THE NATURAL STEP FRAMEWORK GUIDEBOOK

INTRODUCTION

The TNS Framework is a methodology for successful organizational planning, developed by The Natural Step. It enables organizations to create optimal strategies for dealing with the present-day situation, by incorporating a perspective of a sustainable future. Today's perception of what can be achieved never determines the direction of change, solely its pace. This results in investments and activities that not only move the organization toward sustainability, but also maximize short-term profitability and long-term flexibility. The TNS Framework has helped many organizations around the world proactively embrace sustainability as a strategic opportunity rather than an unknown liability.

THE NATURAL STEP

The Natural Step is an international organization that helps organizations move strategically toward sustainability.

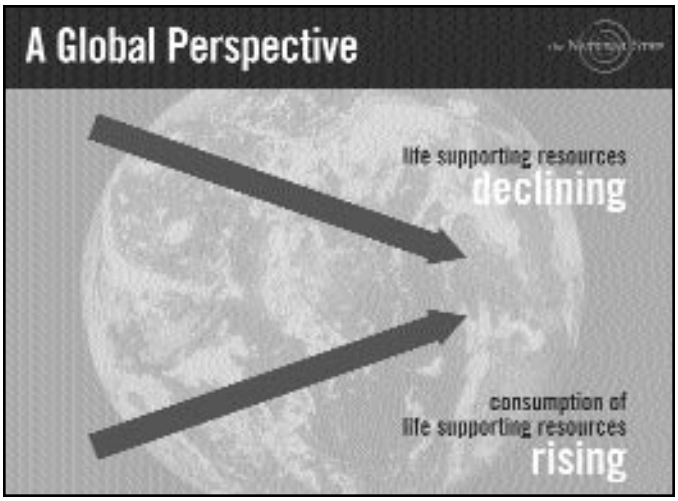
The Natural Step's approach is:

- to continuously develop the TNS Frame work, and the tools related to it, in associa tion with clients and scientists.
- to support the implementation and use of the TNS Framework in companies and other organizations, through training and as consultant advisors.
- to provide a forum for dialogue, particularly for decision-makers capable of influencing ideas and becoming global role models in the field of sustainable development.

THE FUNNEL

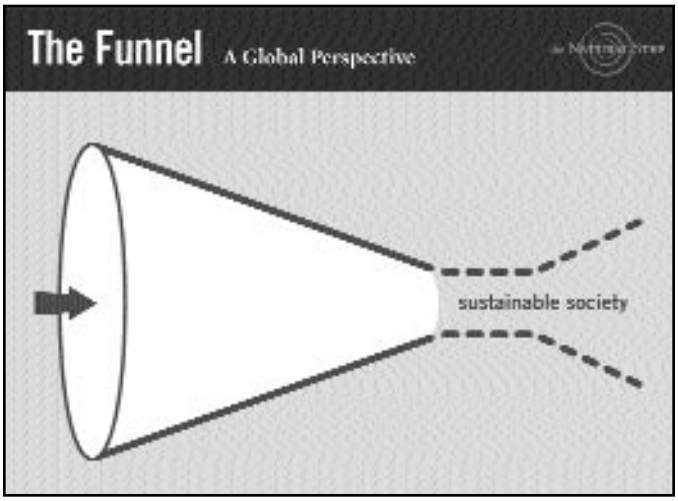
In the quest for good health, welfare and economic prosperity, we are systematically destroying the system that we, as humans, are completely dependent upon - nature. Life-sustaining natural resources, such as clean air and clean water, are subject to increasing deterioration due to human activity. Forests are being lost and species extinction is gathering pace. At the same time, nature's long-term productive capacity is being degraded in fields, forests and oceans. As a result, we have to input more resources to harvest or catch as much as we did last year. For example, to obtain the same amounts of food, wood and other raw materials, we need bigger fishing boats, more energy, more pesticides and more fertilisers.

Fig. 1 A Global Perspective



The reason for nature's reduced productive potential is that we are polluting and displacing nature in various ways. Renewable resources are being used up at such a rate that nature does not have time to build new ones. At the same time, there are more and more people on earth in need of these resources, and the gap between rich and poor is widening. It's as if all of civilization is moving into a funnel whose narrowing walls demonstrate that there is less and less 'room for maneuver'.

Fig. 2 The Funnel



Everyone is in this funnel, from the smallest family to the largest multi-national corporation, and it has a direct bearing not only upon us as a society, but also upon the economy. Increasingly, organizations are noticing that changes in demand, rising raw materials and waste handling costs, punitive taxation, more rigorous demands from lenders, and other factors in the market are already starting to affect their daily operations.

While sudden economic setbacks may be viewed as 'bad luck', we know that the room for maneuver of any activity is constantly diminishing. The 'bad luck' is usually caused by earlier investments in techniques or activities contributing to ecological non-sustainability or undermining human needs. The self-benefit of being able to avoid many of these setbacks in the future is obvious, an effective strategy is fundamental if we are to avoid 'bad luck' and create opportunities.

STRATEGIC PLANNING IN TODAY'S NON-SUSTAINABLE SOCIETY

The TNS Framework enables an organization to integrate business development with sustainablity. This strategic approach of systematically moving an organization toward sustainability can easily be justified on the grounds of improved competitiveness alone. By expanding their room for maneuver, organizations are improving their prospects for the future. The self-benefit stems from harnessing inevitable changes in:

- raw materials costs
- energy costs
- costs of waste
- environmental legislation
- differentiated taxation
- insurance premiums
- credit ratings
- customer needs
- employee needs
- brand value drivers

With the help of the TNS Framework, many organizations have reduced costs, improved quality and productivity, identified new customers and markets, and have avoided future liabilities.

Although long-term financial results will improve as an organization evolves in a sustainable direction, the risk of being too far ahead of the market needs to be considered. However, that risk must be balanced with the greater risk of being too late to evolve. The key is to be on the "leading edge", and using the TNS Framework has helped many organizations do just that.

