

Sustainability: The Leadership Challenge

Dr. Karl-Henrik Robèrt

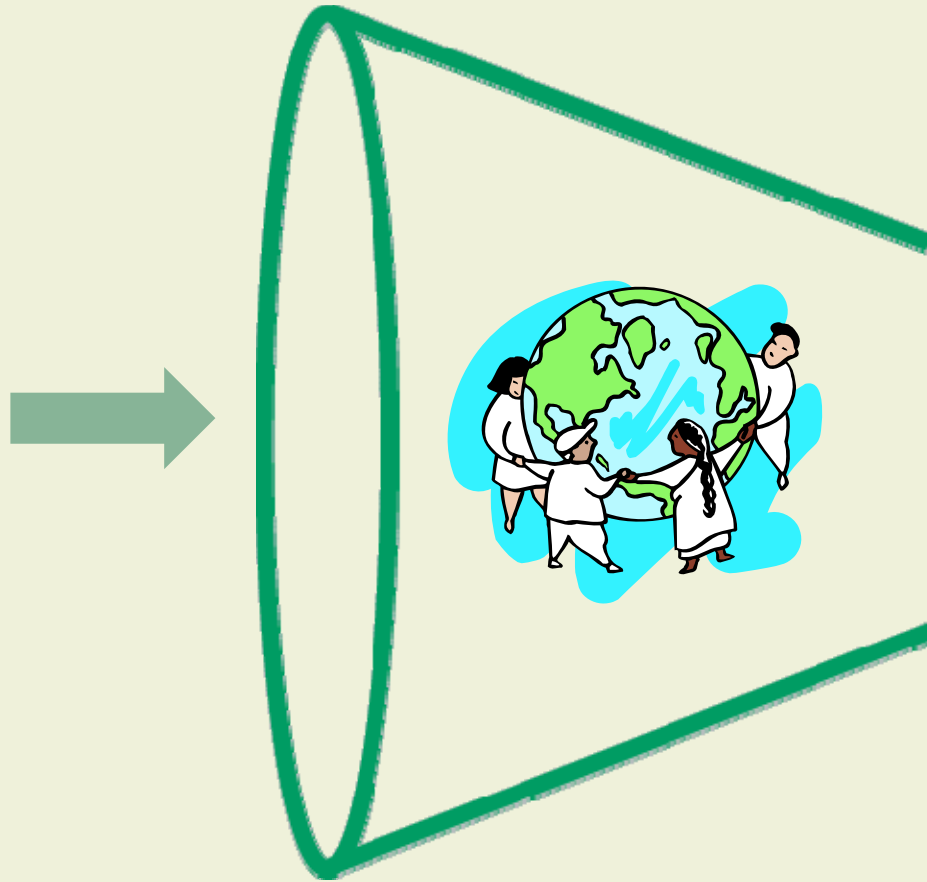
September 2006, Halifax, Nova Scotia

Systems thinking

- Individuals
- Groups



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- **Forests**
- **Agriculture**
- **Fisheries**
- **Ground water**
- **Climate**
- **Metals and chemicals**
- **Developing world**
- **Global justice**
- **Interpersonal trust**
- **Stories of meaning**

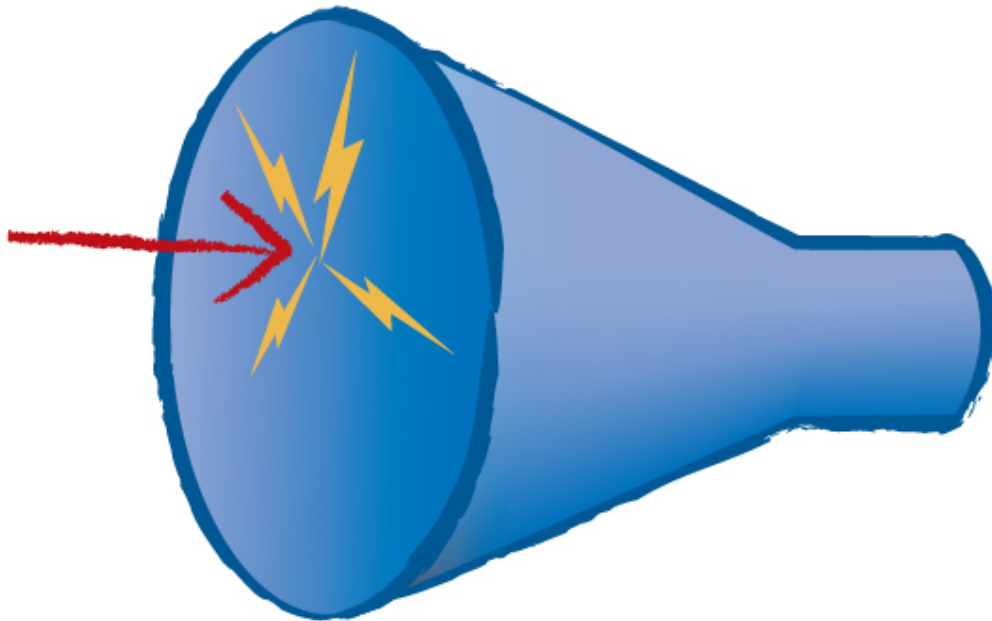
Time

Leadership in a highly changing world

More about competence than values!

Strategic Opportunities

for those who foresee changes:



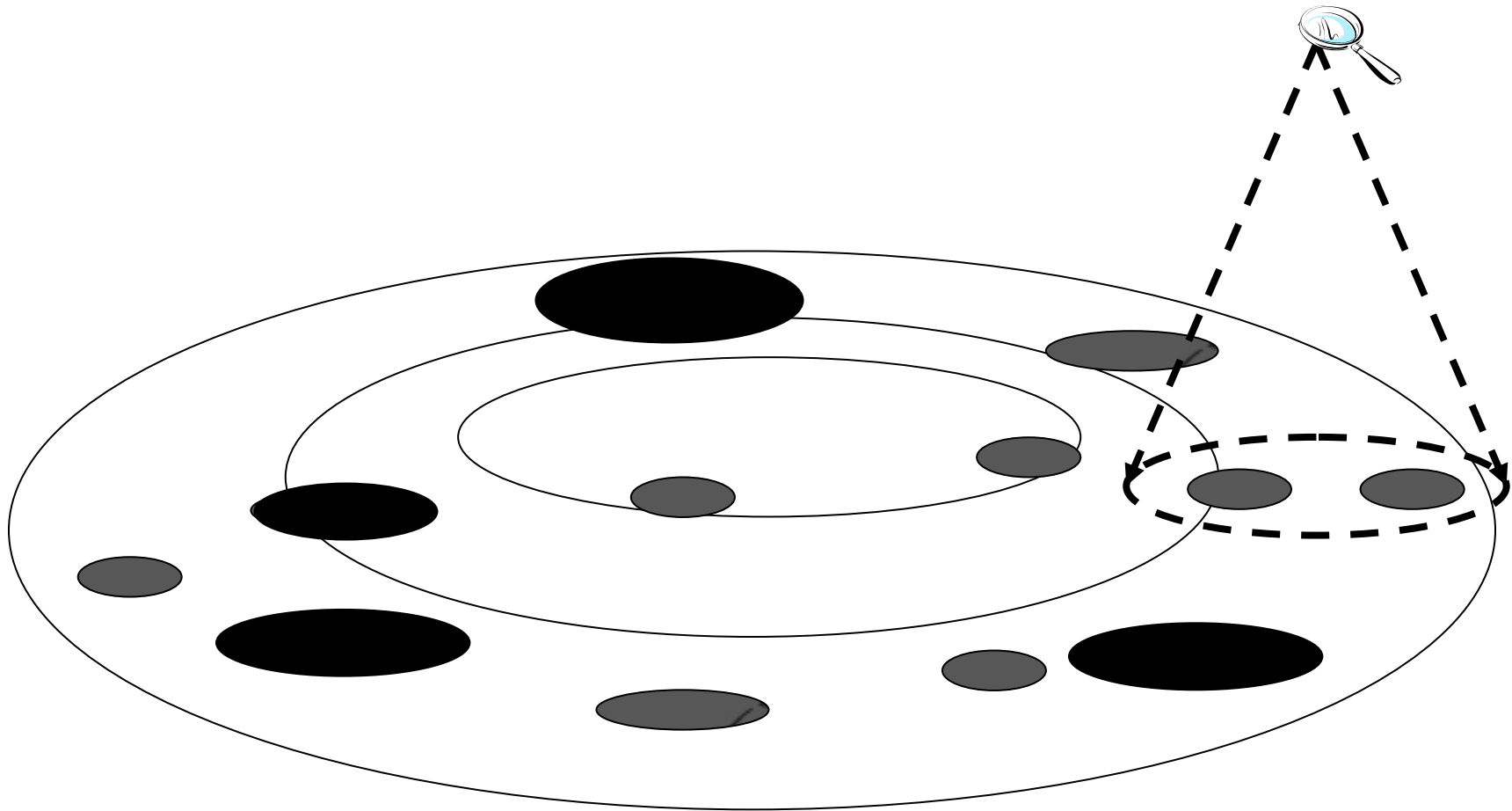
- Resource costs
- Waste management
- Tax, legislation, insurance, loans
- International agreements
- Credibility
- Employees
- Community

