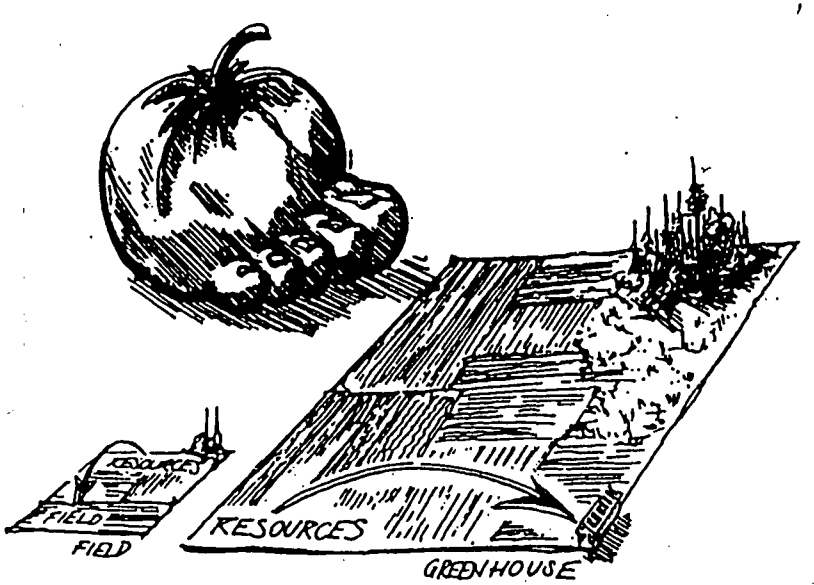


Figure 3.13: The ecological efficiency of various technologies can be assessed by Ecological Footprinting. This example compares two ways of growing tomatoes in British Columbia: open-field production and heated hydroponic greenhouses. Even though a greenhouse's physical Footprint per unit production is much smaller than that for open-field production, when we consider the Ecological Footprints of energy, fertilizer and other inputs, the greenhouse's total land requirement per tomato is actually 10 to 20 times larger (drawn to scale).

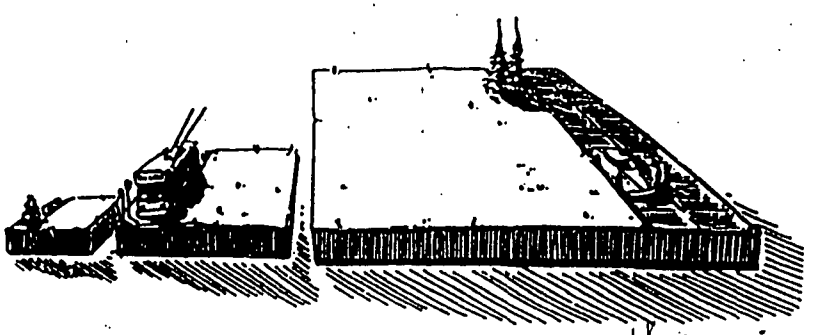


Figure 3.12: The Ecological Footprint of one person traveling five kilometres twice each workday (10 km per day) varies according to transportation mode: for bicycles, it is about 122 square metres, for buses 303 square metres and for cars 1,530 square metres.

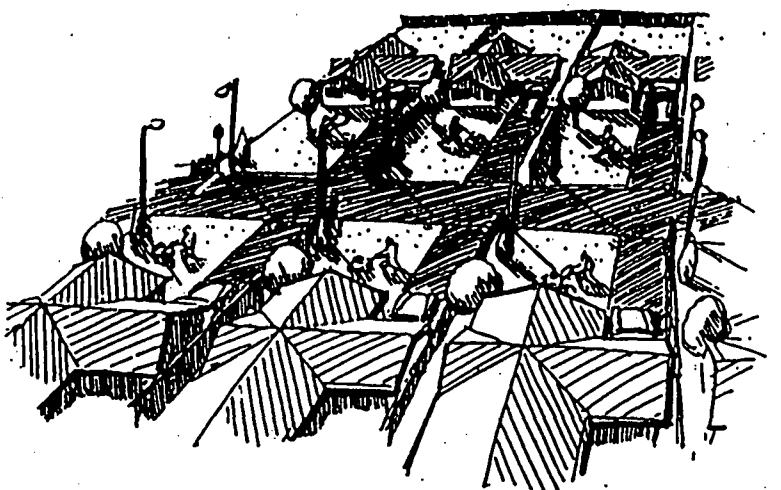
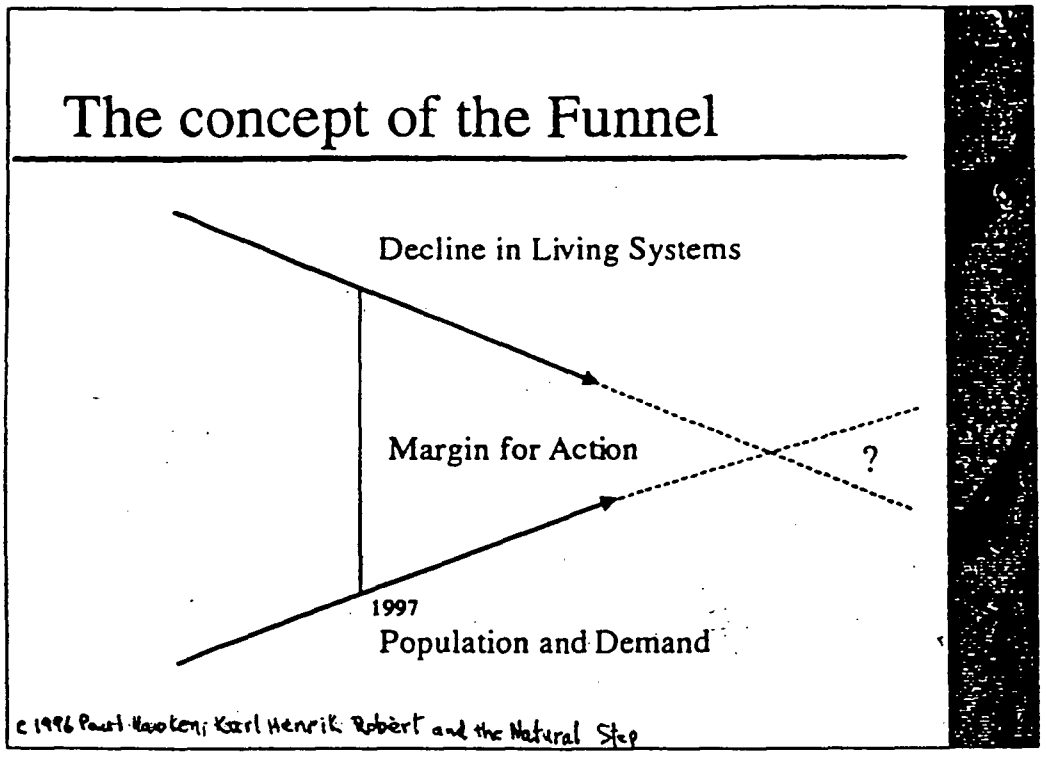
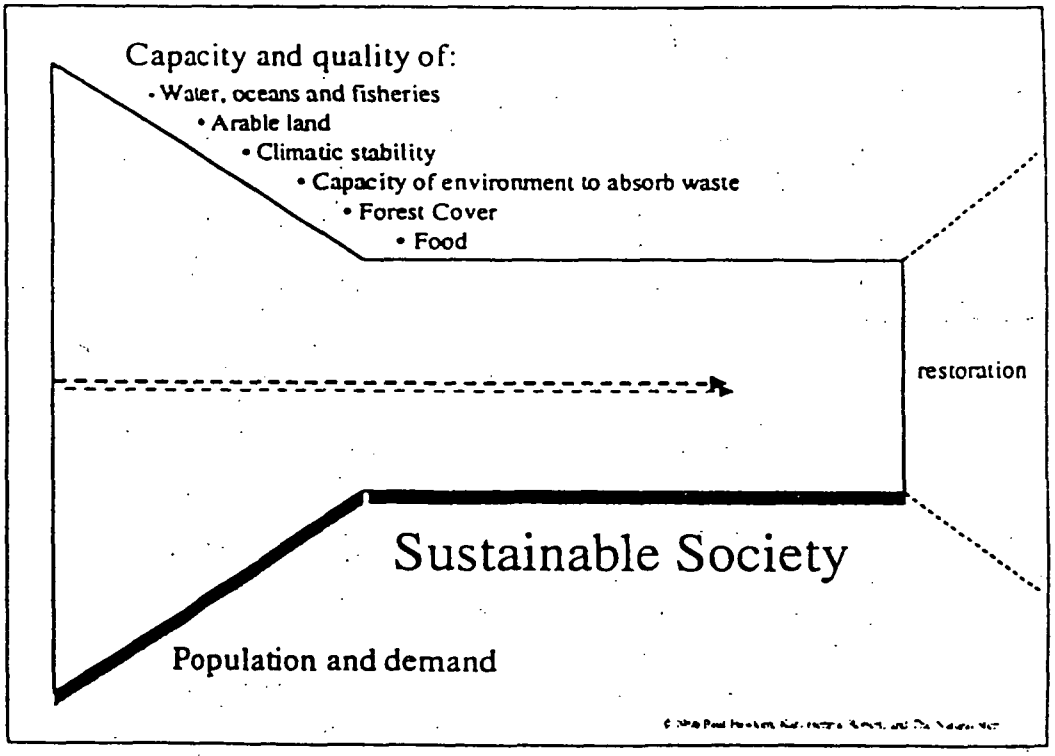


