PUBLIC AGENCY HANDBOOK ON SUSTAINBILITY

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What is Sustainability?

The term "sustainable development" was defined by the 1987 U.N. World Commission on Environment and Development as: "meeting the needs of the present generation without compromising the ability of future generations to meet their own needs." Key objectives included: "reviving economic growth, but in a new form (less material and energy intensive…); meeting essential needs for jobs, food, water, energy and sanitation; conserving and enhancing the natural resource base; and merging ecological and economic considerations in decision making."

In practical terms sustainability means applying cost-saving techniques and systems planning to phase-in the development of "closed-loop" economic systems. In closed-loop systems, non-toxic, renewable sources of energy and raw materials are extracted from nature in a manner and at a rate that does not degrade ecological systems. The materials are turned into goods and services through highly efficient, non-polluting processes. Materials formally considered waste are reused and recycled over and over until all useful value is lost. Once exhausted, the non-toxic material then naturally decompose and are reassimilated into nature without contaminating or degrading natural processes.

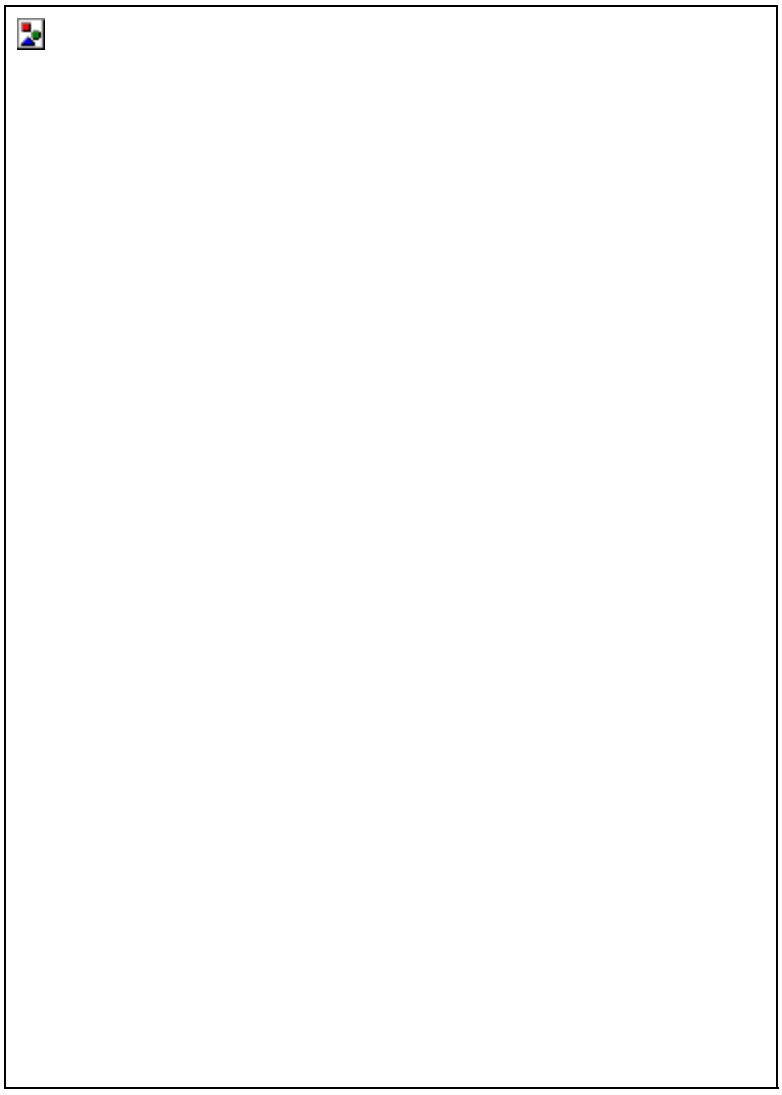
Why The Need for a Sustainability Initiative?

There are environmental and economic reasons for a sustainability initiative. Despite our best efforts, data shows that pollution and waste are growing at or above the rate of population and economic growth in most states and nations globally. Governments contribute to these concerns as they are major purchasers of goods and services, are major developers, greatly influence the way communities and the economy grow, and generate significant waste and pollution. In addition, ample data shows that sustainability practices lead to cost savings and increased productivity within agencies, organizations and business. A sustainability initiative can lead to ***enhanced economic efficiency*** within government, communities and the private sector ***while simultaneously reducing environmental impacts*** to levels needed to maintain healthy ecosystems and resources.

Sustainability May Lead to *Factor Ten* Increases in Efficiency.

Waste and pollution (a molecular form of waste) and other environmental impacts equate to lost resources and money. They indicate design failures

within government, communities and business. A sustainability initiative should identify and squeeze out the inefficiencies and waste, thus saving money and resources while significantly reducing environmental impacts. Many believe that full fledged sustainability programs can increase environmental efficiency by a *factor of ten.* As with labor productivity, the growth in environmental efficiency will be largely based on new management techniques and technologies which reshape the way government, business and communities function.



Will Sustainability Programs Save Money?

A growing stable of research shows that while sustainability practices may require initial investments, they generally have a rapid payback leading to large returns in investment.

Can Government Save Money? There are many examples of savings by government through the application of sustainability programs. For example, in 1998 the State of North Carolina initiated a sustainability program. They purchased 1000 alternative fuel vehicles and now rebuild vehicles rather than purchasing new ones, saving over $2 million annually. Recycled materials are now used in highway construction. Their Brown Creek Correctional Institution reduced its waste by 60 percent, from 28 tons to 9 tons, by composting food, shredded paper, dryer lint, and hair from the barbershop. The Correction Enterprises' Paint Plant saves $325,000 per year now by reusing steel drums 60 times instead of 6 by using plastic liners instead of scrubbing out the barrels after each use. About 200 million pieces of paper and $7 million in printing costs are saved each year at the Correction Enterprises Duplicating Plant by sending print jobs digitally to State agencies, saving trees, money, time, and waste. The installation of utility monitoring systems and review of utility contracts resulted in cost savings of $460,434 in 1998. The National Guard is even involved, reducing hazardous waste and taking other steps.

