Karl-Henrik Robèrt, Founder, The Natural Step
Halifax Presentation, September 22, 2006

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Sustainability: The Leadership Challenge

Dr. Karl-Henrik Robèrt

September 2006, Halifax, Nova Scotia

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Systems thinking

- Individuals
- Groups
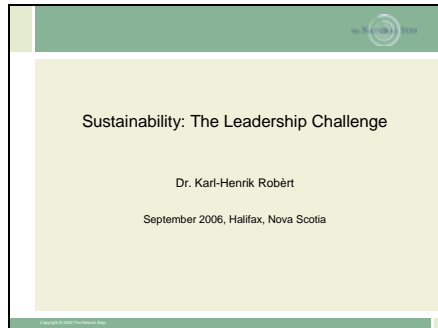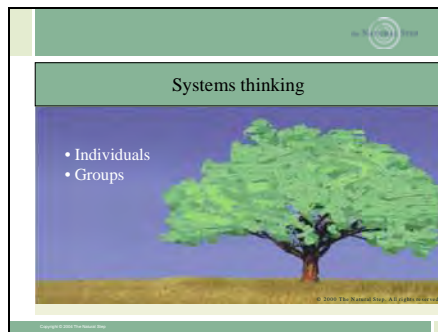
The biosphere with its human societies and organizations is a complex system. A tree is a good metaphor for a complex system. If we take a step back we can comprehend the whole system, and avoid to drown in all the information 'amongst the leaves' of details. Individuals are ingenious when it comes to dealing with complex systems – when we learn our first language, when we handle our cars in traffic, or when we play chess or the piano – whereas groups of people are often dumber than the dumbest participant of the whole group. The reason is that groups often fail to scrutinize the overall rules of the system and then agree what it is the group actually wants to achieve before it starts to act. If the group, on the other hand, does that, the group can perform better than any individual. On such conditions, the group can make use of that it has a higher collective knowledge than any of its members.

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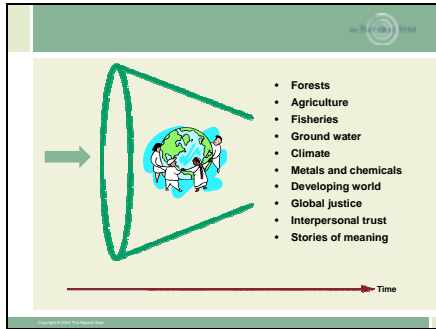
The sad truth is that we are not in a cylinder, but in a funnel. The leaning walls denote that the problem is not some impacts in Cropland, Forests, Marine systems, Atmosphere, and Social systems around the world, but the fact that those things get MORE AND MORE eroded. We are systematically loosing more and more top soil layers in agricultural land, more and more biodiversity in forests and the see, we get higher and higher levels of green-house gases in the atmosphere, higher and higher levels of pollutants in the ecosystems, we get more and more people on Earth, and the gaps between the haves and the havenot's, widen more and more. The undermining of our habitat is due to system errors of societal design, and it will not be until we correct those errors all the way down to the basic level, that we can get out of the funnel.

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Over a few decades we have moved from "The Environment" through "Social and Ecological Sustainability" to "Competent Leadership" in general. Whatever values we have, and whatever organizations we are working in, there is no stronger and more consistent trend than sustainability and it will only continue to grow. Everything will go down the gurgler, unless we can make society sustainable. In the end, there is no stronger determinator of the future, and there is no stronger challenge to our leadership. Organizations that systematically seek to become part of the solution rather than the problem, will benefit from lower financial risks and better market opportunities. This has been shown with scientific scrutiny, and this presentation is responding to the questions (i) what is unsustainability, (ii) what is sustainability, (iii) why is sustainability crucial to bottom line business and (iv) how do we tackle sustainability to turn threats into opportunities? Responses to all those questions rely on our inborn capacity for systems thinking.