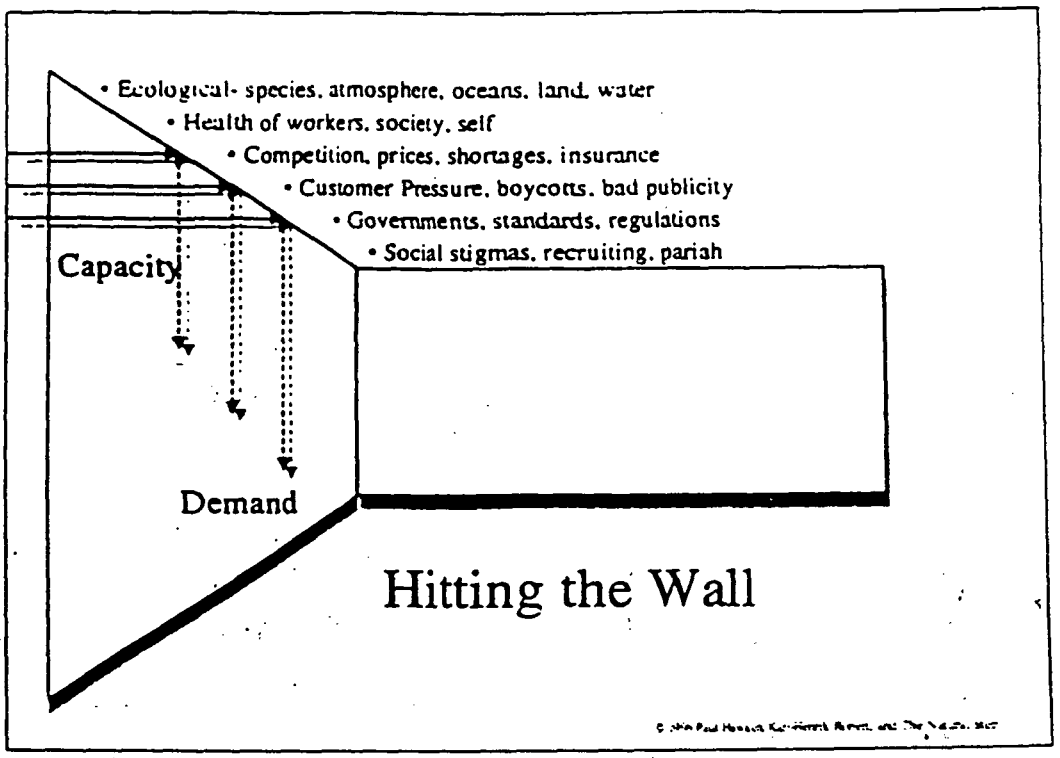
Figure 3.11: Mirrored Density: To assess a household's contribution of density to a city's resource consumption, we extrapolate the energy and material requirements of sample housing types to the entire city as if all households lived that way. This clearly contrasts the Footprints of different densities and lifestyles at the whole city level. (Using average figures for whole neighborhoods dilutes the effects of different lifestyle choices.)

