A TEMPLATE FOR LOCAL GOVERNMENT SUSTAINABLE DEVELOPMENT INITIATIVES

This document has been prepared by members of the League of Oregon Cities with staffing assistance from the Center for Watershed and Community Health at Portland State University. It is intended for use by any local government or community interested in starting a sustainable development initiative. The authors request that readers review the document and provide feedback as to its usefulness, content and presentation. See Appendix D for author contact information. The participants include:

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TABLE OF CONTENTS

Step One: Secure a Commitment To Your Sustainability Initiative From
                 Elected Officials, Agency Directors and/or Community Leaders.
Step Two: Establish a Guiding Policy Framework on Sustainability
Step Three: Establish a Strong Guiding Coalition

Step One: Assess The Sustainability of Government or Community Operations
Step Two: Identify and Highlight Your Existing Successes and Strengths
Step Three: Identify Gaps, Omissions, Needs and Priorities

Step One: Generate a Vision, Goals and Targets for Your Agency or
                 Community
Step Two: Adopt Cost Saving Goals and Targets
Step Three: Include Job and Business Goals

Step One: Determine Your Priorities
Step Two: Develop An Implementation Team and Action Plan
Step Three: Educate, Train and Reward Employees, Businesses and Citizens
Step Four: Involve Elected Official, Senior Agency Management and
                 Community Leaders in Continual Review and Improvement

Step One: Establish Sustainability Indicators
Step Two: Implement Mechanisms to Gather Data, Monitor Progress and
                 Ensure Continual Improvement

INTRODUCTION AND PURPOSE

This document outlines a step-by-step process, or template, which any local government can follow when adopting sustainable development policies, programs and practices. It is intended for use with an introductory companion document entitled *Context and Background for Local Government Sustainable Development Initiatives*. Members of the League of Oregon Cities developed both documents, with staff assistance from the Center for Watershed and Community Health at Portland State University. The documents are working drafts, and the authors request feedback on their usefulness, content and presentation.

While organized sequentially here, the development of a sustainability initiative is not a linear process. You can start anywhere you want. Some communities may follow the template step-by-step, starting with the adoption of authorizing policies and guiding principles. Others may initiate pilot projects to understand the costs and benefits of the approach. The more effective sustainability initiatives usually circle back and forth through the inter-related steps a number of times as they develop and continually improve their program.

This template, therefore, simply outlines the common, major components of successful local government sustainable development initiatives. It offers suggestions for how to approach key issues. It also provides examples of how various communities have approached the issues. Though there are commonalities among strategies, there is no one-size-fits-all design. Each local government must develop an initiative tailored to the unique needs, culture, economy and environment of its community.

CONTENTS OF DOCUMENT

There are five key questions that should drive the development of your sustainable development initiative. Each section of this document is organized around the steps involved in answering one of these questions.

On the left margin, examples are provided of how other communities have responded to each question. They are marked ✓**Examples** and more details can be found in Appendix A.

At the end of each section, "start-up" ideas are suggested. These are easy steps you can take to get going. They are marked ▶ *Start-up Ideas.*

At the end of each section, exercises are suggested to help you assess your community's past or current approach to the questions. These are marked ʸ**Exercises** and more details are found in Appendix B.

Appendix C contains a **glossary** of terms used in this document. Appendix D provides a **contact list** of League of Oregon Cities members who participated in the development of this template. Appendix E offers some selected **reference books**.

LEADERSHIP IS THE KEY TO SUCCESSFUL SUSTAINABILITY INITIATIVES

Before launching your sustainable development initiative, it is important to know the ultimate key to success: *leadership*. Leadership, not management per se, creates successful change in any organization, institution or community. Leadership is a set of processes that creates organizations in the first place, or adapts them to significantly changing circumstances. Leadership defines what the future should look like, aligns people with the vision, and inspires them to make it happen despite the many obstacles. Management, on the other hand, is a set of processes that keeps complicated systems of people and programs running smoothly. It involves planning, budgeting, organizing, staffing, and problem solving. Efforts to affect change that are overmanaged and underled usually achieve limited success. Managing change in your organization or community is important, but, in most cases, the biggest challenge and need will be to lead change.

FIVE KEY ORGANIZING QUESTIONS OF A SUSTAINABILITY INITIATIVE

The five organizing questions that should drive the development of your sustainability initiative, along with the strategies for answering them, are described in Table 1. The balance of this document elaborates on these questions and strategies.

Table 1: Five Questions, Five Strategies

Question	Strategy
What is our commitment to sustainability?	→ Develop an initial policy framework that authorizes and guides your sustainability initiative.
How sustainable are we now?	→ Develop a baseline by assessing the economic, social and environmental conditions, trends and risks of your agency or community.
How sustainable do we want to be in the future?	→ Set measurable goals and targets for what you want to achieve in the future.
How do we get there?	→ Develop an implementation action plan.
How do we measure it?	→ Establish indicators and implement an on-going monitoring system.

SECTION 1. <u>WHAT IS OUR COMMITMENT TO SUSTAINABILITY?</u>

<u>Step One:</u> **Secure a Commitment to Your Sustainability Initiative From Elected Officials, Agency Directors and/or Community Leaders.**

✓ **Example 1**

Following a series of work sessions and the drafting of a background report, the Eugene, Oregon City Council adopted a resolution establishing a definition and a set of sustainability principles. See Appendix A for more details.

To get your sustainability initiative off the ground, elected officials, senior agency managers or community leaders need to declare their support for the effort. A formal commitment highlights the importance of the initiative, authorizes staff to work on it, and helps to catalyze action within government and the community. The initial commitment may be a resolution from the City Council, an order from the Mayor or City Manager, or a joint declaration by community leaders.

At this early point, it is helpful to define what sustainability means in the context of your agency or community, and adopt an initial set of goals and principles that will guide the development of your initiative.

Each community must decide how it will define sustainability and the terms it will use to explain the concept. "Resource efficiency" and "resource productivity" are other terms used to describe sustainable development.

An example of a commonly used, broad definition of sustainability is: *"Using, developing, and protecting resources at a rate and in a manner that enables people to meet their current needs and also provides that future generations meet their own needs*" (Brundtland Commission and many others).

This definition means that ample, healthy stocks of clean water, clean air, fertile soils, forests, agricultural lands, plants, fish, wildlife, and other resources should be passed on to future generations.

All environmental problems eventually lead to socio-economic problems and all good solutions to environmental problems enhance economic and social well-being. Therefore, your initial definition, goals and principles should make it clear that your sustainable development initiative will seek to address economic, social and environmental issues concurrently.

Step Two: Establish a Guiding Policy Framework on Sustainability

Once leadership has established its commitment to the sustainable development initiative, the next step is to establish a policy framework to guide the effort. The framework should clarify your goals (what are you trying to achieve?); describe the guiding principles of the initiative, including that of continual improvement, and lay out general guidelines for implementation.

It will not be possible at this point to predict all the policy changes that may result from the initiative. The goal is simply to establish the initial policy framework to guide program development.

Sample goals for local government sustainability initiatives might include:

- Increase the economic efficiency and reduce costs of government and community operations to target levels;
- Increase the economic competitiveness of local firms, and generate jobs and social well-being for citizens to target levels;
- Reduce the amount of energy, water, and material resources used within government and the community to target levels; and
- Reduce habitat impacts, waste, and toxic releases to target levels.

The targets define the milestones you want to reach on the way to achieving your long-term goals. They will change over time as new information becomes available.

Step Three: Establish a Strong Guiding Coalition

Once the policy framework has been established, a coalition should be formed to guide the initiative. The group should include a mixture of key elected officials, senior management, program directors, line staff and outside stakeholders. The guiding coalition should be chosen based on its ability to provide leadership and credibility to the effort. It should also be constructed with the knowledge that this group will be key to providing the momentum needed to push through the inertia and obstacles that are certain to emerge.

Start-up Ideas

✓ Gather examples of sustainability policies, goals and principles adopted by other local governments. Share them with agency staff and citizen leaders.

✓ Have the Mayor or City Council host a meeting on local government sustainability.

Invite key officials, agency directors and community leaders along with representatives from nearby communities or businesses who have implemented sustainability programs. Discuss the potential costs and benefits and ways to implement sustainability efforts. At a follow-up meeting, see if there is consensus on starting a sustainability initiative.

