

Sustainable Development and the Company

What can the Engineer do?



http://meaganmccall.theworldrace.org/blogphotos/theworldrace/meaganmccall/_tpw0709.jpg

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January 8, 2010

Sustainability

What can the Engineer Do?

Classic: 'Triple D'

'Management'

'End of pipe'

Process integrated

'The leap'

Sustainability

Traditional Triple D technologies

Dumping

(waste in pits etc.)

Displacement

(moving pollution by e.g.
sewerage or smoke stacks)

Dilution

(of gaseous and fluid waste)



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Sustainability

Good housekeeping or triple M

Monitoring,

Management,

Maintenance



International Chamber of Commerce

The world business organization

Principles

1. Corporate priority

To recognise environmental management as among the highest corporate priorities and as a key determinant to sustainable development; to establish policies, programmes and practices for conducting operations in an environmentally sound manner.

2. Integrated management

To integrate these policies, programmes and practices fully into each business as an essential element of management in all its functions.



International Chamber of Commerce

The world business organization

Principles, ctd.

3. Process of improvement

To continue to improve corporate policies, programmes and environmental performance, taking into account technical developments, scientific understanding consumer needs and community expectations, with legal regulations as a starting point; and to apply the same environmental criteria internationally.

4. Employee education

To educate, train and motivate employees to conduct their activities in an environmentally responsible manner.

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End of Pipe Technologies

Incineration

Pyrolysis

Separation

Fermentation

Chemical transformation

Catalytic reduction

Shielding (radiation, noise)



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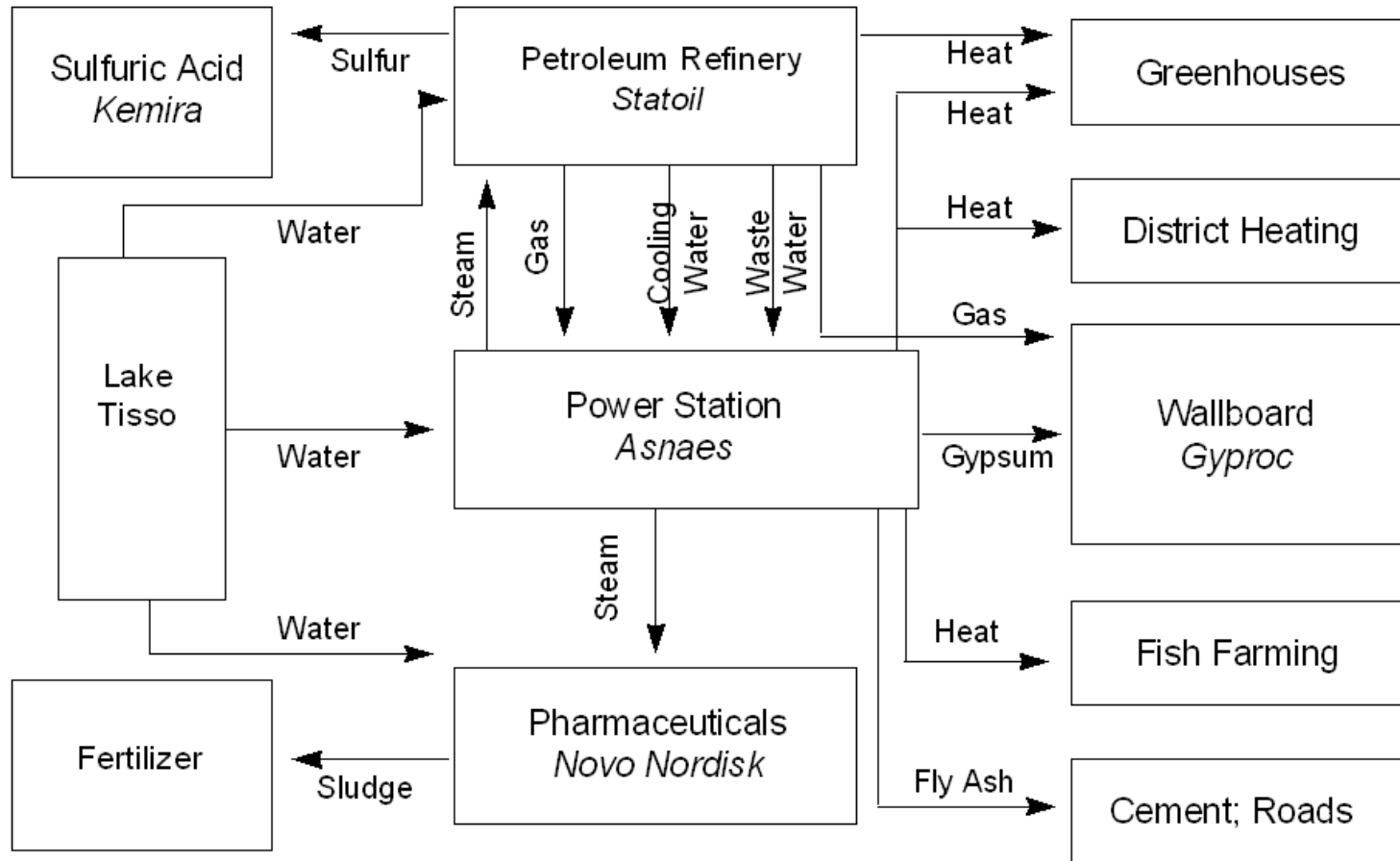
Emission reduction by process and organizational change