Can the Private Sector Save Money? As with government, evidence shows that applying sustainability practices can save money for business. For example, a recent study *Saving Salmon, Saving Money: Innovative Business Leadership in the Pacific Northwest* (Goodstein, Doppelt and Sable, 1999) analyzed economic data available from 137 firms representing 9 economic sectors in Oregon and Washington which reported a combined minimum gross savings of over $42 million from 1992-1999 through sustainability practices, with most savings coming in the last three years. Returns on investment averaged 4.04 years for private companies and 8.79 years for public organizations.

Case examples of these savings include The Collins Company, an 1100 employee woods product company based in Portland, Klamath Falls and Lakeview, which adopted a plan to eventually eliminate all waste at their manufacturing facilities, saving $1 million in the first year alone. Graphic Sciences, a Portland printer, added a cooling tower to their pigment grinding process which allows most of the cooling water to be reused. It paid for itself in months, making the same quality ink at a lower cost with 2,500,000 less gallons of water yearly. Viewmont Orchards in Hood River, Oregon, conserved energy by replacing an inefficient oil pressure heating system, and installing capacitors and control circuitry to regulate energy use which saved $55,000 per year. This are but a few examples of the cost savings that sustainability practices can generate.

By making sustainability a touchstone of government, community and private sector policy and practice, a sustainability initiative can position your state or community as a center of excellence in public and private sector economic and community development consistent with sustaining the environment

How Can Government Adopt Sustainable Paths?

Public agencies, commissions and whole communities can adopt sustainable paths by phasing-in the use of complete *Sustainability-based Environmental Management Systems* (SEMSs). A SEMS can apply at the site, facility, agency or community level. It is a system for continually identifying, managing, reducing and eliminating the environmental impacts of an organization. A SEMS starts with the adoption of clear organizational policies on sustainability. A "materials and energy flow analysis" is then completed to determine the degree to which the "inputs" (e.g. energy, raw materials) and "outputs" (e.g. waste, pollution, products) of the organization are consistent with basic principles and targets of sustainability. Once areas or activities inconsistent with sustainability principles and targets are identified, they are prioritized, measurable targets for improvement are set, multiple options are examined to achieve the targets, and a systematic phase-in strategy to achieve the targets is implemented.

A complete agency or institutional Sustainability-based Environmental Management System should address: a) all aspects of internal agency or organizational operations which impact the environment; b) all policies, programs and practices which effect the environmental performance of "external" constituents (e.g. business, communities); and c) all partnerships, links and relationships with constituents.

See Section II for more information on how to develop a Sustainability-based EMS.

How Can Government Define Sustainability?

Sustainability can be defined through direct means and by following a set of principles.

Direct Measures and Targets: Science can define the basic parameters of what is needed to sustain many ecological systems. This can be done by measuring the characteristics of the environment before significant human disturbance (pre-European development), comparing the historic range of characteristics with current conditions, and then defining the level of risk to ecological health based on the degree to which current conditions differ from historical (i.e. natural) conditions. Once the level of risk is determined, measurable targets can be established to define the change needed to reduce impacts and bring the environment back to more self sustaining (sustainable) levels.

The Oregon Progress Board's Oregon State of the Environment Report directly measures ecological health and risk for many ecosystems and resources statewide in this manner. In some cases (e.g. coastal forests) good information is available to define historic conditions and hence, levels of risk. In other cases data is not yet available (though it could become available son through a focused research project) and hence direct measurement is not possible. State and local governments may want to complete similar assessments of environmental conditions, trends and risks in order to establish clear goals and targets. (Note: this approach does not suggest that society should or could return to pre-development conditions - it is simply a means to measure risks to the environment).

Sustainability Principles: In many cases it is not possible to directly measure how human activities affect the environment. Many human activities have indirect, diffused or unknown effects which make it impossible to directly link an action with a specific environmental outcome. In these cases, sustainability can be defined by the extent to which an agency or institution follows a set of sustainability principles which are based on immutable laws of science. A sustainability program would systematically phase-in policies, programs and practices which are consistent with the principles and phase out those that are not. Five sustainability principles include:

1. *Conserve, protect, and where needed, restore the productivity and diversity of nature (ecological processes and structure) to levels necessary to maintain ecological health (with special focus on key areas such as riparian areas, floodplains, wetlands, native plant habitats etc).*

Why? Because ecosystem science shows that human health and prosperity depends on the ability of nature to produce a continued supply of physical goods (wood, water, fish) and ecological services (e.g. clean air and water) and on natures ability to break down and reassimilate human waste and turn them into new resources. Today, many resources and ecosystems are below the levels needed to provide these goods and services in perpetuity.

2. *Phase-out the use and emission into nature of toxic minerals, metals and fossil fuels and synthetic, persistent bio-accumulating toxic materials and substances while phasing-in the use of renewable energy and naturally occurring, non-toxic materials and substances in production processes, goods and services.*

Why? Because the first and second laws of thermodynamics show that to maintain ecological health toxic materials must not be discharged into nature faster than nature can break them down and reintegrate them into natural cycles. Today, we are emitting toxic materials and substances faster than nature can assimilate them (which causes pollution).

3. *Eliminate waste through reduction at the source and enhanced reuse, remanufacturing and recycling internally within and externally between agencies, institutions and business.*

Why? Because to meet the first two principles, materials and substances must be used as efficiently as possible to prevent the overharvest of natural resources and to reduce the discharge of waste and pollution into nature faster than nature can assimilate them.

4. *Increase the efficiency by which natural resources and energy are extracted, processed and used.*

Why? Because to meet the first two principles materials and substances must be used as efficiently as possible to prevent the overharvest of natural resources and to reduce the discharge of waste and pollution into nature faster than nature can assimilate it.