✓ Find a champion and a home for your sustainability effort.

Behind every successful sustainability initiative there is a respected person or organization that champions the cause. Sometimes it is a key elected official or senior staff member, other times it's a key commission or department. Local business people, academic or non-profit leaders can also play key roles. Find a person(s) who can champion the cause within government and the community. In addition, find a home for the initiative within government that provides visibility, easy access and authority.

Section 1 Exercise

Exercise

Go to Appendix B to describe the resolutions and guiding policy framework on sustainability for your agency or community.

SECTION 2. HOW SUSTAINABLE ARE WE NOW?

Step One: Assess The Sustainability of Government or Community Operations

Once the initial purpose, definition and policy framework have been established to guide your sustainability initiative, the next step is to identify how sustainable your agency or community currently is. Credible scientific and economic baseline data is needed to determine what your government and community are doing well and what the future needs and priorities should be.

A useful metaphor here is the "footprint". When calculating a community's footprint, you analyze the extent and types of its resource use, waste generation and overall environmental effects. A community with a sustainable footprint uses resources in a way, and at a rate that does not harm nature's capacity to sustainably produce key environmental resources and services (e.g. clean air and water) and assimilate waste and pollution.

There are three common ways you can assess your community's footprint: "Input-Output Analysis"; "State of the Environment Reporting"; or "Principle-based Assessments."

A. Agency or Community "Input-Output Analysis"

An Input-Output Analysis can be used to assess the footprint of internal government operations or that of the broader community. The process starts by mapping each sequential step in the operations of your agency or community. Information is then gathered to measure the following parameters:

- Amounts, types and costs of all *inputs* (e.g. raw materials, energy, water, products) purchased or consumed in each step;

- Amounts, types and costs of all *outputs* generated as a result of each operational step (e.g. products, all forms of waste, emissions and habitat impacts).

Mapping the processes and quantifying the inputs and outputs of your agency or community identifies ways to save money or generate income by reducing unneeded inputs, improving energy and materials efficiency, and reusing or recycling waste materials.

✓ **Example 3.1**

See Appendix A for an illustration of an Input-Output Analysis applied to *vehicle fleet use* within local government.

✓ **Example 3.2**

See Appendix A, Example 3.2 for an example of the City of Portland P-2 program's Input-Output process map for their Tryon Creek *Water Treatment Facility*.

B. "State of The Environment Reports" or "Report Cards"

Communities can also assess their footprint by completing a "Report Card" or "State of the Environment Report."   A State of the Environment Report is an integrated assessment of the conditions, trends and risks to the local environment. The analysis should measure air and water quality, soil health, erosion rates, the status of fish and wildlife, riparian areas, native plants, agricultural and forest lands, and other resources. The report can also describe where and how local economic and community activities generate pressure on the environment. The selection of key "indicators" (a process described in Section 5) is an important part of the process because indicators are essential in measuring trends.

✓ **Example 4**

The city of Lake Macquarie, Australia uses a Drivers-Pressures-State-Impacts-Response (DPSIR) indicator framework for its State of the Environment Report. See Appendix A.

A State of the Environment Report should help your community answer key environmental questions such as: Are ecological quality trends up or down? How might the condition of one resource affect another (e.g. is soil erosion causing increased stream temperatures or loss of fish habitat)? What should the key priorities be in terms of conserving and restoring the environment?

The report should also seek to answer key socio-economic questions like: Is there a risk that local forests or agricultural lands will loose their capacity to sustainably produce goods that humans will need in the future (e.g. fiber, food)? How are population and economic growth, or transportation patterns, impacting the environment? How much is waste management actually costing the community? Is non-point pollution increasing the costs of water purification for taxpayers? How much money is "leaking" out of the community through payments to distant energy producers because of inefficient use of water, energy or raw materials?

In sum, your "State of the Environment Report" or "Report Card" should attempt to quantify and describe the linkages between the conditions, trends and risks to the local environment, the economy and community. The report should be updated periodically to track trends.

The City of Ashland, Oregon, adopted the Valdez Principles (now called Ceres Principles) several years ago as a way for the City Council to keep track of the implementation of an environmental program.

King County in Washington State adopted the principle of phasing-out emissions of toxic substances into nature.

C. Principle-Based Assessment

You can also assess the sustainability of internal government operations or the overall community by determining the degree to which current practices are consistent with, or violate, basic principles of sustainability.

A number of organizations have developed guiding principles of sustainability. For example, The Natural Step, an organization from Sweden with U.S. affiliates has developed four "systems principles." The PSU Center for Watershed and Community Health has modified and linked these with other principles to clarify what sustainability may mean to local governments:

- *Reduce the use and emission into nature of toxic minerals, metals and fossil fuels and synthetic, persistent toxic materials and substances; and enhance the use of renewable energy and non-toxic materials and substances, in processes, goods and services.*

- *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).*

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

- *Increase the efficiency by which natural resources and energy are extracted, processed and used by a factor of ten or more.*

- *Enhance business development, economic competitiveness, job creation, and fairness in the way resources are distributed to meet basic needs such as food, housing, public safety, health care, education and quality-of-life consistent with the principles above.*

<u>Step Two:</u> Identify and Highlight Your Existing Successes and Strengths

Once you have assessed the footprint of your agency or community, the next step is to identify and highlight your successes. Some resources and ecosystems may be in excellent shape, some in poor condition, and others in decline. Highlight the policies and programs that have successfully maintained healthy systems. Every community has a number of past and current policies and programs that support sustainability, though they may be called something different. It is important to focus on these and their accomplishments.

For example, is local stream and drinking water quality good? Is there ample streamside riparian vegetation? Are reuse and recycling rates high? Highlighting these successes can reinforce the message that a sustainability initiative does not require reinventing the wheel. It also allows elected officials, agency personnel and community members to celebrate and build upon past and current accomplishments.

Step Three: Identify Gaps, Omissions, Needs and Priorities

Finally, your footprint analysis should help identify areas where significant threats exist and improvements are required in the environment. For example, are trends in toxic releases or non-point pollution harming air, soil or water quality? Are native habitats protected or increasing being lost to development? This information should lead to the identification of gaps, overlaps or failures in policies, programs and practices.

This should naturally identify the new programs, practices or policies that may be required to achieve the established targets.

Start-up Ideas

▶ **Start-up Ideas for Section 2**

✓ Gather bills and calculate the total annual energy, water use or waste generation of one building or department. Set a reduction target (e.g. 10% reduction) and ask employees for suggestions on ways to achieve it. Develop a simple implementation plan with a short timeframe (e.g. 3 months). Measure, highlight and celebrate the reductions achieved and associated cost-savings.

✓ Complete a simple Input-Output Analysis for one facility or process as a test model.

> Choose a facility with high energy, water or waste costs and work with staff to outline the sequence of steps involved with the operation of the facility. Gather past utility bills and measure the total amounts and costs associated with the inputs of energy and water and the outputs of waste. Then, look for ways to reduce energy and water use through steps like conservation, alternative lighting, green-building techniques and HVAC technologies. Consider alternative uses for waste products. Measure and highlight the reductions achieved.

✓ Complete a Simple State of the Environment Report.

The first iteration can be relatively simple. Ask federal, state and local agencies for all existing data on air and water quality and other key resources. Develop a simple description of the conditions and trends from this data. A surprising amount of data is usually available. Fill in the gaps with estimates based on principle-based assessments. Identify potential links between environmental problems and activities within the community that generate pressure on the environment. Ask for feedback on a draft from government agencies, academic experts and knowledgeable citizens. This may elicit a good deal of new information. Share the final report with government officials, the media and the public. Hold meetings to discuss the implications for local firms, quality-of-life and the environment.

Section 2 Exercise

Exercise

Go to Appendix B and describe how your community or agency might assess its footprint.

SECTION 3. <u>HOW SUSTAINABLE DO WE WANT TO BE?</u>

Step One: Generate a Vision, Goals and Targets for Your Agency or Community

Once you have developed baseline information, the next step is to determine how sustainable you want to be in the future. Generating a compelling vision for your agency or community with respect to sustainability is perhaps the most difficult, yet most important step. Your vision should be based on your community's core goals as well as its definition and principles of sustainability.