Primary energy

Raw materials

By- product prevention

Industrial Symbiosis: Kalundborg



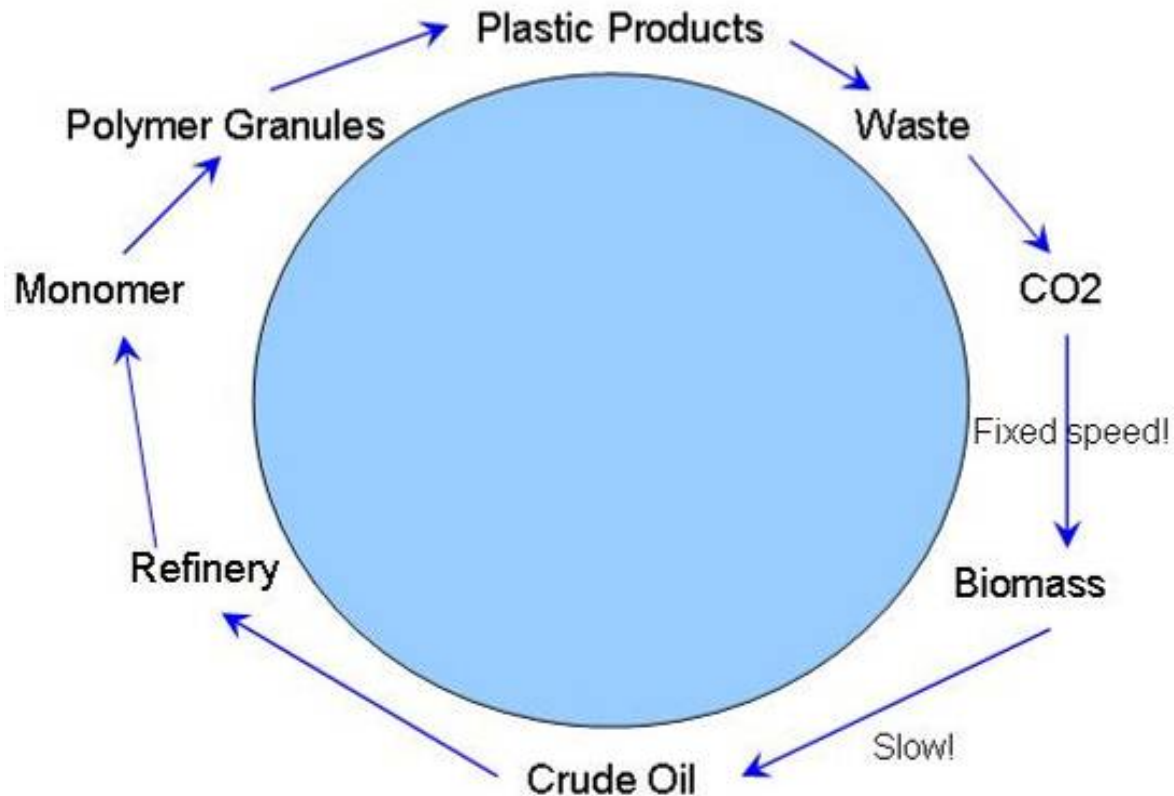
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Rebound