5. *Enhance business development, economic competitiveness, job creation, fairness in the distribution of resources to meet basic human needs, public safety, health care, and education consistent with the principles above.*

Why? Because to meet all the principles above, we must have health economies and communities which benefit all members of society. Everyone must be included in our prosperity to ensure social equity and cooperation which will lead to better support for and involvement in sustainability programs.

Both targets and principles are needed - neither alone is sufficient. We need to take steps to sustain the environment where this can be measured directly. Yet, because the activities of society have local, regional and even global implications in ways that cannot be measured directly, sustainability principles are also needed.

PART II

AN OVERVIEW OF THE

RATIONALE, DEVELOPMENT AND IMPLEMENTATION OF

SUSTAINABILITY-BASED ENVIRONMENTAL MANAGEMENT SYSTEMS

INTRODUCTION

This section is intended to assist public agencies, organizations, institutions or communities to implement a Sustainability-based Environmental Management System.

An Environmental Management System (EMS) is a system that addresses those aspects of organizational or community operations which impact the environment. An EMS includes an organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the organization's environmental (sustainability) policy.

Your Sustainability-based Environmental Management System should help your agency or organization:

1) Build a systematic approach to identify, reduce and eliminate aspects of your organization that are inconsistent with principles and targets of sustainability, relying on quality assurance principles and continuous improvement of the management system.

2) Integrate with other internal organizational management systems, goals and policies.

3) Demonstrate performance objectives (e.g., compliance, voluntary steps beyond compliance, competition, cost savings and economic success).

A complete Sustainability-based Environmental Management System should address: a) all aspects of internal organizational operations that impact the environment; b) all policies, programs and practices which effect the environmental performance of "external" constituents (e.g. business, communities); and c) all partnerships, links and relationships with constituents.

There are many different models for environmental management systems, including the British System (BS 7750), the European Union's system (EMAS) and others. The EMS model used in this document is the International Standardization Organization's (ISO) EMS standard, ISO 14001. ISO 14001 is the world's first international standard specifying the requirements for an organization's environmental management system.

I. The ISO 14000 Environmental Management System

The International Organization for Standardization is the same group which developed the ISO 9000 Quality Standard. The ISO 14001 Environmental Standards are expected to become the worldwide benchmark for EMS development and implementation, and if the spread of ISO 9000 is any guide,

the Standard will be recognized (and potentially required) worldwide in a relatively short time period.

The ISO 14000 environmental standards were drafted in response to the growing list of different national and regional environmental management system standards worldwide, and the desire on the part of the international business community to establish a common set of standards for free trade purposes.

The ISO 14000 series of management standards can be grouped into two functional categories: Organization Evaluation and Product and Service Evaluation. Both may apply to public agencies and institutions. The two functional categories can be further subdivided as follows:

Organization Evaluation Standards

* Environmental Management System Specifications (ISO 14001)

* Guidance (ISO 14004)

* Environmental Auditing (ISO 14010, 14011, 14012)

* Environmental Performance Evaluation (ISO 14031)

Product and Service Evaluation Standards .

* Labeling Standards (ISO 14020, 14021, 14024)

* Life Cycle Assessment (ISO 14040, 14041, 14042, 14043)

* Product Standard Guide (ISO 14060)

II. The Sustainability-based EMS Leader

If your agency, institution or community has decided to develop a SEMS, some individual (perhaps you!) or a group of individuals must coordinate, promote, and support the development of the SEMS. A SEMS Leader(s) must be responsible for promoting, developing and overseeing the implementation of the SEMS. The Leader(s) may work in administration, could be a line staff, or may wear several "hats" within the agency or institution. No matter what their position, the SEMS Leader(s) have the critical task of raising the awareness level of all of those integral to the success of the SEMS.

In order to be an effective proponent of SEMS development, the Leaders(s) must recognize the benefits and costs of SEMS development to each area in

which the agency or institution operates, and must understand how to align those areas within the SEMS. We have provided information to help begin this process by establishing means to assess your agencies current practices and policies to turn them into a sound SEMS framework.

III. A Sustainability-based EMS Should be Tailored to Your Organizations Specific Needs and Culture

There is no "one size fits all" Sustainability EMS. The flexibility of the ISO 14000 standard and principles and targets of sustainability allow organizations to focus their SEMS on those aspects of operations, policies and programs which create environmental impact or even upon those areas expected to provide an economic benefit. Thus, with respect to any particular component of an SEMS, two agencies or institutions may develop programs which vary substantially. Yet, there is a minimum level of performance which represents alignment with an SEMSs standard requirements.

IV. Develop A Phase-In Strategy for Your Sustainability-based EMS and Foster Continuous Improvement

Success with a SEMS will require a careful phase-in approach. Not everything can be done all at once. The easier or more obvious "low hanging fruit" should be targeted first, followed by more difficult institutional or process changes. Allow time for management and employees to become educated about the goals and to get comfortable with the process. Phase-in changes as opportunities arise.

A key requirement of an SEMS is continuous improvement. Regardless of where your agency or institution chooses to start a SEMS, it must commit to continuous improvement. The steps involved in increasing the sophistication of sustainability management within your agency or institution may not always be additive or incremental. For example, while sustainability training may represent increased sophistication in the employee training component of an SEMS, other areas may require a paradigm shift to succeed (such as redesigning facilities to reduce energy use or eliminate pollution and waste). At some point, rather than adding more SEMS department responsibilities, your agency or institution must integrate SEMS responsibilities within the existing operational organizational structure.

V. The Components of a Sustainability-based EMS

A well-structured and executed SEMS can benefit your agency or organization in a number of ways, ultimately saving money and resources for your agency and the constituents you are responsible to or influence. Operational costs can be reduced through increased efficiency of operations and the reduction of waste and pollution and associated waste management practices. You should

find improve employee morale, increased agency performance, and improved community relations as well. A well integrated, comprehensive SEMS is needed to accomplish these goals however.