STRATEGIC PLANNING NEEDS A FUTURE PERSPECTIVE

The TNS Framework is based upon a method known as backcasting – looking at the current situation from a future perspective. Initially, you envisage a successful result in this future scenario; then, you ask: What can we do today to reach that result? This allows you to make sure that your actions and strategy are taking you in the direction that you wish to head, that they align with your vision. This may seem simple and obvious, but many people do not do it, and without backcasting you can not strategically pursue a future vision.

A prerequisite for backcasting is obviously to know what constitutes the future scenario you are heading for. In terms of planning from a sustainable future scenario, this approach would appear flawed, as we can not accurately predict and agree upon the future precisely. However, despite not being able to outline a sustainable future scenario in detail, we can agree upon basic conditions that must apply in any sustainable society. These basic principles, or conditions, can serve as a lighthouse to guide us, enabling us to backcast with confidence from a future sustainability perspective. These conditions, known as the system conditions have been developed and agreed upon by an international network of scientists. By using backcasting, in line with the system conditions, targets and measures can be chosen that combine long-term flexibility with short-term profitability.

This approach means that the strategy focuses on the causes of environmental and social problems rather than reacting to the effects of them. Investments and measures are selected to tackle today's problems without creating further problems in the future. Strategies and measures taken will obviously vary between organizations, but the over-all direction will be the same - toward alignment with the system conditions. It is also important to remember

that today's perception of what can be achieved will only affect the speed of change, not it's overall direction.

The TNS Framework makes it easier to categorize problems and possible solutions so that relevant questions can be asked and informed judgments can be made. Once all team members are using the TNS Framework, a process is set in motion. Everyone starts using the same language, comparing experiences, and therefore learning from one another – a prerequisite for effective teamwork.

How then does an organization start to strategically plan for success and combine long term flexibility with short term profitability? By applying the TNS framework.

THE TNS FRAMEWORK

A. FINDING COMMON GROUND

How do you find common ground in your sustainability planning? Discuss the TNS Framework among all participants and align behind the sustainability objectives. These work as a lighthouse for your organization, outlining the criteria for any sustainable organization.

B. WHAT DOES YOUR ORGANIZATION LOOK LIKE TODAY?

Analyze current operations with the help of a sustainability review. Map out and list flows of raw materials and energy that are critical with reference to every sustainability objective.

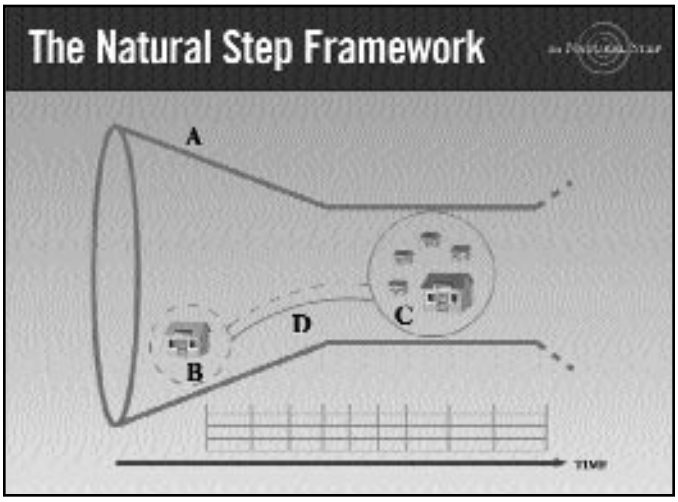
C. WHAT DOES YOUR ORGANIZATION LOOK LIKE IN A SUSTAINABLE SOCIETY?

Imagine what your operations will look like in a sustainable society based upon the sustainability objectives. Create a mission statement and list all measures, whether or not they are realistic in the short-term.

D. PRIORITIZE AND MANAGE

Which targets and measures should you prioritize? Which of them will be the most effective from a business point of view? Prioritize measures from C that move the organization toward sustainability fastest while optimizing long-term flexibility and short-term profitability.

Fig. 3 The TNS Framework

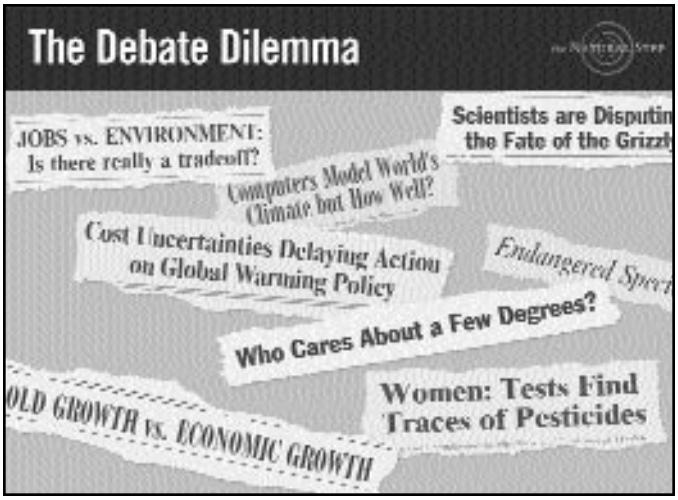


A. FINDING COMMON GROUND
TACKLING COMPLEXITY WITH SYSTEMS THINKING

Twenty or thirty years ago, environmental questions seemed simpler than they do today. They could be summed up in single images: a factory, chimneys spewing out smoke, a poisoned lake in the neighborhood, dead fish floating in the water. Remedies were put in place: filters were placed on the chimneys and water treatment plants built. The problems were apparently solved.

Today, most people are aware that these social and environmental problems were not solved, and that many may be getting worse, as well as increasingly complex. Because many problems are now global rather than regional, it can also be extremely difficult to find direct instances of cause and effect. This is the underlying reason for all the endless debate that we see and hear every day in the mass media and between scientists.