So, what's the problem?

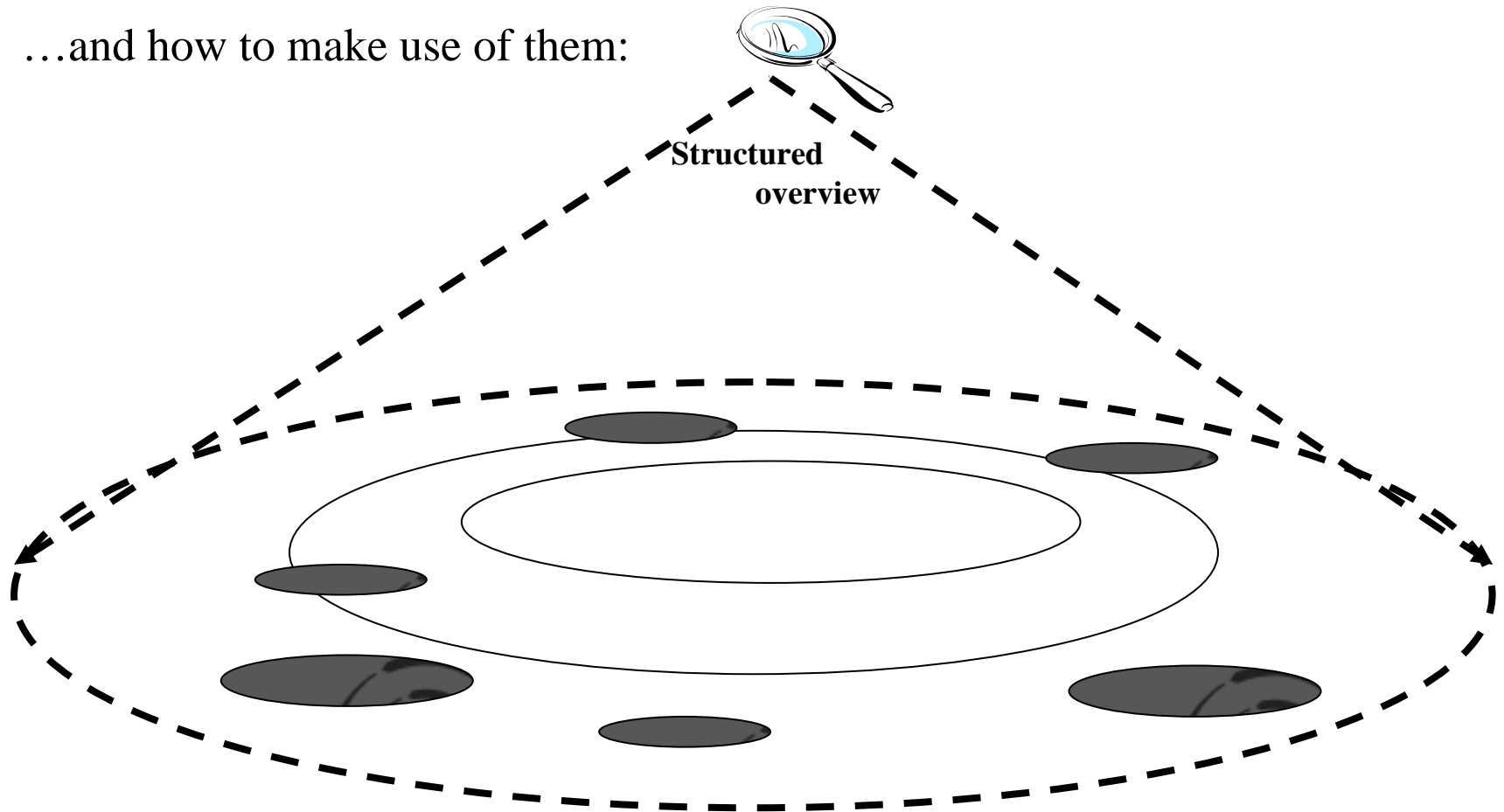
Avoiding reductionism...



The drill holes...



...and how to make use of them:



EECA
ISO14001
EMAS
LCA
Ecoefficiency
Agenda 21
Sustainability analysis
Hannover Principles
Renewables
Factor 4
Zero Emission
RMA
Triple bottom line
CSR
Life Cycle Analysis
Sustainable growth
Ecological Footprinting
Natural Capitalism
Ecoliteracy
Factor 10
Cleaner Production
Sustainability

Planning from trends 'minus problems': Forecasting



Planning from idea of Success = Backcasting



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Nobody can look into the future...

...but we can invent it!



The Natural Step



- International NGO
- Scientific approach
- All Embracing Framework
- Strategic Advice & Education
- Leadership and Role models
- Innovative tools and services



Strategic Leadership towards Sustainability

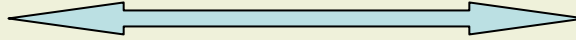
- **International science program**
- **Masters program**



Finding a unifying theory

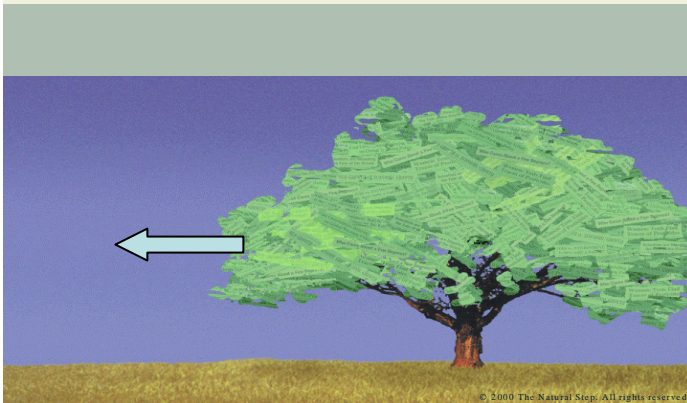
Empirical methods

- Data-collection
- Ideas: Zero Emission, Foot-printing, Factor 10, Global Compact, WBC, GRI, IE, CSR....
- Competition



Deductive methods

- Theoretical/Logics
- Principles for:
 - (i) System, (ii) Success
 - (iii) Strategic, (iv) Actions
 - (v) Tools
- Learning trans-disciplinary dialogue