The ISO 14001 standard include a number of major components for an SEMS. They are discussed below:

1. Statement of Sustainability Policy

An agency or institution must define its sustainability policy and demonstrate commitment to its SEMS. Agency directors, commission members and/or relevant elected officials must commit to the goal of sustainability in the SEMS and be willing to demonstrate continual improvement, reduction and prevention of environmental impacts, and compliance with applicable laws and regulations. The policy must be relevant to the nature, scale, and environmental impacts of the agency or institutions and apply to: a) internal agency operations; b) policies, programs and practices which effect "external" constituents (e.g. business, communities); and c) partnerships, links and relationships with constituents. The policy must be available to the public, and it must be communicated to the employees.

2. Planning

An agency or institution must formalize the process used to fulfill its sustainability policy. During the planning phase, significant environmental impacts of your agencies activities, products, policies and services must be identified by assessing them against external sustainability targets or principles (see Part I). Legal, regulatory, and other standards which may apply must also be assessed. Clear objectives and targets for improvements should result and quantified wherever possible.

3. Implementation and Operation

Effective implementation of the SEMS requires that the agency or institution develop capabilities and support mechanisms which ensure achievement of its sustainability policy, objectives, and targets. Implementation requires defining the roles and responsibilities of individuals, departments or programs involved in the process, including senior management. Necessary resources must be identified and provided. Activities and processes which are inconsistent with sustainability targets or principles and/or have significant environmental impacts must be identified and procedures developed for the management and phased-out of those activities and processes. Employee training procedures must be established and executed. Internal and external communications procedures must be established and implemented.

4. Checking and Corrective Action

An agency or institution must measure, monitor, and evaluate its sustainability performance, and specific procedures for conducting performance evaluations should be developed to accomplish this. Performance and conformance with objectives and targets should be tracked and reported on a regular basis. Audits of the SEMS should be conducted to identify areas needing improvement, and non-conformance should be corrected.

5. Management Review and Continuous Improvement

A public agency or institution should develop procedures to review and continually improve its SEMS, with the objective of improving its overall environmental and economic performance. Performance should be compared with objectives and targets developed during planning, and root causes of deficiencies should be identified and corrected. Further opportunities for improvement should be identified and plans for further improvement executed.

6. Implementation

Developing a SEMS is fundamentally different from environmental compliance management. The SEMS should systematically phase-out environmental impacts by redesigning processes, products and services to become consistent with principles and targets of sustainability. This requires that the SEMS relate to the core of your agency or institution's environmental and economic impacts, challenges, and opportunities. It will be successful only if it is fully embedded in all of your policies, programs and practices. Unlike compliance, the SEMS should "live" in all corners and spaces of your agency or institution.

Successful SEMS implementation depends on your full understanding of your agency or institution. You will need to look well beyond the "environmental function" into virtually all other policy and programmatic functions of the organization. You will need to understand the motivations of and influences on these functions, and the relationship between them. You will need, in short, to understand the process of managing change within your agency or institution.

VI. Assessment Questions to Help Your Agency or Institution Prepare to Build a Sustainability-based EMS

The following questions are intended to help you to obtain the information necessary to build your SEMS. The questions are two-dimensional. They should guide the information you need to gather. Information is crucial to successful SEMS implementation. The thoughts and ideas should also inspire you to think creatively to deepen your understanding of your agency or institution.

1. Management Commitment and Policy

How does your agency or institution develop new policy initiatives? Policies establish the principles and values which guide or dictate major decisions. Policies operate as touchstones and anchors in times of challenge and change. They can also function as engines of change when they are modified or replaced by new policies.

What are the three most recent policy initiatives adopted in your agency or institution? What were the drivers behind them? Who developed these policies? Who (or what team) implemented the policies?

2. Planning for Objectives and Targets

How does change occur in your agency or institution to allow for success (e.g., quality improvement, achieving compliance, service delivery)? How do functional departments or programs in your agency or institution choose their new challenges, opportunities, and measures for success? These challenges, opportunities, etc. form the foundation for selection of Sustainability-based EMS objectives and targets. Are there existing management and service delivery teams that can integrate objectives and targets successfully into overall agency operational, quality, and environmental goals, etc.?

Are the goals and targets developed in a top-down fashion, i.e., does the director or upper management make the decision, or does this occur through a consensus-building process that asks input from various levels of the agency or institution before major goals or policies are established or changed? What forms of communication does this take?

How are resource needs evaluated, prioritized, and satisfied within your agency or institution? Is there a process in place to evaluate the environmental resource requirements of new capital projects? Are procedures in place to allow you to track the costs and benefits of environmental activities? Key to evaluating your agency's preparedness for operational program implementation is understanding how it allocates human, financial, and organizational resources.

3. Internal Agency Operations and Services

Does your agency or institution have an individual (or team) assigned to maintain, evaluate, and improve environmental performance? Do you use, provide, or remove hazardous (e.g., toxic, corrosive) chemicals when providing your service? Are any of these chemicals environmentally restricted? Are you under the jurisdiction of any agency with environmental responsibilities (e.g., DEQ, EPA, fire department, local city or county environmental health department, sanitary department, water authority)? Do

you have any environmental permits (e.g., permits for air emissions, water discharges, hazardous materials usage, hazardous waste generation)? Have you ever received an agency violation, fine or penalty for non-compliance of environmental requirements? Have you ever received a complaint on an environmental issue from an employee, a facility neighbor, or a community member? Do your know the overall environmental impact of your operations or service? Are your constituents interested in the potential environmental impact associated with your operations or service? Have you been able to satisfactorily respond to those questions? Have your operations been impacted by constituent demands for better environmental performance? Are you aware of the environmental impact associated with your suppliers'/vendors' activities?

If your agency or institution produces a product (e.g. roads, fish, hard goods), the following questions may also apply: Do you use hazardous chemicals to support your manufacturing/production process (e.g., paints, solvents, petroleum products)? Do you use any chemicals, substances or materials that are environmentally restricted (subject to agency regulation)? Do you know the overall environmental impact of manufacture, use, and disposal of your product? Are your products subject to environmental requirements or recommendations such as eco-labeling, energy conservation etc.? Does the disposal of your product at the end of its useful life have the potential to create environmental issues (e.g., contains hazardous components)? Are you unaware of the environmental impact associated with your suppliers'/vendors' activities?

