits of Composting in the Supermarket Industry Food Marketing Institute, Publications Department (202) 452-8444

Best Management Practicers Manual for Composting Produce Waste and Wax-Cardboard #B8 (description of grocery food waste composting with case studies) Clean Washington Center (206) 587-5520

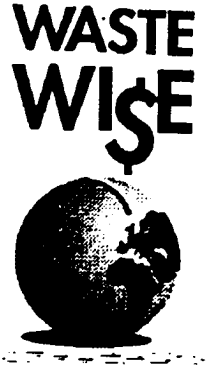
Earth Care, Ukiah, California, 95842,1-800-347-0070 - Catalog containing a wide range of recycled content, unbleached paper products.

Real Goods, 966 Mazzone Street, Ukiah, California, 95842,1-800-762-7325 - Catalog containing energy-efficient lighting and related equipment, cleaning products and paper goods.

Waste Age, 4301 Connecticut Avenue, N.W., suite 300, Washington, D.C., 20008, 1-800-829-5411 - Monthly publication on waste reduction issues facing communities and businesses. \$45 per year.

EPA Waste Wise Program forming partnerships with businesses to reduce waste. Call 1 800 EPAWISE (800 372-9473)

King County Solid Waste Division's Green Works program recognizing businesses who manage solid waste well. (206) 296-4352



Hazardous Waste



Hazardous Substance Hotline, Department of Ecology (800) 633-7585

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Business Waste Line (206) 296-3976

Hazards Hotline (Household Hazardous Wastes) (206) 296-4692

On-Site Consultation Line, Local Hazardous Waste Management Program (206) 689-3090

Seattle/King County Health Department Waste Characterization Line (advice on what can go in the landfill) (206) 296-4633

Buy Smart, Buy Safe: A Consumers Guide to Less-Toxic Products (This guide rates common brands you sell according to their personal and environmental safety). Washington Toxics Coalition (206) 632-1545

Energy Management

Electric Ideas Clearinghouse
Rob Penney
925 Plum St. SE
P.O. Box 43171
Olympia, WA 98504-3171
800 872-3568



EPA Green Lights Program

A partnership program assisting businesses and institutions manage energy use through efficient lighting. Call (202) 775-6650

GLOSSARY OF USEFUL TERMS

Air Contaminant: Dust, fumes, mist, smoke, other particulate matter, vapor, gas, odorous substance or any combination thereof.

Avoided Cost: The difference (usually a savings) between the cost of an existing practice and the cost of an alternative. For example, if garbage collection is \$100 per ton and composting costs \$60 per ton, the avoided cost (or savings) equals \$40 per ton.

Best Available Control Technology (BACT) (usually applied to air quality): An emission limitation based on the maximum degree of reduction, which the Agency, on a case-by-case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable for such a source through application of production processes and available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of each pollutant.

Biodegradable: A substance which is broken down into simpler compounds in the environment, usually through the action of bacteria, sunlight, or chemical reactions. The biodegradability of a material depends both upon the material itself and the environment in which the breakdown occurs.

Biosolids: The portion of organic wastes (sludge) extracted in the wastewater treatment process that has been heated to kill germs and reduce volume.

BMP (Best Management Practices): A general name given to a variety of methods for minimizing waste and controlling pollution.

Catch Basin: A structure at the point where a street gutter empties into a sewer, built to catch what would not easily pass through the sewer.

CFCs (Chlorofluorocarbons): A class of substances used as refrigerants and cleaning agents that migrate to the upper atmosphere of earth when vented into the air. They are thought to be a principal cause of depletion of the atmosphere.

Corrosivity: The ability of a chemical to cause burns to skin, eye, lung or mucus membrane tissues in the body. Examples are lye and hydrochloric acid. Weaker solutions of the same materials may only be irritating.

Detention Pond or Vault: A constructed pond or vault that temporarily stores storm water runoff and releases it at controlled rates.

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Digester (sewage): A system in a secondary waste water treatment plant which heats solids extracted from the liquid waste and breaks them down with bacteria.

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Drainage System: See storm drain system.

Ecosystem: The complex web of living and non-living elements that co-exist and interact as a unit. The size of the units depends partly on the physical and biological environment and partly on the point of view of the observer. For example, an ecosystem could be a pond. stepping back, a larger ecosystem including the pond might be a watershed. As seen from the moon, the entire earth is an ecosystem. Living elements in an ecosystem include all of the plants, animals and other organisms that inhabit it. Non-living elements include the water, soil, air and physical characteristics such as temperature, sunlight and rainfall. Crucial to defining of the concept of an ecosystem (and to protecting it) is the inclusion of the interaction and interdependencies between its inhabitants.

Emission: A release into the outdoor atmosphere of air contaminants.

Fugitive Dust: Particulate matter or any visible air contaminate other than uncombined water that is not collected by a capture system and emitted from a stack, but is released to the atmosphere at the point of generation.

Hazardous Waste: Any solid, liquid or gaseous substance which, because of its source or measurable characteristics, is classified under state law as dangerous or deferal law as hazardous and subject to special handling, shipping, storage and disposal requirements. Washington State businesses are regulated for two categories of hazardous waste: Dangerous and Extremely Harardous.

HCFCs (hydrochlorfluorcarbons): These are common refrigerants which are thought to harm the ozone layer much less.

HFCs (hydrofluorocarbons): These are refrigerants that have little effect on the ozone layer.

Household Hazardous Waste (HHW): Waste from homes which exhibits one or more of the characteristics of hazardous materials (toxicity, flammability, corrosivity or reactivity) but is not generated in sufficient quantities to be regulated by the federal government. HHW includes such things as pesticides, paints and solvents, automotive products, adhesives, batteries, hobby materials and polishes. In order to remove hazardous materials from the solid and liquid waste streams, local govern-

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Sanitary Sewer System: A network of pipes for carrying sewage to a treatment facility.

Sediment: Particles from rocks, soil or biological material (used often with reference to water runoff or sewer water).

Secondary Sewage Treatment: The second step in waste water treatment, utilizing both aerobic and anaerobic bacteria to break down organic pollutants and remove them from the water.

Signal Word: A federally mandated term found on the label of a consumer product, which expresses the level of hazard posed by the product. Terms used include CAUTION, WARNING, DANGER and POISON.

Storm Drainage System: A network of pipes and channels for carrying storm water and surface waters (not domestic, industrial and commercial waste waters) to surface water bodies such as streams and lakes.

Surface Runoff: Water which flows across the surface of the ground, such as streets, parking lots and hard-packed soil.

Toxic: Capable of producing illness or death upon sufficient exposure.

Urban (or Storm Water) Runoff: Storm water that collects on the surface of developed areas and runs off to a stream or other body of water.

Waste Exchange: Regional organizations based on the principle that "One person's trash is another person's treasure." Monthly catalogs list items and materials "Available" and "Wanted." Through a confidential network, the exchanges serve as clearinghouses to bring those with material to dispose of together with those who need the materials. Transaction details including any costs are the sole responsibility of the two parties. Categories include chemicals, plastics, metals, containers, textiles, fixtures and more. see Resource Listings in this workbook for phone numbers of the Northwest Exchanges.

Water Pollutants: Substances which can render water harmful to people, fish or wildlife or impair recreation or other beneficial uses of water.

Watershed: The region which drains water and everything it carries to a common outlet, such as a river or bay.