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# TNS SEMINAR SMALL GROUP SUMMARIES

On April 11, the second night of the Natural Step seminar in Decorah, IA. we broke into small work groups to practice applying the principles of The Natural Step to several areas:

- TRANSPORTATION
- GREEN INVESTING
- OAK TREES/TIMBER MANAGEMENT
- WATER QUALITY
- *VALUE-ADDED AGRICULTURE
- *RENEWABLE ENERGY
- *HOUSING DEVELOPMENT
- *EDUCATION--GENERAL
- *EDUCATION—ADOLESCENT INTEREST IN AND COMMITMENT TO SUSTAINABILITY

Each group explored their topic in three ways. First they examined how present behaviors with respect to their topic did or did not violate system conditions 1-4. Then they "sketched" the "view from the mountain top" or visioned what things would look like if the 4 system conditions were satisfied in their area of concern. For example, what would the ideal transportation system look like? How could we satisfy our energy needs more sustainably or develop more of a commitment to sustainable living in high school age people?

Lastly, each group did some "backcasting" or worked backwards to determine a sequence of steps which would bring us closer to the ideal, sustainable reality. The discussions were lively and energized and focused. Attached are summaries of notes that were given back to me. Although I considered this as only a process exercise, some of you felt it was the beginning of a project. So here are the notes!

## THE NATURAL STEP SEMINAR
### WATER QUALITY

Concerns:
1) Loss of buffer strips and sedimentation of streams
2) Fertilizer/herbicide/pesticide contamination of streams from animal wastes and agricultural/lawn runoff
3) Well contamination from similar sources
4) Loss of wetlands as a filtering system and for wildlife habitat
5) Acid rain

View from the Mountain Top:
1) Safe drinking water
2) Greater species diversity in streams and wetlands
3) Fish and shellfish are safe to eat
4) Rivers and other water bodies are safe for swimming and tubing
5) Fishing, swimming, boating, abundance of nature, etc., brings in low-impact ecotourism to help boost local economy
6) Stable wetlands reduce flooding problems, filter pollutants

Climbing the Mountain
1) Educate the community [wouldn't it be possible to have the local newspaper print the results of each testing of the local water supply and help the readers to interpret what the figures mean?]
2) Encourage farmers to participate in the Riparian CRP to promote the establishment and maintenance of buffer strips along streams
3) Promote crop rotation to reduce need for fertilizers
4) Promote smaller, organic, livestock farming
5) Promote improved animal waste management
6) Encourage the Legislature to provide more adequate funding for REAP; and seek government incentives (cost-sharing, etc.) to make it easier for farmers to function in the more eco-friendly ways we are recommending
7) Promote less-manicured, more eco-friendly lawns and gardens that would require little, if any, fertilizers, herbicides, or pesticides; and plant native species that can establish and maintain themselves with a minimum of chemical assistance

## THE PRESENT EDUCATIONAL SYSTEM FOR ADOLESCENTS

(How does it fail to encourage young adults to live sustainably, according to their own ideas?)

*Violations of 4 systems conditions*

#1

- media propaganda promotes consumption
- lack of heroes who do otherwise
- young people have premature financial burdens (own car, have a job of a certain kind)
- they don't feel they can satisfy their need for social contact without consuming fossil fuels
- peers have become their mentors

#2

- schools/adults important in their lives do not model sustainable choices with regard to man-made substances

#3

- students are removed from diverse environments—few are fortunate enough to have personal experience with them
- architects for buildings where adolescents spend a lot of their time do not place enough value on imitating and working with natural systems as they create living and working spaces as well as make plans for adjacent open space (no matter how small).
- adjacent spaces are often barren wastelands of mowed grass

#4

- adolescents have lack of perspective about relative resource consumption. (Local schools are monocultures.)

*Going to the Mountain (Visioning)*

- No corporate sponsorship of curriculum materials, school equipment, programs or information transfer (i.e. channel one), unless the corporation is working towards satisfying the 4 Natural Step system conditions for sustainability.....
- adequate funding in schools
- alternative to public schools so that those of us who can't wait for them to "come around" can get to work
- Students are made to feel an important part of the community—are integrated in more apprenticeship kinds of situations, which are considered legitimate learning formats, so that they can start to establish greater diversity of mentors in their lives.
- Students go to other places—more diverse locales—and get credit for the experience
- Schools with more eco-design features and retrofits (or long range plans to implement these) get more state funding
- Code of Iowa requires TNS training for all pre-service teachers so that it becomes possible for students to also get this training. Include TNS knowledge in the benchmarks.

*Backcasting/Action Steps*

- Amend school mission statement to include sustainability literacy or principles
- Adopt the contest idea (A "TNS All State")
- Invite students over a certain age to serve on local boards or government committees
- Include in the district budget some $ for the above-mentioned excursions
- Arrange for TNS training for Iowa Dept. of Education officials
- Expand the concept of "legitimate learning experience" to include hands on TNS implementation projects
- give grades for "bettering your personal sustainability index"

## VALUE-ADDED AGRICULTURE

*VIOLATIONS*

1.) Dependence on materials extracted from the earth's crust:
   *Sending raw materials overseas or long distance to process them
   *Not making what we need locally (apples, processed meats, soy products, hemp)

2.) Decreasing compounds manufactured by society:
   *excess transportation = toxins
   *value-added organics are an untapped business—organics can reduce toxins

3.) Increasing physical productivity and Biodiversity of nature:
   *losing processing capacity reduces profits
   *concentration on soybeans and corn is limiting

4.) Efficiency and fairness in use of resources:
   *farmers going out of business for lack of focus on above 3 areas