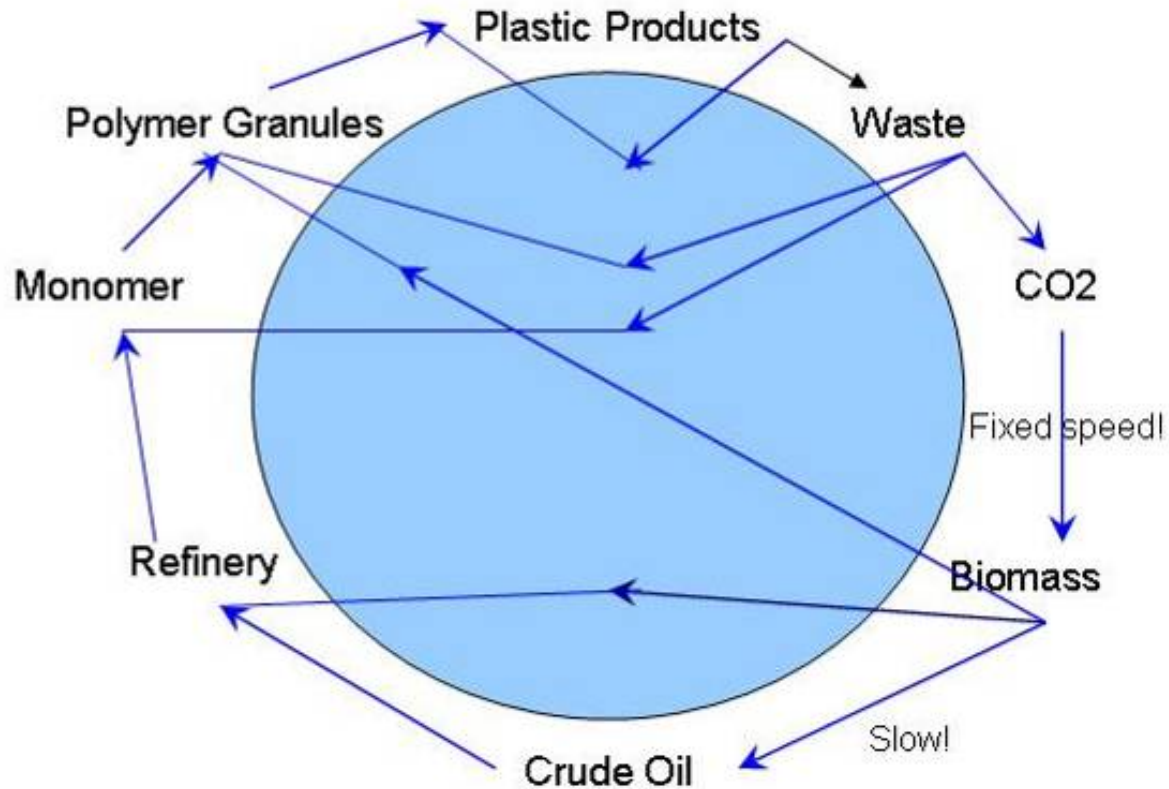
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System Change? Transition? Can it be accomplished?