Fig. 4 The Debate Dilemma



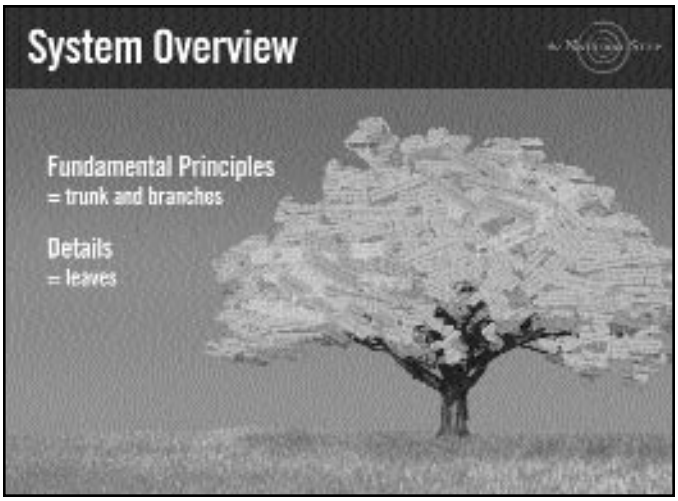
In addition to local environmental problems, we also have global problems such as ozone depletion and the greenhouse effect. Environmental damage is caused by a host of diffuse sources in addition to a small number of 'hot-spots'. Serious environmental problems cannot simply be blamed on manufacturers and factories. Sometimes the causes are directly linked with the goods and services we consume and the transportation that we use. In addition, the effects of environmental damage are very rarely direct, and are often deferred. Once those filters from the industrial chimneys have been dumped alongside other discarded junk, it takes a long time for their pollutants to be released. This complexity makes it difficult enough to recognize today's environmental problems; it is even more difficult to predict tomorrow's environmental problems lying dormant in the system.

To be able to tackle complicated problems, we need an over-arching perspective of the situation that utilizes a systems approach. Systems thinking creates understanding of the connections in the system. Everything is connected, and the connections express certain dynamics. In other words, if we change one part of the system, another part is affected.

A system is made up of many different parts, all working together and all sharing a set of basic principles. One way of visualizing this idea is to see it as a tree. The basic principles are represented by the trunk and branches. The leaves symbolize details - value judgments, priorities, design solutions or behavioral changes all seeking to align with the basic principles. The leaves and the trunk and branches are important aspects of a functioning whole. Without the trunk and branches, the leaves have nothing to hang on – in other words, the detailed solutions must align with the basic principles.

When you are driving a car you are a part of a very complex system. What you do has direct consequences on many other drivers on the road, as well as the pedestrians and cyclists. In short, you have to process an enormous amount of information in order to drive safely. Nevertheless, most of you don't even think about it while driving – why? It is

Fig. 5 System Overview



because there are rules (or basic principles) that govern how the system operates. It means that you can navigate your way through the complexity with a certain amount of ease, knowing that if you stick to the rules of the road you will be all right. However, if you ignore the rules (for example if you drive on the wrong side of the road or run a red light) then you are likely to have an accident.

Rather than restricting you, these rules actually allow you to be innovative. As an individual, you can drive wherever you please, in whatever vehicle you like, and even develop your own unique driving style, as long as you stay within the basic principles.

If you think that it is easier not to take a systems approach, and you don't need basic principles, just imagine driving through your nearest city in rush hour, except that anything goes and there are no rules at all. How far do you think you would get before crashing?

The system within which we operate is far more complex than a traffic system, and we don't get to define the basic principles. They are set for us by the Laws of Physics. The system, of course, is the global one, the Earth. The next section details the basic conditions for 'driving' on the Earth and how they are derived.

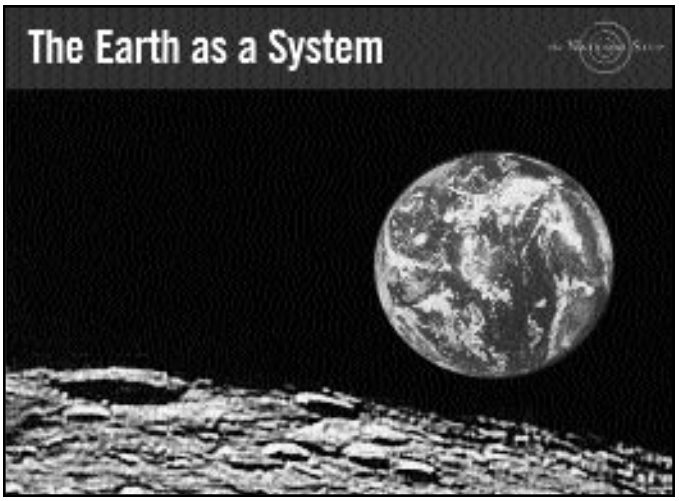
BASIC SCIENCE

The Earth can be regarded as a closed system for matter because gravity does not allow matter to escape. Almost all the atoms that were here when

the Earth was created about 4.6 billion years ago are still here, although many in different forms (e.g. different molecules or types of rock). However, when it comes to energy, the Earth is an open system. Energy is continuously entering the system in the form of sunlight. The amount of solar energy that flows in is approximately 10,000 times greater than the current global energy use of the entire human population. At the same time, energy exits in the form of heat radiation into the cooling universe. There is a balance between the amounts of energy flowing in, and the amounts flowing out.

The principle of matter conservation and the laws of thermodynamics are important here. All are universal. Which means, in practice, that they apply to the whole universe.

Fig. 6 The Earth as a System



Matter and energy do not disappear[1].
Matter and energy can only be transformed. Where has the gasoline gone when the tank is empty? It may look as if it has disappeared, but, in fact, the atoms have simply been dispersed as gaseous emissions.