*GOING TO THE MOUNTAIN (VISIONING)*

- Diversity of crops
- more and smaller producers (5 acres +)
- focus on niche markets for things like specialty jams, canned products)
- cooperative processing facilities
- locally processed foods, textiles, wood, etc.
- regional self reliance—feed ourselves
- increased awareness bioregionalism
- cleaner water as a result of bioregionalism
- innovative uses of local agricultural knowledge and resources
- expanded markets
- use of biofuels
- collaboration among businesses according to this vision
- action toward feeding the world efficiently

*Backcasting/Action steps*

- transport finished products
- Start up research and Development Centers for other crops to grow, methods of producing, efficient mode of transport
- Revolving loans/grants to help start value-added biz
- Encourage cooperative processing/marketing centers/small kitchens
- Education for retraining farmers & others is available and accessible

# TNS Group Problem: Over cutting of timber

Jean Young, Chris Frantsvog, Jeroen Jocquin 4/11/00

Which Conditions Does This Practice Violate?

I. *Substances from the Earth's crust must not systematically increase in nature. This means that fossil fuels, metals and other minerals must not be extracted at a faster rate than their slow redeposit into the earth's crust.*

**Violation: Heavy petroleum use in logging.**

II. *Substances produced by society must not systematically increase in nature. This means that substances must not be produced faster than they can be broken down and reintegrated into the cycles of nature.*

**Violation: We did not note anything for this condition.**

III. *The physical basis for the productivity and diversity of nature must not be systematically deteriorated. This means the productive surfaces of nature must not be diminished in quality or quantity, and we must not harvest more from nature than can be re-created or renewed.*

**Violations: Oaks and Hardwoods are being harvested much faster than they are being grown.**
**Wildlife habitat is being destroyed.**
**Soil is being eroded.**

IV. *There must be just and efficient use of resources with respect to meeting human needs. This means that basic human needs must be met with the most resource efficient methods possible, including equitable resource distribution.*

**Violation: Large percentage of hardwoods that are harvested go to making single-use pallets.**

The View from the Mountain Top

**In our Ideal Scenario:**

- All pallets would be re-used or rebuilt
- There would be a variety of locally-produced, value-added wood products made from "scrap" wood
- A better price would be paid to producers of timber (there wasn't a consensus on this)
- All timber would be sustainably harvested
- No sacred oaks would be cut down (note on this: two of our three members had a special connection to a sacred tree that is being jeopardized by commercial logging practices).

Roadmap Back to Here

**Things we thought of to do:**

- Produce an inventory of local consumers and accumulators of pallets to facilitate sharing and re-use
- Put on a festival ("Woodstock") to celebrate the work of local craftspeople and highlight creative and sustainable uses of wood
- Do research into better methods of making pallets so that wood pallets are not so easily broken

## EDUCATION -- GENERAL

***Violations***

- Products in everyday life are not sustainable
- People are unaware that our immediate lives are not affected by this
- Consumption is the "mass media education"
- We are unaware of our current condition of violations
- Needs vs wants (are they sustainable?.....now needs are driven by advertising)
- consumers lack consciousness necessary to move industry
- kids consume based on_____(what they're sold by advertising, their peers, parents?)

***Going to the Mountain (Visioning)***

- Language is different—"sustainable" is the second-most common word
- People (from childhood) are raised with the knowledge of which questions to ask, and to ask them loudly
- What is a well-lived life? Not things but connectedness (the basic needs)
- All products are labeled with their level of sustainability
- There are no nursing homes
- Communities are integrated—all ages interact in varied ways and environments
- Lots of community gardens, hoop greenhouses, fresh food year-round
- No Super Wal Mart
- Centers for: community sustainability education, gathering places, museums
- "reclaimers" are revered in the culture
- sustainable behavior is revered / celebrated / rewarded

***Backcasting/Action Steps***

- Reaching farmers
  --Northeast Iowa organics
  --value-added agriculture
- Local speakers
  --groups such as scouts, Rotary, etc. introduce sustainability projects
- Contests
  --promote sustainable changes
- Public Health
- Key Leaders on board
  --business --church --government --educators

# THE NATURAL STEP

## HOUSING DEVELOPMENT

| The Way it is | The Idea! | Methods to Accomplish Goals |
|---|---|---|
| 1. Materials | Use Recycled or Renewable source materials | |
| 2. Too many hazardous materials | No toxic stuff | |
| 3. Location<br>Haphazard. No plan | Planning<br>Houses built in appropriate location | Develop Process to define appropriate location<br>What is one person's ideas of appropriate is not necessarily another's |
| 4. Utilities, Services. Efficiency<br>Longevity<br>Efficient Use of Space and Resources<br>Waste<br>Humane Housing | Self-Sustainable or Better.<br>Really Good Construction. Long Lived<br>De-Construct Easier<br>Affordable<br>Accessible<br>Aesthetically Pleasing | |

## Ideas for Applying the Natural Step Process to Energy

Where it is at:

Coal is being burned, excessively

The distribution system of power lines is damaging to the habitat and view

There is a lack of incentive to conserve

An electric deregulation bill in Iowa threatens to make things worse

Ideal:

Less polution and less damage with distribution

Sustainable/renewable energy sources

Idependence of centralized utilities

Consciousness of energy and conservation

Program to implement:

Financial incentives from the government

Education to help people realize the damages caused by the existing system

Iowa as a political enity needs to organize its resources to promote renewable energy as an economic industry. The state technical/research schools could develop wind and biomass production, becoming a world leader. This could serve many purposes by creating jobs in research, manufacturing and energy production. The other major benefit would be using our natural renewable resources for energy production, keeping our energy dollars in the state.