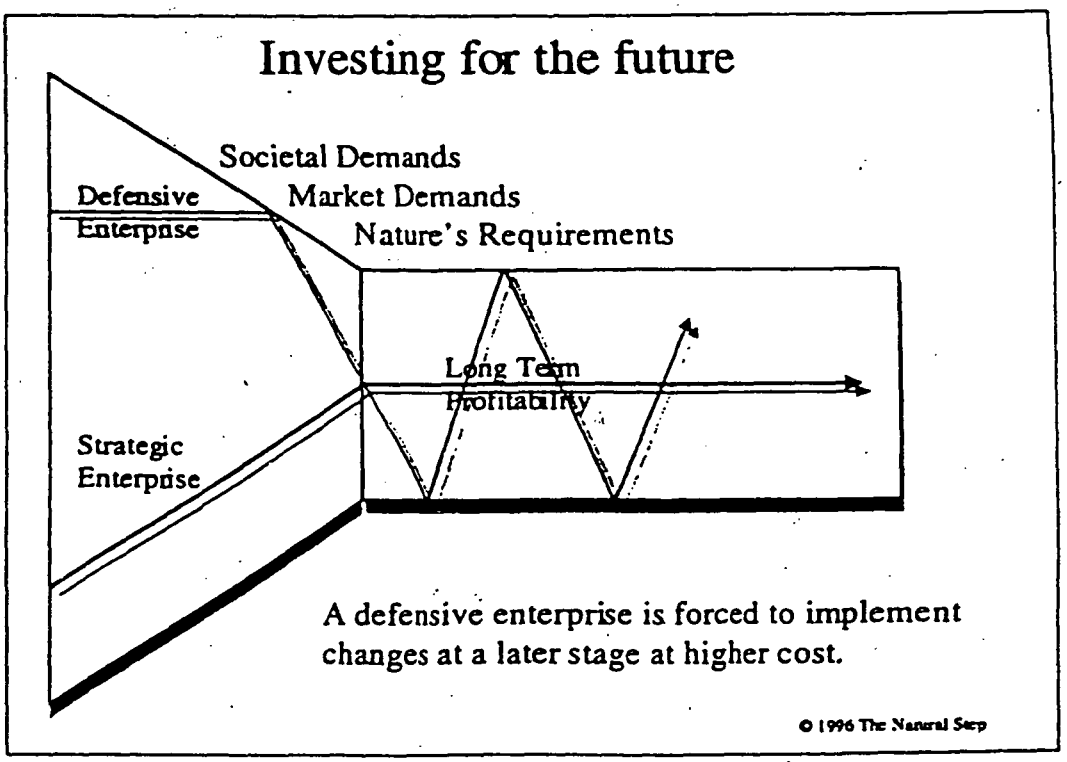
Lyle Walker has examined the implications of housing and other lifestyle choices on the Ecological Footprints of households in various income groups for the UBC Task Force on Healthy and Sustainable Communities. He estimated the effects of income, housing type/density, and transportation options for households in the Vancouver region. The link between different housing types/densities and corresponding transportation requirements was established by extrapolating baseline data for particular housing types to the entire city (the "mirrored density" approach) and then estimating the transportation needs of such a hypothetical city (Figure 3.11).

Preliminary estimates show that living in a multi-unit condominium or apartment of similar market value to a suburban house, and using a compact, energy-efficient car rather than a standard-sized vehicle, can reduce a household's transportation and housing Footprint by a factor of three. At the same time, the condominium dwellers may see an improvement in their quality of life — they may be able to walk to work, be closer to friends and relatives (more contacts per square kilometre), enjoy a more vital neighborhood, and take advantage of greater recreational diversity such as parks, pedestrian areas, street cafés, movie theatres, and more.

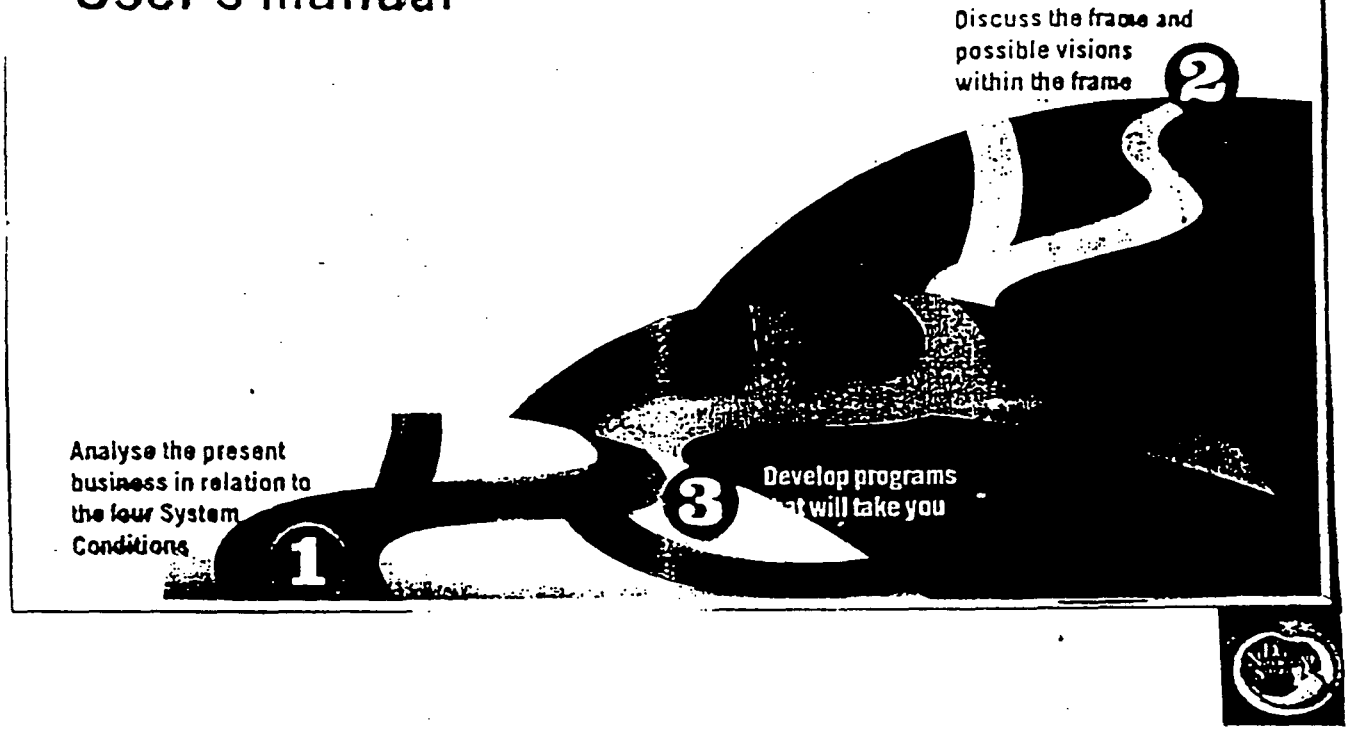

The concept of the Funnel
Decline in Living Systems
Margin for Action
?
1997
Population and Demand
c 1996 Paul Hawken, Karl Henrik Robèrt and the Natural Step


Capacity and quality of:
• Water, oceans and fisheries
• Arable land
• Climatic stability
• Capacity of environment to absorb waste
• Forest Cover
• Food
restoration
Sustainable Society
Population and demand