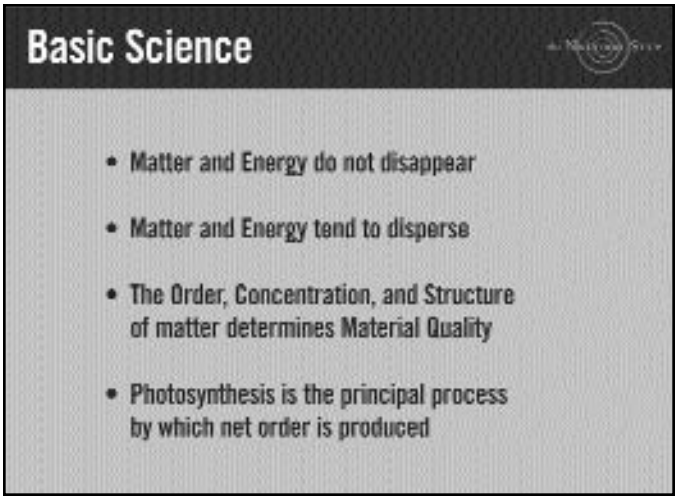
Matter and energy tend to disperse[2].
The fact that energy changes into heat radiation is not too serious a problem. It leaves the earth's atmosphere at the same time as we receive new solar energy. However, dispersed matter can become a problem because gravity retains it in the atmosphere. Examples of this are numerous: rusting cars, carpets turning to dust, or spreading pollution.

The concentration and structure of matter determine material quality.
The quality or value of matter increases as its concentration rises. For example, a gold ingot is more valuable than an identical amount of gold dispersed in nature. In addition to this, if we also add form or structure to the matter, its quality or value goes up even more. A gold ring, for instance, commands a higher price per gram than the gold ingot.

When we consume something, we consume its concentration and structure. But if all matter disperses, surely most if it should be converted into waste by now? Or is new material quality being created out of the waste, and if so, how?

Green cells create a net increase in concentration and structure of matter using energy from the sun.
By photosynthesis, green cells, such as plants, are able to use the solar energy that flows continuously into the earth's system. Photosynthesis gathers dispersed matter and assembles it into new, complicated structures – i.e. plants – thus creating a net increase in material concentration and structure on the earth. Their uniqueness lies in the fact that they obtain their energy[3] from outside the system. Even nature's mechanisms couldn't function sustainably if the natural cycles were not fuelled by the sun's energy. If plants needed petroleum to perform their work, they too would disperse more matter than they could concentrate and structure. In other words, we are completely dependent upon photosynthesis[4].

Fig. 7 Basic Science



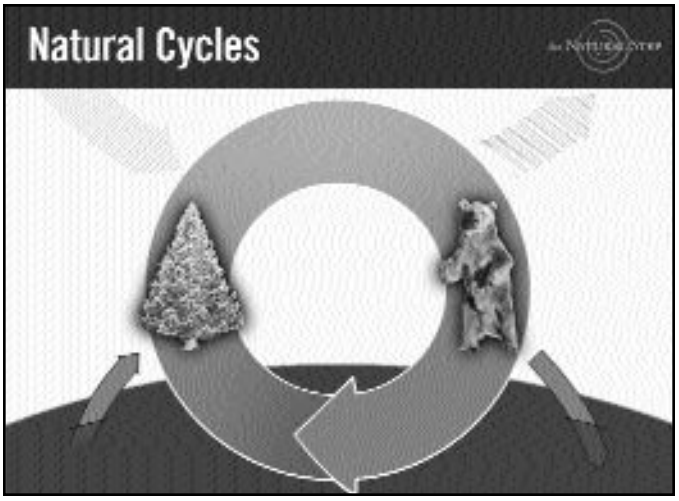
NATURE AND OUR EFFECT ON IT

All living organisms, including humans, are a part of and completely dependent upon nature. Cells are the smallest building blocks of life and have a limited capacity to adapt to changing circumstances. They cannot withstand systematic alterations in living conditions, such as higher and higher concentrations of pollution or lower levels of nutrients.

Over time, nature has slowly evolved to create the necessary conditions to support plants and animals. Plants have created concentration and structure on Earth through the process of photosynthesis, enabling the development of ever more sophisticated life forms, in an almost inconceivable array of complexity and diversity. It is indisputable that neither productivity nor biodiversity must systematically diminish if we want a sustainable world: Biodiversity provides a vast array of direct and indirect resources to us; it is an essential aspect of productivity, the complex web of species in cooperation providing the very cycles upon which our life depends; and it is an important defense strategy for nature in the face of change.

However, nature only has a limited capacity to adapt to sudden change and therefore while it can evolve to deal with change, it cannot do so over night. Sustainability only really becomes an issue when nature is forced to do this, to cope with rapid systemic change.

Fig. 8 Natural Cycles



To understand and address the impact of human actions upon nature, we need to move from assessing our impacts in nature to finding the root-causes for these effects. Can we summarize the root-causes for ecological non-sustainability? There are essentially only three mechanisms by which human society can damage nature. Damage to nature occurs when:

1. concentrations of substances are continuously rising because they are dispersed in nature from the Earth's crust (mined from outside the system) faster than they are returned (re-deposited into the Earth's crust).

2. concentrations of substances produced by society are continuously rising because society disperses them faster than they can be broken down and built into new resources by nature (or deposited in the Earth's crust).

3. it is continuously degraded by physical means. This occurs either by extracting more than nature can replenish (for instance, more timber or fish than can be regenerated) or by other forms of ecosystem manipulation (for instance, altering the water table, soil erosion, unforeseen accidents with genetic manipulation or covering fertile land with asphalt).

Fig. 9 Present Society

A SUSTAINABLE SOCIETY

By looking at the three ways we are damaging nature, and then adding the word 'not', The Natural Step has defined the three basic principles for an ecologically sustainable society. However, because we are talking about sustainability for people and planet, a basic social principle is also needed to

outline a sustainable society.