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Strategic Opportunities

for those who foresee changes:
- Resource costs
- Waste management
- Tax, legislation, insurance, loans
- International agreements
- Credibility
- Employees
- Community

This challenge to humanity automatically leads to opportunities and benefits also from the individual organization's point of view. What will resources cost, as we lose them more and more in the funnel, and as we get more and more people on Earth? Soon, it is 11 billion people, not 6, who are going to bid on what is left e.g. productive fisheries in clean waters. It is obvious that things will change on tomorrow's market. For the decision maker who understands the funnel, and how to plan to avoid its walls, the risks of being hit by increasing resource costs, waste management costs, insurance costs and so on, will be systematically lower. Doing so will help others not only from reducing the total burden on the system, but also from being role models for others. This is called enlightened self-interest. And vice versa: decision makers who do not learn the rules of the game and how to plan ahead, will call it "bad luck" each time their respective organizations will hit the wall of the funnel as unforeseen escalation of costs for resources, waste management, tax, insurances and as lost market opportunities, poor organizational cultures, and bad reputation.

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So, what's the problem?

Avoiding reductionism…

This dominating challenge to humanity cannot be dealt with by reductionism.

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Reductionism denotes the flawed attempt to deal with each problem one by one as it surfaces and outside the context of the whole system. This is an impossible approach for success in complex systems, yet it is the most commonly applied, at least in groups larger than five. "Fixing problems" at the level of detail in complex systems, is an almost certain way of solving one problem by inventing a new one.

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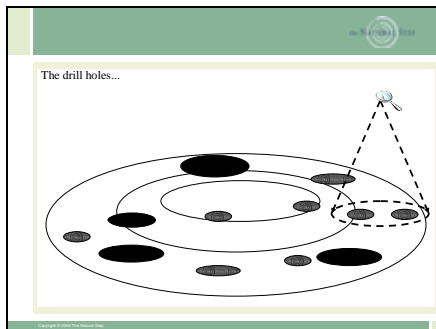
Reductionism has its corresponding organizational structure in society, compartmentalization. It means that each societal sector and each science field is drilling deeper and deeper into their respective 'drillholes' of increasing knowledge but with limited or no understanding of what is going on in the other drillholes. This is not a viable societal model for sustainable development. The question is – how do the drillholes connect, and how can we make better use of the deep knowledge from a holistic point of view?

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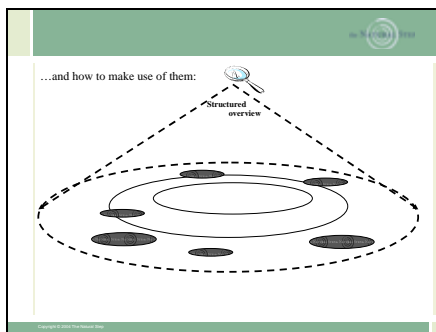
What we need is a structured overview by which all the drill holes, represented by their respective experts, connect. An example is clinical conferences, where experts from all kinds of sciences within medicine – pathologists, surgeons, radiotherapists, physiotherapists, nurses and social workers – have a shared mental model of the problem at hand. That shared mental model is the "purpose" - to cure "Mrs. Anderson." None of the professional groups can cure Mrs. Anderson with her serious disease on their own. But they can do it together because they have a strict shared mental model about what it's all about - Mrs. Anderson. Through the patient, the clinical conference becomes concrete and purposeful. Today, the patient is the biosphere and its human society It is suffering from the deadly disease "unsustainability," and to cure that

patient we *need* business people, insurance people, politicians, engineers, economists and all other professional groups. But how can they cooperate unless we share a good understanding of the disease?

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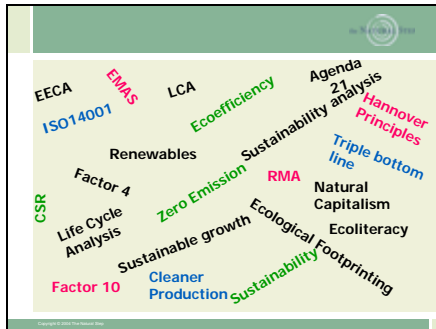
Without a well structured overview, all the tools that have evolved to support sustainable development will not help us. On the contrary, the growing number of tools outside the context of a shared framework have begun to be perceived as confusing in themselves.
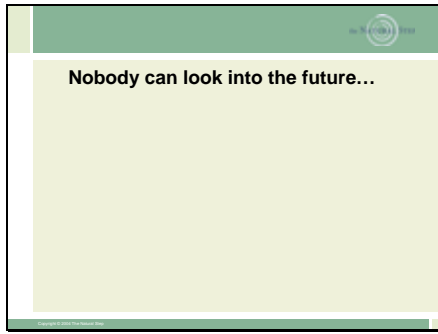
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Rather than having a clear picture of the whole, today's reductionist way of planning is based on current trends and current problems. This means focusing on one problem at a time, extrapolating current trends to the future and trying to fix the problems we see or expect on the way. Alone, this is a useless methodology for planning in complex systems, not the least for Sustainable Development.

