A life cycle perspective, looking beyond our noses to better assess the environmental impacts of our actions

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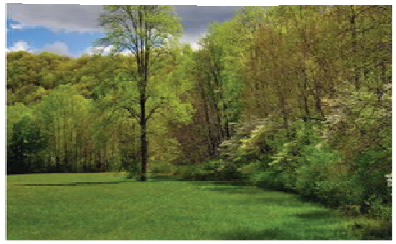
IESM 2009, 13th of May 2009

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Centre interuniversitaire de recherche sur le cycle de vie des produits, procédés et services

Fonds de recherche sur la nature et les technologies Québec

Fonds de recherche sur la société et la culture Québec

ÉCOLE POLYTECHNIQUE MONTRÉAL

CIRAIG Factsheet

Multidisciplinary world-renowned research centre

130+ professors, researchers and students

10 universities, 7 Chairs, 5 research units

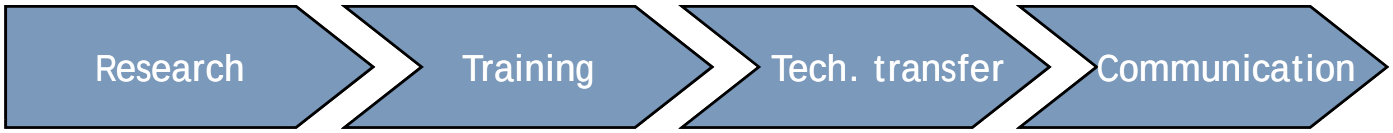
Member of the UNEP/SETAC Life Cycle Initiative

Numerous collaborations (Canada, USA, Europe)

110+ applied research projects (industries and govs)

Volume of business in 2009: 2.5M$+ (CIRAIG-Poly)

LCA expertise: energy, waste management, pulp and paper, mine and metals, urban infrastructure management, green buildings



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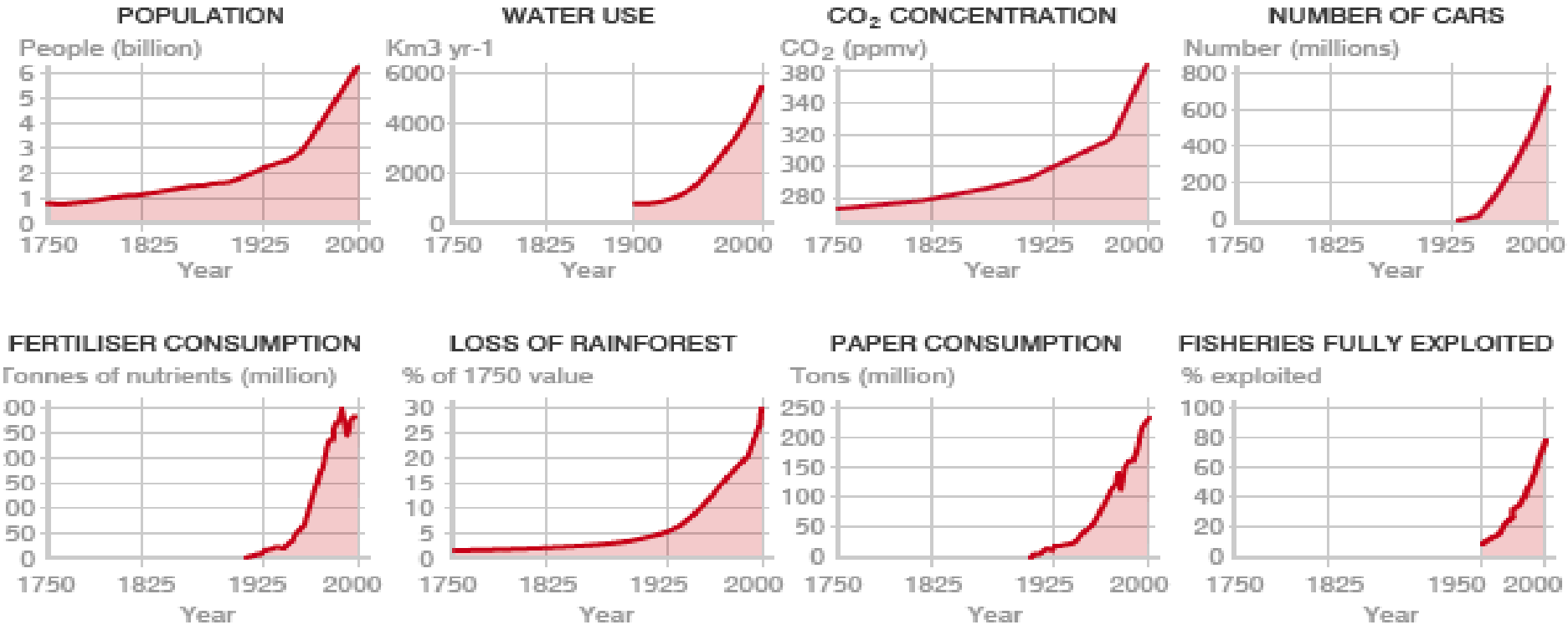
International Chair on Life Cycle Assessment

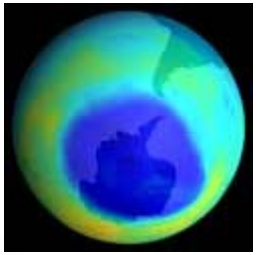
« […] the world`s largest private investment in LCA research.»