• Ecological- species, atmosphere, oceans, land, water
• Health of workers, society, self
• Competition, prices, shortages, insurance
• Customer Pressure, boycotts, bad publicity
• Governments, standards, regulations
• Social stigmas, recruiting, pariah
Capacity
Demand
Hitting the Wall


Investing for the future
Societal Demands
Market Demands
Nature's Requirements
Defensive Enterprise
Strategic Enterprise
Long Term Profitability
A defensive enterprise is forced to implement changes at a later stage at higher cost.
© 1996 The Natural Step

The Compass - User's manual



Applying the System Conditions

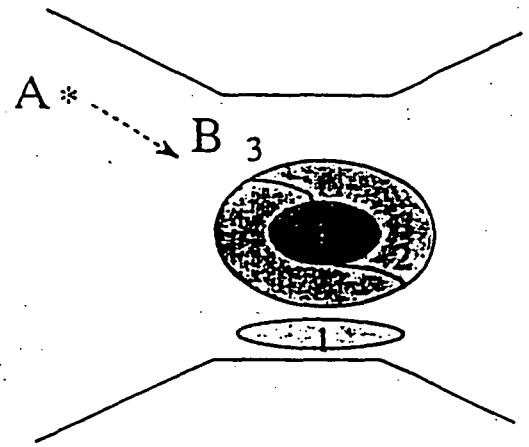
Does this decision:	Yes	No
1. Decrease dependence on materials from earth's crust?	☐	☐
2. Decrease dependence on compounds produced by society that can accumulate in nature?	☐	☐
3. Increase the physical basis for productivity and biodiversity in nature?	☐	☐
4. Increase the efficiency and fairness with which resources are used?	☐	☐

Action Programme

	already done	year 1	year 2	...	System Conditions met
green electricity		x			
ethanol powered vehicles			x		
metal components on furniture and lamps are replaced with wooden components					
freon-free air-conditioning	x				
plastics without persistent unnatural additives		x			
computers without persistent unnatural antiflammables			x		
ecologically grown timber					
support to environmental projects		x			
replantation of old industrial land			x		
paper recycling			x		
cleaning agent with refill system		x			
low energy lamps replace ordinary lights bulbs			x		

The Compass

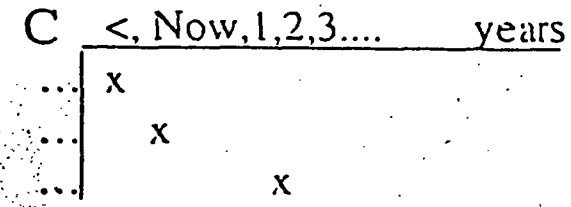
- User's Manual -



A. Today - list problems by S. C.s

B. Tomorrow - ... Vision as service, and solutions are listed by S. C.s

C. The way there - strategic program for achieving the vision



The Program

- Back-casting:
  - * Will each measure bring us closer to vision/decision?
  - * Is each measure a platform for the next
- Focus on low hanging fruits
  - * Savings
  - * Early return on investment
  - * Using today's structure
  - * Existing market demand

The Compass

- The overall frame of reference -

- Valid at any scale
- Links principles to details
- Enables control over outcome
- Uses language of the CEO
- Makes sense of other tools (auditing, LCA, ISO 14001)

Internat Standards

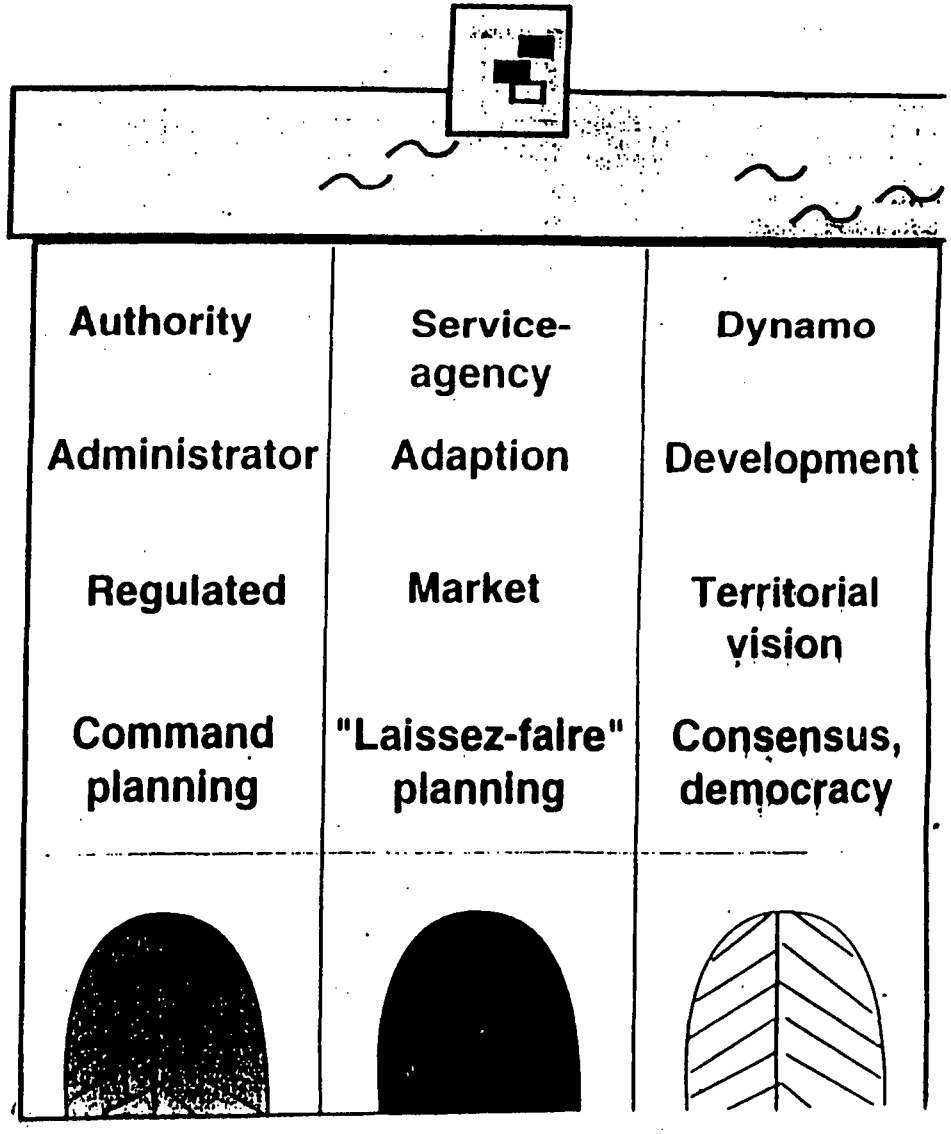
LOCAL AGENDA 21

Each local authority should enter into a dialogue with its citizens, local organizations and private enterprises and adopt **"a local Agenda 21".**

Through consultation and consensus-building, local authorities would learn from citizens and from local, civic, community, business and industrial organizations and acquire the information needed for formulating the best strategies. The process of consultation would increase household awareness of sustainable development issues.