# Great Ideas from the Transportation Group

## *As it is in Decorah area now:*

- Limited Mass trasportation
- Fossil Fuel use
- Stop lights
- too many SUV's
- no links to outlying areas
- trips not planned carefully. Too many 1 person, 1 vehicle trips
- Lack of communication for ridesharing
- tailpipe emissions
- land use patterns exacerbate transportation problems
- no bike lanes means biking is unsafe
- no education, no incentives
- gas too cheap
- no curfew (joyride all night)
- stock car races
- afterlife of cars
- noise pollution
- Inefficient distribution of goods

## *View from the Mountaintop:*

- Eliminate fossil fuel use
- Fewer stop lights
- Horse drawn trolley on Water street
- Trees in North Alley
- Free Bikes available for borrowing downtown
- Allow all citizens to ride school buses
- Buses at high traffic times of day - early am, 3pm, and 5pm
- Bike lanes
- Hometown pedicab for deliveries or people
- Public trasportation
- Conversion to alternative fuels
- Grade requirements for students driving to high school
- Recharging station for electric vehicles

- Harvest energy from exercise machines at RC 10
- Youth culture honors cycling
- Good, well maintained bike access
- Bike parking lots, priority parking spaces for eco-friendly vehicles
- Ride sharing communication
- Bike-car interaction Safety
- Local car rental
- Skiing trails

## *Possible projects to start with:*

1) Integrate school bus w/ public transportation needs
2) Make-a-Habit: Get a dollar for everyday you ride in May (Decorah Bicycles)
3) Vike Bikes System:
   - Free bikes for use downtown.
   - Each sponsored by a local business.
   - Child seats on bikes.
   - Biker - Driver safety awareness.
   - Involve high school students.

4) Car pooling
   - Communication through bulletin board, internet, phone hotline and/or radio call-in program.
   - This could serve people coming to Decorah from Northeast and other areas, Along Highway 52, to LaCrosse, Twin Cities, and to other areas.

5) Electric Driver's Education Car at the H.S.
6) Horse Drawn trolley running on Water St.
7) Locally and cooperatively owned car rental service

CHAPTER 9

# A Compass for Environmental Management Systems

by Susan Burns[1]

*I wish I had known about The Natural Step earlier.*
*We were introduced to The Natural Step after we had already built our environmental management system. The Natural Step helps the nuts and bolts of the environmental management system make more sense.*
*I believe the The Natural Step framework can help build a stronger and better overall system.*
Larry Chalfan — *former President and CEO*
*Oki Semiconductor Manufacturing*

THE NATURAL STEP FRAMEWORK is a strategic planning tool with implications for an organization at every level. The framework provides a clear vision and a scientifically rigorous definition of what it means to be environmentally sustainable. It acts as a compass that helps to determine if a company is in fact moving in the direction of sustainability. However, because the framework does not prescribe what specific steps to follow, a company will gain the most benefit by integrating it with an environmental management system. For many sustainability goals, a formal environmental management system is an effective vehicle for implementation.

An environmental management system is primarily a vehicle designed to help a company achieve and demonstrate improved environmental performance. It provides a set of procedures for implementing and monitoring environmentally relevant business practices. Used in conjunction with The Natural Step framework, it provides a clear vision of where the business is headed and a practical methodology for getting there. This chapter describes how and why The Natural Step framework enhances environmental management systems and explores the approaches various companies are taking when they combine a traditional environmental management system with Natural Step-style systems thinking.

## Environmental Management Systems Today

Formal environmental management systems are gaining popularity around the world. With the globalization of the economy, many companies are upgrading their environmental management systems to conform to international standards, such as the Eco-Management and Audit Scheme (EMAS) in Europe or the ISO 14001 Environmental System Standard created by the International Standards Organization.

The ISO 14001 standard was published in the fall of 1996 and is part of the ISO 14000 series of environmental standards. The technical committee that drafted ISO 14001 (TC 207) included representatives from most of the industrialized countries in the world. More than 5,000 sites worldwide have been certified to the standard by independent ISO 14001 registrars, and many more are creating "ISO-conforming" environmental management systems without seeking certification.

A formal environmental management system can yield many benefits, including increased environmental compliance, reduced costs and liabilities, reduced impact on the environment, and competitive advantage. In addition, business customers are increasingly requiring that suppliers become certified according to one of the internationally recognized standards, or at the very least, institute a credible environmental management system.

Karl-Henrik Robèrt compares an environmental management system to a powerful sailboat. The boat comes with a detailed instruction manual describing where the stern and bow are, how to operate the sails, etc. Robèrt adds, however, that building an environmental management system without a strategic planning tool (like The Natural Step framework) is like having no compass or map to guide the boat. The metaphor can be taken further: a typical environmental management system may certainly support a company in sailing along the familiar coastline of regulatory compliance and incremental improvement based on present conditions extrapolated into a predictable future, but it may be of little use in the stormy waters of the global economy and increasing, changing, and uncertain ecological pressures.[2]

With The Natural Step framework providing a compass to steer a company in the direction of ecological sustainability, a company's environmental management system can move beyond goals like compliance and incremental improvement to support goals such as market leadership and improved competitiveness. The environmental management system can provide the steps that lead to new opportunities and reduced costs that strengthen the bottom line as well as create a sustainable, or even restorative, economy.[3] According to Bertil Rosquist, Environmental Manager at McDonald's of Sweden: "ISO doesn't tell