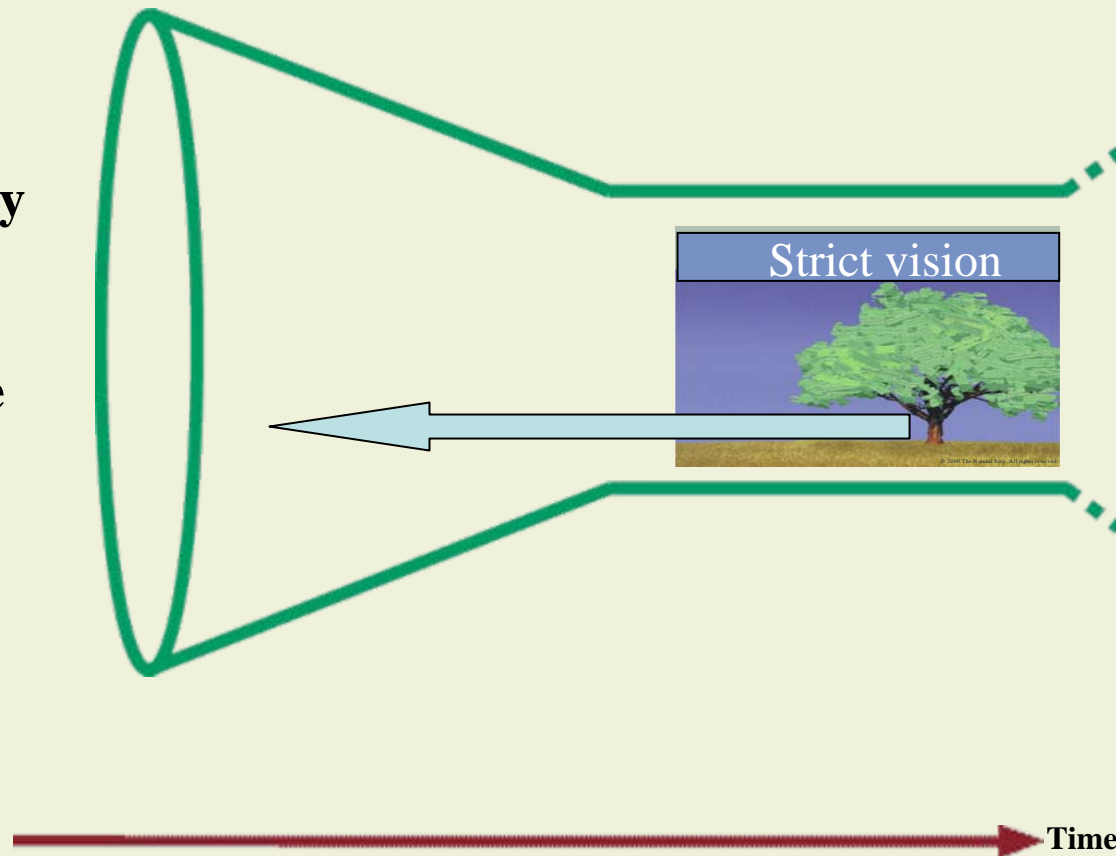


TNS 'hub' for cooperation with universities:

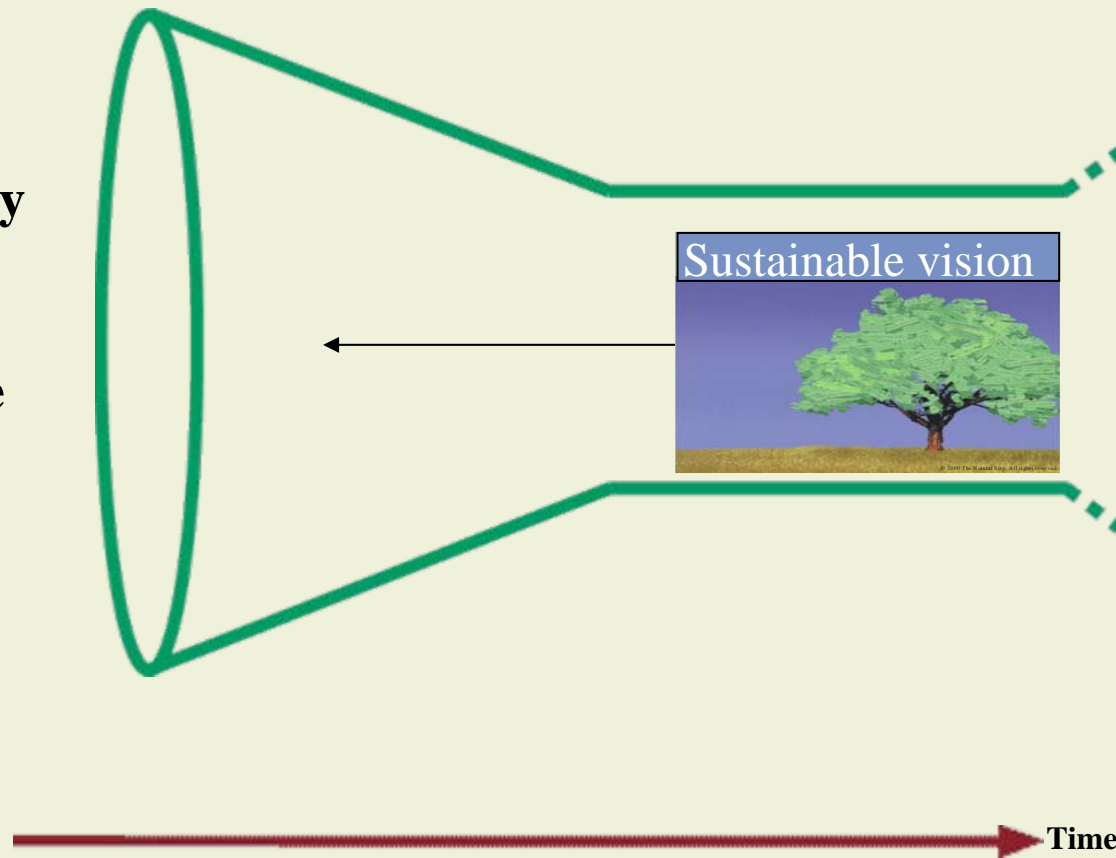
BTH (Sustainable Product Development)
Chalmers (Physical Resource Theory)
Chalmers (Logistics and transport)
Lund's University (System dynamic modelling)
Tampere University (Industrial Ecology)
British Columbia (Social Sciences)
Newcastle Australia (Metals and minerals)
KTH (Construction and Regional Planning)
Tokyo (Materials)...

Leadership requires generic success principles

- (i) **Necessary**
- (ii) **Enough**
- (iii) **General**
- (iv) **Concrete**
- (v) **Distinct**



- (i) Necessary**
- (ii) Enough**
- (iii) General**
- (iv) Concrete**
- (v) Distinct**

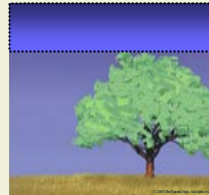
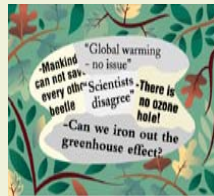
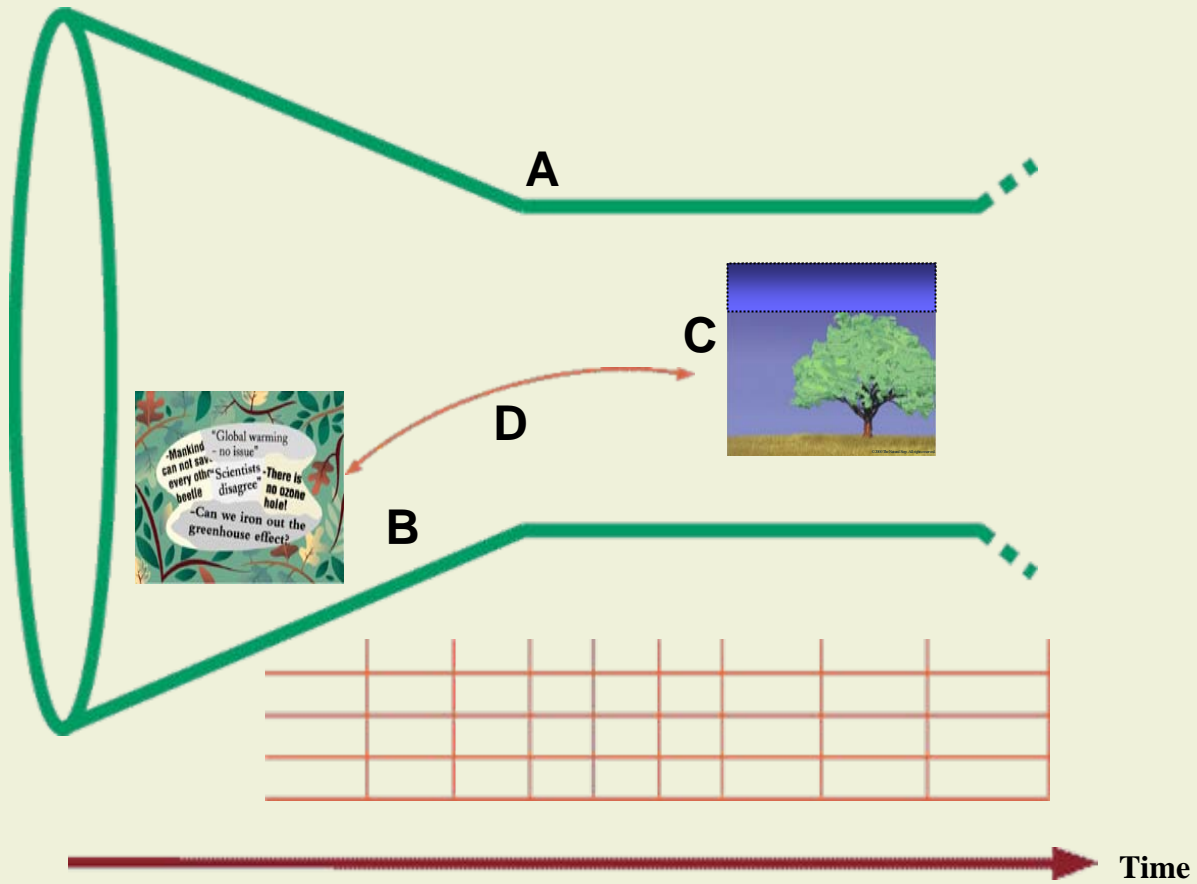