Guido Sonnemann - UNEP

Unrestrained Rate of Growth



Source: Millennium Ecosystem Assessment



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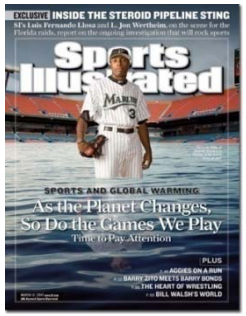
Spread of Awareness

« What we do, as a society, is transform resources into waste.

The process is measured at the cash register.

What we actually measure is the rate at which this transformation takes place. »

Anders Moberg, former president of IKEA



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Finding Real Solutions

Zero emissions

OR emissions elsewhere !

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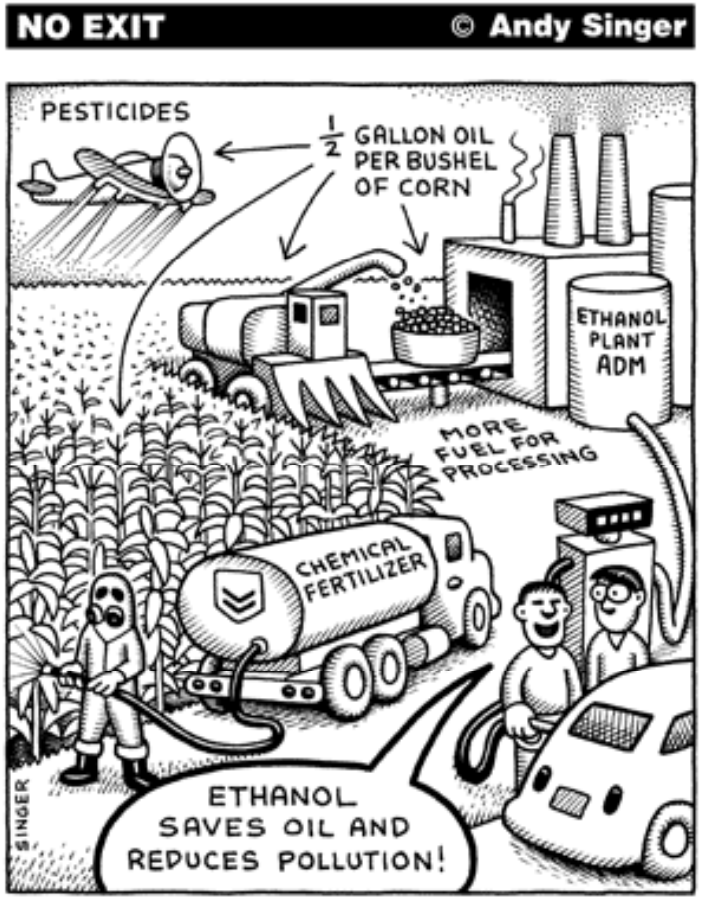
Finding Real Solutions



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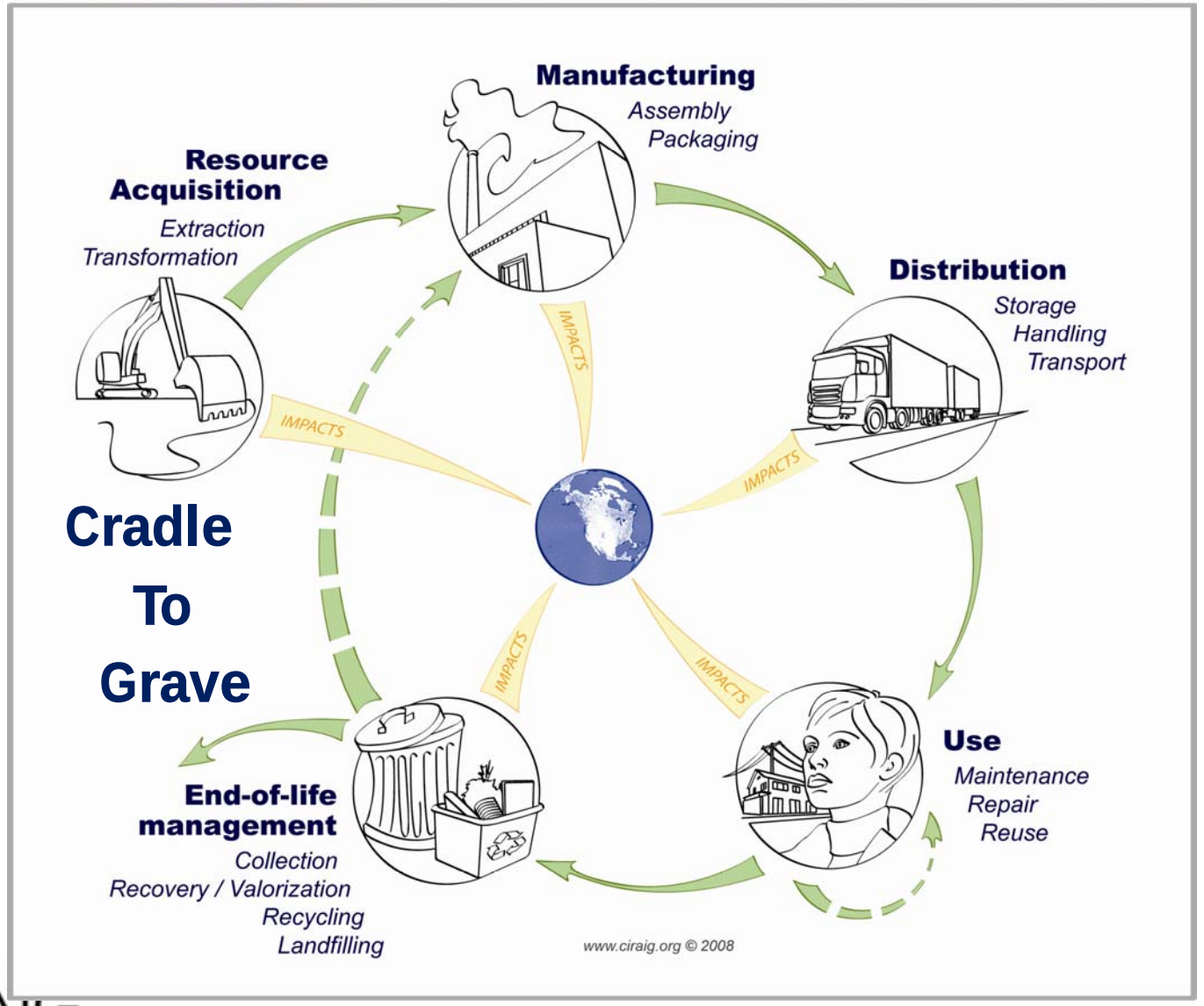
Environmental Problem Shifting