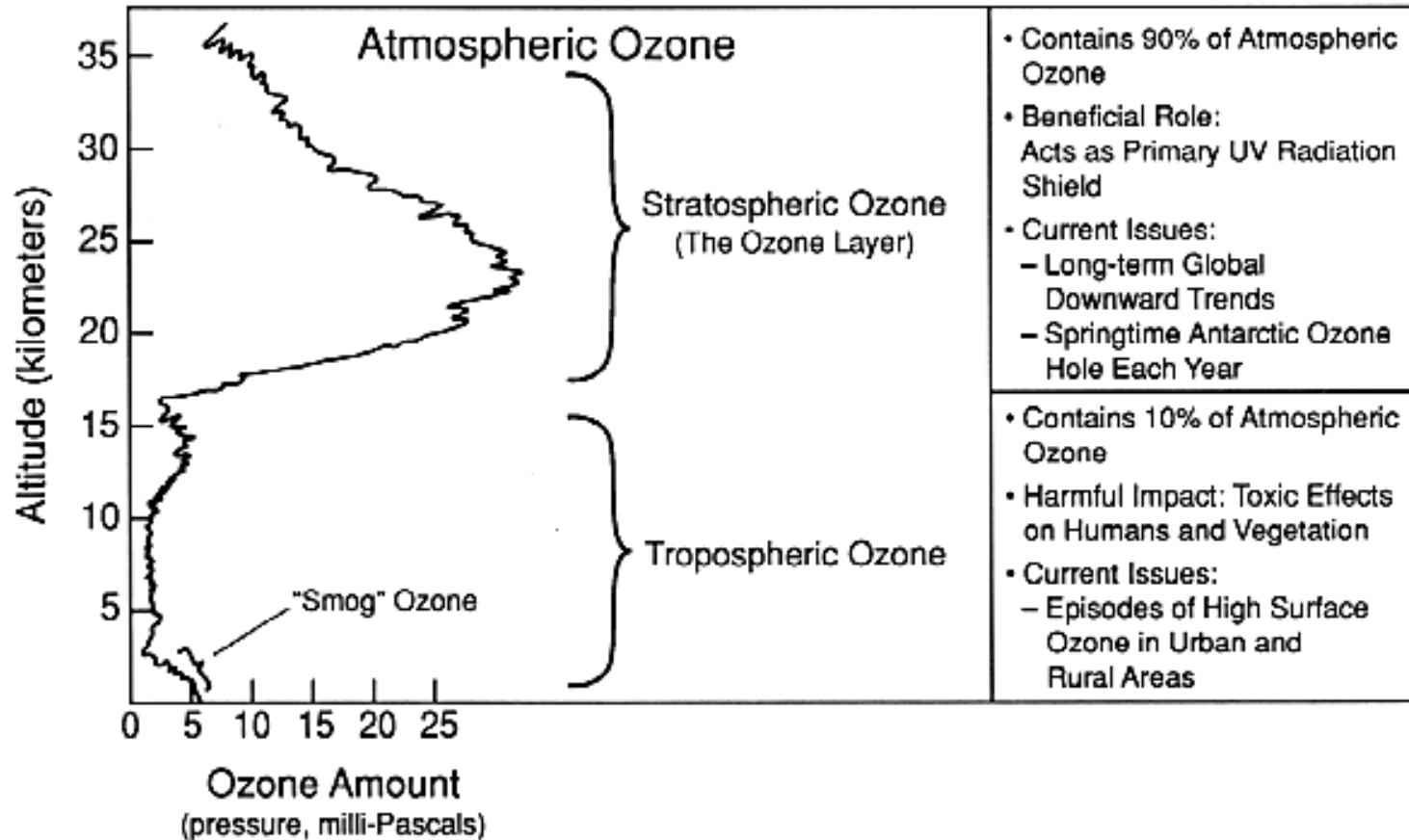
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System Change? Transition? Can it be accomplished?