A community's vision and goals should clearly define: a) the levels and types of changes to which your agency or community will commit in order to become more sustainable; and b) the time frame within which these changes will be made. Achieving the goals within a set time frame will require the development of measurable targets. These are milestones to be met on the way to the long-term end goals. The targets should include both environmental and social-economic components.

Our review of U.S. community-based sustainability programs found that few have developed a compelling vision or measurable goals and targets. This has limited the success and dampened public support for sustainable development initiatives.

For example, the Sustainable Seattle network states "sustainability is a direction, more than a fixed destination." This is not completely accurate. Science can often define the range of characteristics that exist when ecosystems or resources can be considered healthy or sustainable. These conditions can be measured and long-term goals as well as interim targets can be set for achieving them. Meeting the targets should be a primary focus of your sustainable development initiative.

In addition, setting soft "process" goals rather than measurable goals and targets is not very helpful from a practical standpoint. Few agencies or communities can turn process-oriented goals into specific action plans. Clear, measurable goals and targets are needed to accomplish this.

✓ **Example 6**

Santa Monica, California adopted community goals around reductions in resource use, pollution prevention and community development.

11

Use Outcome or Performance-based Approaches to Set Goals:

Some communities, especially in Europe, have found the best way to set measurable goals and targets is to use an "outcome" or "performance-based" approach. Most planning today involves looking for ways to take small incremental steps forward. By comparison, an outcome-based approach starts by deciding on the long-term goals your community wants to achieve in the future (e.g. 25 years) to be sustainable (e.g. Zero Emissions, 75% of riparian areas on all local streams restored), then working backwards to set interim targets that will serve as milestones to achieving the long-term end goals.

While traditional planning processes usually lead to small incremental improvements, outcome-based approaches often lead to dramatic leaps forward. This is because people are freed to innovate and find new strategies and technologies to achieve the long-term goals, thus leaping beyond the believed constraints of existing systems.

Step Two: Adopt Cost Savings Goals and Targets

It is important to set cost-saving goals and targets for your agency or community, in addition to environmental goals. This enhances creative problem solving. It also makes it clear that your initiative is not just a new type of environmental program.

For example, you may establish a long term goal of reducing energy, water or waste costs by 40% over five years. You may then set targets of a 10% reduction within one year, a 25% reduction within three years, with the last 5% (usually the most difficult to achieve) in the last two years. These can be linked with environmental targets related to reductions in energy and water use and waste generation. The combination of cost saving and environmental targets can stimulate innovation to find new technologies or management strategies that can achieve both.

Step Three: Include Job and Business Goals

Your community's sustainability initiative should also include targets for environmentally sustainable business and job opportunities. Many new industries and jobs can be generated when increasing the efficient use and conservation of land, promoting compact urban centers, increasing the efficiency of and shifting to renewable sources of energy, water and raw materials, making the built environment more natural, and increasing the efficiency of local transportation systems.

You can also pursue new jobs using an approach promoted by the Zero Emissions Research Initiative (ZERI) called "Total Resource Productivity." The goals of this approach are:

- All environmental, natural resource and energy inputs must be fully used in organizational and business operations;
- No liquid waste, molecular, gaseous waste or solid waste should be generated in any process;
- When waste occurs, it should be re-circulated for use in other products or processes to create value-added.

Total Resource Productivity is based on the belief that the objective of a sustainable economy is to minimize and detoxify the inputs used in operations and production processes, and to achieve the maximum level of value in the use of all material and energy inputs and outputs.

✓ **Example 8**

The 'brewery of the future' is found in Tsumeb, Namibia. It produces beer from sorghum without generating any waste. It also acts as a protein factory for fish farming, produces mushrooms for food and generates energy for the local community. See Appendix A.

As long as government, communities and business fail to achieve maximum productive value from the energy and raw materials they use, and as long as they continue to discharge material and energy inputs into the environment as waste and pollution, they are wasting money and resources.

Using energy and environmental resources fully can save money and generate new jobs and incomes. In projects underway in Asia, Africa, Eastern Europe and Latin America, ZERI says it has found that "total resource productivity" (Zero Emissions and Waste) can be achieved in agriculture in four to five years. Other sectors may require 5 to 10 years or more.

The Five Step ZERI Methodology Involves:

1) *Use Input-Output Assessments To Achieve More Efficient and Cleaner Processes.*

As discussed in Section 2, this is a key focus of most sustainable development efforts today. The goal is to eliminate excess resources and waste and to detoxify production and operational systems. Thus, costs are reduced, organizations are more competitive, and the environment is improved.

2) *Search Creatively For Ways To Use All End-Of-Life Materials (i.e. Molecular, Solid, Industrial and Hazardous Waste) For Value-Added Uses.*

Cleaner and more efficient processes are important, but they are often not sufficient to achieve sustainability as few industries or organizations can achieve zero emissions and waste on their own. Jobs and incomes are consistently lost if end-of-life materials (waste) are simply *downcycled* (used for less valuable purposes than is possible) such as when waste is incinerated to generate power. However, searching for ways to *upcycle* (add value to) end-of- life materials can turn resources once thought of as waste into new products. For example, spent grain can be used as substrate for mushroom production, rather than as a soil supplement. This will add value by generating food and jobs.

Upcycling requires thinking beyond the core business. It often requires breaking down end-of-life materials into their biochemical components and finding ways to turn each component into a product (much as the petrochemical industry does when it distills oil into numerous substances and products).

3) *Cluster Businesses Together that Can Use End-of-Life-Materials From One Process as Feedstock for Another Process or Product*.

Once new uses are identified for end-of-life materials, the next step is often to create business clusters. This means physically locating businesses in close proximity to one another so they can use the by-products of one process as feedstock for new value-added processes or products.

This step can increase productivity and generate new businesses and jobs. A series of inter-linked business networks can evolve with creativity and careful engineering.

4) *Identify Breakthrough Technologies*.

Barriers will often be identified in the process of reducing inefficiencies and developing waste-based businesses. Academic institutions and the private sector must be engaged to develop the breakthrough technologies to eliminate technical barriers. Often, the new technologies may be slight modifications of long-abandoned approaches. If a technology is lacking, this is not a reason to give up. Rather, it provides an opportunity for entrepreneurs to create new business ventures.

5) *Seek Appropriate Policy Changes*.

The logic of the process described here is often inconsistent with our legal system and community development policies. For example, local zoning ordinances and building codes often do not encourage nor provide incentives for waste-sharing business clusters. Policy changes will be needed to eliminate the barriers and support the strategies.

Economic and Job Benefits of Total Resource Productivity

The ZERI approach identifies capital growth opportunities by using materials at high rates of efficiency. It leads to clusters of different industries that are closely linked on the basis of material needs and cycles. It generates growth, profits and jobs by identifying a wide range of value added products - while dramatically improving environmental performance and eliminating waste to landfills and emissions to land and water.

Start-up Ideas

✓ Your community vision might include healthy wetlands and riparian vegetation along local streams. Use outcome-based planning to establish the long-term goals for your wetlands and streams in 20 years (e.g. 20% more wetlands, 75% of all streams with healthy native riparian habitat). Then, generate specific environmental targets (e.g. 25% of streams replanted within 5 years, 50% within 10 years, 75% within 15 years) as well as cost saving or job creation goals and targets (e.g. reduce water purification costs by 10%, generate 50 over 5 years local jobs in wetland and riparian restoration). Explore many options and then develop a plan to simultaneously achieve the environmental, cost-savings and job creation goals.

✓ Go to your local transfer station or landfill and identify the types of materials actually being discarded. Ask local farmers about the types of agricultural waste biomass they generate and how they currently dispose of it. Then, gather a team of scientists and technical experts to brainstorm ways to use the waste in new products or processes. Put out an RFP for ideas that can turn the waste into new products. Provide a small grant to underwrite the winning proposal.

Section 3 Exercise

Section 3 Exercise

Go to Appendix B Section 3 to describe the sustainability visions, goals and targets of your agency or community.

Consider how your community can generate new businesses and jobs through sustainable development.

SECTION 4. HOW DO WE GET THERE?

Step One: Determine Your Priorities

Once your goals and targets are clear, you must set priorities. This requires evaluating the range of key economic, social and environmental issues that have been identified in your assessment to determine top priorities. Immediate and secondary priorities will emerge.