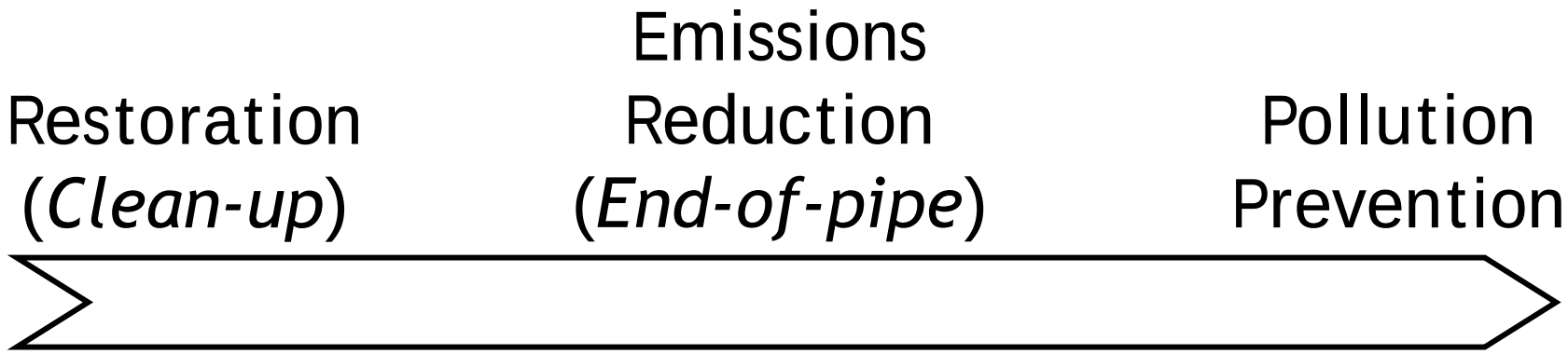
In time	Recycling products containing heavy metals
In space	Exporting hazardous waste
To other emissions	Replacing zinc gutters with PVC gutters
To other media	Incinerating waste containing heavy metals
To other impacts	Reducing acidifying emissions by increasing GHG
To other consumption patterns	Spending automobile savings on plane travel

Source: N Wrisberg, H A Udo de Haes (Eds.) (2002) Analytical Tools for Environmental Design and Management in a Systems Perspective, Kluwer Academic Publishers, 275 p.

A Global Perspective = A Life Cycle Perspective



Simple Common Sense ?



Cleaner Production

Design for the Environment

Extended Product Responsibility

Green Chemistry

The Problem Is…

Must have the right information

Otherwise

➔ Wrong priorities

➔ Waste limited resources

➔ Might even make things worst

How to Get the Right Information ?