Local authority programmes, policies, laws and regulations to achieve Agenda 21 objectives would be assessed and modified, based on local programmes adopted. Strategies could also be used in supporting proposals for local, national, regional and international funding.

THE ROLES OF THE MUNICIPALITY

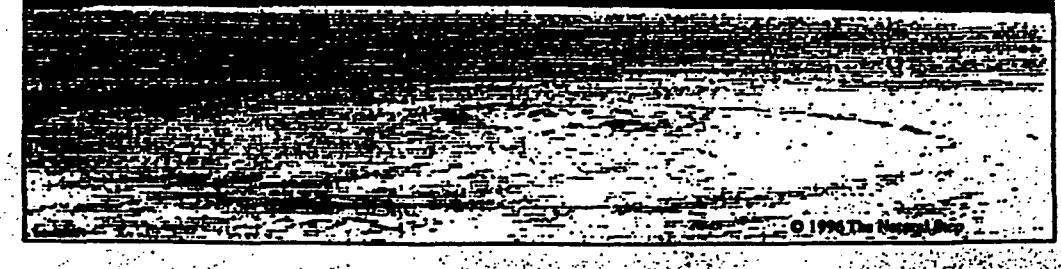


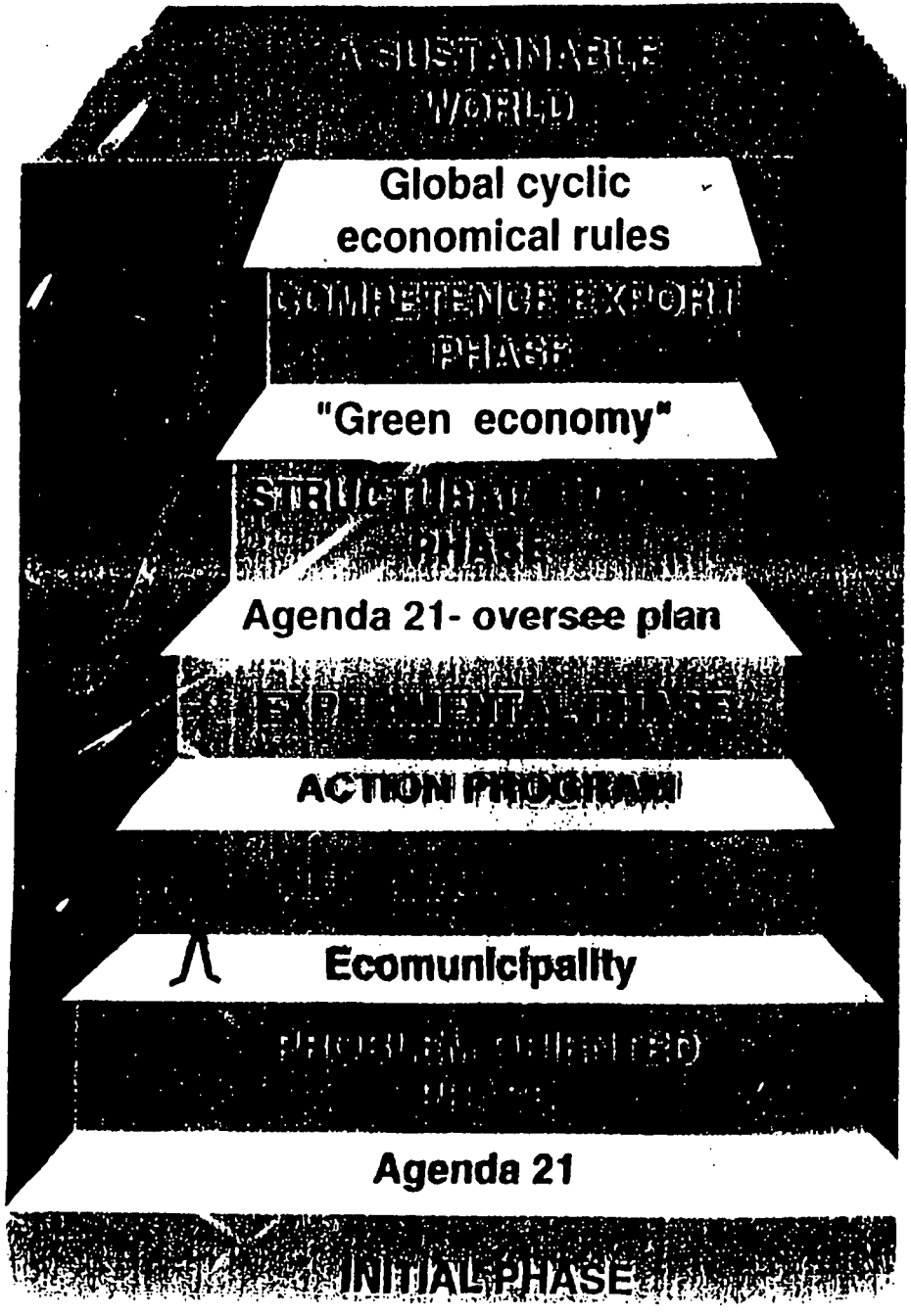
How does The Natural Step apply to business?

- Economy and environment are linked
- Nature's limits have economic consequences
- Understanding these limits allows for more effective planning
- Results in ecological benefits and long-term competitive advantage

Scandic Hotels

- $386 million sales in 1995
- Lost $5 million annually for 3 years prior to TNS
- Over 100 hotels in 11 countries
- 4,225 employees