✓ **Example 10**
The City of Austin, Texas, uses a Sustainability *"Multi-Attribute Decision Utility Matrix"* to make investment decisions on capital improvements. See Appendix A.

The first step is to establish some criteria for priority setting. For example, this may include an "urgency" factor, a financial "hurdle rate" for investments, the degree of public support, or the degree to which a project or need achieves multiple environmental-socioeconomic objectives. You then establish a method to weigh all possible projects and programs against the criteria. In this way, top priorities will rise to the top.

Step Two: Develop An Implementation Team and Action Plan

Once your priorities have been established, you can develop a complete implementation action plan. The plan should identify the sequence of actions to be taken and establish timetables and lines of responsibility. It should outline how the actions will be integrated with existing policies and programs. It should define the structure and responsibility for managing and implementing the initiative (lead staff, teams, etc.). It should identify the human, technical and fiscal resources to be involved. It should include operational controls and feedback mechanisms. It should also include documentation, data gathering and monitoring processes for continual improvement.

Step Three: Educate, Train and Reward Employees, Businesses and Citizens

One of the primary determinants of success for your agency or community sustainability initiative will be the degree of employee and citizen understanding, buy-in and engagement. Throughout the process a major emphasis should be placed on continually explaining why the agency and community has developed the initiative. People will want to know what you hope to achieve, what the process is, how they can participate, and how it will benefit them.

The initial implementation plan should include continuing education and training opportunities for employees and citizens. It should also provide mechanisms for public recognition and reward and opportunities for employees and citizens to celebrate successes.

Step Four: Involve Elected Officials, Senior Agency Management and Community Leaders in Continual Review and Improvement

Finally, mechanisms should be established to engage local leaders in progress reviews. At this point, senior management should consider needed changes and take steps to continually improve the initiative.

Start-up Ideas

✓ Build on the team you organized in Section 1. Empower it with the resources and authority needed to oversee and guide the sustainability initiative.

✓ Develop an implementation plan to conserve energy and water and reduce waste in the facility you assessed in Section 2. Use the results of your Section 2 analysis for clues on the best strategies for efficiency and savings. Share the implementation plan with employees or citizens and ask for feedback.

✓ Rewrite your procurement, recycling, and maintenance procedures to stress source reduction, reuse and finding value-added used of waste.

Section 4 Exercise

Section 4 Exercise

Go to Appendix B and describe your priorities and implementation plans.

SECTION 5. <u>HOW DO WE MEASURE IT</u>?

<u>Step One</u>: Establish Sustainability Indicators

In order to understand the success or weaknesses of your sustainability initiative, key indicators must be selected. Indicators are quantitative and qualitative data used for measuring trends. Some indicators measure resource use; for example, the amount of energy consumed. Some measure environmental quality; for example, miles of streams with intact riparian buffers. Still other indicators might measure community behavior or program effectiveness; for example, the percent of residents who participate in recycling programs.

Not every resource or issue can be measured. It is therefore important to select indicators that provide a credible *overall* evaluation of progress in achieving your community's vision, goals and targets. The selection of indicators may occur when you complete your Section 2 assessments. If so, it is important to reaffirm their usefulness now. There are many resources available to help guide indicator development.

<u>Step Two</u>: Implement Mechanisms to Gather Data, Monitor Progress and Ensure Continual Improvement

Once the indicators are established, mechanisms should be developed to continually gather, integrate and display the data generated so that trends can be evaluated. This allows you to track performance. Sufficient staff and resources should be dedicated to these tasks. Procedures should be established for ensuring that a data review leads to continual improvement.

Every community should establish a repository where sustainability data can be stored, integrated, analyzed and distributed. Appropriate protocols will ensure that good records are kept documenting actions, costs, cost-savings and returns on investments as well as related resource savings and environmental improvements. Periodic performance assessments should update your "Report Cards" or "State of the Environment Report." These reports should be shared with government and community leaders to stimulate discussion and continual improvement.

▶ Start-up Ideas for Section 5

Start-up Ideas

✓ Use the Sustainable Seattle, the Santa Monica and the Boulder Colorado examples and your Section 2 assessments to help you to formalize indicators for community-wide and local government sustainability.

Section 5 Exercise

Exercises

Go to Appendix B and describe how your community might develop sustainability indicators and monitoring systems.

APPENDIX A

EXAMPLES FROM OTHER US AND INTERNATIONAL LOCAL GOVERNMENTS

Example 1: Local Government Policy Commitment

Eugene, Oregon: The Eugene city council adopted a resolution establishing a definition and a set of sustainability principles. Prior to adoption, the council directed staff to gather information on sustainability, prepared a "background document", and held a series of "work sessions" to gain understanding of sustainability and learn how the concept might fit into existing environmental and economic management. A statement of intent and understanding is a necessary first step for strong integration. The Eugene resolution states that the city is "committed to promoting a sustainable future that meets today's needs without compromising the ability of future generations to meet their needs…."
(See: http://www.ci.eugene.or.us/PDD/Sustain/resolution_no_4618.htm)

Example 2: Local Government Sustainability Goals and Policy Framework

In their ordinance, the city of Eugene, Oregon, identified the following goals:

- Support a stable, diverse and equitable economy
- Protect the quality of the air, water, land and other natural resources
- Conserve native vegetation, fish, wildlife habitat and other ecosystems
- Minimize human impacts on local, regional and worldwide ecosystems

They also identified the following principles to guide policy development:

- The concept of sustainability guides city policy and actions.
- The City will lead by example (e.g. procurement, facility design etc.)
- The quality of the environment and the health of the economy are interdependent.
- Community awareness and education are fundamentally important to successful implementation of sustainability policies and programs.
- Local actions have regional, national and global implications

Example 3.1: Illustration of Input-Output Analysis For Vehicle Fleet-Use

Identifying and mapping the sequence of steps in each agency process is an essential part of input-output analysis. The mapping consists of top-level or coarse scale mapping, and second level, finer scale mapping. The ultimate goal is to identify the types, quantities, make-up and costs associated with each input and output in the process.

Fleet Use: Sample Coarse Scale Map: A coarse scale map for local government vehicle fleet use might consist of the following steps or processes:

Travel and Trip Planning -1-	Operation of vehicles -2-	Maintenance -3-	Risk Management -4-	Parking -5-
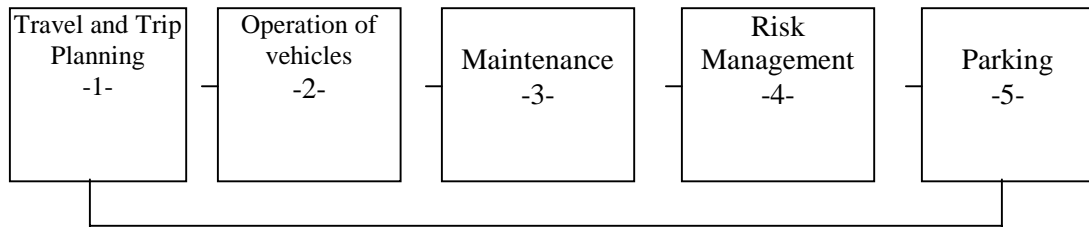
Fleet-Use: Sample Fine Scale Map: The second level, fine scale maps identify more detailed inputs and outputs for each process.