Tool	Subject	Scale	Impacts considered
Risk Assessment	Installation, substance	Local or regional	Toxicity (eco-)
Environmental Impact Assessment	New localized activity	Local or regional	Variable
Life Cycle Assessment	Product, service (= **system**)	**Global** (life cycle)	**Multiple**

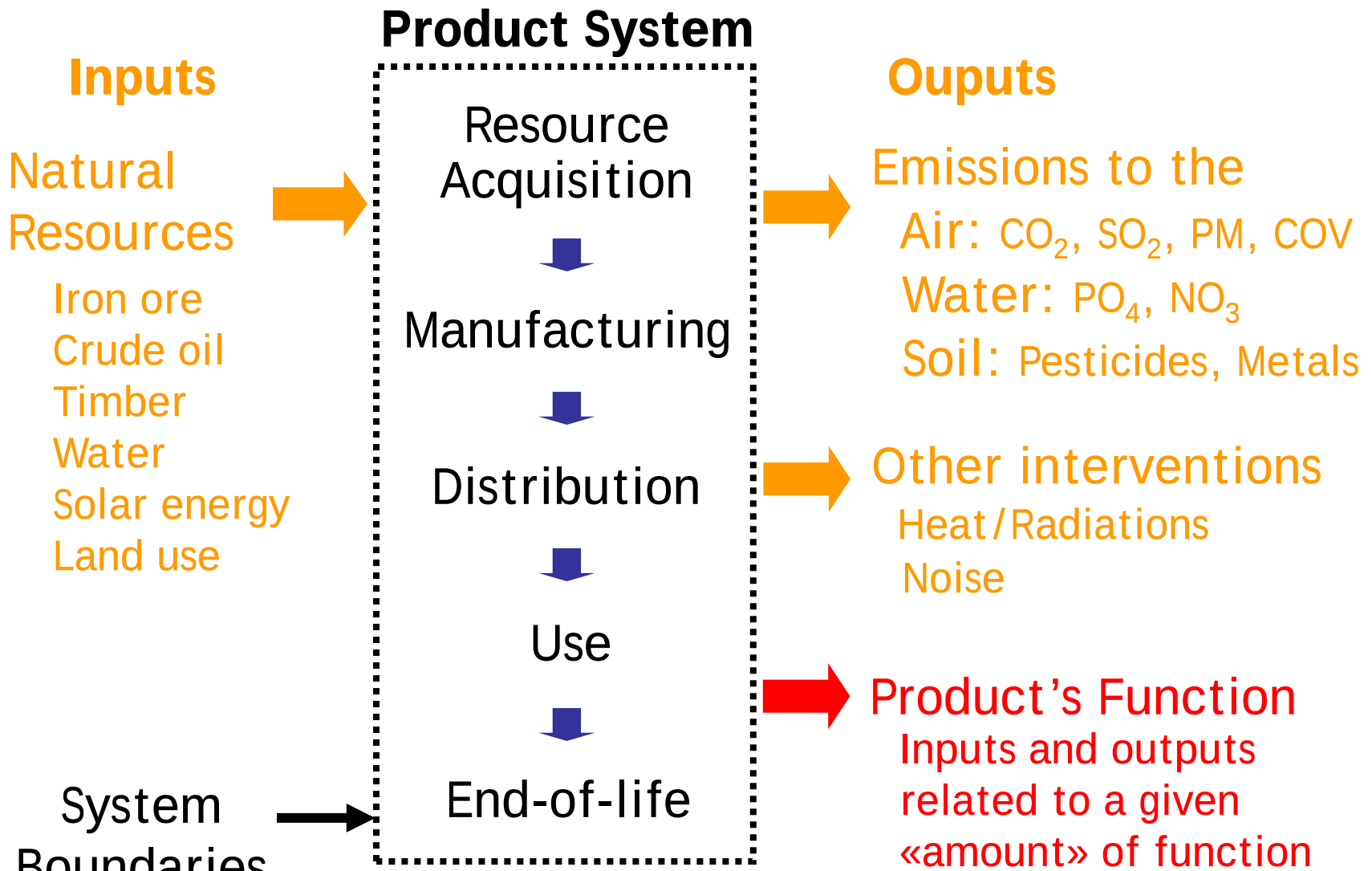
Source: O Jolliet, M Saadé, P Cretaz (2005) Analyse du cycle de vie, Comprendre et réaliser un écobilan, Presses Polytechniques et universitaires romandes, 242 p.

The Basis of LCA

Environmental impacts ➔ Disturbances in natural processes due to environmental interventions from human activities

LCA ➔ Accounting for the environmental interventions associated with the life cycle

Life Cycle Inventory



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Life Cycle Impact Assessment

Inventory

Inputs:

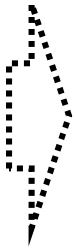
Iron ore
Crude oil
Timber
Water
Solar energy
Territory
...

Outputs:

CO_2
SO_2
PM
COV
PO_4
NO_3
Pesticides
Metals
...