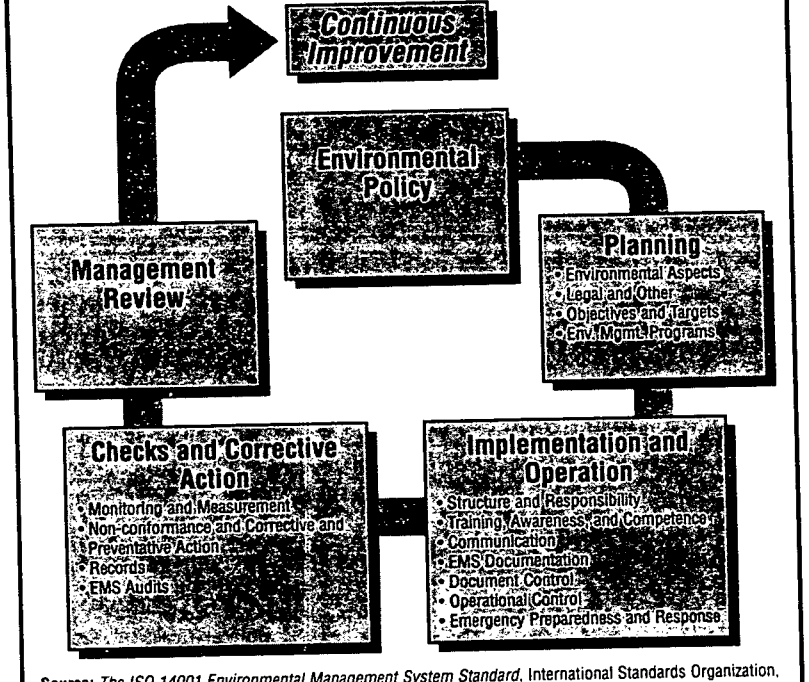


you anything about goals. You can be quite a polluting company and still get certified if your management system meets the standards."

The ISO 14001 standard is a template, but a company need not be seeking ISO certification to apply the guidelines outlined in this chapter. Application of an environmental management system varies enormously across different countries' legal systems and across different accreditation/certification frameworks, but the fundamentals are essentially the same.

The management system outlined in ISO 14001 is cyclic. The cycle begins with setting an environmental policy. Next, a company plans how it will carry out that policy, and then the plans are implemented. Progress toward goals is continually checked and, when necessary, corrective action is taken. Periodically, the organization's top management reviews the efficacy of the programs and the continued relevance of the original policy and plan. At the end of each cycle, policy and programs are reviewed and revised as necessary, and a new cycle begins.[4] Each of the components of a formal ISO 14001 management system are outlined in Figures 9.1 and 9.2.

**ISO 14001 Summary** — **Figure 9.1**




**Source:** *The ISO 14001 Environmental Management System Standard*, International Standards Organization, 1996.

Figure 9.2

## The ISO 14001 Environmental Management System

***Environmental policy.*** Each iteration of an ISO 14001 cycle begins with top management setting or amending the environmental policy. At a minimum, a company's policy must express a commitment to compliance with environmental legislation and some form of continual improvement and prevention of pollution.

***Planning.*** To facilitate ongoing evaluation of progress, a company must have procedures to identify environmental aspects and legal requirements and to determine which aspects have significant environmental impacts associated with them. Focusing on activities with significant environmental impacts, a company then sets objectives and measurable targets for improvement and designs programs to achieve those objectives and targets. The word "measurable" is important. For a company to be able to gauge progress, goals and targets must be measurable.

***Implementation and operation.*** Once programs are designed, a company outlines a management structure and assigns roles and responsibilities to carry out the programs. Training needs are identified and employees are trained to ensure that they have the necessary awareness and competence to carry out their responsibilities. Procedures are established and maintained for communication regarding significant environmental impacts to relevant employees and to community members and interested stakeholders. The major components of the EMS must be documented and procedures must be established for controlling documents to ensure that they are up-to-date and can be located. Operational controls must be established and carried out for all activities that are associated with significant environmental impacts. In addition, the organization must establish and maintain procedures to mitigate environmental impacts associated with accidents and emergency situations.

***Checks and corrective action.*** The organization must have documented procedures to monitor and measure activities that can have significant effects on the environment. They must also have procedures for handling and investigating nonconformance, taking action to mitigate effects caused as well as corrective and preventive action. Procedures must also be established and maintained to keep environmental records that demonstrate conformance with the requirements of the standard. Periodic audits are conducted to determine if the EMS conforms to the standard and has been properly implemented and maintained. The results of the audits must be provided to management.

***Management review.*** At the end of each cycle, top management must evaluate the effectiveness and suitability of the EMS. Changes are made to improve the management system for the next round, and it starts again through the cycle.

**Source:** Adapted from Kranz & Burns, 1997.





There are many ways that The Natural Step framework can enhance an environmental management system. Jimmy Sjoblom, Environmental Manager of Sånga-Säby Hotel and Conference Center, notes: "By using the System Conditions, our ISO program is something we can use on the offence, rather than just guarding our back. The System Conditions tell us how far we can go, how far we can set our anchor. We are way beyond incremental improvements or defensive strategies. Defensive activities are not a constructive use of our resources." Bertil Rosquist of McDonalds of Sweden adds: "Since our whole environmental program is based on the System Conditions, incorporating The Natural Step into our ISO system will be no problem. In fact, ISO will solidify our goals even further."

Oki Semiconductor analyzed this ISO/TNS integration and identified at least 15 areas where the framework has added value to the process. In the ISO 14001 summary provided in Figure 9.1, the only areas where The Natural Step framework did not add value was in communication, environmental management system documentation, and document control under "Implementation and Operation." In every other area on the chart, The Natural Step framework improved the ISO process for Oki Semiconductor. Figure 9.3 is a summary of Oki Semiconductor's suggestions on how to integrate the two tools.