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Planning from idea of Success = Backcasting
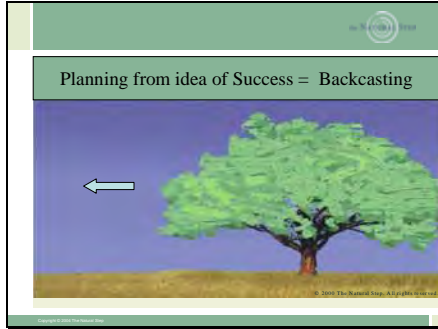
We must obviously try to envision the healthy patient ahead of us, the whole system being sustainable, and then ask ourselves: "How can we cooperate today and all the way there, to make it happen?" It's called Backcasting, i.e. imagining a point of success in the future and then 'backcasting' from that point.
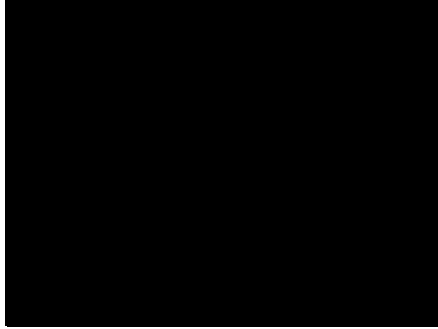
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Nobody can look into the future…

Nobody can look into the future, Einstein said…

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…but we can invent it!

…but we can invent it, he added. This requires a basic understanding, at the level of principle, of the goal. So the scope changes from the level of detail, to the level of basic principles that connect all the details. The Natural Step started with an intuitive belief that it would be possible to identify such basic principles, the trunk and the branches of sustainability. With such principles it would be possible to inform all kinds of experts and departments in organizations into joint ventures for the curing of the patient. The deep knowledge of all the professional groups could then be put at use for the innovation of sustainability, and there would be innumerous opportunities for the creation of all kinds of different organizations and cultures – as long as they all complied with the basic principles of sustainability.

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The Natural Step is today an international organization in 12 countries, working with Scientific Consensus to provide Role Models with the TNS Framework for Strategic decision making. We train executives in business and policy, coach them in their activities to increase chances of doing well by doing good in tomorrow's market, to avoid risks, and to develop the tools they need.

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Supported by Swedish EPA, Swedish Science Fund Vinnova, and Hydro Polymers, TNS is now creating an international hub for scientific trans-disciplinary cooperation, sharing the same framework for sustainability with a growing number of universities around the world. The two universities displayed at this picture, Blekinge Institute of Technology and Lund's University, are currently cooperating with TNS to launch an international science program, as well as an international masters program, both named Strategic Leadership towards Sustainability.

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But we need many more universities to draw all the right conclusions from our systems perspective. This is our current list of cooperative partners…

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So, to summarize all of this into a concise problem description: If we want to win in a complex system, we need to be able to define what success would be. This can generally not be done at the level of detail, but needs a principled definition. Such basic principles for a successful outcome of planning, need to be (i) necessary for success, (ii) enough for success so that there are no gaps, (iii) general to allow trans-disciplinary and trans-sector cooperation, (iv) concrete to guide action programs in real life and (v) distinct to provide comprehension and allow development of indicators for the monitoring of the winning process.