Basic human needs are often thought of as subsistence needs, such as food, clean water and shelter. Manfred Max-Neef[5] outlines nine basic human needs, which create a more complete list:

o	Subsistence	o	Protection
o	Participation	o	Leisure
o	Affection	o	Understanding
o	Creation	o	Identity
o	Freedom.		

Given that these needs exist, is it really possible to have a sustainable society if they are not met?

A sustainable society by implication is one that can continue on in perpetuity, one that not only does not undermine the natural system upon which we depend, but also one that essentially satisfies its constituents, that people are happy with. That is not to say that a sustainable society will not evolve, but rather that it will not have to be completely restructured over a short period of time. If a "sustainable" society needs to change itself dramatically due to pressures from within, it is, by implication, unsustainable. Societies change most notably when citizens are not content, when their needs are not met (leading to revolutions, wars and conflict). Therefore we can say that a sustainable society must, at the very least, meet the needs of all individuals within that society.

Consider the implications for ecological sustainability when human needs are not met. People will do anything to meet their basic human need of staying alive. They will not take a global sustainability perspective when they have to decide whether or not, for example, to take coal from the ground to provide heat; use plastics to provide shelter; or, cut down forest to try to cultivate crops for food. If people's needs are not met, they will not take a global systems perspective, but rather an immediate and very human perspective – what do I have to do to survive? In this situation, it is unlikely that the individual action will be in alignment with the long-term needs of the overall system.

Given this, in addition to the principles for an ecologically sustainable society, it is necessary to add a fourth principle - that human needs must be met worldwide.

These four basic principles define the prevailing conditions that will apply in any sustainable society. Originally developed by Karl-Henrik Robért and John Holmberg, they have been refined in cooperation with an international network of renowned scientists. They are referred to as the four system conditions.

THE FOUR SYSTEM CONDITIONS

In a sustainable society, nature is not subject to systematically increasing:

1. concentrations of substances extracted from the earth's crust,
2. concentrations of substances produced by society;
3. degradation by physical means;

and, in that society. . .

4 human needs are met worldwide.

In the illustration below, the four system conditions are shown in relation to the natural cycles and human society, as an integrated system where flows are balanced and "left over matter" does not increase in concentration in nature.

Fig. 10 A Sustainable Society

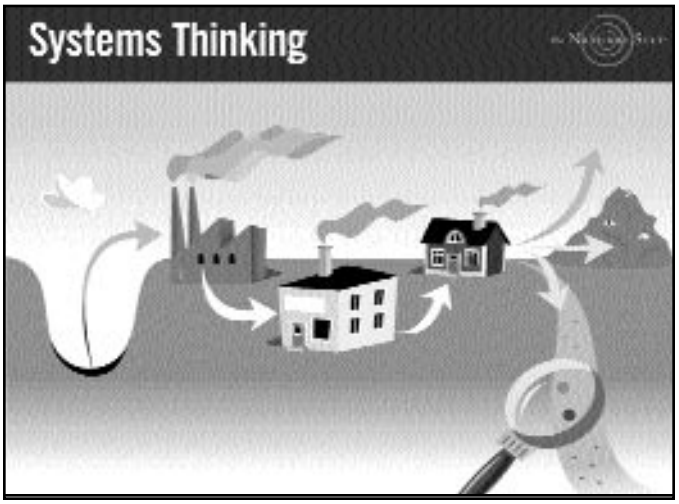
Natural cycles (the larger circle) surround society and define the limits which we have to live within. In a sustainable society, plants (on the left-hand side) build up enough renewable resources to satisfy con-

sumption by animals and humans (on the right-*hand side). Various agents break down the waste from animals, thus making it available, as a resource, to plants. The sun provides energy, and heat radiates into the universe. Society lives partly on small flows of metals and minerals from the earth's crust (1) and on larger flows from nature's production (3). A flow of substances produced in society leak into nature, breaks down and gets assimilated in the natural cycles (2). And in that society, all resources are used effectively enough to meet human needs everywhere (4).*

A SHIFT IN FOCUS

The four system conditions enable a shift in focus to the underlying causes of social and environmental problems rather than looking at the symptoms, which sooner or later manifest themselves anyway. What this means is that we can move upstream to preventive measures through our understanding of the source of problems. We know that 'nothing disappears and everything tends to disperse', therefore unless we address the cause, the symptoms will persist despite our efforts to contain them. By taking action at the source, complexity becomes more manageable, by preventing damage before it occurs.

Fig. 11 Think Upstream
- Don't just focus on symptoms



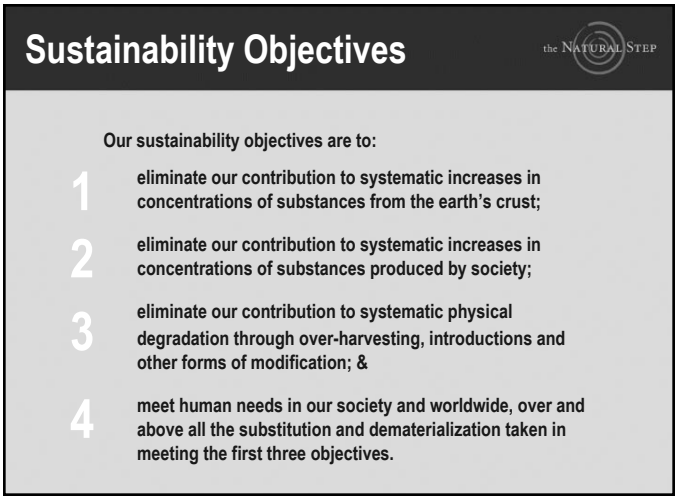
SUSTAINABILTY OBJECTIVES

An organization is sustainable when it no longer contributes to ecological non-sustainability and no longer undermines human needs by any of its practices. This can be broken down into sustainability objectives for the whole organization.