Inputs	Process	Outputs/Impacts
Vehicle Fleet, Bicycles, Scheduling System, Ride Sharing System, Travel Time, Personnel, Computers	Travel and Trip Planning	- Trips - Vehicle Miles Traveled (VMT) - Breakdowns
- Fuel storage systems - Fuels: natural gas, gasoline, electric power. - Tires - Oils and other lubricants	Operation: Fuel Combustion, Wear & Tear	- Emissions: Carbon Monoxide, Nitrogen Oxides, Lead, Particulate Matter, Benzene, Formaldehyde … - Oil and fluid leakage; - Non-point pollution on roads
- Oil and other fluids - Water, detergents, cleaning solvents - Parts - Maintenance equipment - Maintenance facility	Maintenance	- Oil canisters - Oil and fluids - Waste water and detergents - Storm-water runoff - Used parts
Insurance policies Driver Training	Risk Management	Accidents
Land (parking spaces)	Parking	Vehicle safety Non-point source pollution

Costs and Revenues: Once the overall sequence of steps is mapped, the next step is to identify costs and revenues associated with each different input and output. For example:
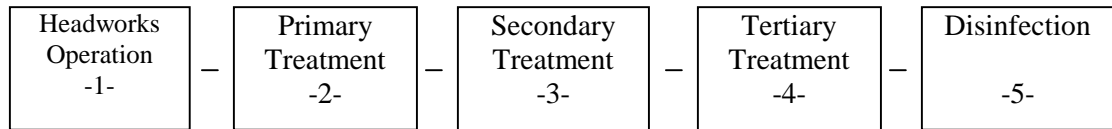
Inputs	Input Costs $		Output wastes	Output Costs (and Revenues) $
Cars, Trucks and alternative transportation vehicles and passes	$ Vehicle purchases, rental costs, fares		Vehicles at end-of-life	$ Recycling and disposal costs or revenues; resale revenues
Breakdown policy	$ Policy cost		Breakdowns	$ Towing costs
Scheduling and sharing systems	System costs			
Trip time	$ Salary, wages			
Fuel storage system	$ System costs		Emissions, leakages	$ Remediation costs
Delivery wastes	(Estimated losses) x (costs)			
Natural gas	$ Gas bill		Emissions, leakage	$ Permitting, Clean-up Costs
Gasoline	$ Gasoline bill		Emissions	$ Permitting, $ Public health costs related to emissions. $ Other environmental costs
Electric power	$ Power bill		Air Emissions, Other	$ Permitting, $ Public health costs related to emissions. $ Other environmental costs
Oils and other fluids	$ Oil costs		Engine quality Oil canisters Oil for recycling Oil leakage during operation Non-point pollution	$ Oil canister recycling or landfill costs. $ Oil recycling treatment costs or revenues. $ Estimated costs of non-point source pollution
Parts	$ Parts costs		Used parts	$ Landfilling and , hazardous wastes costs $ $ Reuse and recycling revenues
Insurance	$ Policy costs		Accidents	$ Premium increases
Training	$ Training costs			$
Parking	$ Rent, meter			$

Prioritization: The final step is to identify priority areas for improvements in economic and resource efficiency for reductions in environmental impacts. These will be associated with both inputs and outputs. Increasing fuel efficiency or shifting to natural gas, for example, would have dramatic impacts on both the costs of fleet purchases and maintenances and on negative impacts related to gasoline emissions. A better trip planning system might also lead to reductions in auto-use through time management and substitutions (e.g. car-sharing, transit and/or bicycling) and less emissions and discharges.
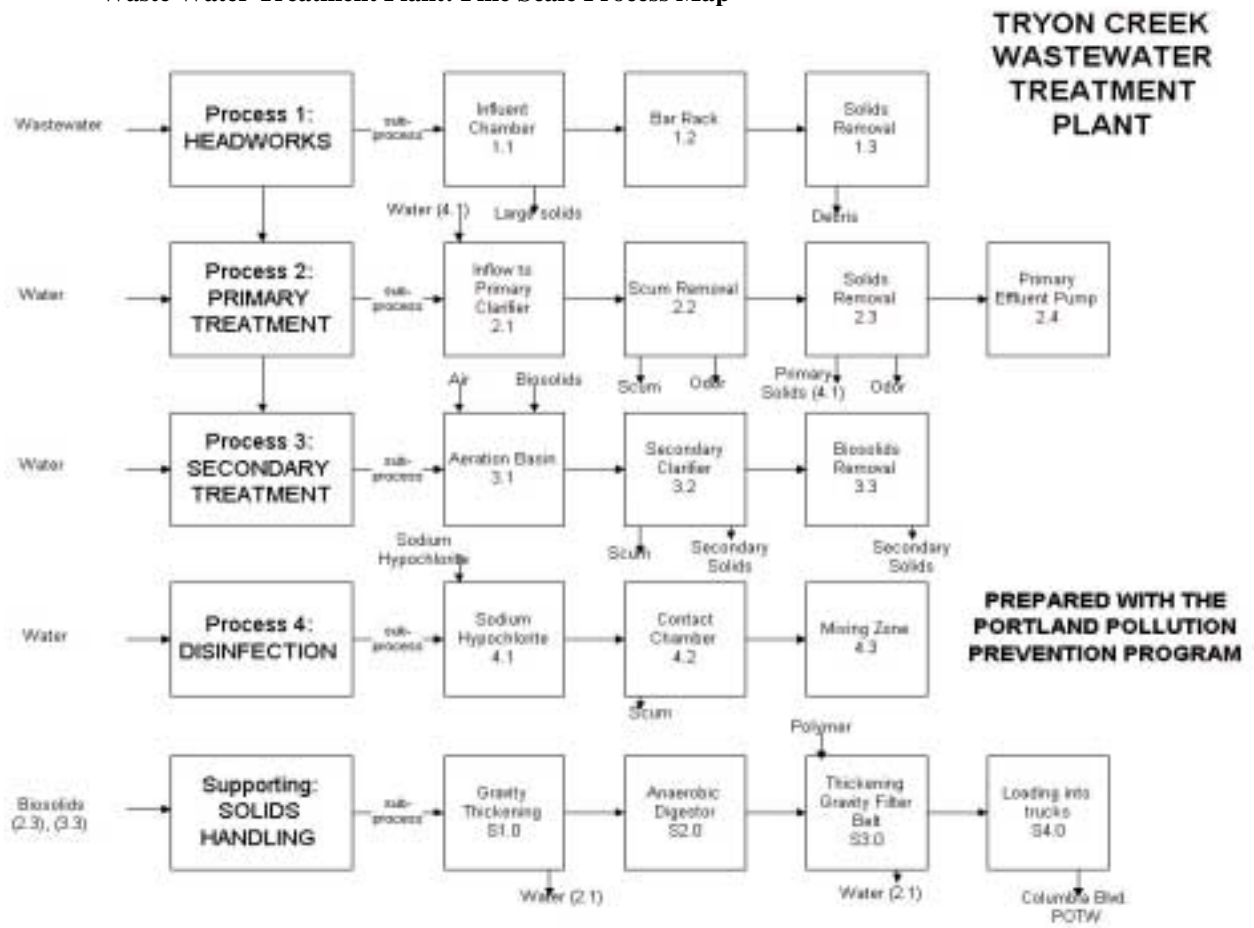
Example 3.2: Input-Output Process Map for Waste Water Treatment[1]

Process mapping and input-output analysis are critical for understanding the complexities of local government operations and opportunities for resource efficiency improvements. Margaret Nover of the City of Portland Pollution Prevention Program has developed a top-level coarse scale map for water treatment at Portland's Tryon Creek facility.[2] A fine- scale map is also shown below.

Waste Water Treatment Plant: Top-Level Coarse Scale Map

| Headworks Operation -1- | – | Primary Treatment -2- | – | Secondary Treatment -3- | – | Tertiary Treatment -4- | – | Disinfection -5- |

Waste Water Treatment Plant: Fine Scale Process Map

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[1] Solid are included is a separate supporting diagram.

[2] Additional top-level maps developed by the Portland, Pollution Prevention Program are available on the CWCH website: http://www.upa.pdx.edu/CWCH/

Example 4: "State of The Environment Reports" or "Sustainability Report Cards"

The city of Lake Macquarie in Australia uses a Divers-Pressures-State-Impacts-Response (DPSIR) indicator framework for its State of the Environment Report. In its report, the city focuses on the state of air, water, land resources and their relationship to changes in population, industry, transportation and governance. See Lake Macquerie's SOER http://www.lakemac.infohunt.nsw.gov.au/environ/soe/soe.htm. Also, see information on how to put together an SOER provided by the UN Grid Program in their *Cookbook for State of the Environment Reporting* at http://www.grida.no/soe/cookbook/cdbook.pdf

Example 5: Principle-Based Assessment

The following table elaborates on principles of sustainability as used by the PSU Center for Watershed and Community Health. They are modified from The Natural Step, ZERI and principles of Industrial Ecology

Principles of Sustainability

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 nature's ability to assimilate human waste and turn them into new resources. Today, many resources and ecosystems in Oregon are below the levels needed to provide these goods and services in perpetuity.
2	*Reduce the use and emission into nature of toxic minerals, metals and fossil fuels and synthetic, persistent toxic materials and substances and enhance the use of renewable energy and non-toxic materials and substances in 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 businesses.*	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 by a factor of ten or more.*	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. ($\rightarrow$ continued on next page …)

5	*Enhance business development, economic competitiveness, job creation, and 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, Oregon must have healthy economies and communities which benefit all Oregonians. Everyone must be included in Oregon's prosperity to ensure social equity and cooperation, which will lead to better support for and involvement in sustainability programs. This principle is perhaps the most important in terms of setting the overall framework for linking environmental, economic and social goals.