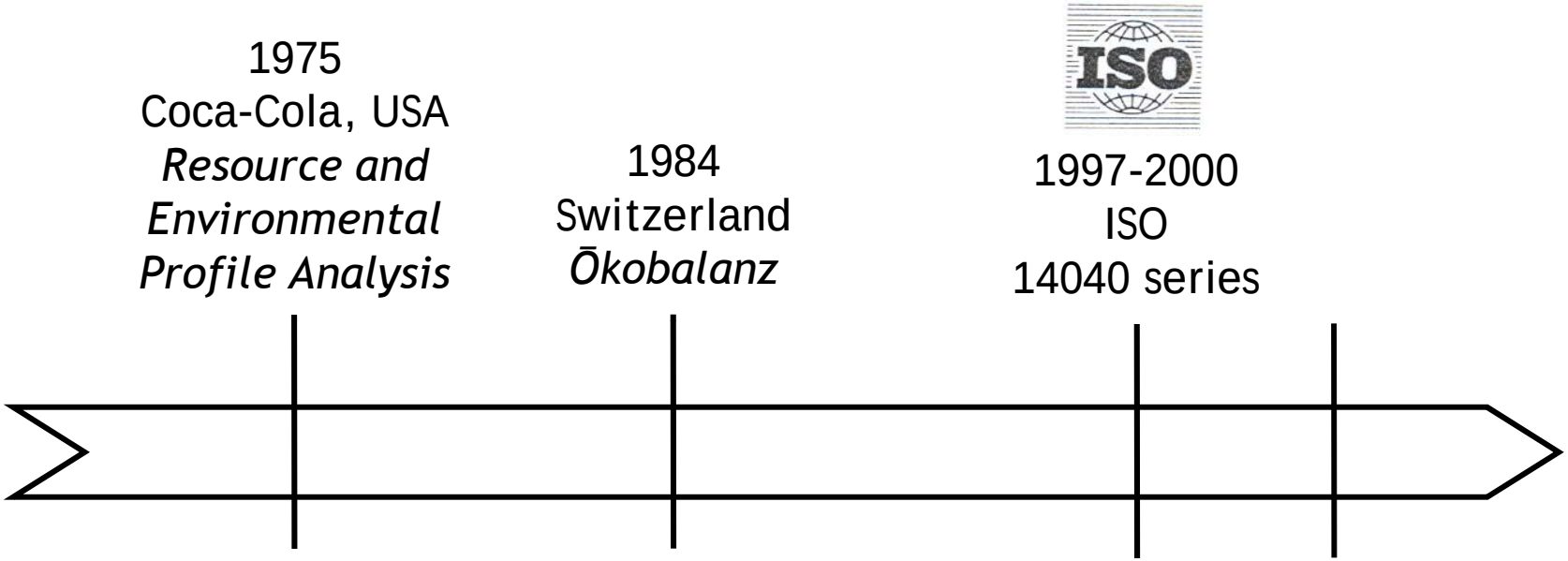
Impact categories

Global warming
Ozone layer depletion
Land use
Natural resources depletion
Aquatic acidification
Eutrophication
Photochemical ozone formation
Human toxicity
Ecotoxicity



Single score

A Short History



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Summit on Sustainable Development (2002)

« Develop production and consumption policies to improve the products and services provided, while reducing environmental and health impacts, using, where appropriate, science-based approaches, such as **life cycle assessment**. »

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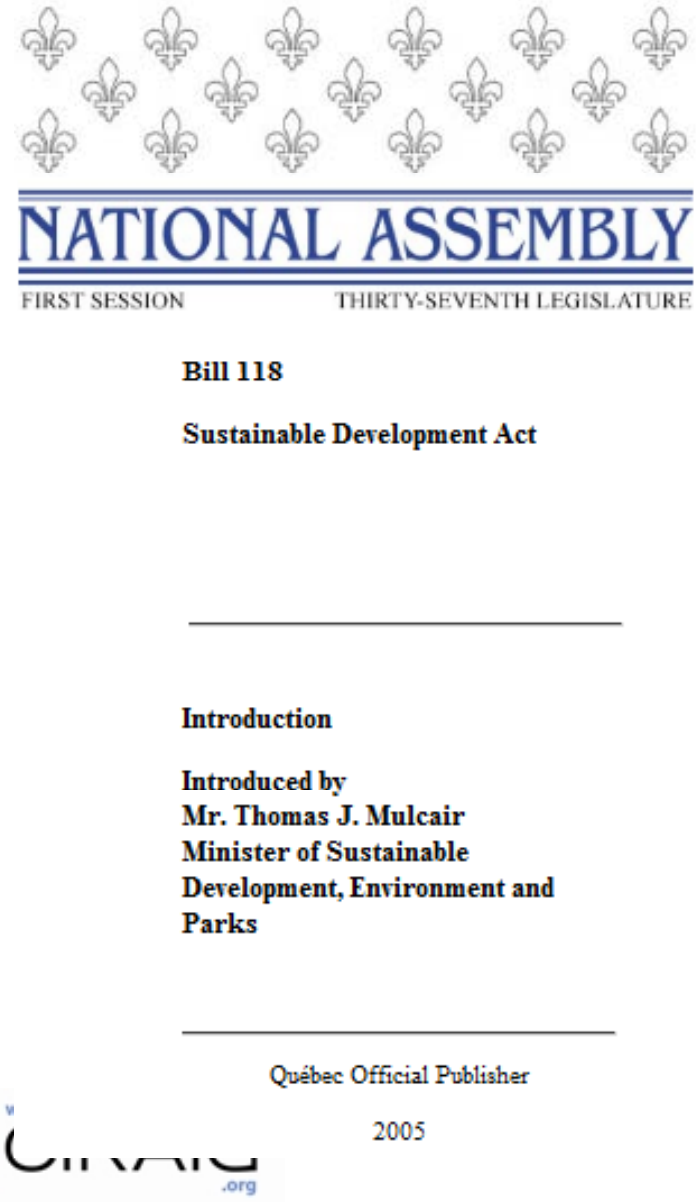
Quebec's Sustainable Development Act (2005)



NATIONAL ASSEMBLY

FIRST SESSION THIRTY-SEVENTH LEGISLATURE

Bill 118

Sustainable Development Act

Introduction

Introduced by
Mr. Thomas J. Mulcair
Minister of Sustainable Development, Environment and Parks

Québec Official Publisher

2005

(16) **«** *Internalization of costs* **»**
The cost of goods and services must reflect all the costs they generate for society during their **whole life cycle**, from their design to their final consumption or disposal.