Our sustainability objectives are to:

1. … eliminate our contribution to systematic increases in concentrations of substances from the earth's crust.
2. … eliminate our contribution to systematic increases in concentrations of substances produced by society.
3. … eliminate our contribution to systematic physical degradation of nature through overharvesting, introductions and other forms of modification.
4. … meet human needs in our society and worldwide, over and above all the substitu tion and dematerialization measures taken in meeting the first three objectives.

Fig. 12 Sustainability Objectives



By assessing each specific activity against these objectives, we ensure that all existing and future environmental & social problems are dealt with[6].

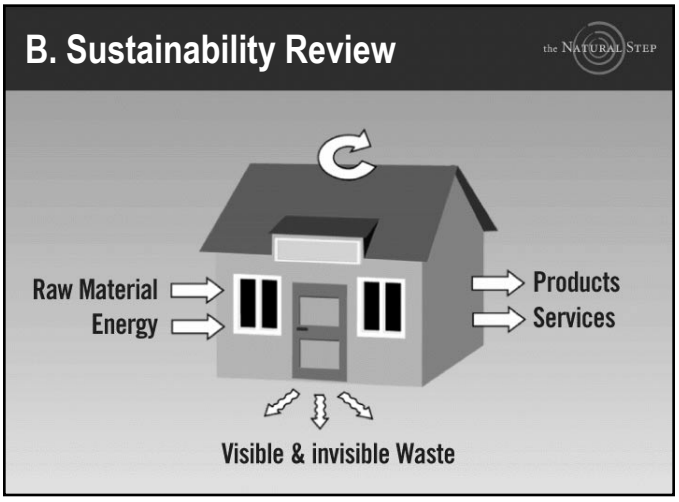
B WHAT DO YOUR OPERATIONS LOOK LIKE TODAY?

To find out what your organization's operations look like today from a sustainability perspective, you need to map out critical flows and practices in your organization in regard to your sustainability objectives.

An organization, and every single operation/activity in the organization, is like a box with various flows going into, and coming out of it. As 'nothing disappears', it is logical to start by looking at the flows of raw materials and energy into 'the box'. That way, you can eventually relate these to what is

being exported and establish how particular materials or types of energy relate to your sustainability objectives.

Fig. 13 Sustainability Review



It is important to involve all employees in this process, as everyone has some impact on the flows of raw materials and energy. Individuals must engage not only in identifying the problems, but also in creating, developing and implementing specific solutions. At the Natural Step, we have found the best results are obtained if employees are involved in this way by carrying out the sustainability review themselves – backed up by resources such as questionnaires that examine the position of the organization in relation to its sustainability objectives. It creates ownership of the process and a real desire to find and implement solutions to create success.

Some examples of flows to look for are given below for each of the sustainability objectives but these are only here as a guide. It is key that you develop your own sustainability review, tailored specifically to the situation within your organization, and that this is an ongoing process rather than a one-time event.

Sustainability objective 1
– to eliminate our contribution to systematic increases in concentrations of substances from the earth's crust.

Look for:
Flows in your organization containing elements from the Earth's crust that are scarce in nature and fossil fuels.

Examples of problems found in nature include:
Rising levels of heavy metals in the soil, phosphates in lakes, sulfuric acid in forests, and carbon dioxide in the atmosphere. Nature cannot sustain systematic increases of any substance. Every single atom of mercury, lead, zinc, copper or coal that we extract from the Earth's crust, must end up somewhere.

If we continue on this path:
Levels of substances from the Earth's crust will continue to increase. Complexity and time-lags make it difficult to predict at what level damage is caused. Each substance has its own limit, but this limit is often unknown until the damage has already occurred. Even after we have recognized the problems caused by rising concentrations of substances from the Earth's crust, and cut down levels of extraction from mines, many substances will continue to build up in nature. This is because society has already amassed, and is using, huge quantities of materials from mines, many of which are scarce in nature.

Sustainability objective 2
- to eliminate our contribution to systematic increases in concentrations of substances produced by society.

Look for:
Flows in your organization containing persistent and unnatural compounds and large emissions of naturally occurring compounds.

Examples of problems found in nature include:
Rising levels of non-biodegradable substances in nature that are not normally found there. Chlorofluorocarbons (CFCs), polychlorinated bi-phenols (PCBs), many pesticides, dioxins, bromide anti-flammables and many additives in plastics such as chlorinated paraffin are some examples already causing problems. The manufacturing of substances is either intentional (as in the chemicals industry) or unintentional (such as by-products created during waste incineration). Substances not broken down and integrated into the natural cycles will build up in the environment, as will emissions of naturally occurring compounds emitted in

quantities too great for the cycles to cope with.

If we continue on this path:
Levels of substances produced by society will continue to rise. Complexity and time-lags make it difficult to predict at what level damage is caused. Each substance has its own limit, but this limit is often unknown until the damage has already occurred. Regardless of these thresholds, these substances will continue to build up in nature, undermining the system upon which we depend (for example depletion of the ozone layer). As for human effects, we are not separate from nature, and as such these substances will continue to build up in our systems. The effects of this are unknown, but given the concerns regarding carcinogens and endocrine disruptors it would seem prudent to seek alternatives.

Sustainability objective 3
- to eliminate our contribution to systematic physical degradation of nature through overharvesting, introductions and other forms of modification.

Look for:
Flows in your organization containing resources from badly-managed eco-systems, incautious modification of nature or use of fertile land, or area consuming activities like road transportation.

Examples of problems found in nature include:
Clear-cutting of forests, spreading deserts, loss of nutrients, construction of roads and buildings on fertile land, over-fishing of seas and lakes, mass tourism in pristine areas of nature and damage to underground water flows.