This may sound academic, but is in fact quite intuitive. This is how the individual brain, or brains in small groups, tend to operate. Say that a family is going to move to Paris, and that they have never been there before. Is that possible? Yes by Backcasting from the basic principles (i) close enough commuting distance to the working place(s) of the family, (ii) affordable, (iii) meeting safe and pleasant enough indoor requirements, (iv) meeting the specific requirements of the family and (v) being free for rent or purchase. There may be a large number of different dwellings that meet all those requirements, but only those that meet *all* criteria can be considered. So, even if mistakes are made amongst the leaves, e.g. choosing ugly wallpaper for the living room, it wouldn't happen that they make mistakes at the trunk and the branch level, e.g. ending up in a too costly castle ruin in Berlin, trying to figure out what went so wrong.
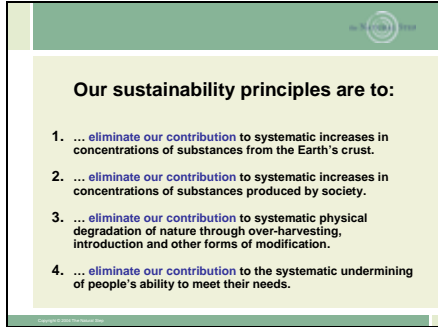
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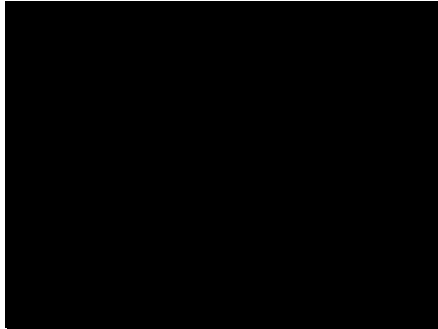
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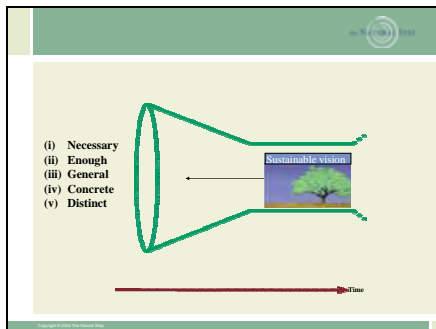
So, how do we find basic principles of any sustainable vision (that fit any of the possible 'dwellings'), so that all organization with their departments and experts can cooperate to get there? In order to do that, we need to understand enough of the system. Then we can proceed by identifying logical guidelines to approach the principles of sustainability, i.e. guidelines for sustainable development.

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To identify basic principles for sustainability, we need to identify basic mechanisms for how humans currently destroy the system. So what are the primary mechanisms of this destruction?

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Our sustainability principles 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 over-harvesting, introduction and other forms of modification.

4. … eliminate our contribution to the systematic undermining of people's ability to meet their needs.

This question led to an understanding of four different basic mechanisms by which the human society is currently eroding the whole system. By putting a 'not' in those mechanisms, it was possible to design basic principles for sustainable *practices* and *organizations* that are independent of scale and type of activity. Any practice is NOT part of the sustainability problem, if it does not violate those principles. Decreasing the dependence on violating those principles, is a way of systematically avoiding the risks of being hit by the 'funnel'. The principles are applied to scrutinize today's business ("do we contribute to the violation of those principles"?), trigger innovation and design for inherently sustainable practices in the future ("do these solutions phase out our violations of the principles"?), and help us guide actions in a strategic way ("How do we approach those solutions in a step-by-step fashion while being economic or even earning resources on the way?"). In fact, by understanding how to define sustainability, we have automatically approached the strategic level of the TNS Framework

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Knowing principles for success, e.g. principles of sustainability or principles of check-mate, makes it possible to move ahead - step by step while ensuring a good economy (I.e. "taking care of the pieces.")

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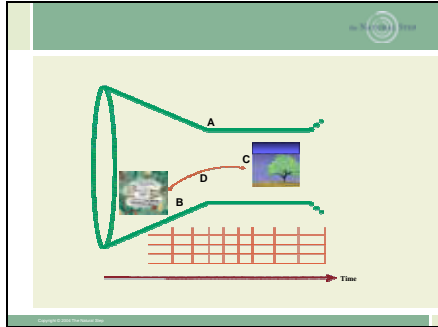
The Framework is operationalized into a concrete manual for systematic development of management programs, I.e. curing "Mrs. Anderson" or the company or community:
 A. Share the rules of the game before the game starts
 B. Assess today from a point of winning, not only from a rear-view perspective of trends and known problems.
 C. Create a list of solutions and visions – short term as well as long term.
 D. Pick actions from C list that (I) go in right direction, (II) are flexible platforms for further improvement and (iii) economically sound even in the short to mid-term perspective.
In this way economically feasible doors are opened to a future with even greater economic potential. Financially sub-optimized investments and worse - costly dead ends - are avoided in this way. This is the only rational way of dealing with trade-offs. From "choosing between plague or cholera" to"picking financially smart investment routes to success." This is the generic framework for thinking and planning strategically in our times, and it can be applied for all kinds of endeavors…