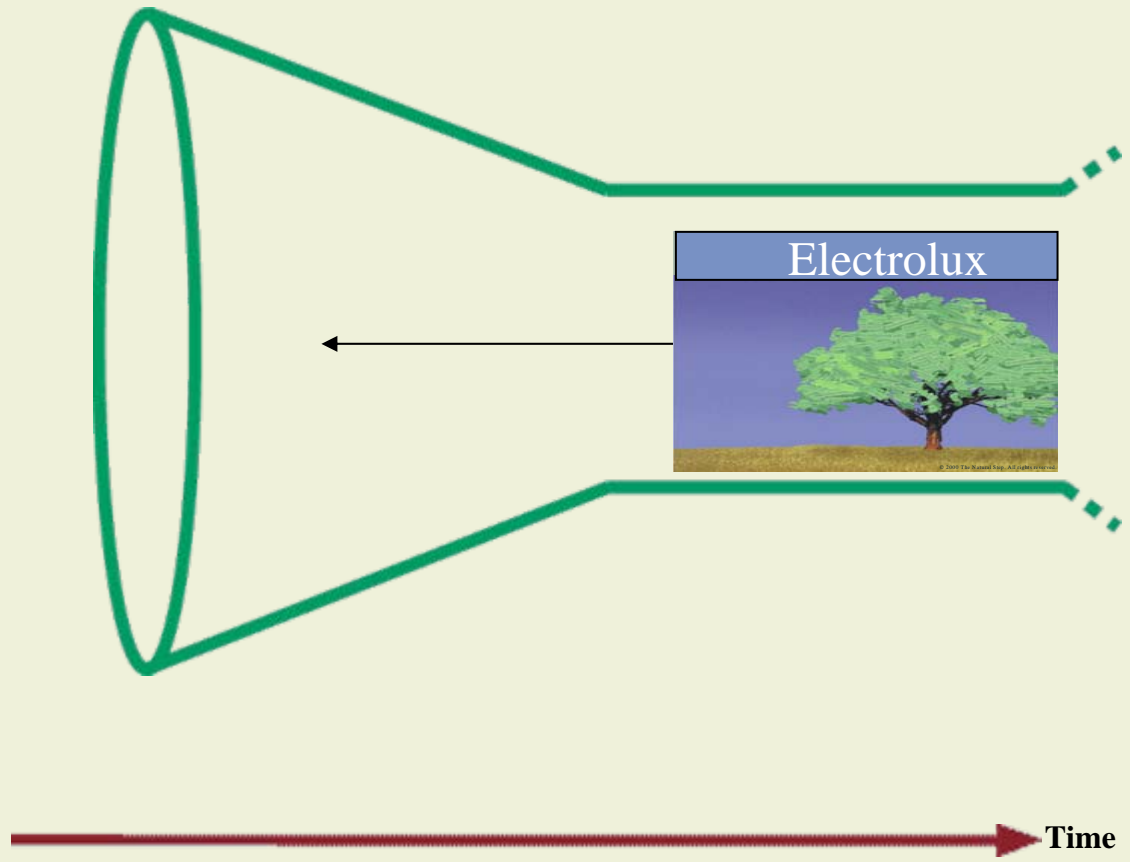


Our sustainability principles are to:

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.







METAL	IN TOP SOIL (MG/KG)	WEATHERING (W) (KTON/YEAR)	MINING (M) (KTON/YEAR)	FOSSIL FUELS (F) (KTON/YEAR)	(M+F) / W
Al	72 000	1 100 000	18 000	34 000	0,047
Fe	26 000	390 000	540 000	34 000	1,5
Ti	2 900	44 000	2 500	1 700	0,095
Cr	54	830	3 800	34	4,6
Cu	25	380	9 000	55	24
Pb	19	290	3 300	85	12
Cd	0,35	5,3	20	3,4	4,4
Hg	0,09	1,4	5,2	10	11



Examples from Local Governments



Övertorneå, SEKO...

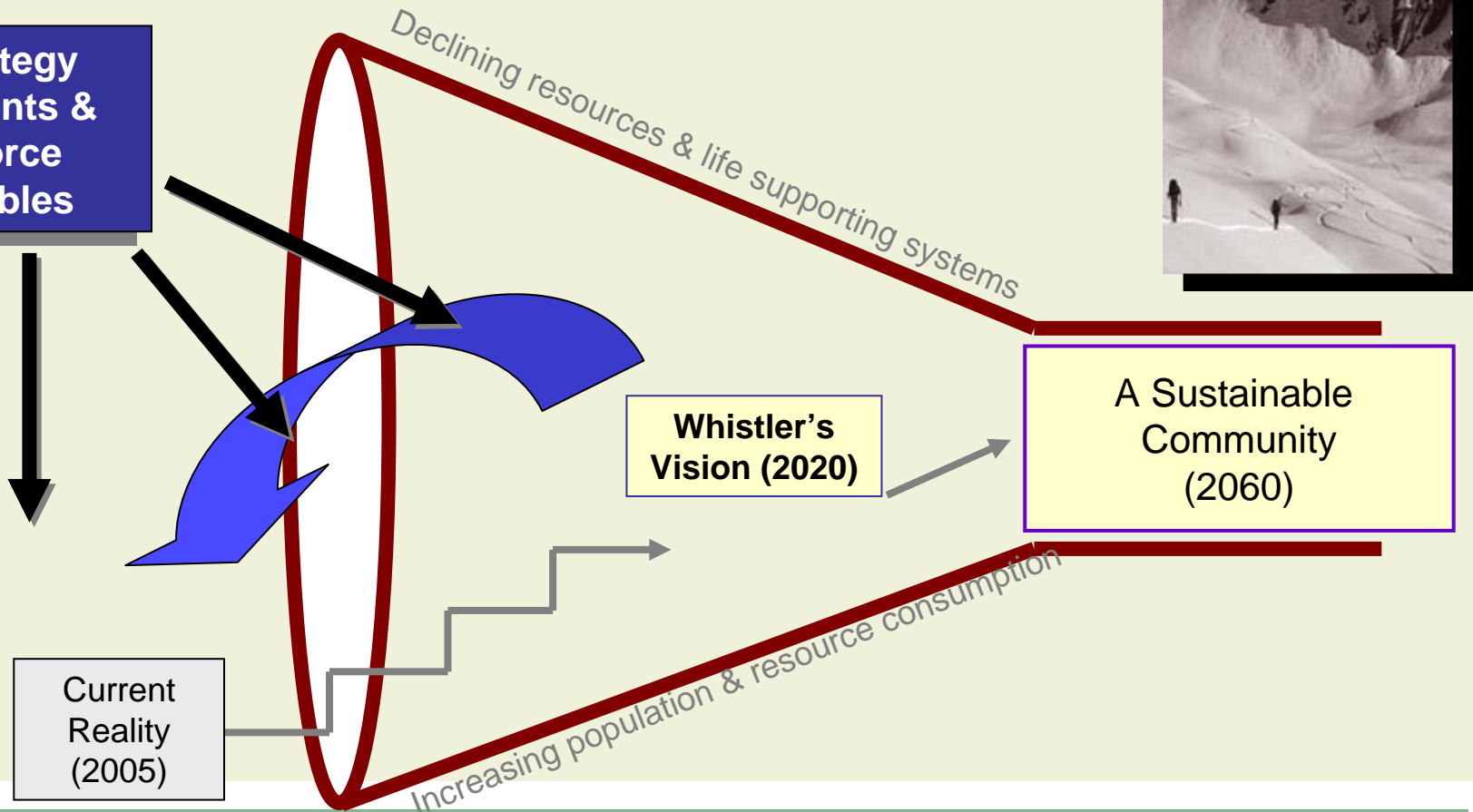
Whistler, Canmore, Wolfville, Halifax,
Seattle, Portland, APA ... EU Round Table.