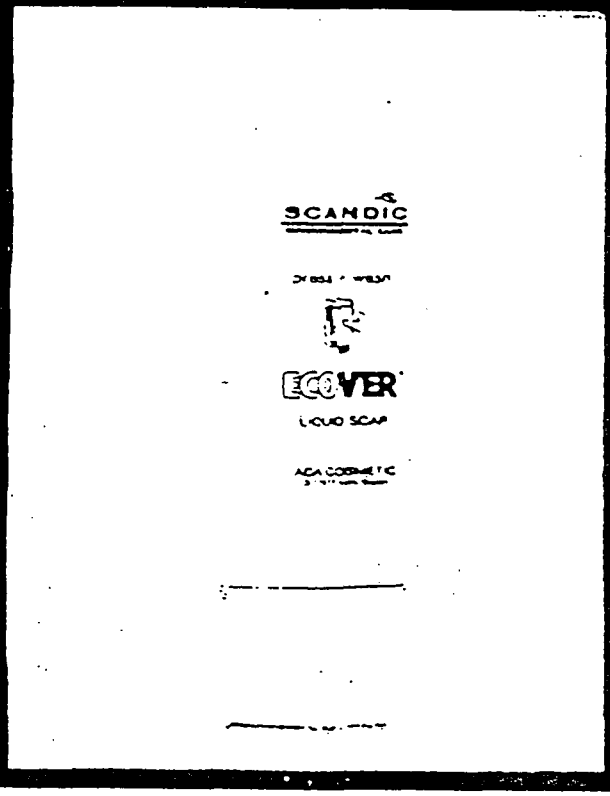



A SUSTAINABLE WORLD
Global cyclic economical rules
COMPETENCE EXPORT PHASE
"Green economy"
STRUCTURAL PHASE
Agenda 21- oversee plan
ACTION PROGRAM
Ecomunicipality
Agenda 21
INITIAL PHASE


ECOMUNICIPALITIES IN SEKOM

A New Soap & Shampoo System

System conditions 1, 2,4



In the past

- Made of petrochemicals
- Soaps in 15 gr. bar
- Shampoos in bottles/sachets

The new concept

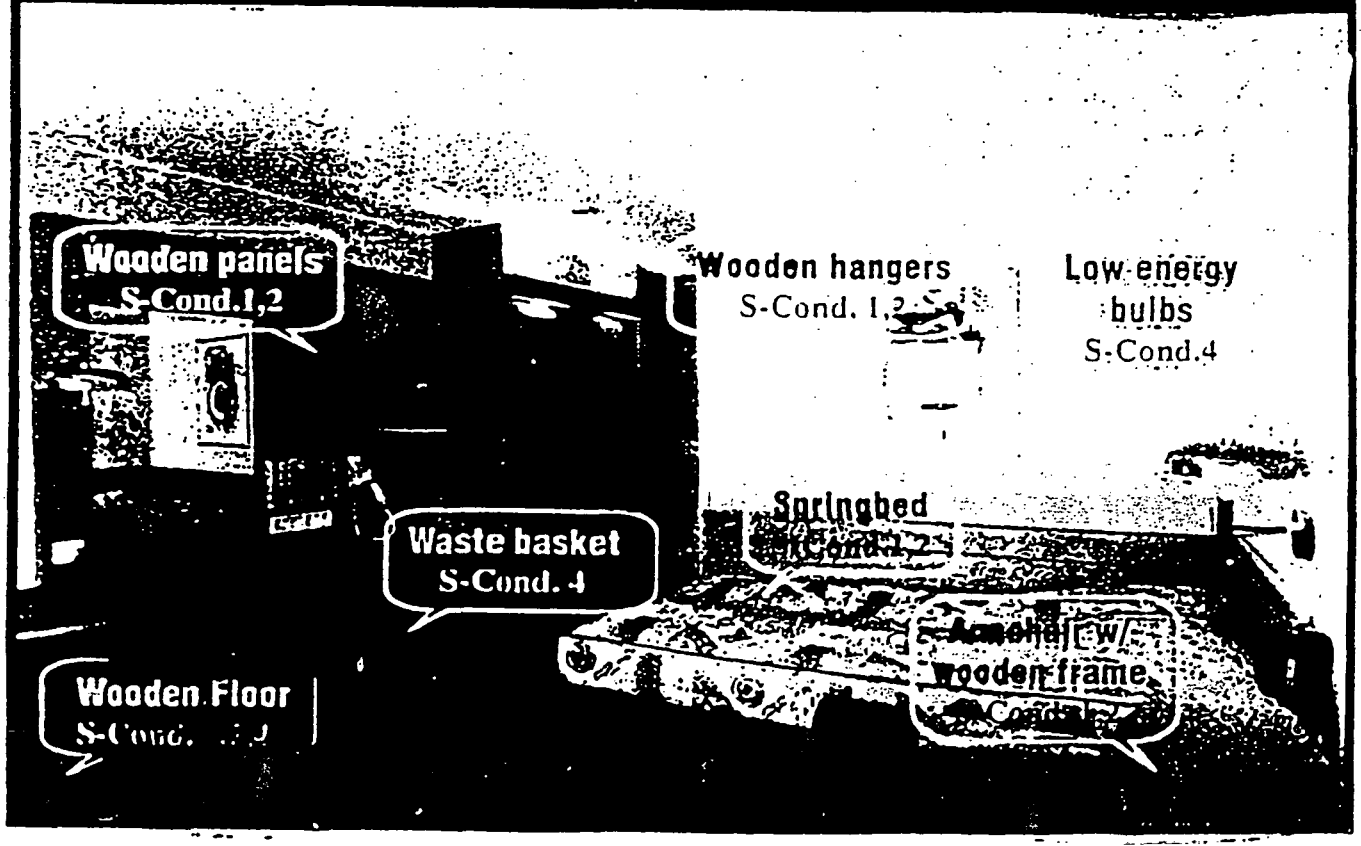
- Made of Cane sugar tensides
- Dispenser dosage system
- PET bottles are re-cycled

Less 40 % of chemicals

100 % bio-degradable

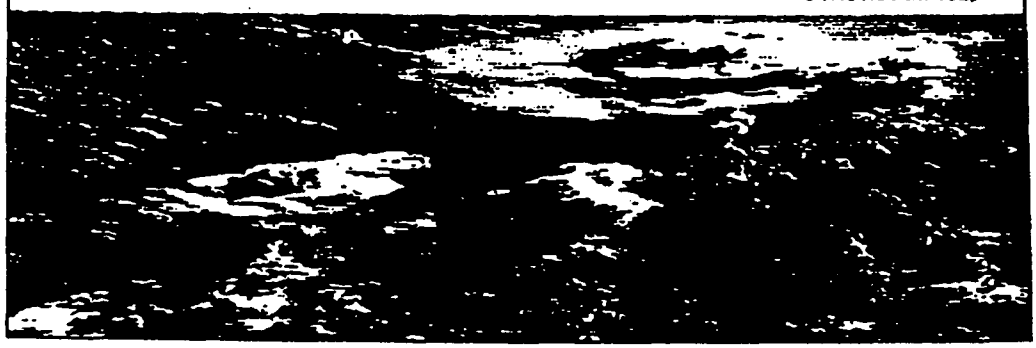
Less 8 tons of waste

The recyclable Hotel Room



Electrolux

- Largest appliance manufacturer in the world (In U.S.: Eureka, Frigidaire)
- 1996 worldwide sales: $14.2 billion