**Integrating The Natural Step and ISO 14001** Figure 9.3

1. Include Sustainability and TNS conditions in the company's environmental policy
2. Train all employees in the four system conditions, and include TNS in the induction process
3. Include TNS principles in the rating and ranking of environmental aspects
   - to help determine the significance of impacts on the environment
   - to help ensure objectives chosen are in accordance with sustainability
   - to help ensure resources expended will be balanced toward sustainability

   Use specific criteria from TNS for evaluation and ranking (in database)
4. Include TNS analyses in new materials, products, processes, and activities decisions
   - ensure new product/process system meeting agendas include TNS analyses
   - use ranking analysis sheets for thoroughness
5. Include confirmation of effective use of TNS analyses during internal audits
   - records confirming use must be defined and retained as objective evidence
6. Include a TNS activities review for effectiveness in Management Reviews
   - review the records as objective evidence, look for evidence of effectiveness

**Source:** Larry Chalfan, OKI Semiconductor.

## Back-casting: How Strategic Planning for Sustainability Informs an Environmental Management System

Back-casting provides one of the most powerful tools for the strategic implementation of an environmental management system. Fundamental to The Natural Step framework as discussed in Chapter 2, back-casting is a method of strategic planning that aligns a company's long-term vision with the principles of sustainability. When back-casting, a company first analyzes its current situation in light of the funnel and the four System Conditions. It examines its current operations, products, and services to determine where it is most out of alignment with the principles of sustainability. For example, for System Condition One, it asks whether the company is dependent on materials from the Earth's crust that accumulate in nature. If so, are those materials used in a dissipative fashion? If so, is the company willing and able to phase out its dependence on this type of activity? This is done for each of the four System Conditions.

Next, the company envisions an ideal future in which it operates in accordance with the principles of sustainable society. This includes imagining how the marketplace of the future will view its products and services, and how its core competencies can be best positioned to service that market. This can be a tremendous source of creativity and innovation.

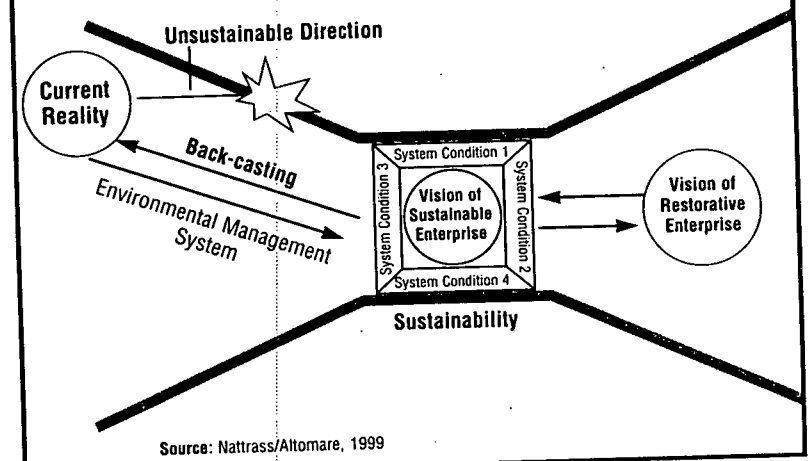
Finally, the company designs an action plan that will move it from its current reality to its long-term vision. It takes advantage of "low-hanging fruit", making sure that each short-term action serves as a platform for longer-term goals. This long-term strategic planning provides the direction for the environmental management system, which will then embed the strategic decisions made during back-casting.

The sustainability strategy embraced by Electrolux, the largest appliance manufacturer in the world, is an excellent example of this approach. In 1992, Electrolux formulated its vision and policy to guide its actions toward sustainability using The Natural Step framework. Electrolux states: "The vision presents images of our goals, the ideal situation that we constantly strive towards in our efforts to be a good neighbor in the global community. The basis of that is a thorough understanding of nature's limits and the sobering recognition of how our actions impact upon the environment. Our policy encompasses a holistic view of a product's entire lifecycle, from raw material handling and manufacturing to utilization to recycling." In Electrolux's view, an environmental management system offers a structure for its environmental work, a pathway to realizing its vision and policy. In 1995, Electrolux determined that all of its 150 production facilities worldwide would be ISO 14001 certified before the year 2000. The Electrolux 1997 environmental report credits collaboration with The Natural Step for inspiring their "holistic approach to environmental management."





**The Natural Step, Back-casting, and Environmental Management Systems** — Figure 9.4




Source: Nattrass/Altomare, 1999

This type of long-term strategic planning makes for a stronger environmental management system, especially when contrasted with the traditional forecasting approach of many companies. During forecasting, a company reviews its current impacts and sets targets that incrementally reduce its impacts year after year. This can lead to incremental improvements in environmental performance, but doesn't provide the type of leaps that are possible with seeing the whole picture. Companies that have a holistic picture and a strong vision of the future align multiple resources and departments toward this unified vision. If they don't have a holistic approach, a company's efforts could potentially move them along a number of different paths, without adding up to a coherent direction with significant improvements.

## Advantages of Using The Natural Step Framework to Enhance an Environmental Management System

An environmental management system combined with a comprehensive sustainability vision supports a company's strategic goals and drives strategic decisions throughout the entire organization in a systematic way. Such an environmental management system will result in targets and objectives that take into account a global perspective and are keyed into the business's core strategy.

With ISO 14001 implementation, some companies stop at the plant boundary, assuming that certain issues are beyond the direct control of the facility

being certified. The Natural Step framework can help expand and connect the environmental management system with other aspects of the business, and helps it to encompass as many domains of sustainability as possible. For example, a shared framework can help managers in product design, marketing, and manufacturing, to implement improvements more effectively throughout the entire product lifecycle.