Whistler, B.C.

WHISTLER2020
Moving Toward a
Sustainable Future



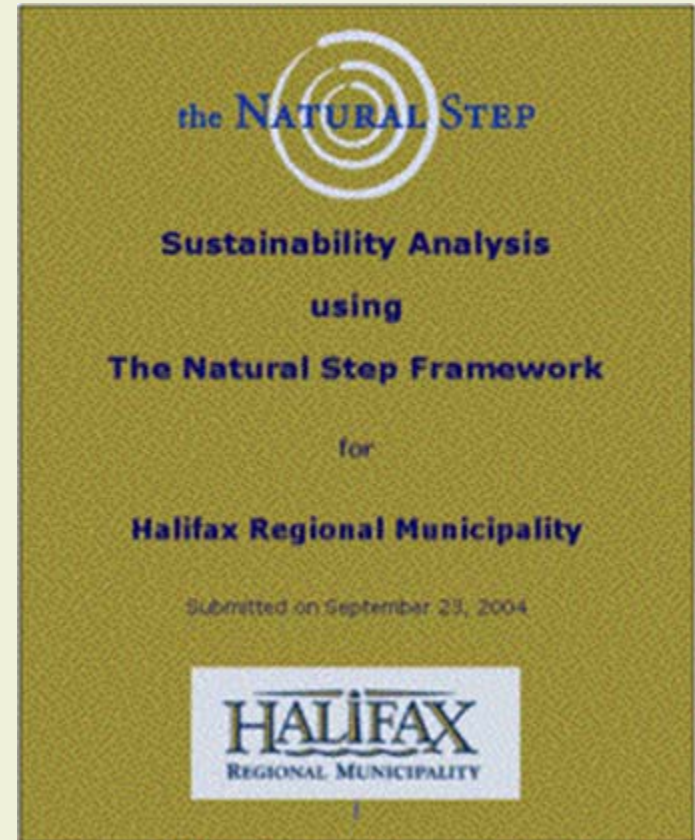
Key Strategy
Components &
Task Force
Deliverables



Communities in Nova Scotia



Town of Wolfville

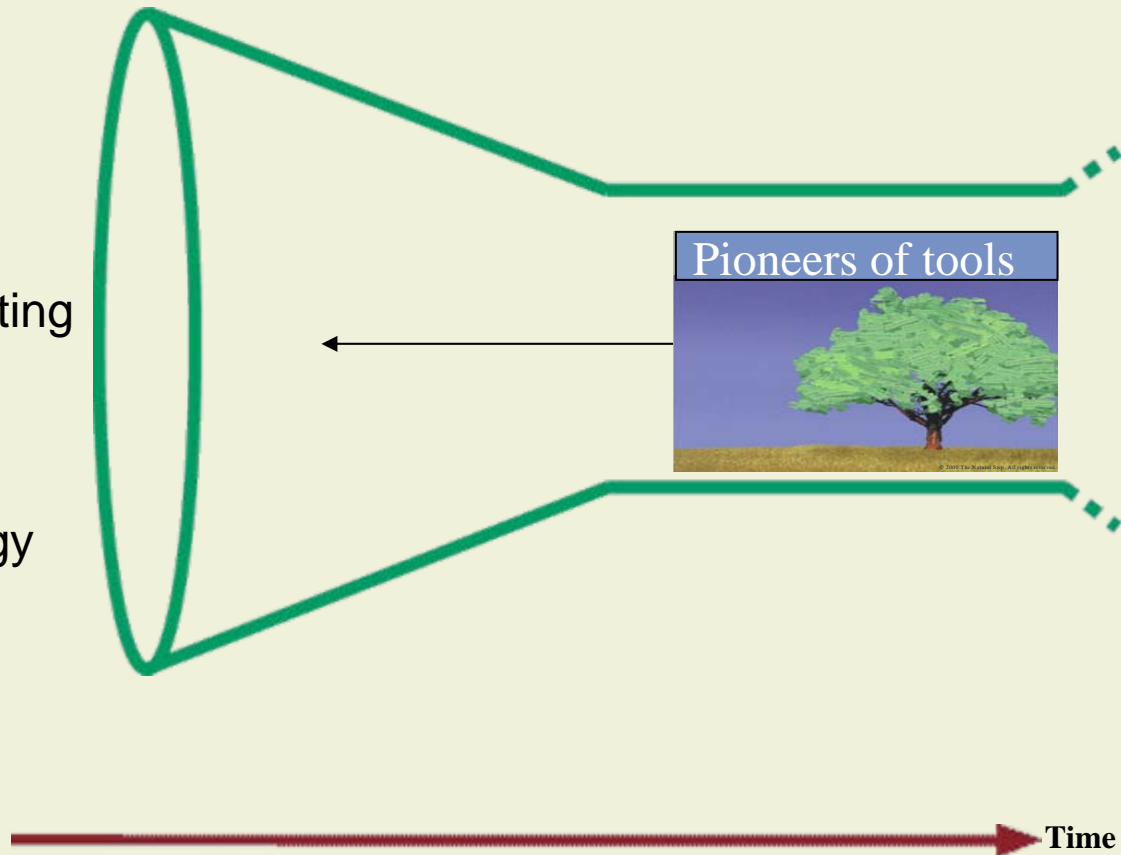


Backcasting from Sustainable Communities

- **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.**

EECA
ISO14001
EMAS
LCA
Ecoefficiency
Agenda 21
Sustainability analysis
Hannover Principles
Miljömålen
Renewables
Sustainable growth
Triple bottom line
Faktor 4
Zero Emission
RMA
Natural Capitalism
Life Cycle Analysis
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Ecological Footprinting
Factor 10
Cleaner Production
Sustainability

ISO 14001
Indicators
LCA
Ecological footprinting
Factor 10
Zero Emission
Natural Capitalism
Cleaner Technology



Tools and concepts, conclusions

- **There are many good tools and concepts**
- **Each have their own merits and gaps**
- **None can replace systems perspective**
- **Systems perspective increases their utility**

TNS framework - summary

Robust principles for:

- **...*full* sustainability, informing vision.**
- **...stepwise approach.**
- **...continuous capital (financial, social, political) influx.**
- **...informing and choosing tools.**

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...

...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.**

The next challenge:

Crossing borders!