Other Examples of Sustainability Principles

COALITION FOR ENVIRONMENTALLY RESPONSIBLE ECONOMIES: THE CERES PRINCIPLES (formerly the Valdez Principles) http://www.ceres.org/

Protection of the Biosphere: We will reduce and make continual progress toward eliminating the release of any substance that may cause environmental damage to the air, water, or the earth or its inhabitants. We will safeguard all habitats affected by our operations and will protect open spaces and wilderness, while preserving biodiversity.

Sustainable Use of Natural Resources: We will make sustainable use of renewable natural resources, such as water, soils and forests. We will conserve non-renewable natural resources through efficient use and careful planning.

Reduction and Disposal of Wastes: We will reduce and where possible eliminate waste through source reduction and recycling. All waste will be handled and disposed of through safe and responsible methods.

Energy Conservation: We will conserve energy and improve the energy efficiency of our internal operations and of the goods and services we sell. We will make every effort to use environmentally safe and sustainable energy sources.

Risk Reduction: We will strive to minimize the environmental, health and safety risks to our employees and the communities in which we operate through safe technologies, facilities and operating procedures, and by being prepared for emergencies.

Safe Products and Services: We will reduce and where possible eliminate the use, manufacture or sale of products and services that cause environmental damage or health or safety hazards. We will inform our customers of the environmental impacts of our products or services and try to correct unsafe use.

Environmental Restoration: We will promptly and responsibly correct conditions we have caused that endanger health, safety or the environment. To the extent feasible, we will redress injuries we have caused to persons or damage we have caused to the environment and will restore the environment.

Informing the Public: We will inform in a timely manner everyone who may be affected by conditions caused by our company that might endanger health, safety or the environment. We will regularly seek advice and counsel through dialogue with persons in communities near our facilities. We will not take any action against employees for reporting dangerous incidents or conditions to management or to appropriate authorities.

Management Commitment: We will implement these Principles and sustain a process that ensures that the Board of Directors and Chief Executive Officer are fully informed about pertinent environmental issues and are fully responsible for environmental policy. In selecting our Board of Directors, we will consider demonstrated environmental commitment as a factor.

Audits and Reports: We will conduct an annual self-evaluation of our progress in implementing these Principles. We will support the timely creation of generally accepted environmental audit procedures. We will annually complete the CERES Report, which will be made available to the public.

THE NATURAL STEP: FOUR SYSTEM CONDITIONS http://www.naturalstep.org/

> 1. *In order for a society to be sustainable, nature's functions and diversity are not systematically subject to increasing concentrations of substances extracted from the earth's crust.*
>
> In a sustainable society, human activities such as the burning of fossil fuels, and the mining of metals and minerals will not occur at a rate that causes them to systematically increase in the ecosphere. There are thresholds beyond which living organisms and ecosystems are adversely affected by increases in substances from the earth's crust. Problems may include an increase in greenhouse gases leading to global warming, contamination of surface and ground water, and metal toxicity which can cause functional disturbances in animals. In practical terms, the first condition requires society to implement comprehensive metal and mineral recycling programs, and decrease economic dependence on fossil fuels.
>
> 2. *In order for a society to be sustainable, nature's functions and diversity are not systematically subject to increasing concentrations of substances produced by society.*
>
> In a sustainable society, humans will avoid generating systematic increases in persistent substances such as DDT, PCBs, and freon. Synthetic organic compounds such as DDT and PCBs can remain in the environment for many years, bioaccumulating in the tissue of organisms, causing profound deleterious effects on

predators in the upper levels of the food chain. Freon, and other ozone depleting compounds, may increase risk of cancer due to added UV radiation in the troposphere. Society needs to find ways to reduce economic dependence on persistent human-made substances.

3. *In order for a society to be sustainable, nature's functions and diversity are not systematically impoverished by physical displacement, over-harvesting or other forms of ecosystem manipulation.*

In a sustainable society, humans will avoid taking more from the biosphere than can be replenished by natural systems. In addition, people will avoid systematically encroaching upon nature by destroying the habitat of other species. Biodiversity, which includes the great variety of animals and plants found in nature, provides the foundation for ecosystem services which are necessary to sustain life on this planet. Society's health and prosperity depends on the enduring capacity of nature to renew itself and rebuild waste into resources.

4. *In a sustainable society resources are used fairly and efficiently in order to meet basic human needs globally.*

Meeting the fourth system condition is a way to avoid violating the first three system conditions for sustainability. Considering the human enterprise as a whole, we need to be efficient with regard to resource use and waste generation in order to be sustainable. If one billion people lack adequate nutrition while another billion have more than they need, there is a lack of fairness with regard to meeting basic human needs. Achieving greater fairness is essential for social stability and the cooperation needed for making large-scale changes within the framework laid out by the first three conditions.

Sample Application of Sustainability Principles

Community Level: The City of Ashland, Oregon, adopted the Valdez Principles (now called Ceres Principles) several years ago as a way for the City Council to keep track of the implementation of an environmental program. Administrative Services Director Dick Wanderscheid updates a list every year. They include:1) Protection of the biosphere; 2) Sustainable use of natural resources; 3) reduction and disposal of waste; 4) wise energy use; 5) Rise reduction; 6) Safe products and services; 7) Damage compensation; 8) Disclosure; 9) environmental director and managers; 10) annual assessment.
For more information contact: Dick@ashland.or.us.

Internal Operational Level: King County in Washington State decided to adopt a principle of reducing toxics and pesticide use. To prioritize which toxics to phase-out, the first thing the county had to understand was the types, quantities and potential hazards of the pesticides. County staff made a list of pesticides used and rated them based on ingredients and warning labels. This screening process was fairly complex,

but illustrates the use of sustainability principles in action. For more information see:
http://www.metrokc.gov/hazwaste/ipm/ipmback2.htm#sec1

Example 6: Goal Setting

Public Agency: The city of Portland, Oregon's Bureau of Environmental Services (BES) has developed an agency strategy for ecological sustainability. In three categories of agency activity (design and planning, operations, business), they crafted "outcome statements". These serve as a vision and are linked to set of goals.

Community: The city of Santa Monica, California adopted a sustainability program in 1994. The program has centered its sustainability effort on reductions in resource use, pollution prevention and community development. The city adopted the following goals:

I. Resource Conservation	Promote the use of conservation technologies and practices and reduce the use of non-renewable resources. Develop local, non-polluting, renewable energy, water and material resources, and expand recycling technology in these areas.
II.Transpor-tation	Maximize the utilization of alternative forms of transportation, including walking, bicycling, public transit, and car-pools/rideshare. Develop innovative traffic policies which reduce negative impacts from vehicles and limit pavement area to the minimum necessary. Implement work schedules which reduce the number of employee commute days. Advocate for the regional development of public transportation systems.
III. Pollution Prevention & Public Health Protection	Protect and enhance environmental health and public health by reducing or eliminating the use of hazardous and toxic materials by residents and businesses, minimizing the levels of pollutants entering the air, soil and water, and lessening the risks which environmental problems pose to human health. Ensure that no one geographic or socioeconomic group in the City is being unfairly impacted by environmental pollution.
IV. Community And Economic Development	Encourage the development of compact, mixed-use, pedestrian-oriented projects designed to maximize affordable housing, encourage walking, bicycling, use of existing and future public transit systems and creation of community gardens. Promote the growth of local businesses which provide employment opportunities to Santa Monica residents, including Santa Monica youth, and have positive environmental and social impacts. Facilitate education programs which enrich the lives of all members of the community.