4. Policies, Programs and Practices Effecting External Constituents

Public agencies and institutions have significant influence over the environmental and economic performance of the private sector and communities. Does your agency or institution have an individual (or team) assigned to maintain, evaluate, and improve the environmental and socio-economic performance of policies, programs and practices which effect the private sector, communities, academia, non-profits and other external constituents? Does the agency continually evaluate the ways in which external policies, programs and practices may foster and support sustainable environmental and economic performance and the areas or ways in which they may be obstacles to this? How are the benefits and costs to external programs and policies evaluated? How are the outcomes of these assessments communicated to management, the public and elected officials? How are changes made when deficiencies are found?

5. Training and Communications

Training and communication in your agency or institution are important to the operational program. How are new training needs assessed in your company? How are the training needs of specific job functions analyzed? How do you communicate challenges, opportunities, and successes in the company?

Communication relates directly to two key success factors in a Sustainability-based EMS: consistency of action and documentation. Procedures which support your EMS should, in some cases, be documented (e.g., the Policy, and the Objectives and Targets). The actions taken by decision-makers should reflect and be consistent with documented procedures. Is your agency or organization good at achieving this alignment? The procedure/action alignment is also key to understanding the structure of roles and responsibilities in your agency (for example, team structures) and how these may be leveraged to implement an EMS. At this stage, you also need to evaluate your constituents. What are their expectations of the environmental function? How have they responded to new environmental initiatives in the past? And finally, you should evaluate your ability to report back on the operational program.

6. Auditing and Corrective Action

Paramount to the success of a SEMS is being able to effectively measure the performance as it relates to the initial goals and objectives established. What metrics are used to measure agency or institutional success? How does your agency or institution report performance? How does it respond to performance information? How does it audit the performance criteria you have in place?

Every agency or institution has a different mix of metrics used to determine if it has been successful. In some cases it is retaining the brightest and best employees who can develop and deliver the best services. Another metric may be a ratio of units of energy or resources consumed to measure the eco-efficiency of your agency or institution over time. Are metrics clearly defined and tracked so that the performance of a SEMS can be evaluated and compared to show an impact on the agency or institutions success?

Once you determined where you are as compared to the metrics you have set for your agency or organization, what mechanism do you have in place for correcting deficiencies discovered? How are the deficiencies communicated to all functions of the organization? Who is responsible for executing corrective actions? Who is ultimately accountable? Is there a way of measuring the ongoing impact on the organizations performance (i.e., improved productivity, increased profitability, higher returns on assets, capital, etc.) from the corrective actions taken? What positive or detrimental impacts have the corrective actions had on your constituents? Does the cost of making these changes translate to economic savings and benefit?

7. Management Review

How does management exercise organizational review within your agency or institution? What metrics does management typically use to determine the effectiveness of programs or policies? Management review under a SEMS is an active involvement in reviewing the system to determine: a) whether and

how well it is working; and b) if elements of the system (the policy, the objectives, etc.) need to be updated. In most organizations, high level management is involved in decisions which enter the public domain. Elements of a SEMS may fall into the public domain, since the effectiveness of an SEMS will contribute to public perception of the agency or institution and may directly effect the performance of the private sector and communities.

In evaluating how management in your organization reviews management initiatives, consider how standard operating procedures are developed, and to what external standards your agency or institution subscribes. These considerations will give you insight into how management exercises its review authority.

VII. Initial Steps Developing a Sustainability-based EMS: Inputs and Outputs

Now that you have answered these questions, you are ready to begin developing a SEMS. Remember, there is no "right" way to implement an SEMS, and no right place to begin.

Where and how you begin depends most essentially on you and your assessment of your agency or organization. It depends on your organizational structure, objectives, resources, priorities, and limitations. But more than anything else, it depends on your vision of how the SEMS will, or should, function within your agency or institution.

Follow the instructions on the worksheets provided to identify the materials and energy inputs and outputs with their associated costs and effects of your agency, organization or community. (The following charts and examples from the City of Portland P-2 program).

PUBLIC AGENCY SUSTAINABILITY WORKSHEET #1:

WHAT DOES YOUR AGENCY, ORGANIZATION OR FACILITY DO?

Think about your agency, institution or facility as a system of interrelated activities. Use the following questions to help you fill out this worksheet for each facility or division of your agency:

1. *Process*: In very broad terms, what does your agency, institution or facility do, make or sell?

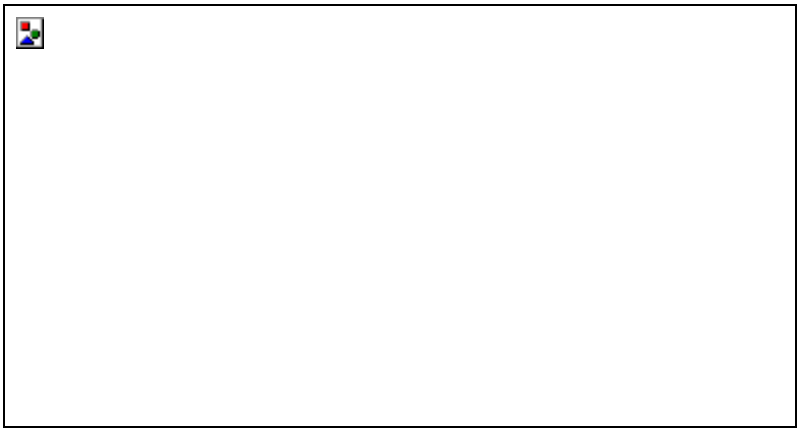
2. *Inputs*: What types of products or resources does your agency, institution or facility buy or use? (for example, energy, water, paper, metal, chemicals, food stuff, packaging, labor, training).