If we continue on this path:
Nature's capacity will be reduced in functions such as its waste processing, the building of resources which society needs, and the provision of the host of 'free services' crucial to the survival of life (for instance, clean air and drinkable water). Complexity and time-lags make it dificult to predict at which level of physical degradation damage is caused. Each part of an ecosystem has its own limit, but this limit is often unknown until the damage has already occurred.

Sustainability objective 4
- to meet human needs in our society and worldwide

Look for:
Unfair and irresponsible treatment of all people on whom your organization has an impact.

Examples of problems in society include:
Famine and lack of safe drinking water in large regions of the world due to the uneven distribution of resources within humanity, at the same time as many people in the industrialized world suffer from alienation and feel a loss of cultural meaning; breakdown of cohesive family units and community fabric due to increased work pressures, greater demands upon time, and increased mobility; and, increased incidences of mental illness due to work and social stress globally[7].

If we continue as before:
We will see a widening gap and tension between rich and poor. At the moment, 20% of the world's people are using more than 80% of the resources, while the poorest 20% are malnourished and do not have access to clean water. People living in poverty think about sustainability in its starkest terms – how to stay alive that day. If the global disparity in resources is not addressed they will simply degrade the global system in order to meet the most basic of human needs – staying alive. Meanwhile, the richest 20% will continue to try to meet their human needs in a very inefficient manner, rapidly overwhelming the system upon which they depend.

C WHAT DOES YOUR ORGANIZATION LOOK LIKE IN A SUSTAINABLE SOCIETY?

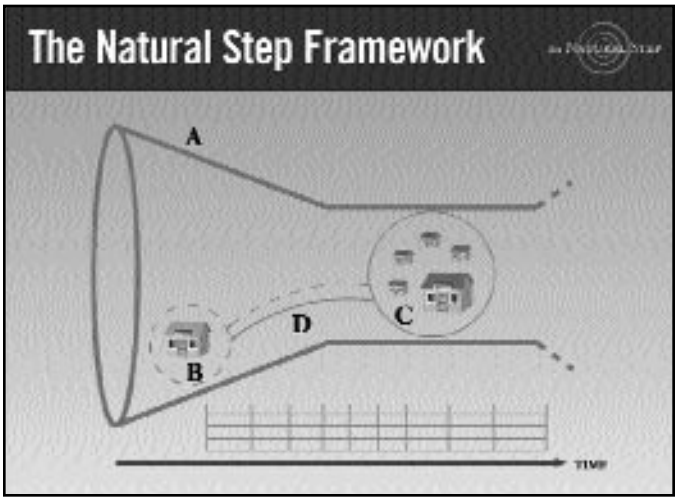
What might your organization look like in a sustainable society? The point of the exercise is to 'lift your vision', looking for solutions free from your preconceptions based upon current reality. What utility is the customer really looking for? What needs are fulfilled by your organization? What human requirements will your organization provide in a sustainable society? What is your role in satisfying human needs worldwide? The way to approach this is to envisage your organization as a service provider. For example are you selling cars or mobility? Kilowatt hours or light and heating?

Next, you list every conceivable connection between the vision of your organization in a sustainable future, and the way it looks today. How are you going to meet the needs of your customers without compromising your sustainability objectives? Make certain that the list covers all kinds of possible measures and not only measures that are "realistic" in the short term, or address mistakes that are already causing damage.

For the organization to become sustainable, planned measures and strategies must be assessed in relation to the sustainability objectives. You have to content yourselves with testing the measures against these objectives. We cannot know exactly what the future holds, within the basic outline of your sustainability objectives there are an endless number of permutations.

If this process is overseen & implemented with proper care, there can be far-reaching consequences. The opportunities, innovation, and competitive advantage that stem from the process can be huge.

Fig. 14 What does your organization look like in a Sustainable Society?



For each objective you should list solutions, i.e. make a list of all the options in compliance with each sustainability objective that would be available to your organization.

One key area to address is efficiency as this impacts every objective, for example:

- Resource productivity: reduce the amounts of resources needed for the production or use of a product, for instance by means of more energy-efficient engines and products that require less materials.
- Less waste: improved systems for reuse and recycling.
- Organizational efficiency: avoiding unnec essary transportation, encouraging local manufacturing, a global exchange of infor mation and knowledge rather than manu factured goods.
- Personal efficiency: our daily lives. How do we fulfill our needs and desires? With mate rial objects or experiences? With which goods and/or services?

Everything that is theoretically possible should be listed. Some examples are given below for each of the sustainability objectives, but these are only here as a guide. It is key that you develop your own solutions tailored specifically to the situation within your organization.

Sustainability objective 1 options might include: Switching to renewable fuels and materials such as wood, fibers, ceramics, glass, etc. You can also discriminate in favor of metals commonly found in nature. The more common a metal is in nature, the more freely you can use and recycle it without fear of rising concentrations. Aluminum and iron, for instance, are considerably more common in nature than copper and cadmium.

Even in a sustainable society, it may be necessary to increase mining of particular substances in the short term, even of some scarce metals. An example of this would be certain rare metals needed in solar cells (which would need to be tightly cylced at end of use). The effects would be beneficial, as solar cells reduce the need for non-renewable fuels.

Sustainability objective 2 options might include: The phasing out of substances that are persistent and are not commonly found in nature. It may also be necessary to switch away from a range of other substances that, even though biodegradable, are nevertheless building up in nature because of excessively high volumes of use.

Even in a sustainable society it may be necessary to occasionally use non-biodegradable substances not normally found in nature, such as important pharmaceuticals. These substances should however be tightly cycled and only used if there are no better alternatives.

Sustainability objective 3 options might include: Drawing resources only from well-managed ecosystems, systematically pursuing the most productive and efficient use both of those resources and land, and exercising caution in all kinds of modification of nature. By locating new factories on the foundations of old ones, planning all construction with respect for nature, and switching to less area consuming transport through smarter logistics, boat traffic, or by changing business strategy to more local production, you can minimize your degradation of nature by physical means.