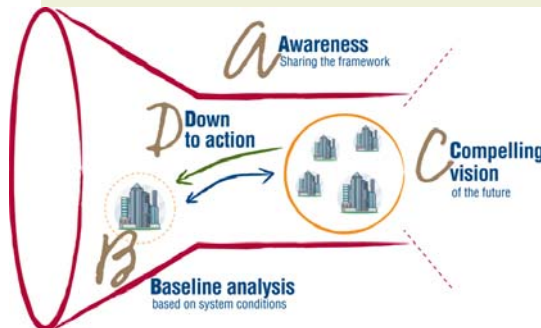
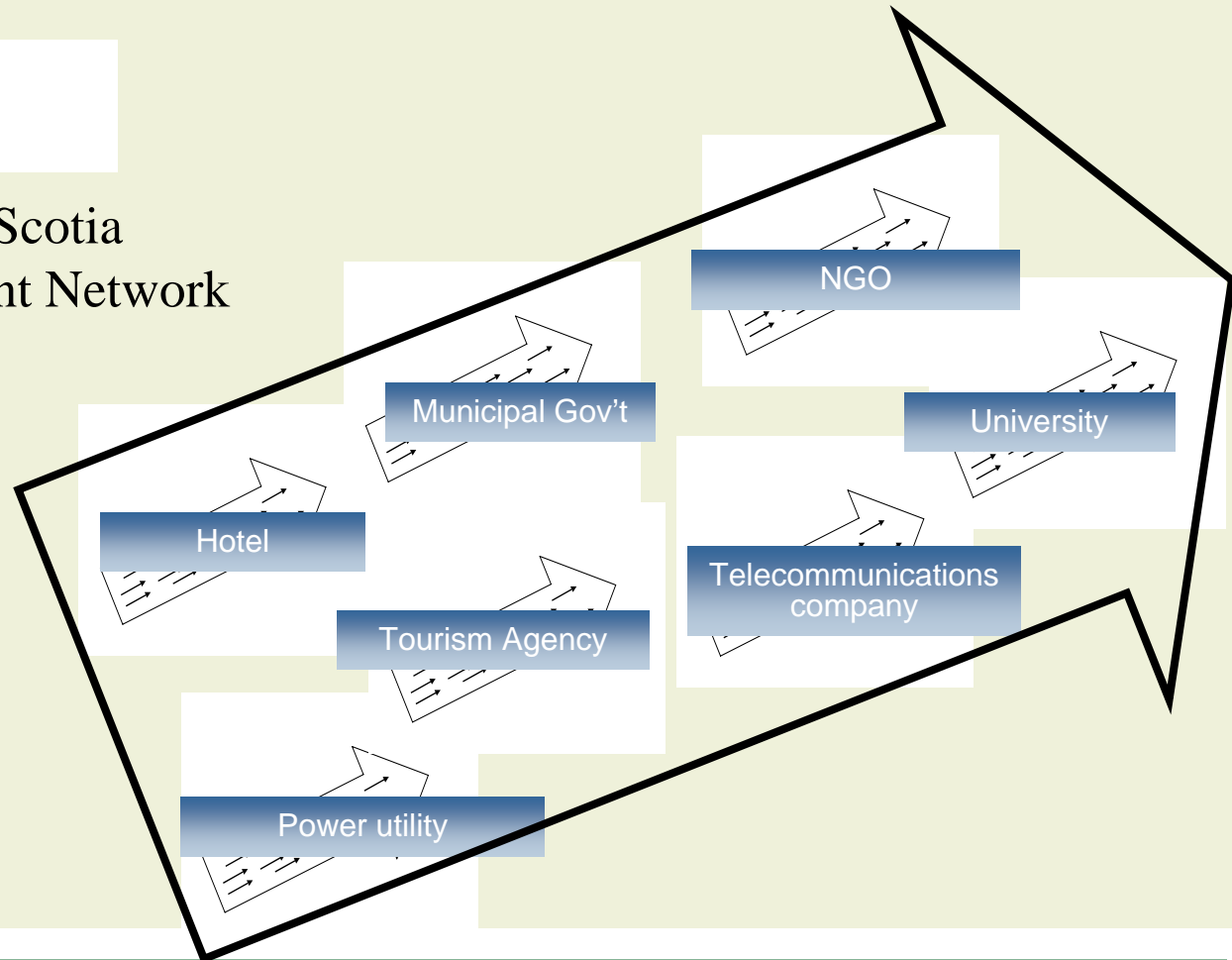


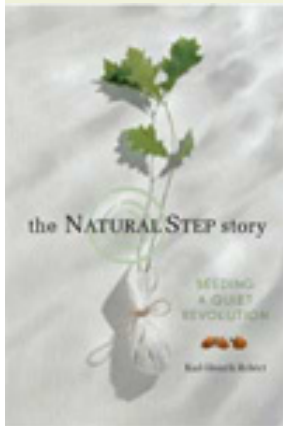
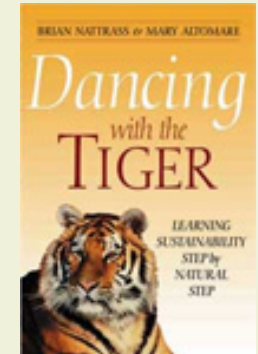
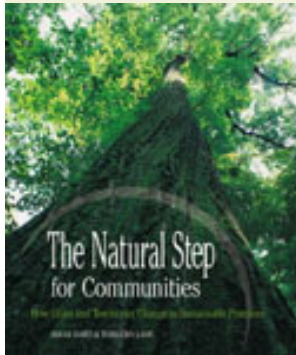
Atlantic Early Adopters Program

QuickTime™ and a
TIFF (LZW) decompressor
are needed to see this picture.



Nova Scotia
Environment Network



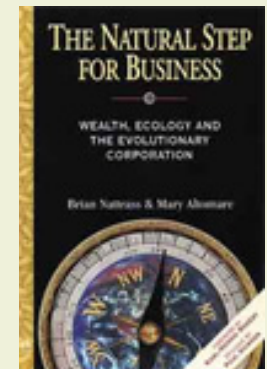


Thank you!