(see *http://pen.ci.santa-monica.ca.us/environment/policy/adopted2.pdf*)

Example 7: Target Setting

In the Santa Monica case, the City adopted the following targets:

I. Resource Conservation	Reduce energy usage 16% Reduce potable water usage 20% Reduce solid waste volumes at least 50% Achieve 50% average postconsumer recycled and/or tree-free content in all City paper purchases Convert 75% of the City vehicle fleet to reduced-emission fuels Reduce wastewater flows 15% Increase total number of trees on public property by 350
II. Transportation	Increase ridership on Santa Monica Municipal Bus Lines (including shuttles) by 10% Achieve average vehicle ridership of 1.5 for all employers with over 50 employees
III. Pollution Prevention & Public Health Protection	Reduce the total volume of dry weather stormdrain discharges to the ocean 60% Reduce consumption of hazardous materials, including pesticides, 15% Cleanup and close 75% of all known Underground Storage Tank contamination sites
IV. Community And Economic Development	Provide 750 additional affordable housing units Create 3 new community gardens Establish partnership with local schools to create and implement a Sustainable Schools Program Increase total public open space area by 15 acres

Example 8: Innovative Total Resource Productivity Business and Job Opportunities

The 'brewery of the future' is found in Tsumeb, Namibia- which produces beer from sorghum without generating any waste. It acts as a protein factory for fish farming and is producing mushrooms for food and generates energy for the local community. Engineered by Professor George Chan, the Tsumeb brewery uses a closed-loop system cascading waste from one process into a feedstock for another. Spent grain from the brewery (formerly landfilled or used as cattle feed) is used to form the substrate for mushroom cultivation, generating new food sources and jobs. The spent mushroom substrate is fed into a digester which produces methane gas used to generate power and protein rich feed for fish production ponds, again generating revenues and jobs. The fish ponds are stocked with a diversity of native fish that naturally clean and aerate the water, thus allowing it to be reused by the brewery.

For more information contract: zeri@mail.zeri.org. Also see *Upsizing: The Road to Zero Emissions, More Jobs, More Income and No Pollution.* Gunter Pauli, Greenleaf Publishing, 1998.

Example 9: A Sustainability Team Structure

The City of Portland, Bureau of Environmental Services created a sustainability steering committee and several work groups (Building, Energy/Transportation, Solid waste/Recycling workgroup, Stormwater/Habitat, Toxics/Procurement, Water/Wastewater). The combined structure allows for both focus and integration.

Example 10: Prioritization Methodology

Austin Texas: The City of Austin decided to use the CIP Sustainability Matrix to determine priorities. This is a "Multi-Attribute Decision Utility Matrix" because it allows comparison of projects that have multiple and varied attributes. The city evaluates capital improvements and scores different projects in terms of how they impact the following weighted priorities. (See http://www.ci.austin.tx.us/sustainable/matrix.htm)

Public Health/Safety (weight 13) Maintenance (weight 13) Socio-Economic Impact (weight 10) Neighborhood Impact (weight 11) Social Justice (weight 12) Alternative Funding (weight 5)	Coordination with Other Projects (weight 6) Land Use (weight 10) Air (weight 4) Energy (weight 4) Biology (weight 4) Other Environmental (weight 4)

Example 11: Indicators and Monitoring Systems:

Community Level: The non-profit Sustainable Seattle publishes and applies indicators for the Seattle/King County metropolitan area. The project focuses on both social and environmental conditions. The report tracks, among other things, air quality, water quality, and waste generation. Each of the indicators is presented and analyzed under the headings "Description", "Definition", "Interpretation", "Evaluation", and "Linkages".

Indicator	Finding
Vehicle Miles and Fuel Consumption	Fuel consumption per capita and vehicle miles traveled per capita have both increased by 7% over the last 4 years.
Voter Participation	More residents are voting, but participation levels are still fairly low - with only one-fifth of eligible adults voting in the last primary election.
Water Consumption	Aggressive rate structures, strong conservation programs, and efficient system operations have reduced total water consumption 12% in the last five years.
Wild Salmon Runs	Local wild salmon runs have dramatically declined by 50 %-75% since the 1980s but have leveled off at dangerously low levels over the last six years.
Youth Involvement in Community Service	Almost half of Seattle high school students are involved in community service.

City Government: The city of Boulder Colorado collects data on a yearly basis to monitor its leadership on sustainable management. They use the following indicators to provide information to citizens:

Water	1. Total water consumption by City government Energy
Energy	2. Non-renewable energy use in City facilities 3. Percent of energy use that is renewable
Materials	4. Total City government trash 5. Recycled or composted materials as a percent of trash 6. Environmentally preferable products as percent of total purchases
Transportation	7. City employee commute trips 8. Vehicle-miles traveled for work
Ecosystem Health	9. Total Open Space/Mountain Parks lands 10. Quality of habitat

(see: http://www.ci.boulder.co.us/environmentalaffairs/sustainability/sustainability_menu.htm)

Public Agency: In the City of Portland, the Bureau of Environmental Services established a set of 73 action items and identified ways to evaluate progress toward goals. For example, the agency decided that success toward storm-water management goals would be measured by the following indicators:

Annual review of trees and vegetation planted and removed as part of City operations
Acres of BES land converted to native plants
Percent of impervious area converted to pervious area

APPENDIX B: EXERCISES

PLANNING YOUR SUSTAINABILITY INITIATIVE

Appendix B, Section 1:

List Your Community's Authorizing Resolutions or Orders Related to the Development of a Sustainability Program Here:

List Your Community's Sustainability Policy Framework Here:

Appendix B, Section 2:

List the Report Cards or State of the Environment Reports Your Community Has Done Here:

List Your Policies, Programs and Practices That Currently Support Sustainability Here:

List The Gaps, Omissions and Probable Priority Areas for Your Sustainability Program Here:

Appendix B, Section 3:

List the Sustainability Vision, Goals and Targets Your Community Has Developed Here:

List the Cost Savings, New Businesses or Jobs Your Community Has Prioritized or Generated Through Your Sustainable Development Programs Here:

Appendix B, Section 4:

Describe your Sustainability Implementation Priorities, Team Structures and Plans Here.

Appendix B, Section 5:

List the Sustainability Indicators and Monitoring System Your Community Developed Here:

APPENDIX C

GLOSSARY OF SUSTAINABLE DEVELOPMENT TERMS[3]

Agency Sustainability – for the purposes of this template, agencies can be considered sustainable when they adopt management policies, principles and practices that reduce and eliminate environmental impacts to specific, measurable target levels. See the PSU Center for Watershed and Community Health's *Public Agency Handbook at Sustainability for more information.* It can be found on the CWCH website: http://www.upa.pdx.edu/CWCH/

Airshed – the geographic region in which air pollutants tend to aggregate. Generally defined by the characteristics of the source -- either ground-level emissions or elevated plumes from industrial stacks -- and by the surrounding topography and local wind flows.

Backcasting – the technique of identifying desired outcomes first and then backing-up to identify the types and sequences of changes in processes, systems, and management practices required to achieve the desired outcomes. Term used as a comparison to "forecasting" which focuses on incremental steps forward without a stated clear long-term goal. Also called outcome-based planning.

Baseline – information that provides a measurement against which future changes can be compared. Indicators are measured for the baseline year and then again in subsequent years.

Biodiversity – describes all aspects of biological diversity including species richness, ecosystem complexity, and genetic variation. Biodiversity is both a measure of the variety of life and an indicator of the overall health of our planet. Scientists have counted about 1.4 million species to date.

Brundtland Commission – The United Nations World Commission on Environment and Development was named the Brundtland Commission when it was chaired by Prime Minister Gro Harlem Brundtland of Norway. The commission promulgated the commonly used definition of sustainable development in its publication of *Our Common Future* (1982) and in the UN Agenda 21 process (1992).

Business Networks or Clusters – businesses located in close physical proximity to each other for mutual gain. For example, clustering allows one business's waste to be used by another as a raw material, avoiding transportation costs. To be successful, such clusters usually require a diversity of businesses with varying inputs and outputs.

Closed-loop Production (also called Zero Waste or Zero Emissions Systems) – manufacturing systems that fully utilize all energy, water and raw materials in a circular process generating little to no waste or pollution.