The creation of an environmental management system, especially if one seeks certification, necessitates a serious commitment of company resources, particularly labor hours, to create the policies, procedures, and programs required, and to train employees in how to use the system. Especially if a company's current environmental management system is doing an adequate job of keeping the company in compliance, the investment in an enhanced system must be justified by significant new benefits to the company, and these ultimately must translate into increased profitability and enhanced competitive advantage. The Natural Step framework can help the environmental management system provide additional added value to the company.

Unfortunately, although our environmental problems are due to systemic errors in our relationship with nature, our regulatory system reacts to the downstream effects of these errors rather than addressing root causes. This keeps industry reacting to constantly changing environmental regulations rather than helping it get ahead of the game. A good example is the case of ozone-depleting chemicals. When chlorofluorocarbons (CFCs) were initially restricted by law, companies re-engineered their products and factories to accommodate hydrochlorofluorcarbons (HCFCs) instead; however, they are problematic as well. While they are less ozone-depleting than CFCs, they are persistent compounds, are greenhouse gases, and are toxic. HCFCs will eventually be phased out, necessitating companies to change course again. There is no doubt that benign substitutes can sometimes be difficult to find. Nevertheless, there are many opportunities for companies to avoid these costly course corrections by thinking systematically about long-term sustainability.

Some companies may encounter internal resistance to creating a formal environmental management system, especially if a company's experience with ISO 9000 certification (the international standard for quality management systems) was a negative one. A common sentiment among management and employees is, "Oh, no, not another program." Yet it is vitally important to have the majority of employees and senior management on board in order to build an effective system. Integrating the environmental management system with The Natural Step framework helps create this important buy-in because people can see how it supports the company's larger vision for the future as well as real business objectives. The Natural Step framework also provides coherence and meaning





for employees by helping them understand the relationship between the system and their own personal values, leading to better participation.

## How to Create an Environmental Management System with The Natural Step Compass

In a typical environmental management implementation, a company first sets its environmental policy, and then forms a cross-functional team made up of individuals from all areas of the facility. The team then completes a comprehensive review of the facility's environmental "aspects," or those activities that have the potential to interact with the environment.[5] It decides which of these aspects are significant, using a framework for decision-making of its own choosing. Significant aspects must be addressed by setting objectives and targets which can include such activities as:

- controlling the aspect, i.,e., inspecting a chemical storage area to ensure that no spills occur
- improving it, i.e., reducing energy use by 20 percent each year or
- studying it for action later on.

From here, the cross-functional team incorporates these objectives and targets into its programs, procedures, and work instructions, trains its employees on their role in the environmental management system and in these procedures and work instructions, and then maintains records to ensure that the procedures and work instructions are carried out. Periodic auditing is conducted to ensure that the system is functioning properly, and a periodic management review of the whole system leads to continuous improvement.

Although there are many ways that the framework can be integrated into an environmental management system, for purposes of this chapter, we have chosen several centrally important areas to explore in more detail. This exploration focuses on the following key steps for building an ISO environmental management system:

1. Setting an environmental policy
2. Creating an inventory of environmental aspects
3. Determining which aspects are significant
4. Setting objectives and targets
5. Measuring progress
6. Establishing training programs, awareness, and competence
7. Instituting a management review.

## Setting an Environmental Policy

The Natural Step provides a framework for an environmental policy that is based on sustainability principles. The framework helps a company articulate a vision of the future that can be reflected in its environmental policy. It provides one additional benefit: the ISO standard requires that a company's policy incorporate a commitment to "pollution prevention." However, it does not provide a definition of pollution. Since the framework helps identify the root cause of environmental problems from a systems perspective, it can help to build a common definition of pollution among the members of the cross-functional team. Without this systems perspective, a company is left to rely on a definition of pollution that may vary from person to person, and from company to company.

Sånga-Säby is a Swedish hotel and conference center located in the countryside about an hour's drive outside of Stockholm. It is the first company in the hotel and restaurant industry to incorporate The Natural Step framework and be certified according to both ISO 14001 and EMAS. The company has utilized The Natural Step framework as a compass in all aspects of its environmental management system, starting with its environmental policy. In addition, as illustrated in Chapter 8, Sånga-Säby has been a pioneer in developing metrics based on The Natural Step System Conditions (see Figure 8.3).

## Creating an Inventory of Environmental Aspects

Completing an inventory of environmental aspects is an important step in understanding how the company impacts the environment. The Natural Step model can help a cross-functional team to think about the way in which their operations impact the environment, and to see their operations in a global context. For example, companies may miss ways in which they impact the environment, other than those regulated by law. The Natural Step framework can help them identify all sources of potential impact to the environment, especially ones that may surprise the company down the road or that have a more global effect. Tom Chapman, former Vice-President for Corporate Communications of Mitsubishi Electric America, comments: "As we study how to combine TNS and ISO 14001, our approach is to use the TNS framework as a way to organize information about our environmental aspects. Before, the aspects were all just data, but using TNS has turned them into objectives. ISO 14001 is the 'what;' TNS provides the 'why.'"

Larry Chalfan adds: "Our idea of what aspects to include and what their impacts really were was very different after a year of studying The Natural Step. We now look more deeply at our impacts and ask very different questions." Charles McGlashan, a management consultant who uses the framework when designing environmental management systems, comments: "We used the The Natural Step framework when creating the aspects inventory at





one of our client's automotive manufacturing plants. It really helped the cross-functional team understand and categorize the facility's impacts from a global perspective."

## Determining which Aspects are Significant

When determining which aspects are significant (and are therefore the focus of the environmental management system) the The Natural Step compass adds significant value. Normally, a cross-functional team uses a framework of its own choosing using their best judgement about which aspects pose the highest risks. A common practice is to take a downstream approach to this process, looking at the local risks associated with emissions to air, soil, and water. This approach is adequate, but sells the environmental management system short.