The Natural Step Canada

<http://www.naturalstep.ca>

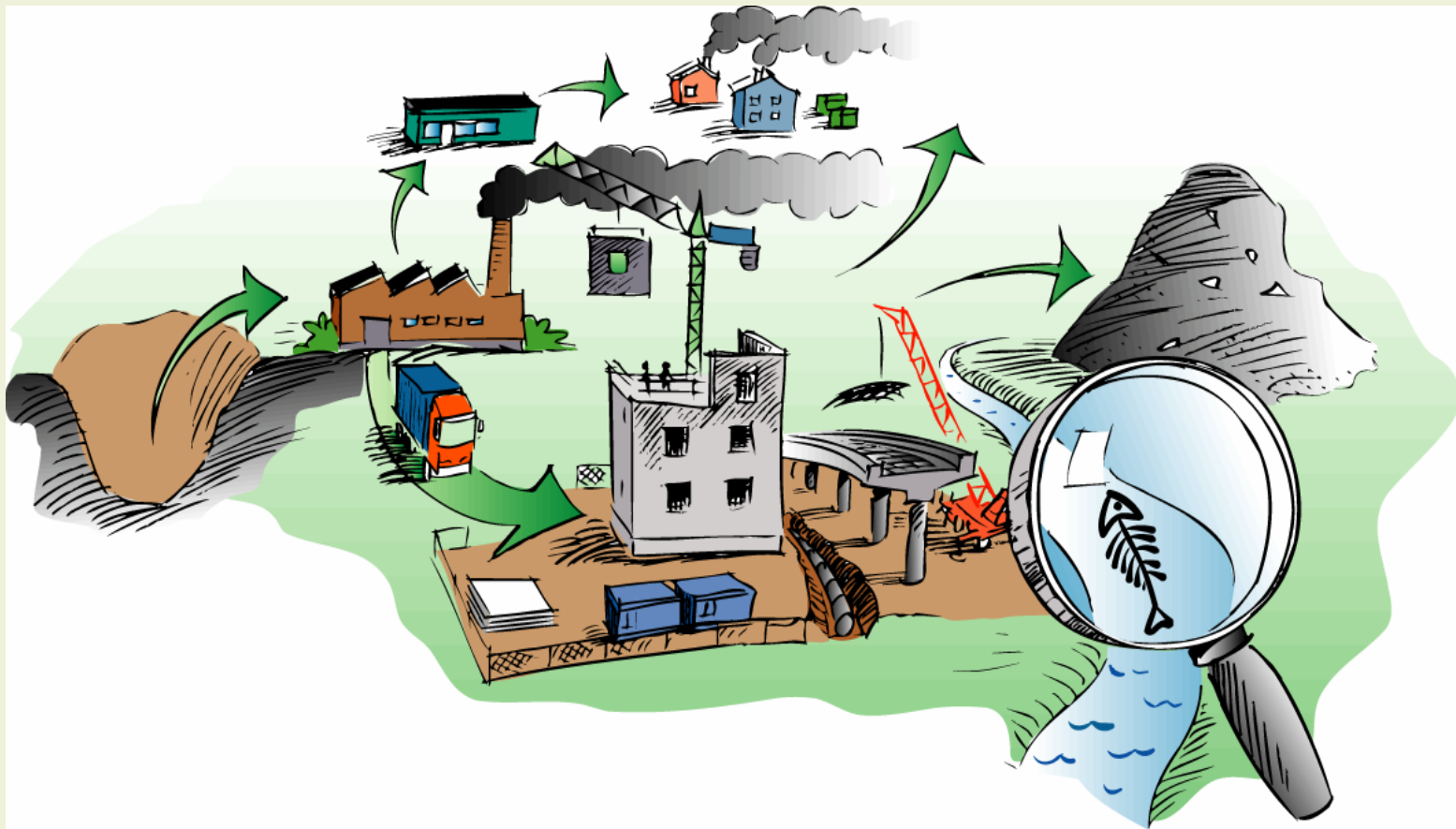
(613) 748-3001



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Backcasting from Principles

- from 'fix' to holistic innovative design -



THE EPIDEMIOLOGY OF TOXIC STEWS

Table 2

Summary of qualitative identifications of volatile compounds in mother's milk^a (according to (32))

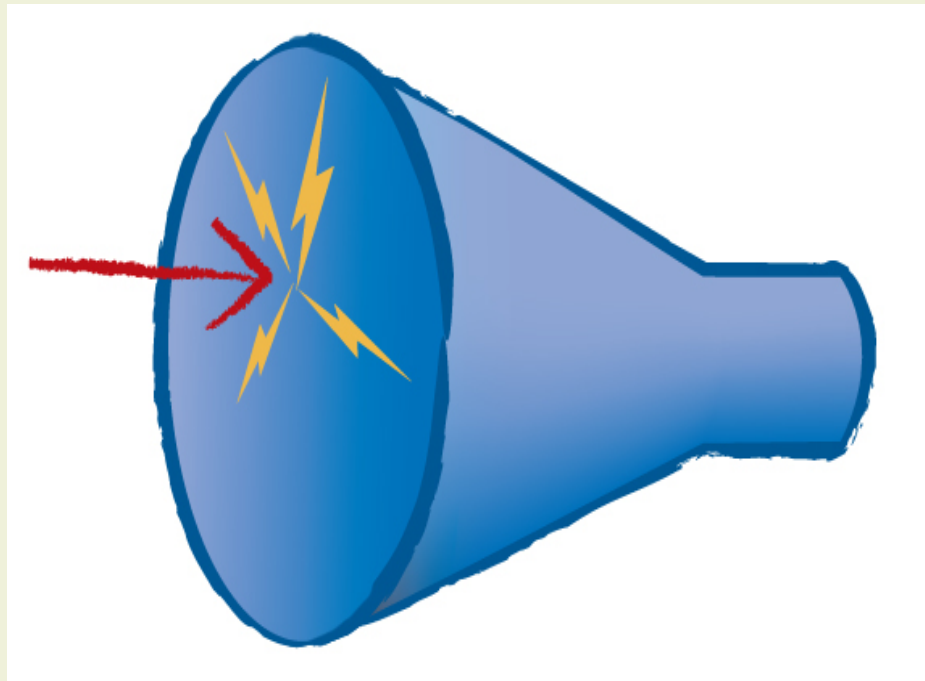
Compound	No. of times found ^b	Compound	No. of times found ^b	Compound	No. of times found ^b
Halogenated compounds					
chlorodifluoromethane	1	methyl pentanone	2	C ₁₀ H ₂₂	7
chlorotrifluoromethane	4	methyl hydrofuranone	1	C ₁₁ H ₂₄	7
dichlorodifluoromethane	2	2-methyl-3-hexanone	1	C ₁₂ H ₂₆	7
chloromethane	2	4-heptanone	1	C ₁₃ H ₂₈	3
chloroethane	2	3-heptanone	4	C ₁₄ H ₃₀	3
trichlorofluoromethane	7	2-heptanone	6	C ₁₅ H ₃₂	2
dichloroethylene	1	methyl heptanone	2	A.kenes	
Freon 113	8	furyl methyl ketone	1	C ₇ H ₈	2
methylene chloride	8	octanone	2	C ₈ H ₈	5
chloroform	7	acetophenone	8	C ₉ H ₁₀	3
1,1,1-trichloroethane	8	2-nonanone	4	C ₁₀ H ₁₂	8
carbon tetrachloride	5	2-decanone	1	C ₁₁ H ₁₄	8
trichloroethylene	8	alkylated lactone	1	C ₁₂ H ₁₆	7
chloropentane	2	phthalide	1	C ₁₃ H ₁₈	6
dibromochloromethane	1	Other oxygenated isomers		C ₁₄ H ₂₀	6
tetrachloroethylene	7	C ₈ H ₁₆ O	1	C ₁₅ H ₂₂	1
dichloropropene	1	C ₉ H ₁₈ O	2	C ₁₇ H ₂₆	1
chlorobenzene	5	C ₁₀ H ₂₀ O	2	C ₁₈ H ₂₈	1
chlorohexane	4	C ₁₁ H ₂₂ O ₂	1	isoprene	1
iodopentane	1	C ₁₂ H ₂₄ O	2	Alkynes	
3-methyl-1-iodobutane	2	C ₁₃ H ₂₆ O	4	C ₃ H ₄	2
chloroethylbenzene	1	C ₁₄ H ₂₈ O	2	C ₆ H ₁₀	1
dibromo-dichloromethane	1	C ₁₅ H ₃₀ O	2	C ₇ H ₁₂	3
dichlorobenzene	8	C ₁₆ H ₃₂ O ₂	1	C ₈ H ₁₄	3
chlorodecane	1	C ₁₇ H ₃₄ O	1	C ₉ H ₁₆	4
trichlorobenzene	1	C ₁₈ H ₃₆ O	2	C ₁₀ H ₁₈	2
Aldehydes					
acetaldehyde	4	C ₁₉ H ₃₈ O ₂	1	C ₁₂ H ₂₂	1
methyl propanal	2	C ₂₀ H ₄₀ O ₂	2	Cyclic	
n-butanal	6	C ₂₁ H ₄₂ O ₂	1	cyclopentane	6
methylbutanal	2	C ₂₂ H ₄₄ O ₂	1	methyl cyclopentane	6
crotonaldehyde	1	C ₂₃ H ₄₆ O ₂	1	cyclohexane	5
n-pentanal	7	C ₂₄ H ₄₈ O ₂	1	ethyl methyl cyclohexane	1
n-hexanal	8	C ₂₅ H ₅₀ O ₂	1	C ₁₀ H ₁₈ isomers	1
furaldehyde	2	C ₂₆ H ₅₂ O ₂	1	C ₁₂ H ₁₈ isomers (other)	4
n-heptanal	7	C ₂₇ H ₅₄ O ₂	1	limonene	8
benzaldehyde	8	C ₂₈ H ₅₆ O ₂	1	methyl decalin	1
n-octanal	3	C ₂₉ H ₅₈ O ₂	1	α-pinene	1
phenyl acetaldehyde	1	C ₃₀ H ₆₀ O ₂	1	camphene	1
n-nonanal	6	C ₃₁ H ₆₂ O ₂	1	camphor	1
methyl furaldehyde	1	C ₃₂ H ₆₄ O ₂	1	Aromatic	
n-decanal	2	Alcohols		benzene	8
n-undecanal	2	methanol	1	toluene	8
n-dodecanal	.	isopropanol	8	ethylbenzene	8
Ketones					
acetone	8	2-methyl-2-propanol	1	xylene	8
methyl ethyl ketone	5	n-propanol	1	phenyl acetylene	1
methyl propyl ketone	2	1-butanol	3	styrene	8
methyl vinyl ketone	2	1-pentanol	4	benzaldehyde	8
ethyl vinyl ketone	4	α-furfuryl alcohol	2	C ₁ -alkylbenzene isomers	8
2-pentanone	4	2-ethyl-1-hexanol phenol	1	C ₂ -alkylbenzene isomers	6
				methyl styrene	2
				dimethyl styrene	5
				C ₁ -alkylbenzene isomers	2
				naphthalene	6
				C ₄ -alkylbenzene isomers	1
				Compound	
				2,2,4-trimethylpenta-1,3-diol	1
				α-terpineol	1
				Acids	
				acetic acid	2
				decanoic acid	1
				Sulfur Compounds	
				sulfur dioxide	1
				carbon disulfide	8
				dimethyl disulfide	6
				carbonyl sulfide	1
				Nitrogen Compounds	
				nitromethane	1
				C ₂ H ₅ N ₂	1
				C ₃ H ₇ N ₂	1
				C ₇ H ₁₅ N ₂ O	1
				methyl acetamide	1
				benzotrile	3
				methyl cinnoline	1
				Esters	
				vinyl propionate	3
				ethyl acetate	1
				ethyl-n-caproate	1
				isoamyl formate	1
				methyl decanoate	1
				ethyl decanoate	1
				Ethers	
				dimethyl ether	1
				dihydropyran	2
				Epoxide	
				1,8-cineole	1
				Furans	
				furan	1
				tetrahydrofuran	1
				methyl furan	2
				methyl tetrahydrofuran	1
				ethylfuran	2
				dimethylfuran	1
				2-vinylfuran	1
				furaldehyde	2
				2-n-butylfuran	1
				2-pentylfuran	7
				methylfuraldehyde	1
				furyl methyl ketone	1
				α-furfuryl alcohol	2
				benzofuran	3
				Alkanes	
				2-methyl-2-propanol	1
				C ₇ H ₈	6
				C ₈ H ₁₀	6
				C ₉ H ₁₂	8
				C ₁₀ H ₁₄	8
				C ₁₁ H ₁₆	7
				C ₁₂ H ₁₈	7
				C ₁₃ H ₂₀	8