Sustainability

The Ozone Layer

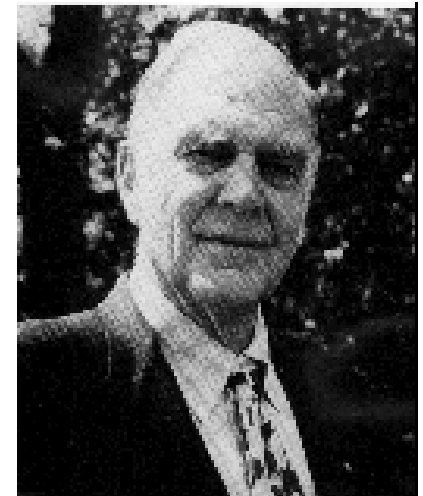


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The Ozone Layer -History

1972 James Lovelock used CFCs as tracer

1974 Rowland/Molina calculate that CFC's are only destroyed by UV, in the stratosphere



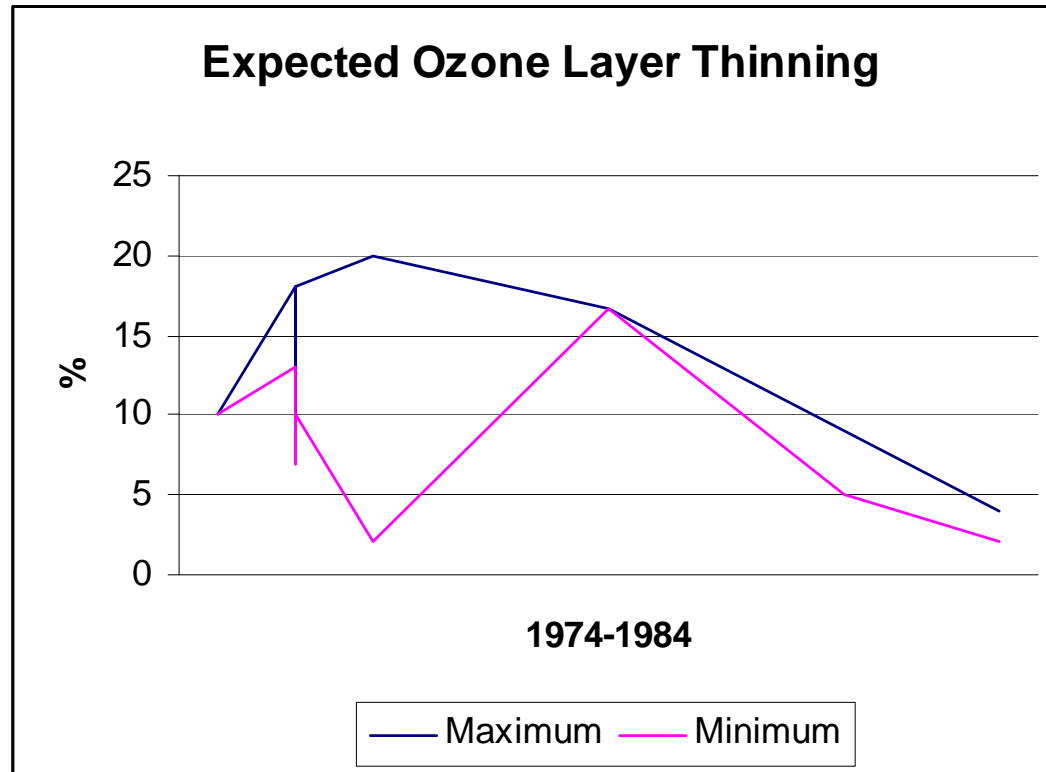
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CFC uses 1974, million lbs

	Total
Spray cans	1046
Foam	343
Refrigerant	380
Micro electronics and Other	133
Total	1902

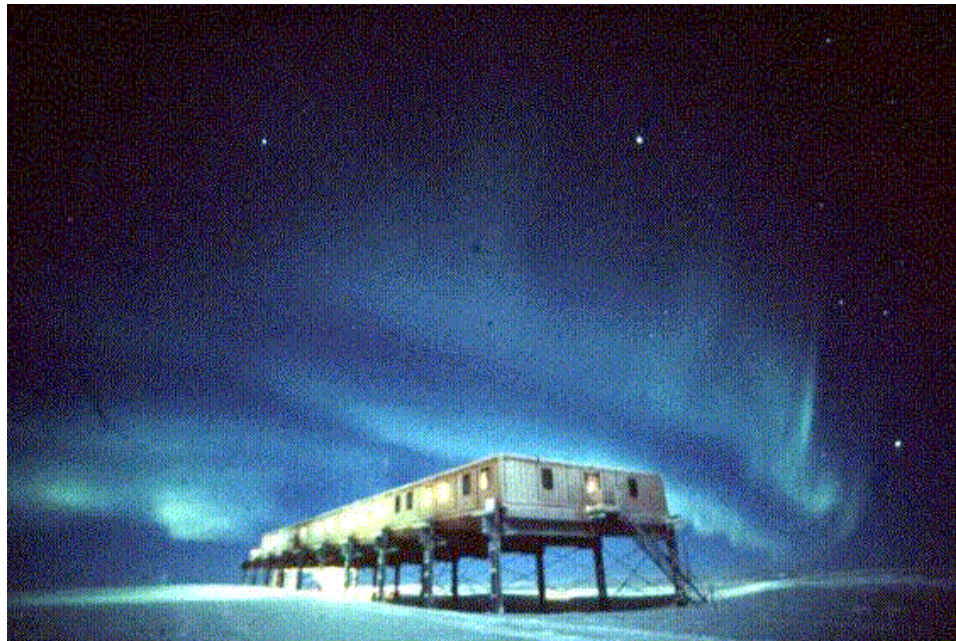
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Ozone Layer Thinning



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Ozone, Joe Farman 1985



Sustainability

Ozone, after 1985

1987: Montreal

Other agreements

1995: Phase out in industrial countries

2005: Total phase out

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CFC 113

Degreasing of electronics by CFC 113;
'No alternative'

Solutions

'No clean'