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[3] Source for some definitions: Allaby, Michael 1994. *The Concise Oxford dictionary of ecology.* New York: Oxford University Press.

Community Sustainability – communities are sustainable when they use and waste resources consistent with the definition of sustainable development below and when community members' basic needs are met consistently over time. Communities must work cooperatively with other communities to fairly distribute resources and responsibilities to achieve broad-based sustainability.

Continual Improvement – an organizational strategy of constantly tracking and evaluating organizational performance and implementing improvement measures.

Criteria – metrics used to evaluate policy and program development alternatives. For example, cost-minimization and/or toxics-use minimization might be criteria for choosing whether to use PVC piping on community infrastructure.

Detoxify – removing toxic substances and materials from products, processes, buildings and practices.

Downcycling – using materials and energy for lower value uses than their characteristics allow. For example, mulching waste paper for fertilizer may represent a loss in value compared to recycling the material for newsprint.

Ecology – referred to here as: a) the science of the relationships between organisms and their (living and non-living) environments; b) the study of the detrimental effects of modern civilization on the environment, with a view toward prevention or reversal through conservation.

Ecosystem – an ecological community together with its environment, functioning as a unit. A discreet unit consisting of living and non-living parts, interacting to form a stable system. Fundamental concepts include flow of energy via food chains and the yield of nutrients biogeochemically. Ecosystem principles can be applied to all scales. Principles that apply to an ephemeral pond, for example, also apply to a lake, ocean or whole planet. Ecologists study different interrelated ecosystems. For example, a forest ecosystem may be a subset of a larger watershed ecosystem.

Ecosystem Health – when healthy, an ecosystem is able to self-repair after major disturbances such as fires, floods, draught, and major insect infestations. Ecosystems are not static – their characteristics change over time. For example, sometimes there is more old growth species and sometimes less in a forest ecosystem. However, ecosystems can be considered healthy when the characteristic of the system are within normal high and low ranges. Ecologists have been able to identify the "normal ranges of variability" of many ecosystems.

Efficiency – the amount or value of output relative to the amount or value of input needed for the production of goods and services.

Emission – the amount of liquid, gas or solid expelled from a given source per unit of time and space; often refers to pollution.

Feedstocks – raw materials used in production processes.

Ecological Footprint – the full extent of an entity's (household, individual, firm, community, state) impact on local, regional and global ecosystems. Ecological footprints are often reported in terms of land units: the amount of land required to provide humans with food, fiber, and assimilation of carbon gases. The per-capita amount of land required to sustain the average North American is estimated at 12 acres.

Green Buildings (also called sustainable construction) - building and site design techniques that improve the quality and performance of buildings while simultaneously reducing stress on the environment (Portland, Oregon, Green Building Initiative). Generally includes high energy and water efficiency measures, use of non-toxic materials and substances (e.g. glues and paints), use of certified sustainable and reused materials such as wood, localized treatment of stormwater runoff, and other measures.

Habitat - The area or type of environment in which an organism or ecological community normally lives or occurs.

HVAC – abbreviation for heating, ventilation and air conditioning.

Indicators – quantitative and qualitative data used to track and measure trends.

Input-Output Analysis – The analysis of the nature (type, amount, costs) of materials and substances used in, and the nature of materials and substances discharged or emitted at the end of, production or operational processes. Inputs might include raw materials, energy and water. Outputs might include waste materials, final products, and pollution (which is a molecular form of waste). Process analysis can reveal opportunities for reductions in costs and environmental impact.

Natural Capital – natural resources and ecological systems that provide life support services. Despite their importance, many such services have no current market value.

Performance-based Systems – (also called outcome-based systems) an alternative to what is known as "command and control" management or regulation. Performance-based systems prescribe specific outcomes and allow the managed or regulated community to devise the implementation strategy to achieve the outcomes. Performance-based zoning, for example, would prescribe outcomes like appropriate noise, pollution, or traffic levels in zones rather than designating the zones "commercial" or "industrial". A performance-based agency management strategy would specify certain outcomes, like reducing energy use by 10%, and allow agency staff to figure out how to achieve them.

Pollution – a by-product of human activity that enters or becomes concentrated in the environment where it may cause injuries to humans, ecosystems or species. In addition to the chemical substances, the term also embraces noise, vibration, and alterations to ambient temperatures. Air emissions and water discharge pollution are molecular forms of waste.

Principles – a fixed or predetermined policy or mode of action to guide action.

Principles of Subsidiarity – the idea that governmental functions should be allocated to the lowest level of government possible - the level that is closest to the problem or issue, or to the level that can most effectively resolve the issue or problem. This idea is similar to federalism.

Procurement – obtaining goods and services required to fulfill the functions of firms or government.

Recycling – to break down a product into its original material components and reprocesses into new materials. Recycled glass bottles are typically crushed, melted and re-fabricated.

Reduce -- to cut out unneeded inputs (of energy, raw materials etc).

Remanufacturing -- to refurbish a product and use it again for the same purpose.

Reuse – to use a material or product again in the same form. Reused bottles are simply washed and refilled.

Riparian – the area of vegetation and habitat that is the interface between an aquatic and terrestrial (land based) ecosystem. Of, on, or relating to the banks of a natural course of water. Intact riparian areas are crucial for water quality, fish habitat, habitat for terrestrial and avian species, the prevention of soil runoff and other functions.

Social well-being – a state of wellness that occurs in society when basic human needs are met. These needs include access to resources (high quality water, food, shelter); health-care, education, self-determination, and vibrant social networks. Sustainable development strategies tend to prioritize social well-being over more abstract notions of economic growth. When economic policy narrowly supports growth, it is possible for social well-being to decline. (See http://www.cyberus.ca/choose.sustain/Question/GPI.html)

State of the Environment Report (SOER) – a report that assesses the conditions of environmental resources and ecosystems, on which a community or state is dependent. The SOER can also report on the community's impact on those resources and ecosystems and evaluates policies that mediate that impact.

Sustainable Development (also called sustainability, resource efficiency, resource productivity) – The concept was introduced in the late 1970s and was emphasized strongly in the World Conservation Strategy published in 1980 by the IUCN (the World Conservation Union) in collaboration with the UN Environment Program and the WWF. *Our common future* (the Bundtland commission) defined it as 'development that seeks to meet the needs of the present without compromising the ability to meet those of the future'. Elsewhere the commission defined sustainable development as 'using, developing, and protecting resources at a rate and in a manner that enables people to meet their current needs and also provides

that future generations meet their own needs'. In practical terms it means applying policies, programs and practices aimed at achieving zero habitat impacts, zero emissions and zero waste.

Target – a specific objective to be achieved at a determined time (e.g. to decrease solid waste by 10% in 3 years).

The Natural Step – a primarily business-centered organization with an approach to sustainability focusing on four "system principles" (see http://www.naturalstep.org/)

Total Resource Productivity (TRP) – obtaining the full value when using materials; when achieving zero waste there is total resource productivity; when any kind of waste occurs, it is used to create value in other businesses.

Toxic – of, relating to, or caused by a toxin or other poison; capable of causing injury or death, especially by chemical means; poisonous.

Upcycle – using resources or wastes in a way that increases their value. For example, turning spent grain into substrate for mushroom production rather than using it for animal feed adds value - upcycles - the waste material.

Value-added – the value that is gained when transforming a product or resource in some way. The market value-added of a loaf of bread is equal to its market value minus the combined market value of flour, yeast and water.

Watershed - a ridge of high land dividing two areas that are drained by different river systems; a land region draining into a river, river system, stream, or other body of water. A watershed is actually an ecosystem composed of many types of habitats (forests, grassland, aquatic) that are connected by (drained by) flowing water.

ZERI – the Zero Emissions Research Initiative. An international organization founded by the United Nations University in Japan focused on creating zero waste and emissions economic development projects. ZERI based projects are underway in Asia, Africa, Eastern Europe and elsewhere. The PSU Center for Watershed and Community Health is initiating ZERI based projects in Oregon (see http://www.zeri.org/)

APPENDIX D

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APPENDIX E: SELECT REFERENCES

Three excellent references on local sustainability programs are:

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Pauli, Gunter. *Upsizing: The Road to Zero Emissions, More Jobs, More Income and No Pollution.* Greenleaf Publishing, 1998.

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