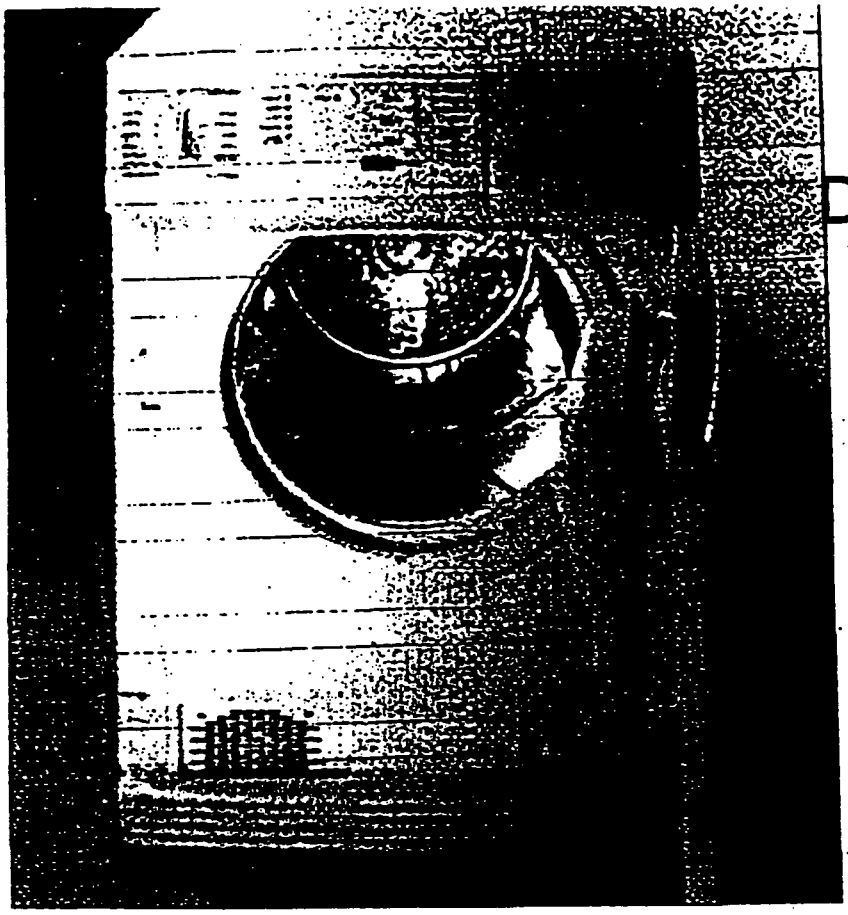


ELECTROLUX IS AN INDUSTRIAL COMPANY.

NOT A GREEN BUSINESS.

As long as we do not adhere to the system conditions, the walls of the funnel will lean inwards... For those companies who seek to act wisely, it is a matter of investing as quickly as possible in moving towards the funnel opening. What it is about is making oneself economically independent of breaking the system conditions...We continue our industrial operations; the only change is that we now carry out our activities increasingly in accordance with ecological demands. Our main goal remains to produce and sell products that make our customers' lives simpler, safer and more comfortable. Even if our sights are set on the funnel's opening and complete ecological adaptation, our journey towards that goal is inextricably linked to economic reality. Wherever we are found, we intend to provide the most advanced technological, economic and business solutions possible. In addition, we will be proactive and encourage industry as a whole to show greater regard for the environment.

ELECTROLUX ENVIRONMENTAL ANNUAL REPORT, 1994, p.8-9



DOC ILLEGIBLE

If the tub of a standard washing machine is turned on its side, it operates more efficiently, in part because the rotating action makes gravity tumble clothes like a dryer rather than agitating. And because the clothes continually twirl, the tub does not have to be filled with water. Electrolux claims that its washer uses half the energy of a conventional machine, saves 16 gallons of water per load, and will cut utility bills by $90 a year.

I am convinced that we are seeing the birth of a new perspective of the world, where ecology and economics are two sides of the same coin.

This means we must strive towards greener solutions for environmental reasons, and also because it's economically profitable and good for us as a group.

-Leif Johansson
CEO & President
Electrolux

Nature's laws have started to create restrictions and limitations with formidable economic consequences.

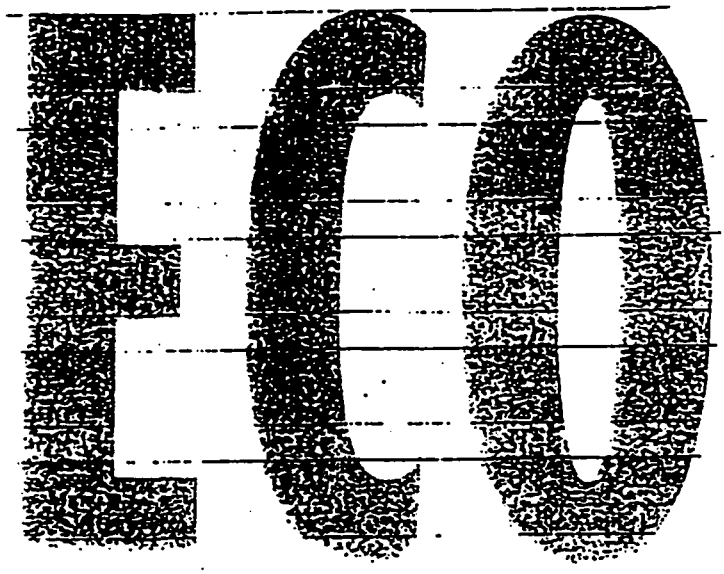
We erode nature's resources when we overstep the boundaries of ecological tolerance.

By persisting in this manner we are moving towards global poverty that no amount of economic prosperity can save us from.

This is the world that Electrolux must adapt to.

- Per Grunewald
Senior Vice-President
Electrolux

Through enlightened persuasion of management, the Natural Step *encourages businesses to take a greener path. The group has succeeded in converting one major American company in a notoriously toxic industry, but others are slow to follow.*



CHECK OUT THE JULY EDITION OF METROPOLIS MAGAZINE!

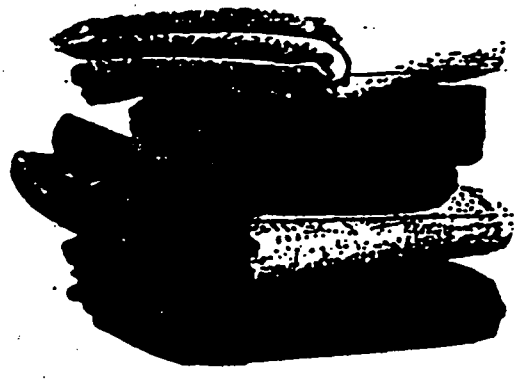
The Natural Step is featured on the cover of the July edition of METROPOLIS magazine (one of the most respected magazines in the field of design and architecture). The cover reads "REVOLUTION: The Natural Step is out to remake the modern corporation by convincing CEO's that eco-ethics can drive profits. How did it teach one American company to turn dirty carpet into the stuff of green business - and triple stock prices on the way?" Visit their website at www.metropolismag.com to read the article - it's well worth the visit.