^a Arranged by class in approximate elution order.

^b Twelve total samples: 6-Bayonne, NJ; 2-Jersey City, NJ; 2-Bridgeville, PA; and 2-Baton Rouge, LA.

Strategic question 1:

”How does Social Sustainability influence Success?”





All business is about people.

- Market confidence and trade mark.
- New market solutions
- Ahead of authorities and legislation
- Working climate and culture
- Productivity in value chain

Or in short – to see business ideas and avoid costs is *at least* as important as image!

Problem?

Stress
(Competition and
perceived time
constraints)









✓ Exclusive bus lanes

✓ Flexibility

✓ Cost-effective

✓ Efficient terminals

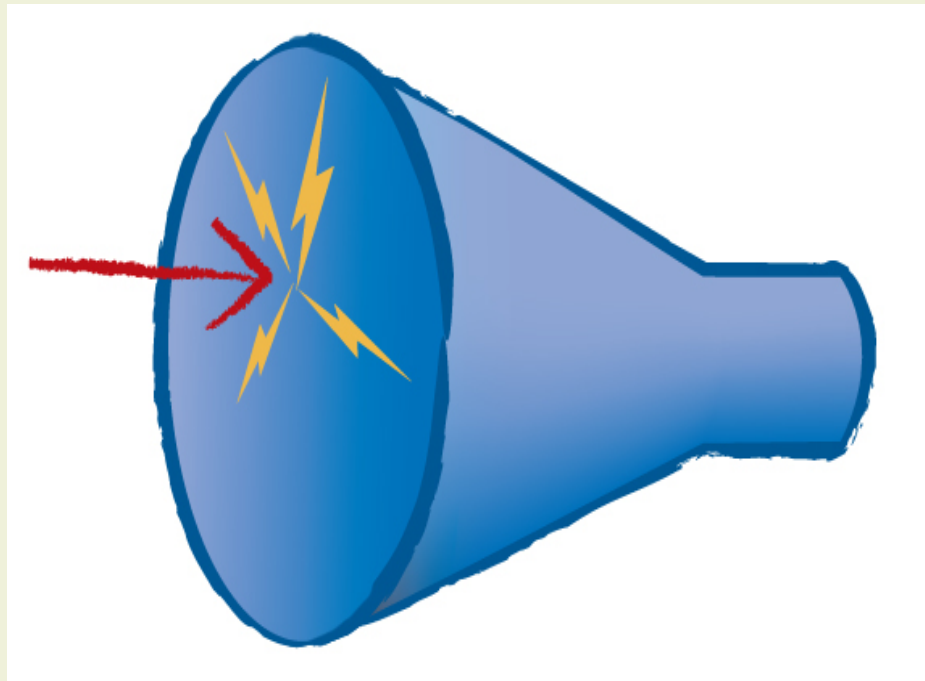
✓ Information systems

✓ Pre ticket systems



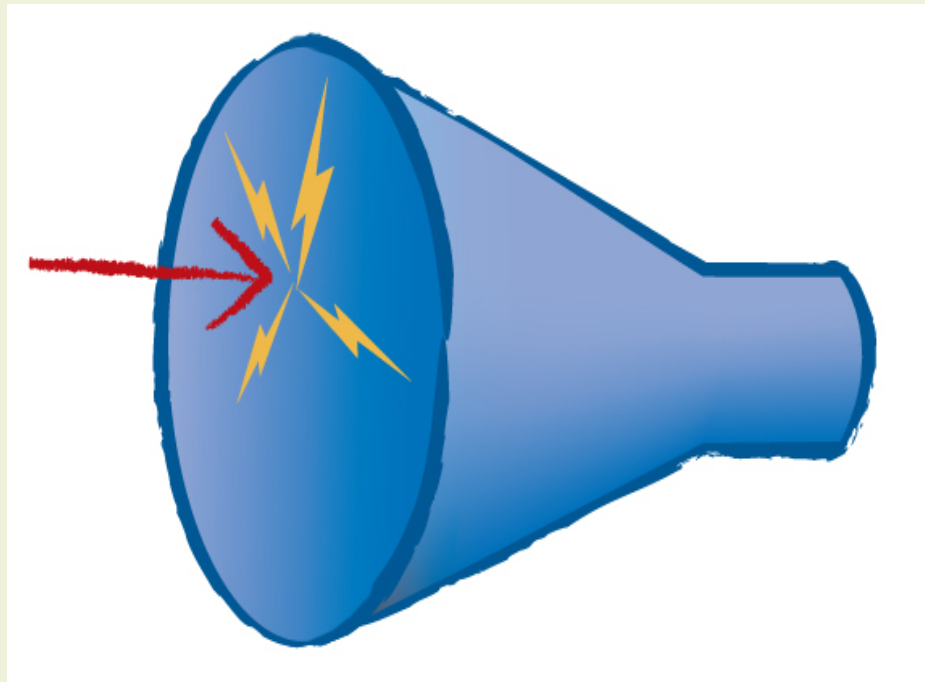
Strategic question 2:

”Is sustainability possible at all”?



- **Food is constraint?**
- **Energy?**
- **Technology?**
- **Money?**
- **Other constraints?**

”So what are the constraints?”



- **Not food!**
- **Not energy!**
- **Not technology!**
- **Not money!**

**Will we get the
Leadership in time?**

Leadership, conclusions

- 1. Competent leadership requires integration of sustainability.**
- 2. Leadership is top-management's responsibility (expert amateur).**
- 3. 'Strategy' implies to *at least* know what you want.**
- 4. Nobody can look into the future ...but we can invent it.**
- 5. Principled definition of distant goal necessary and possible.**
- 6. Strategy is step by step approach during resource influx.**
- 7. Many role models in business and regional planning.**