European Platform on LCA

EUROPEAN COMMISSION
DIRECTORATE GENERAL
Joint Research Centre

Project of the European Commission

1st Phase: 2005-2009

To improve the **credibility, acceptance and practice of LCA** in **business and public authorities**, by providing **reference data and recommended methods** for LCA studies

To support the implementation of the **Thematic Strategies on the Prevention and Recycling of Waste** and on **the Sustainable Use of Natural Resources**, the **Integrated Product Policy (IPP) Communication** and of the upcoming **Sustainable Consumption and Production (SCP) Action Plan**

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Who uses LCA ?


TOYOTA
ERICSSON
MOTOROLA
NOKIA
Connecting People
PHILIPS
Bell
NORTEL NETWORKS
ROCKWOOL
TORR CANADA
Formerly EARTH (Canada) Corporation
CO2 Solution
PICTET
1805
at&t
Lucent Technologies
Bell Labs Innovations
3M
XEROX
LAFARGE
Weyerhaeuser
Unilever
RioTintoAlcan
ALCOA
ABB
Teknion
Hydro Québec
nest
Caisse de pensions écologique et éthique
TOTAL
Québec
CONFOEDERATIO HELVETICA
Montréal
Institut de développement de produits
FONDS D'INVESTISSEMENT EN DÉVELOPPEMENT DURABLE
Canada

Walmart is getting into it !!!

Wants to obtain LCA data for all products

➔ **1000's of suppliers**

Funds LCA research and tools

RONA too !

RONA

Doing it right

RONA-ECO and Eco-Responsible Choice lines

Chosen according to life cycle approach

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Switzerland Environment Label for Vehicles

Now **Energy Label** (only CO_2)

From 2010 **Environment Label**

- Must account for GHGs, air pollutants, noise and fuel production
- Emissions expressed as ecopoints per vehicle

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Switzerland Biofuels Tax Exemption

Ordinance RS 641.611 on mineral oil taxation (Art. 19)

Biofuels get **tax exemption** if:

They emit 40% less GHGs, **from production to use**, as compared to fossil fuels

Their environmental impacts, **from production to use**, are not notably higher than those of fossil fuels

Their production does not pose a threat to tropical forests and biodiversity

California's Low Carbon Fuel Standard (LCFS)

California Environmental Protection Agency
AIR RESOURCES BOARD

Approved by CARB on **23-04-2009**

Requires 10% **reduction of fuels carbon intensity** by 2020

Takes into account GHG content of **every aspect of fuel** – its production, distribution and combustion

Biofuels are included

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US EPA Proposed Biofuels GHG Accounting Rule

Agency will measure GHG emissions based on a biofuel's **entire lifecycle**, from cultivation to fuel production to vehicle exhaust

Cultivation includes direct emissions from fertilizer and tractor fuel, as well as emissions from **indirect land use change**, which is the impact that growing biofuels domestically has on other countries

Consumer Use of LCA

Ecolabel

Environmental Choice

Green Seal (USA)

Shows environmental **preference** in specific product category
Threshold criteria
Verified by **third party**

Environmental Product Declaration

Based on LCA
Very **simplified** LCA report
Verified by **third party**
Governed by **ISO 14025**

Cascades

Climate Declaration
Product: 1 tonne of coated folding boxboard, Duprint, 270 g/m²

EPD

The climate declaration describes the emissions of green-house gases, expressed as CO_2-equivalents. It is based on verified life-cycle data following the concept of Environmental Product Declarations, EPD, as outlined in ISO 14025. The other EPD data are available from Cascades Djupafors on request.

Product description

The coated folding boxboard is used by our customers for carton packaging of food and other products.

Cascades Djupafors was the first board producer to be certified by both FSC and PEFC, which guarantees that all wood fibres used comes from well-managed forests.

The board is produced using groundwood technology which uses around 30% less energy than thermo-mechanical production technology.

The board has an ISEGA certificate (approved for contact with food) and is tested for taint and odour according to the Robins on test.

Climate declaration

Board production, Cascades Djupafors

The emissions of greenhouse gases from the production of Duprint are presented as kg fossil CO_2-equivalents using GWP (Global Warming Potential 100 year) below.

kg CO2/tonne Duprint

Product use and waste treatment

The final board product should be recycled or incinerated with energy recovery after use. It should not be put to landfill.

Company description

Cascades Djupafors AB is situated in Ronneby, Sweden. The owner Cascades is a Canada-based company with deep environmental commitment.

Other environmental information

The uptake of biogenic CO_2 at growth and the emission of biogenic CO_2 at production and incineration after use is presented below.

kg Biogenic CO2/tonne Duprint

Cascades Djupafors is certified according to ISO 9001, 14001 and PFE (Program for Energy efficiency, a commitment to reduce our energy consumption). All electricity at the site is hydro power produced by Vattenfall.