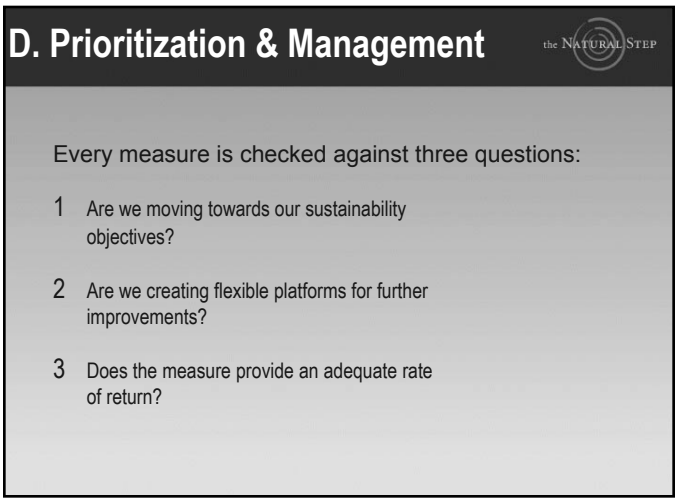
Sustainability objective 4 options might include: Making sure that the organization and all suppliers: operate in full compliance with the laws of their respective countries; pay workers wages and provide benefits regardless of their identity; do not use involuntary or uncompensated labor of any kind, nor child labor; do not abuse labor in any way; do not threaten, penalize, restrict or interfere with workers' lawful efforts to join associations of their own choosing; and make sure that the local community provides health care and schools for children.

D PRIORITIZATION AND MANAGEMENT

Which targets and measures are to be chosen? Which of them move us fastest toward sustainability while still maximizing short-term profitability and long-term flexibility? By choosing measures from C that stand up favorably to all of the key questions outlined below, long-term and short-term profitability are linked – and each step becomes financially viable in itself. This way of planning also makes it possible to solve today's problems without creating new problems tomorrow.

1. Are we backcasting from our objectives when prioritizing this measure? Assess each suggested measure against the sustainability objectives. Which measure brings us toward sustainability the fastest?

Fig. 15 Prioritization and Management



2. Are we creating a flexible platform for further improvements? Choose solutions that are as flexible as possible, otherwise you might end up in a dead end. If technical or economic conditions change, investments in flexible solutions will ensure that adjustments do not bring punitive costs. Can our new, lean-burn engine be modified to use renewable fuels? Is this system for recycling of heavy metals the best decision? Isn't it possible to substitute those materials for others instead?

3. Will the measure bring quick enough financial returns? Prioritize 'low-hanging fruit' – in other words, measures that bring improved profitability in the short term, or in other ways generate comparatively quick returns on investments. The risk of not taking action needs to be considered here as well. Does the measure bring resource savings? Does the measure reduce the risk of future costs? Does the measure respond to a current trend, i.e. can it help serve a market demand and thereby improve our sales figures? Can this measure help us reach a new market segment? Can it generate profits through new marketing strategies to increase customer loyalty and brand equity?

It is the combination of the three key questions that constitute the strategy - a strategy that prioritizes the measures that are most financially viable, bringing you toward sustainability fastest without loosing flexibility or profitability. By examining every aspect of decision-making in terms of the TNS Framework, the probability of long-term success is greatly improved.

THE RISK OF PLANNING IN A TRADITIONAL MANNER

The most common way of planning for the future is to review the present state by looking in the rear view mirror for perceived problems and then trying to remedy these problems in the future. We call this forecasting. With a pressing need for fundamental change and a high level of complexity this planning technique has many disadvantages.

Perhaps its most crucial flaw is that whatever seems important in the present comes to define the future. Planning strategies will then be based on present-day tax levels, present-day costs for sustainable technology, present-day fuels and present-day energy systems. The risk of allowing the trends to be the main drivers of the problems is obvious. Acting in this way, we risk bringing today's problems into the future. It also does not encourage innovation.

The traditional forecasting perspective used in most environmental programs provides a planning procedure starting with a list of negative impacts in nature that have already been discovered. Estimates are then made as to which activities/resources are the most hazardous (from a scientific point of view it is often impossible to tell, due to complexity). This leads into a meaningless debate about causes and makes it difficult to deal strategically with tradeoffs. Incremental changes can sometimes be counter-productive and may lead into dead ends, even if they are estimated to reduce today's impact in nature. Incremental changes of an old system can also lock up resources.

From a strategic point of view, backcasting allows you to deal with the complexity of the problems facing you in a far more effective manner than forecasting. It allows you to create solutions that focus upon the underlying causes of the problem, rather than trying to tackle the myriad effects. In short, it allows environmental and social problems to be turned from a potential major liability into a potential major opportunity.

ENDNOTES

[1] A popularized combination of the first law of thermodynamics and the law of matter conservation. During atomic fission, matter is exchanged for energy, but this exception does not affect the rest of the argument.

[2] A popularized version of the second law of thermodynamics.

[3] Solar energy is the most important, but there are also two lesser additions from other sources. One is heat from processes in the Earth's core. The other is gravitational energy from our solar system, e.g. tidal water.

[4] On a much smaller scale, human solar-driven processes can also create a net increase in concentration and structure, for instance solar-powered vehicles transporting materials for recycling.

[5] See for example Real-Life Economics: Understanding Wealth Creation, edited by Paul Ekins and Manfred Max-Neef. New York: Routledge: 1992.

[6] In Environmental Management Systems complying with ISO14001 the objectives could serve as "environmental objectives", thereby giving a direction to the "continual improvement" stated in ISO14001. Accordingly, the four "significant environmental aspects" of any organization are their contribution to non-sustainability. Because there is no overlap between the four sustainability objectives, it is easier than one might think to produce relevant benchmarks and other indicators for measuring the performance of the organization.

[7] See for example the UNDP's Human Development Reports.