Determining significance from the upstream perspective means that a company takes into account both the local and global environment, both short-term and long-term effects, activities that are not regulated today but may be in the future, and, most importantly, the company's long-term goals.

**Referring to Strategic Goals for Guidance.** One method for determining significance uses the results of the company's back-casting exercise. At the completion of this exercise, the company will have a good idea of the areas where it violates the System Conditions most severely, of its vision of itself in the future, and of some of the critical steps needed to get there. From this future vision, it can then set objectives and targets for the company as a whole. For example, if a company recognizes that its use of persistent compounds in its products and processes poses a significant risk (as seen through the lens of the TNS framework), it can set a corporate target of reducing its dependence on these materials. A facility can then automatically flag these aspects as significant and assign them a facility-specific target and objective in alignment with the company's long-term goals. IKEA has taken this approach by striving to eliminate all heavy metals and persistent compounds from its products company-wide. This type of comprehensive approach can only succeed with a commitment from the top levels of a company.

**The Compass and the Aspects Inventory.** Another way of incorporating the framework is to indicate, when building the aspects inventory, which aspects relate to which System Conditions. This can help a cross-functional team to think about impacts as they relate to the framework and to direct decisions on objectives and targets. The downside to this approach is that the exercise may be cumbersome, especially if a facility's aspects inventory is very detailed.

**System Conditions as Indicators of Significance.** System Condition One: John Holmberg, a physicist working closely with Robèrt to develop The Natura

Step model, derived a set of indicators for sustainable development.[6] These indicators can be used to help a company prioritize its environmental aspects. For example, how is one to determine the relative significance of the release of cadmium over that of mercury? We know that each is a violation of System Condition One, but their effects may not be equal. Holmberg's analysis explains that the material's relative abundance in nature compared with human-created flows will have an impact on its ultimate effect. For example, human-created flows of aluminum are relatively insignificant compared to aluminum's abundance in nature, whereas human-created flows of lead are 12 times those of naturally occurring flows, and human-induced copper flows are 24 times those of naturally occurring flows.

The following formula can be used to weigh the relative significance of a company's use of metals and minerals:

$$\text{Indicator of Significance} = \frac{\text{Human-made quantity}}{\text{Abundance in Nature}} \times \text{Quantity used by the company}$$

This type of analysis can help a company determine which System Condition One aspects are most significant.

System Condition Two: Understanding System Condition Two can also help determine what aspects are significant. Companies may use a variety of methods to determine which materials produced by society are significant. Unfortunately, too many companies use the regulatory system as a guide. The downside to this approach is that a company will be reacting to changes in laws and regulations that are out of its control. Materials that are substituted can later be found to be problematic as well, forcing a company to change course again. Taking an upstream systems approach helps a company be proactive. Most companies need to do a material inventory to understand what materials will have to be reduced or eliminated to reduce their dependence on materials that are persistent, have a human-made presence in nature that is out of balance with natural flows, and are toxic.

Another important focus is substances for which the long-term effects are unknown. Endocrine disrupters provide an excellent example. As reported in *Our Stolen Future* by Theo Colborn, Dianne Dumanoski, and John Peterson Meyers,[7] endocrine disrupters are synthetic compounds found in plastics and other materials that tend to mimic hormones in the body. The body receives and utilizes them in very tiny amounts as if they were the hormones themselves. Endocrine disrupters are not regulated at the present time, but because they are suspected to have a role in infertility and certain cancers, they are currently being studied by the Environmental Protection Agency and other organizations. Chances are that they will be regulated in the future. The Natural Step compass reminds us that the time to think strategically about our use of such synthetic





compounds is not when everything is known about a chemical, but when we know it is not in accordance with principles of sustainability.

System Condition Three: Companies in the mining, forestry, fishing, and agricultural industries have obvious System Condition Three impacts. For many manufacturing facilities, their direct impact on the productive capacity of the biosphere may be less directly visible, but no less important. For example, there are two areas in which an understanding of System Condition Three may help frame a facility's impacts. The first is the company's raw material use, such as water and paper, and the second is the impact of the physical building on the local environment. For the latter, a company may wish to consider landscaping issues or to examine the transportation issues associated with its workforce getting to and from work and with its goods and services being moved around. IKEA, Scandic Hotels, Collins Pine, and Interface all consider transportation to be one of the most important issues for society in general, and their companies in particular, to address. This is true not only because of the contribution transport makes to molecular garbage through the burning of fossil fuels (System Condition One) but also because of the increasing destruction of natural environments through the encroachment of roads and highways.

System Condition Four: Inefficiencies in energy use, material use, and the transportation of raw materials or the final product may be considered System Condition Four impacts. In addition, a company's impact on communities both local and global and the extent to which its products and services meet human needs are addressed here.

## Setting Objectives and Targets

The process of setting objectives and targets is one of the areas where the framework adds the most value. Objectives and targets that are in alignment with a company's long-term vision can make an environmental management system a powerful tool. Too often, a company's targets are set to minimize short-term risks. It is preferable that objectives and targets be based on longer-term objectives set in a business context. These objectives and targets then provide a structure for balancing and integrating both business and ecological concerns.

As Figure 9.5 shows, Mitsubishi Electric America is an example of a company that integrates its business objectives in its environmental management system. Their overarching corporate environmental objectives and targets are integrated at the plant level, with the individual plants setting additional objectives and targets as well.