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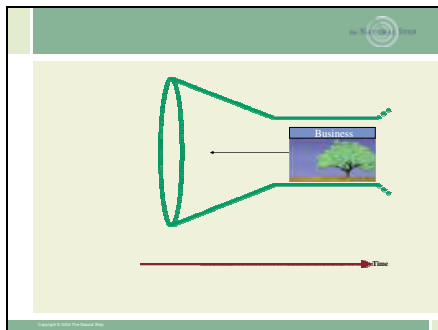
An example is from Electrolux. Envisioning future compliance with the First System Condition, Electrolux top management did not only want to increase their recycling rates of metals by incremental steps, and/or phase out metals that are currently displayed on headlines as dangerous from a sustainability point of view. Electrolux applied the Framework to ask a more intriguing question from a full sustainability perspective: "Since it is difficult to have 0% leakage of metals into the environment, which metals are so abundant that they are relatively safe from tomorrow's sustainability perspective, and which are so scarce that even small leakages pose future threats?"

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Since then (90s) the Framework has been applied and scrutinized at one business organization after another, further refining it, and developing it, and demonstrating that it is really generic - we can use the TNS framework for any business at any scale. More and more business people around the world learn to backcast from sustainability principles today. This is how Ikea and Nike (working with TNS in Sweden and US respectively) developed plans to phase out PVC, and this is what made Hydro Polymers respond by developing strategic plans by backcasting from sustainable PVC. And this is how Electrolux was first on the global market to phase out CFC's without jumping into other unsustainable coolants, this is how Matsushita has performed their sustainability analyses of there TV's, Refrigerators and their recycling plant METEC, this is how Banco Real has started to make business in Brazil, and this is how McDonalds in the US has changed their policy in agriculture as regards antibiotics and GMO. True as this may be, it is also a sort of lie. It is NOT these organizations thinking and planning like this, it is about people in those and other organizations – change agents – thinking and planning like this.

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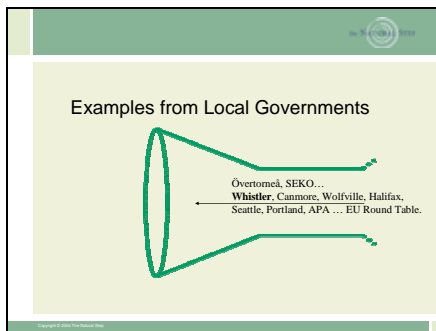
Since any actor can apply the same framework, this generic quality is now proving itself on a growing number of Local Governments and regions. It makes it possible for the regional officials to use the same language not only within Government, but within the community of local organizations and businesses in the region. Backcasting from Principles becomes a big "family game", whereby people can play by the same rules. When each organization analyzes their situation by the same basic principles, synergies as regards solutions can be found and the transition gets systematic. This started in Övertorneå, a little municipality far north in Sweden, spread to a number of Swedish municipalities and cities out of which 60 has created an association – Swedish Eco Communities (SEKO) – and then onto the global level. Today, Whistler in Canada is a role model in Canada and internationally.

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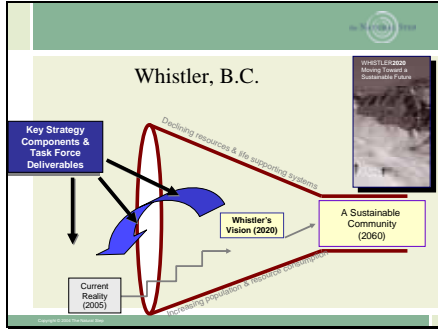
In the year 2000, the Municipality of Whistler had made some significant progress in setting out a direction of sustainability with a new vision and environmental strategy and had began to build community partnerships but were looking for a clear way of communicating this new priority with the broader community and, in particular, with local businesses. As with most communities, there were so many interests, so many diverging wants and needs – it was hard to develop a common, approach for sustainability.