Contact person: Björn Sandberg, Managing Director
E-mail: bsandberg@cascades-europe.com
Cascades Djupafors
Box 501,
SE-372 25 Ronneby
SWEDEN
www.cascades-europe.com

References

1. Elin Eriksson, "LCA of boxboard from Cascades". IVL Swedish Environmental Research Institute, 2007.
2. General Programme Instructions for an international EPD-system, the Swedish Environmental Management Council, Draft 2007-03-02.
3. ISO 14025:2006 Environmental labels and declarations —Type III environmental declarations - Principles and procedures. SIS.

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Futur of Environmental Labelling

E.LECLERC WATTRELOS
POINT ACCUEIL
TEL : 03.20.20.99.99
BONJOUR,

Caisse 040-0090 18 avril 2008 17:08
Ticket 18/04/08 0 1547 05200

* BLANC DE POULET	1.58
* SAUCISSES	1.39
* YAOURT VANILLE	2.50
* GÂTEAU	1.83
* MOUTARDE	1.32
* PUR JUS D'ORANGE	1.60
NETTOYANT CUISINE	1.70
COLORATION CHEVEUX	11.10
DENTIFRICE	1.10
Total 9 articles	24.12
Soit en franc : 158.22	
(1 euro = 6,55957 francs)	
Espèces	24.12
Rendu	0

MERCI
DE VOTRE CONFIANCE
A BIENTOT !

Le bilan CO_2 de mes courses est de :

13,38 kg eq CO_2 (1)

Plus le chiffre est faible, mieux c'est pour ma planète !!

Pour en savoir plus, RDV sur le stand à l'entrée du magasin ou sur le site

www.jeconomisemaplanete.fr

(1) Ce chiffre correspond au calcul des émissions de gaz effet de serre en équivalent CO_2 des produits indiqués par une étoile dans la liste de mes achats.

Our Footprint Notre Empreinte

Environmental Impact Impact sur l'environnement

Energy to Produce: (per pair)*	3.1 kWh
Énergie utilisée (par paire)*	3.1 kWh
Renewable energy (Timberland-owned facilities):	5%
L'énergie renouvelable (sites appartenant à Timberland) :	5%

Community Impact Impact sur la communauté

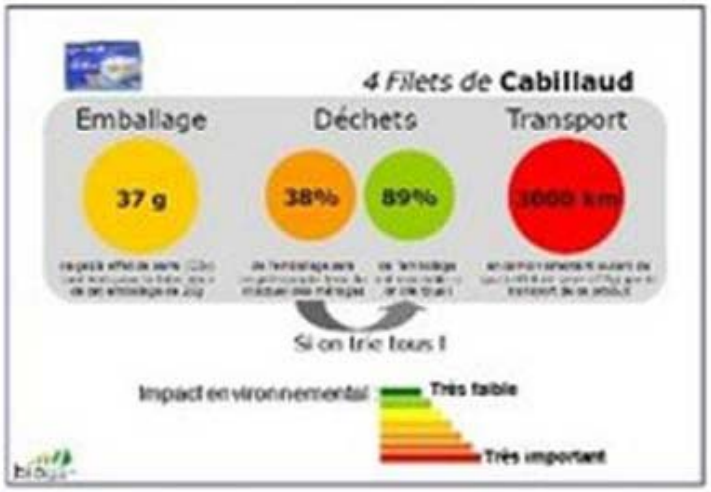
Hours served in our communities:	119,776
Nombre total d'heures données :	119,776
% of factories assessed against code of conduct:*	100%
% d'usines évaluées pour leur conformité au code de conduite :*	100%
Child labor:*	0%
Main-d'oeuvre enfantine :*	0%

Manufactured Fabriqué à

OSI Vietnam, Vietnam OSI Vietnam, Vietnam

* metrics based on global footwear production for 2005
* informations fondées sur production totale de chaussures en 2005

FOR MORE INFORMATION VISIT WWW.TIMBERLAND.COM/CSRREPORT
POUR PLUS D'INFORMATIONS : WWW.TIMBERLAND.COM/CSRREPORT



Environmental Facts

Overall Weighted Score ..... 6 / 10

Energy

Embodied energy 2,800kWhr
Type of energy used: 2,000kWhr coal, 800kWhr solar PV
Energy usage, avg. est 1,900kWhr/yr
Transportation origin
Product: USA
Materials: USA, China, Korea, South Africa

Resources

Product
Mass 10kg
Non-virgin material 5%
Recyclable/Compostable material 30%
aluminum, steel, plastic #1
Ingredients: Polyethylene terephthalate (PET), aluminum, steel, glass, copper, fiberglass, acrylonitrile-butadiene styrene (ABS), lead-free solder, nematic liquid crystals, polyimide, indium-tin oxide, Polycarbonate, Poly(methyl methacrylate) (PMMA), Styrene-butadiene co-polymer, Polyethylene ether, Triphenyl phosphate, polybrominated flame retardant, silicon, silicon dioxide, silicon nitride, selenium, cadmium, antimony, dopants
Life Expectancy 4-7yrs
End-of-life ..... return to manufacturer