Clean with water and dryer

Other

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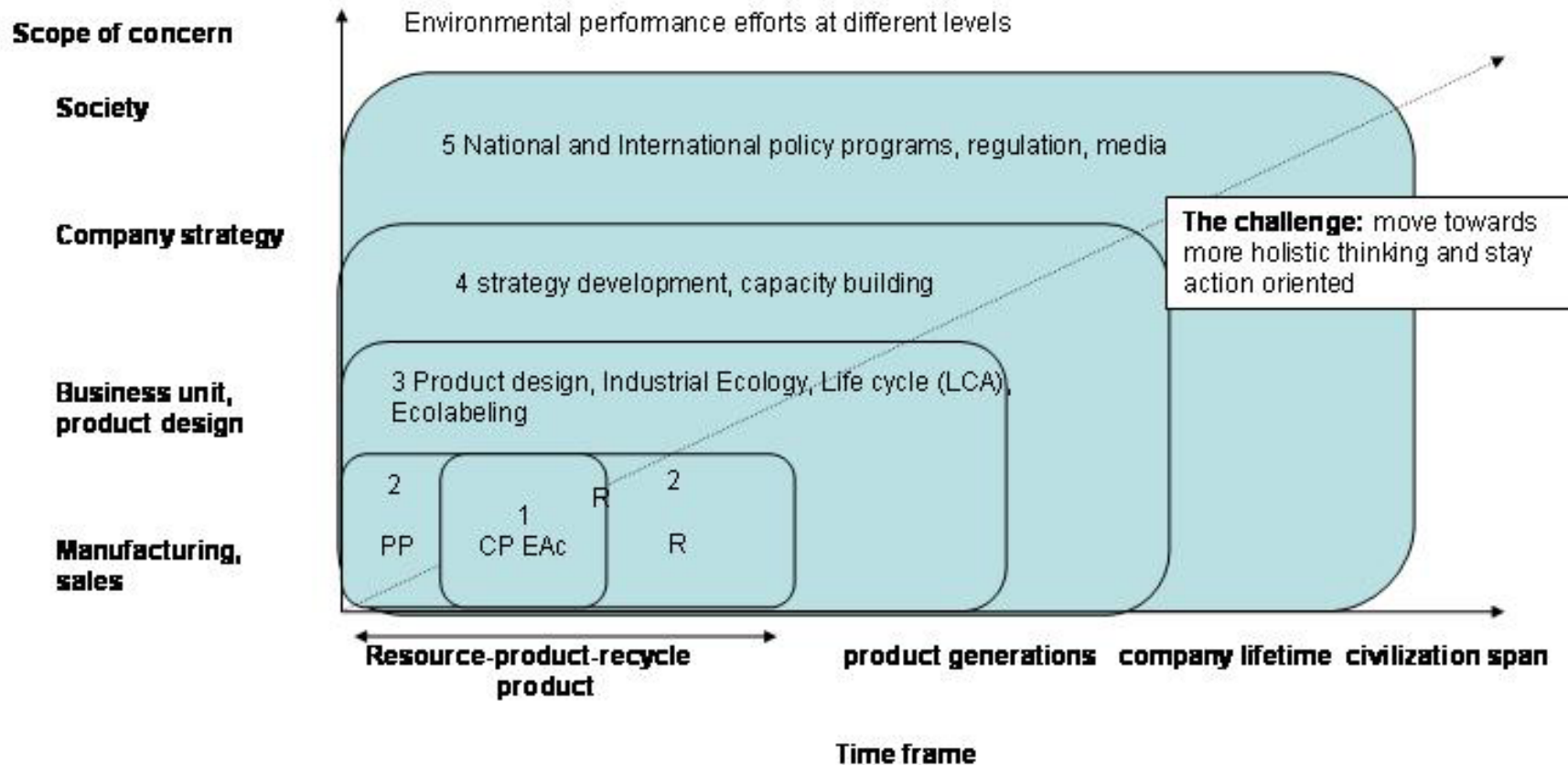
Refrigerator

Greenpeace Actions

US

Sustainability

Architectural Innovation: long term and broadening the process



Sustainability

Barriers for Solution: Division of cause and effect

Cause	Local	Global
Effect		
Local	A Soil Pollution (e.g. old gas works)	B Ozone Hole Antarctica
Global	C Nuclear accident, Chernobyl	D Climate Change, resource depletion, Loss of species

Uncertainty of cause and effect

Sustainable Development for Engineers

Modern engineers must have a holistic approach, so they can not only use their expertise in a scientific or technological context but are also sensitive to social, environmental and political needs. The best technical solution of a challenge is not always the one most acceptable to society.

Therefore engineers must also be skilled communicators, able to translate challenges and possible solutions between society and science.

Jeroen van der Veer
Chief Executive Royal Dutch Shell