The municipality joined with key stakeholders in the community, which they called early adopters, and together they learned about sustainability and The Natural Step Framework and then engaged the broader community.

Each of these organizations and many others are partners in Whistler 2020, sharing in the actions and resources - it is a community plan, not just a local government plan. This plan has won numerous awards, including the Federation of Canadian Municipalities national award for sustainable community planning and the LivCom award for best long range planning, a UNEP-endorsed award..

The picture display's Whistler's use of the TNS framework's A,B,C,D analysis. The yellow circle at C denotes sustainability constraints, basic principles for social and ecological sustainability, that informs the envisioning work of Whistler. 18 community areas analyzed, e.g. affordable housing, energy, water, education, recreation, etc.,are using the ABCD process An example of Backcasting from Principles related to climate change is Whistler's negotiation's with the local utility company. A proposal to build a pipeline for natural gas sized for the next 50 years, and supplying the winter Olympics, based on the rational of natural gas having less carbon per energy unit than propane, had been turned down. Intelligent "backcasting" questions about a) the direction of the investment, b) the flexibility of the investment, and c) the return on investment led to that the proposed $50 million investment could not be safely justified. The thinking lead to a smaller natural gas pipeline serving as a stepping stone to a sustainable energy system featuring a locally-owned utility that gets into geothermal, district heating, etc.

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Communities in Nova Scotia
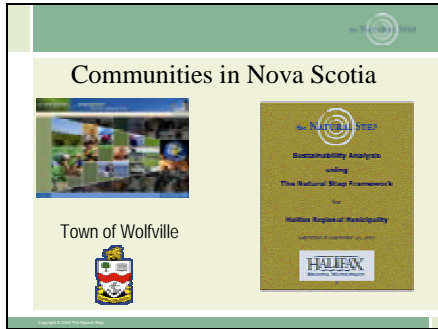
Town of Wolfville

Two communities in this province have also used the Natural Step Framework for different sustainable community planning, outreach and analysis initiatives.

The Town of Wolfville
The Town of Wolfville has adopted the Natural Step Framework and initiated a sustainable community planning process, including a revision of their municipal development plan and a citizen engagement program on sustainability. A number of municipal employees and community members have been trained on the Natural Step, and the Town was one of 10 launch partners for the Natural Step's e-learning course Sustainability - Step by Natural Step.

2. Halifax Regional Municipality
The Halifax Regional Municipality worked with the Natural Step Canada to perform a corporate-wide sustainability analysis, using the Natural Step Framework as a holistic one-system framework to assess the sustainability challenges and opportunities of its operations as part of its commitment to make Halifax a "healthy, vibrant, and sustainable community." They were also one of the launch partners for the e-learning course Sustainability - Step by Natural Step.

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Backcasting from Sustainable Communities

- **Local government is a natural area for application:**
  - e.g transportation, construction, energy, water, agriculture, land-use, social services, business, etc...
- **Vision within sustainability principles**
- **Science-based principles "politically" neutral**
- **Civil service officials key to long-term approach.**

The local government is a critical player for sustainable development and communities and regions are a natural level for applying "backcasting from sustainability principles," because they are close to people and cross-sectoral issues, requiring co-operation many actors and sectors, including business. Backcasting on a community level requires visioning within sustainability principles. The scientific sustainability principles are politically neutral, and so can be instrumental in helping diverse stakeholders begin the backcasting and visioning process with what they agree on. In these kinds of processes, the civil service officials who are not politically elected are key to ensuring a long-term approach that outlasts any particular elected leadership and terms of office.
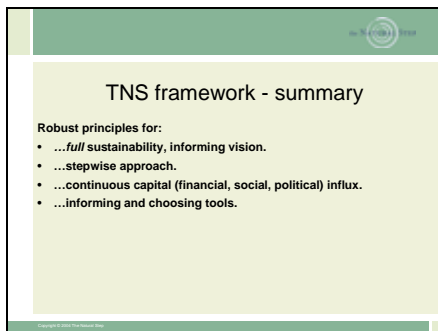
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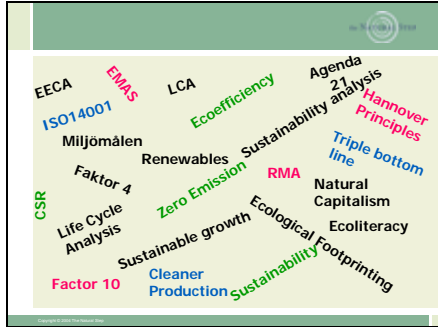
As already mentioned, there are many tools, but outside the context of a shared framework all the tools have begun to be perceived as confusing in themselves. What aspects of sustainability are covered by the respective tools, and what are the gaps that need to be covered by other tools? Which of those tools do we need for a given planning endeavor, and which tools can we do without?