Figure 9.5

## Mitsubishi Electric America Corporate Environmental Targets

**Facility Level:**

- Reduce energy use by 25% below FY 1990 level by FY 2000
- Reduce waste disposal by 30% below FY 1995 level by FY 2000
- Reduce tree-based paper use and purchase by 75% (Factor 4) by the end of FY 1999 and by 90% (Factor 10) by the end of FY 2000
- Eliminate the use of old growth/primary forest products by FY 1998
- Eliminate the use of chlorinated solvents in open systems by the end of FY 2000

**Product Level:**

- Increase the use of recycled materials (excluding metals) in products by 30% above FY 1995 levels by FY 2000
- Reduce packaging materials by 20% below FY 1995 level by the end of FY 2000

### Measuring Progress

Companies use a variety of indicators to measure environmental performance. Designing good environmental performance indicators is vital because what gets measured tends to gets managed. It is important to ensure that a company is measuring the things that matter, not just collecting data.

**The State of the Art.** Unfortunately, most companies still use an end-of-pipe approach to measurement. They measure such items as emissions, pollution, and tons of hazardous waste generated. They also measure compliance statistics. Limiting measurement to only these types of environmental performance indicators limits the effectiveness of an environmental management system because these types of data are normally seen by management as something peripheral rather than crucial to the mission of the business.

**A Systems Approach.** While some of the traditional environmental performance indicators are important (and many are relatively easy to measure and report), a new class is emerging. New environmental performance indicators tend to be normalized (compared to dollars in sales or number of units produced) so that they can be used by managers to run the business better. They emphasize sustainability and are integrated with profitability measures. They use an integrated systems approach and take into account global effects, material inputs (not





just pollution), the entire product lifecycle, and business goals. Following are examples from three companies:

***Electrolux.*** Electrolux's effective use of this approach is an inspiring example. In its 1997 annual environmental report, the company articulates the following environmental performance indicators that show its systemic approach (for more detailed information, see the Electrolux website listed in the Resources section of this book).

Figure 9.6

## Electrolux Environmental Indicators

**Facility Level:**

- Energy cost per added value* (%)
- Energy consumption per added value (kwh/$)
- Carbon dioxide emission/added value (kg/$)
- Water consumption/added value* (cubic meters/$)
- Energy consumption per square meter of heated surface area™ (kwh/m2)
- Direct material efficiency (kg product/kg raw material used)

* added value is defined as the difference between total manufacturing costs and direct material costs

**Corporate Level:**

- Share of total sales represented by environmentally leading products
- Average annual environmental improvement of product range
- Increase in recyclability of products
- Environmental improvement of manufacturing facilities

***Interface.*** When Ray Anderson began shaping Interface's vision of sustainability, he asked about the total quantity of material moving through the company. How much material from the Earth's crust is removed each year due to Interface's operations? How much is deposited in landfills each year? He calculated that the company is responsible for 1.2 billion pounds of petroleum being extracted from the Earth's crust each year. Only one-third is used for the materials in carpet; two-thirds is the energy it takes to make the carpet. Over 250 million pounds of carpet are produced each year in the United States. With an average life of 15 years, most of this material goes to landfills. Quantifying these flows can be a very powerful experience; it motivates people because they can begin to see the whole picture.

An important indicator for Interface is pounds-of-petroleum/dollar sales. Interface's vision is to eventually make all carpet from recycled materials and to use totally renewable energy sources. If their strategy succeeds, the indicator will approach zero. Since starting its journey to sustainability, Interface has watched this indicator fall as sales have risen.

***Sånga-Säby.*** After conducting a thorough review of all of its environmental impacts, Sånga-Säby designed a comprehensive set of environmental performance indicators based on the System Conditions. In its 1997 environmental report, 1995, 1996, and 1997 results are included together with 1998 targets. This impressive document represents the most complete use to date of the four System Conditions as the foundation of environmental performance indicators (an example of these indicators can be found in Chapter 8).

### Establishing Training Programs, Awareness, and Competence

One of The Natural Step's most powerful areas of influence is in employee training. As Chalfan points out: "We tried to get people's hearts and minds engaged when starting our ISO 14001 program. During employee training, I reviewed the environmental situation, connecting it to our lives and the lives of our children and grandchildren. I explained, however, that I had faith that it could change, if we all do our part."

This broader perspective helps employees understand their own and their company's role in creating a sustainable future and often leads to a heartfelt commitment to the environmental program. This can be contrasted to many employee training programs that focus on regulatory compliance as something they "have" to do because "it's the law." The Natural Step training creates a framework for employees' ideas to help a company reach its goals during their day-to-day work lives. TNS training also helps employees apply ecological insights in their personal lives in satisfying ways.

Employees' understanding of their responsibilities and the consequences of their departure from established work procedures is a necessary component of a well-functioning environmental management system, and it is something that auditors will look for during certification. Connecting the company's potential environmental impacts to the global environment using the The Natural Step framework helps explain the rationale for specific work procedures.

### Instituting a Management Review

The last step in the environmental management system cycle is the periodic management review. Management reviews the company's progress toward meeting its objectives and targets, the results of environmental management system audits to determine whether the system is functioning effectively, and the company's inventory of aspects; then plans are made for the next cycle. The Natural





Step framework enhances this process by illuminating the vision that a company can work toward, year after year. The Natural Step framework can not only enhance management's strategic planning sessions so that the environmental management system is seen in the context of the company's back-casting, action plans, and business climate, but also determine the impact of ecological trends on the business.

## Conclusion

Environmental management systems are gaining popularity around the world. They provide structure for the integration of environmental issues into management and day-to-day operations. But they don't provide the vision that guides a company on the voyage to sustainability. Nor do they provide the understanding of what constitutes a sustainable direction. The Natural Step framework provides the compass to navigate these new waters. Once the vision and direction is set, an environmental management system is a valuable vessel for making the journey, operationalizing the vision and documenting progress.