3. *Waste:* What types of waste or looses does your agency, institution or facility produce? (for example, waste water, heat, solid waste, water effluent, air emissions, hazardous waste, industrial waste, by-products, time).

4. *Distribution*: What is involved when your product or service leaves your agency, institution or facility? (for example, shipping, packaging, postage).

5. *Constituent's Process*: How do your constituents use the product, service and/or packaging?

6. *Constituent's Waste*: What waste or losses do your constituents generate? (for example, packaging, repairs, products, materials).



PUBLIC AGENCY SUSTAINABILITY WORKSHEET #2:

MATERIALS AND ENERGY FLOW analysis

Think in more detail about all the steps involved in <u>one</u> of your services, products or procedures (for example: running your office, manufacturing a product, or delivering a service). Use the following pages to map out all the steps, thinking about the inputs and outputs involved with each step. Follow the general format used in the example below and in the example on the following diagram ("BEFORE"). The following questions and guidelines will help you complete this worksheet.

- Consult with staff who are involved in each step of the process.

- *Input examples*: energy, water, paper, metal, wood, chemicals, packaging, labor, training.

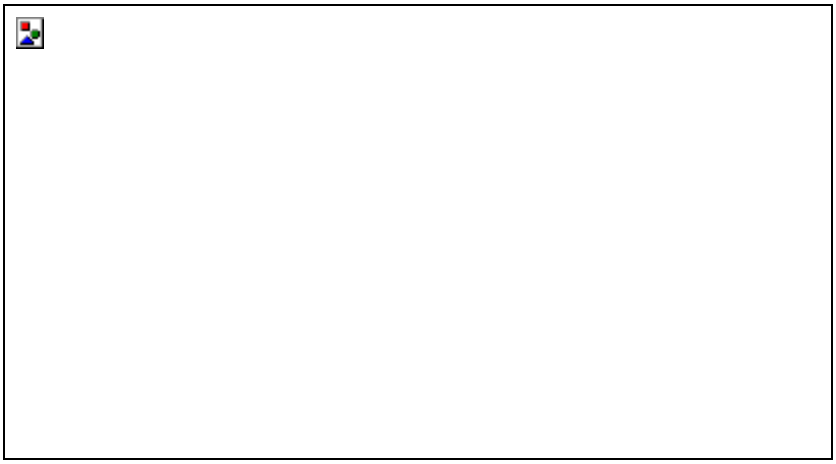
- *Output examples*: water, heat, solid waste, by-products, hazardous waste, pollutants, air emissions.

- Examine your receipts and bills to identify how much each input and output costs you at each step. Be sure to include any regulatory fees or disposal costs. Keep track of your costs per month or per year (convert unit costs to costs per month or year).

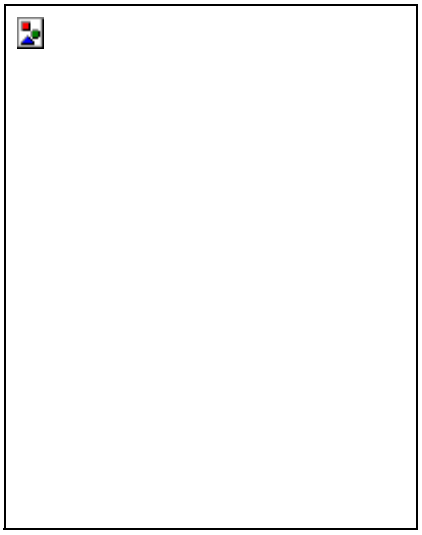
- Be sure to include intermittent steps and their inputs and outputs (for example: periodic cleaning)

- Your product or procedure may be more complicated than the three linear steps shown here. You can use the following pages to record your steps, inputs, outputs, and costs.

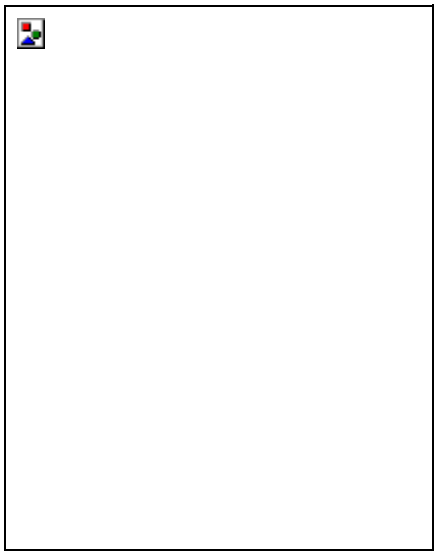
PRODUCT OR PROCEDURE: <u>example: making ice cream (simplified)</u>