Excerpt. July, 1998 Metropolis

by Robert Neuwirth So here's the riddle: Atlanta-based Interface, a $1 billion company that is the world's largest purveyor of carpet tile, runs a dirty business. By its own reckoning, Interface's factories belch 10,447 tons of solid waste, 6053 million gallons of contaminated water, 704 tons of toxic gasses, and 62,800 tons of carbon dioxide every year. Then there's the company's share of the 920 million-square-yard heap of carpet that makes its way into the nation's landfills every year.

Interface is also one of America's most environmentally conscious corporations, thanks in part to the Natural Step, a largely unknown environmental group that is an anomaly in the world of eco-activism. While conservationists have traditionally used pressure tactics and the threat of regulation to get results, the Natural Step takes a different approach. It doesn't engage in political campaigns, doesn't hire lobbyists, and doesn't take stands on issues such as the Clean Air and Clean Water acts. But this group that seems to do so little of what we expect from traditional environmentalists is gradually becoming a player in corporate America.

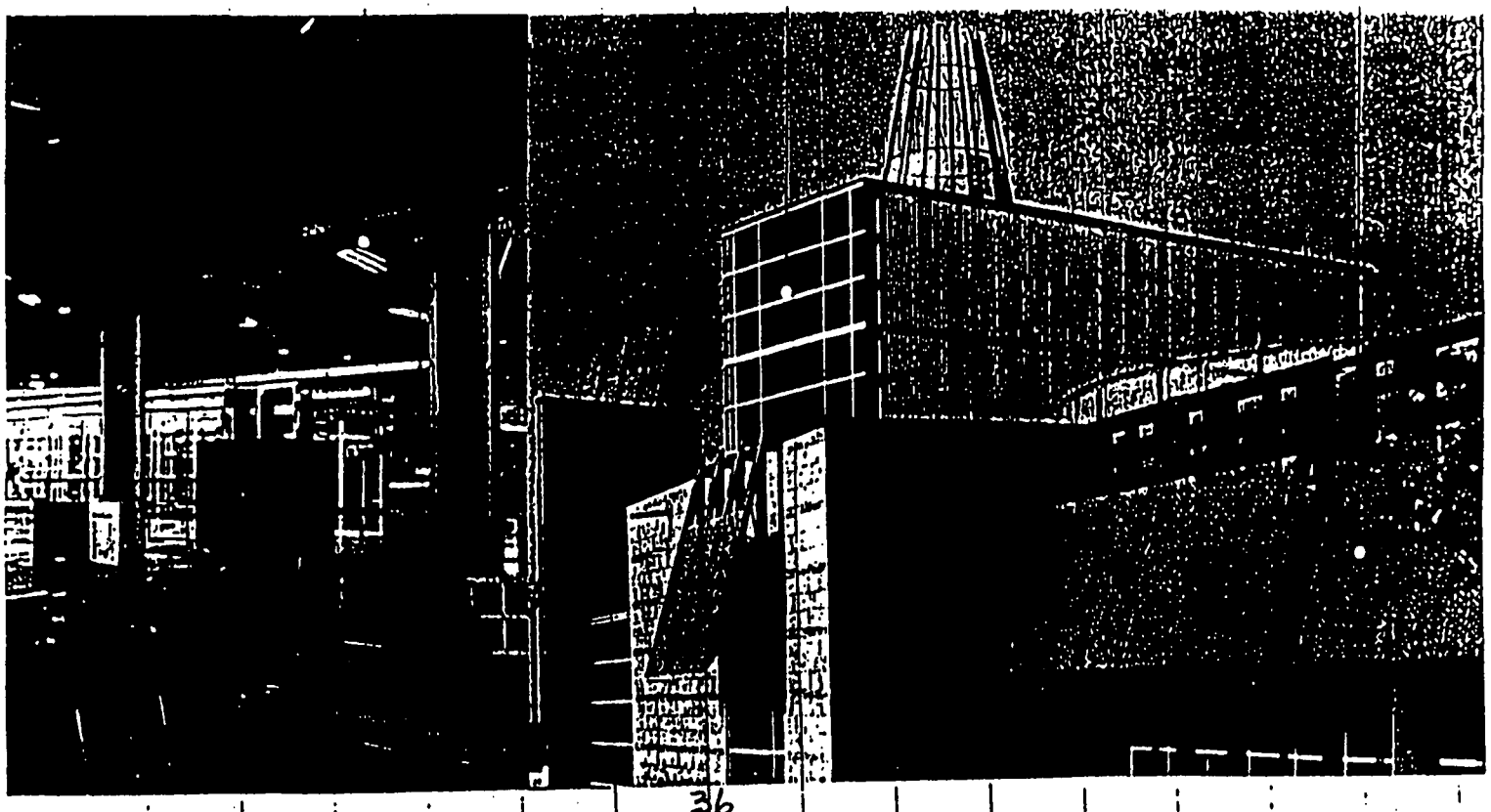
The Natural Step, in its quiet way, aspires to an even greater goal than an eco-sensitive society: It wants to reengineer the modern corporation. The theory is that getting enlightened CEOs to embrace eco-ethics for their whole company will ultimately do more than lower-level piecemeal efforts such as instituting some recycling plans, applying some green design principles, and encouraging division leaders to implement "green" practices. Doing good, the Natural Step says, does not preclude doing well—and businesses can take the lead. Call it a revolution from above.



Interface's Ray C. Anderson plant in West Point, Georgia, has been expanded by Thompson Ventulett Stainback & Associates, which used the opportunity to bring green design into the facility. An efficient lighting system, controlled by motion sensors, employs color-corrected high-pressure sodium lamps. A "stepped" dimming system adjusts the light levels to maintain appropriate footcandles during various daylight conditions.

The roof membrane and stone cladding are light in color, to reflect sunlight and reduce the building's heat load. Daylight is harvested by means of skylights centered in each structural bay; beneath, a reflector/diffuser helps distribute the light throughout the work areas below.

Sun screens protect the west side of the plant, reducing solar heat gain and limiting the heat load on the interior; this optimizes the efficiency of the air conditioning system, which runs on a special zero-ozone-depleting refrigerant.



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