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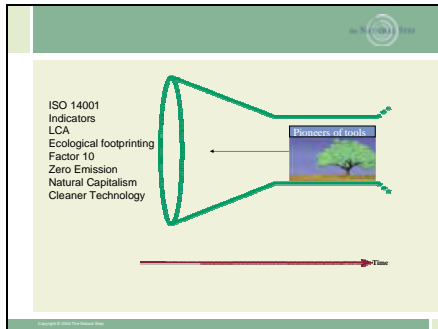
To respond to this question, The Natural Step has led a systematic study of tools, by applying the TNS framework together with the pioneers of the tools. The approach is to imagine that any organization have complied with the four system conditions in the future, followed by the question: "How could the respective tool or concept be used to support the organization's transition, and what could it *not* do?" In a UNEP initiative, a number of those pioneers have come together and jointly published their result in UNEP's scientific journal J Cleaner Production. The article is the most downloaded article in the journal's history. People long for comprehension. An all embracing framework is made for that – comprehension – and is not an alternative to various kinds of tools.

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The good thing is that it has been possible to…

1. …demonstrate a business advantage for individual organizations to plan systematically towards sustainability,
2. …produce a framework for planning and selection of tools,
3. …expanding the number of positive role models working like this,

But the sad thing is that…

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…many problems remain that slow the process:

1. Competitive advantage to not sharing knowledge.
2. Weak political leadership on Sustainability.
3. Mass media focus on sensations rather than solutions.
4. Current economic framework dysfunctional (perverse subsidies, obsolete taxes).
5. Industry organizations support average rather than proactive.
6. Companies afraid of "fouling their own nest" by being provocative and encourage tougher legislation.
7. Social un-sustainability leads to vicious cycles.

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The next challenge:

Crossing borders!

To that end, the next challenge for TNS is to move from helping individual organizations, to orchestrating trans-sector and trans-disciplinary cooperation.

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So far, our twelve national TNS teams have mainly coached one business organization at a time, one municipality at a time, one university at a time. But to create levarage towards a sustainable society, it is mandatory that various societal sectors begin to cooperate. To that end, the generic framework we have developed is independent of activities and scale, and provides a helpful 'language' for systematic cooperation. With this language, we can give concrete trans-sector coopertion a face. TNS is going to take that challenge on, by presenting new action programmes developed to encourage transdisciplinary and transsector cooperation.

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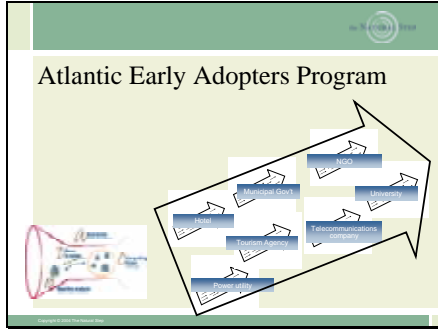
And this same trans-sectoral co-operation is the spirit of the approach being proposed and developed right here in Atlantic Canada, where a group of local organizations led by GPI Atlantic and the Nova Scotia Environment Network are organizing an Early Adopters program, modeled after approaches in Whistler and in Canmore, Alberta. This initiative will begin with a training workshop in October and ultimately will see a group of organizations in the region - organizations from different sectors and industries including local governments, small and large businesses, academic institutions, nongovernmental organizations - go through a training and planning program based on the ABCD approach, learning about the Natural Step Framework together and applying it to their own operations. I invite you to talk to representatives of those organizations or TNS Canada to learn more. Thank you!

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