WORKSHEET 2 (cont'd): Materials and Energy Flow Analysis

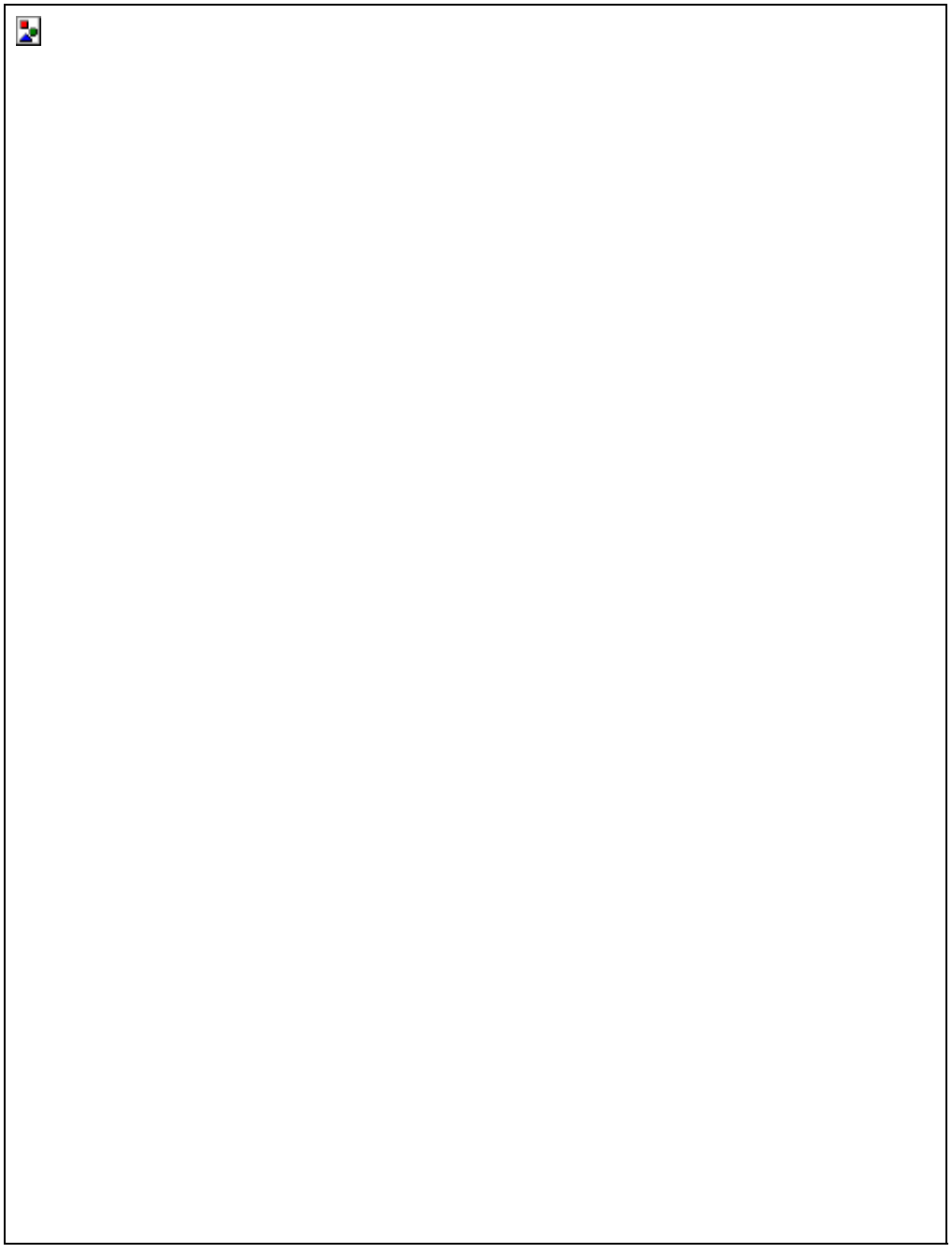


Make photocopies of this worksheet to lay out the materials and energy flow of each of your facilities, departments, services, products or procedures.



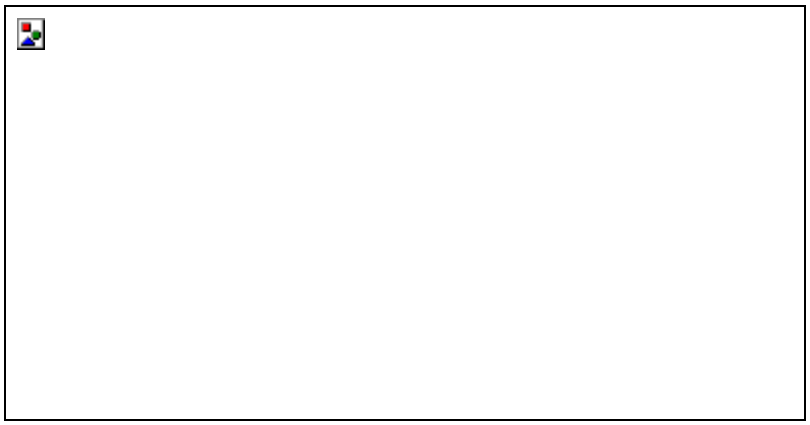
WORKSHEET 2 (cont'd): Materials and Energy Flow Analysis

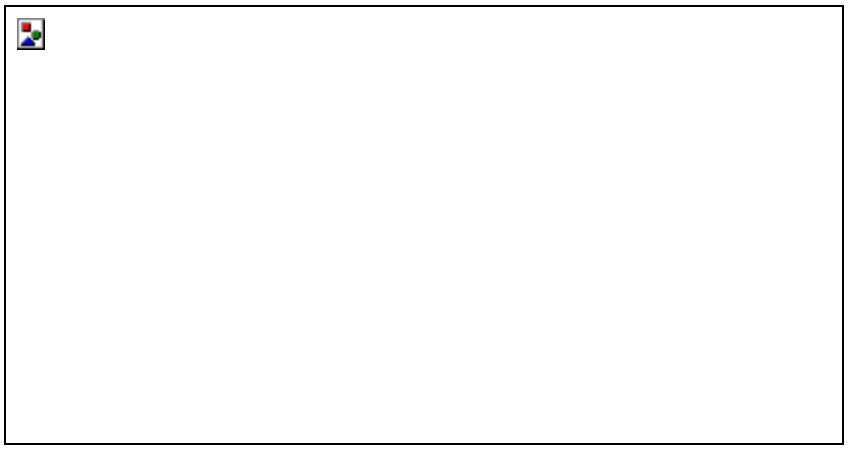
After you have completed your input and output flow map, look at it and think about the following questions. Photocopy this worksheet before you begin, or you can use additional blank paper.



Materials and Energy Flow Analysis - Example

Use the following example from a small software company to help you think about your facility, department, product or service's material and energy flows and changing you may be able to make.