Packaging & Misc.
Mass 800g
Non-virgin material 20%
Recyclable/Compostable material 100%
cardboard, paper, PLA plastic
Ingredients: cardboard, paper, PLA plastic, soy-based ink
End-of-life ..... recycle, compost

Toxins

Restricted/Toxic ingredients: polybrominated flame retardant, cadmium, antimony, dopants
Restricted/Toxic production waste: toluene, mercury oxides, cadmium, antimony, arsine, silane, chlorine, phosgene, perfluorocompounds (CF_4, C_2F_6, NF_3, SF_6, CHF_3)

Water

Embodied water 2,600L
Water pollution 2/10

Social

Labor Practices 8/10
Fair trade 4/10
Transparency 6/10

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Japan LCA National Project

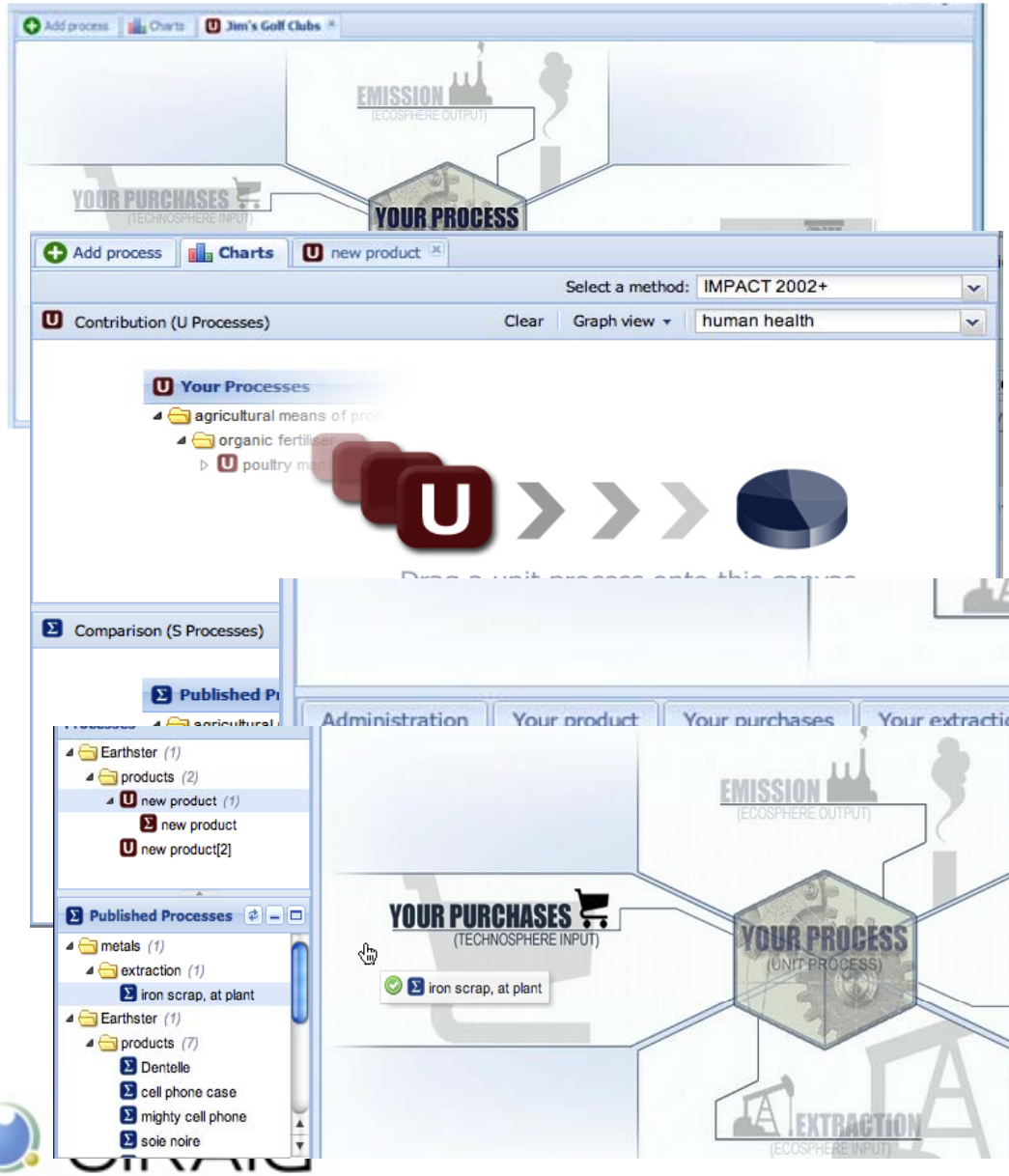
Project of the Ministry of Economy, Trade and Industry (METI)

1st Phase: 1998-2003

> To develop **national inventory database** and reliable **LCA methodology** for Japan

Sectors included: automotive, pulp and paper, food, plastics, electric and electronic equipment, metals, construction

Earthster Project



1. Define your process

2. Contribution analysis and comparison

3. Publish cradle-to-gate results

4. Link to your supplier's data
➔ re-compute, re-publish

Concluding Remarks

LCA fills a void in environmental assessment toolbox as it is the **only tool that gives a global perspective** and captures problem shifting situations

Global trend in industries and governments

Thank you for your attention

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