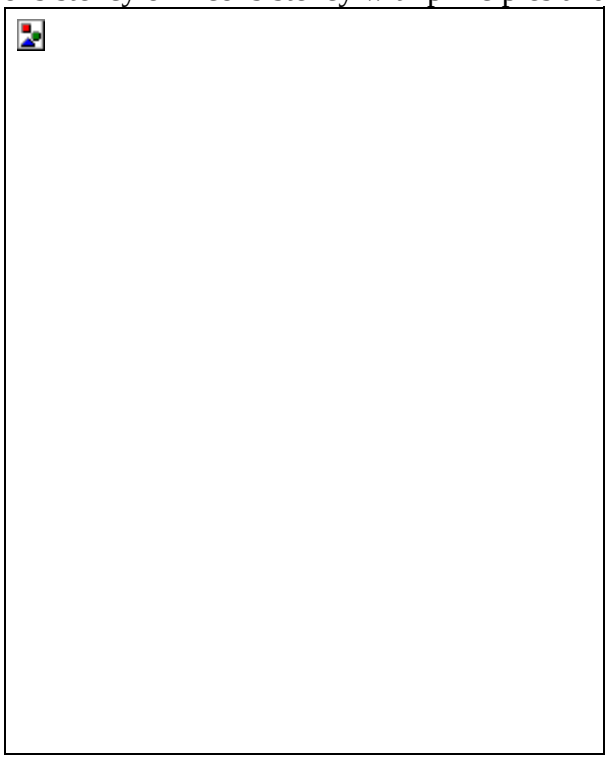
VII. Developing Your Complete Sustainability-based EMS

A. Identifying Aspects of Your Organization Inconsistent with Sustainability.

Complete a materials and energy flow analysis for each facility, department, product o service of your agency or organization. Once you have developed a sound understanding of the flow of inputs and outputs, you can identify the aspects of your agency or organization that effect the environment. Once you understand the environmental aspects of your agency, you can identify if and how and where they may be consistent or inconsistent with basic principles or targets of sustainability.

For example, your organization may use and consume large amounts of virgin minerals and metals which generate hazardous waste or toxic emissions. Even when meeting minimum compliance standards, the discharges and emissions will build up somewhere in nature. Thus, the systematic use and emissions of these materials is inconsistent with basic principles of sustainability. Construction practices by your organization that disturb riparian habitat or native plant species erode the regenerative capacity of nature. Thus, they are inconsistent with principles of sustainability.

Use the sample Sustainability Assessment Matrix on the following page to develop a methodology to identify, quantity, and assess the inputs and outputs of each department, facility or unit within your organization for their consistency or inconsistency with principles and targets of sustainability.



2. Create Action Strategies Through Outcome-Based Scenario Planning

Now that you have identified those aspects of your organization that are inconsistent with principles or targets of sustainability and your team if working well together, you are ready to develop action plans. Many action planning processes start with intense discussions of the problem and the many competing views of how to resolve it. Yet, research shows that the most effective action plans typically result when the first step is aimed at clarifying the end-outcome desired. Once the outcome is clear, your team can work backwards to develop multiple scenarios for ways to achieve the outcome.

Outcome-based strategy development focuses attention towards the future state desired. It can generate excitement and energy to find the most efficient and effective means to achieve it. Focusing on outcomes also helps keep your group focused when deliberations about means get turbulent or emotional.

Outcomes are not problems to resolve. Outcomes describe results and the consequences of action. They are the result you will have achieved once the organization has phased-in changes needed to become consistent with principles and targets of sustainability.

Outcome or performance-based strategy development provides a framework in which your group members can concentrate their thinking and explore the interconnectedness of problems. Focusing on outcomes also opens up a broader range of strategies and options and reduces the potential for prematurely fixating on one solution which may prove inadequate. Finally, focusing on outcomes provides a common measure for comparing and evaluating alternative strategies against.

<u>Essential Tasks in the Sustainability Strategy Development Process</u>

1. Identify Outcomes:

Keep the group’s analysis focused by identifying end-outcomes and Think Big and desired results. Think big - the elimination of aspects of your organization that are inconsistent with sustainability principles or targets.

2. Explore Multiple :

Discuss core problems and their interrelationships, and

Options assess multiple ways to achieve the end-outcomes.

3. Agree On :

Develop criteria and assess, select and commit to multiple

Multiple Strategies strategies to reach the outcomes.

Complete outcome-based scenario planning for each aspect of your organization which is inconsistent with principles or targets of sustainability. Once you have decided on the multiple strategies you will use to achieve the outcomes, you are ready for the implementation phase. (For more information on outcome-based planning within government see *Catalytic Leadership*, Jeffrey Luke, Jossey-Bass Publishers, 1998)

3. Implementing Strategies

There is no right way to implement change within your organization. After many years of research, experts still disagree on the issue of the most effective way to implement change within organizations. You must decide how to implement the strategies based on your assessment of the cultural, organizational, political and economic status of your agency or organization.

There are a few common themes, however, which appear in successful implementation programs. First, successful efforts commonly develop a detailed, written "action plan" which includes a careful phase-in approach, clear assignment of responsibilities, due dates, metrics and means to measure progress, and expected interim results. Action plans that deliver, measure and describe early results typically serve as an important catalyst for increased activity. Second, effective implementation programs typically enhance or maintain trust and relationships between the key players involved. Third, successful implementation typically leads to increased learning and therefore to continuous improvement. Finally, successful implementation programs help team members achieve personal goals (such as skill development) in additional to organizational outcomes.

Beware of some common barriers to implementation within public agencies: turf wars, communication and language obstacles, limited leadership capacities, excessive pressure for immediate results, and lack of an enabling mechanism (e.g. inter-organizational or department cooperation). Keep an eye out for these barriers. When they arise, engage in outcome-based scenario planning to develop ways to overcome them.

D. Weaving The Strategies Together Into a Complete Sustainability-based EMS

Once multiple strategies are identified and implementation plans have been crafted, the final step is to weave them together into a complete, written SEMS. The SEMS should include all of the components outlined previously in this document: organizational policies, commitment from top management etc.. The development of a complete SEMS will help sustain action during the implementation of strategies and can foster continuous improvement. As discussed elsewhere, evidence shows that implementing a SEMS will typically lead to substantial cost savings, improved employee morale, increased efficiency and dramatically reduced environmental impacts.

You now have an understanding of the steps and components for the development of a sustainability plan for your agency or organization. Have fun, keep smiling and good luck.

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