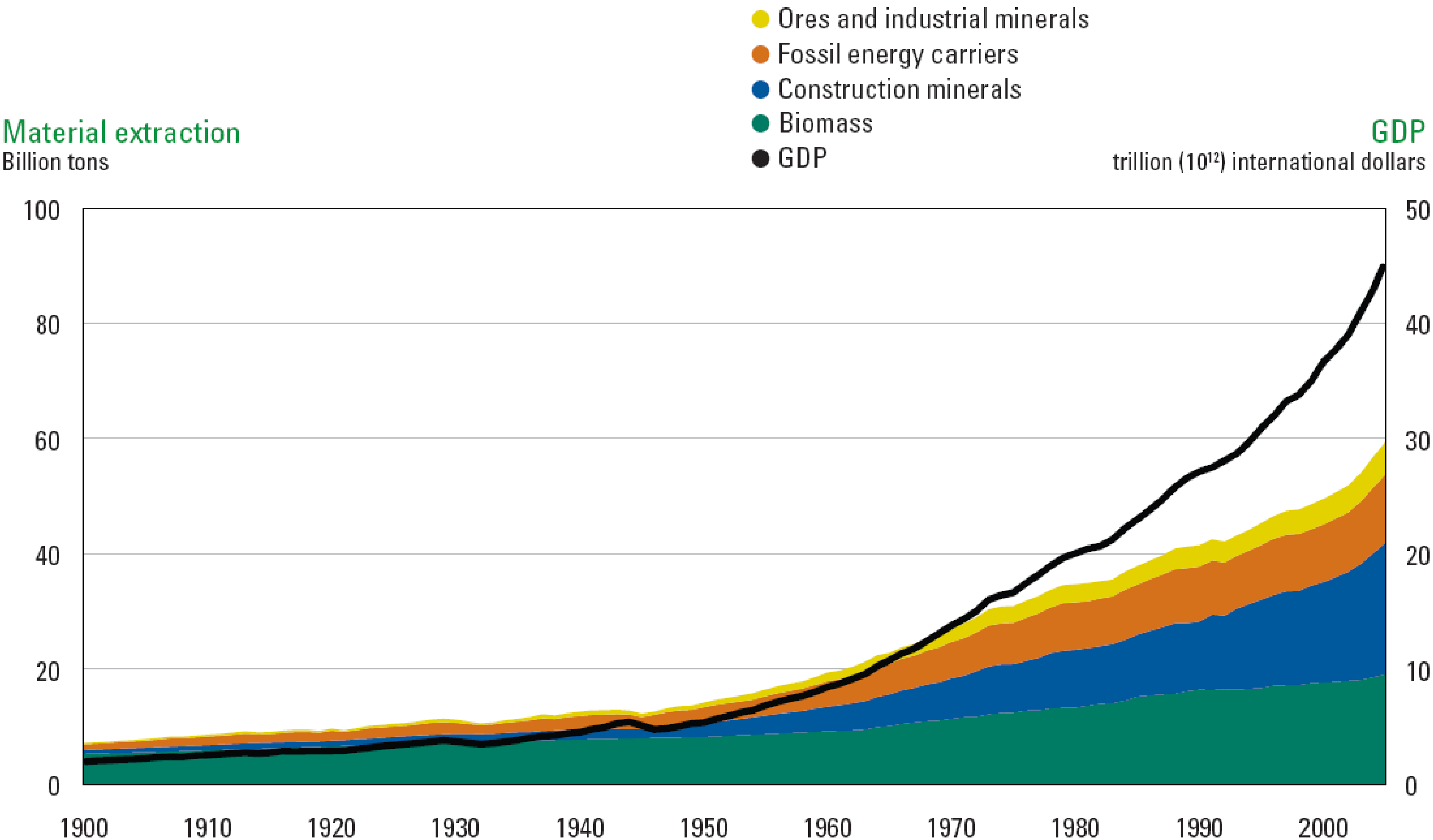
Levelling the playing field for American Hardwoods

Rupert Oliver,
Forest Industries Intelligence Ltd

HMA National Conference 12 March 2013

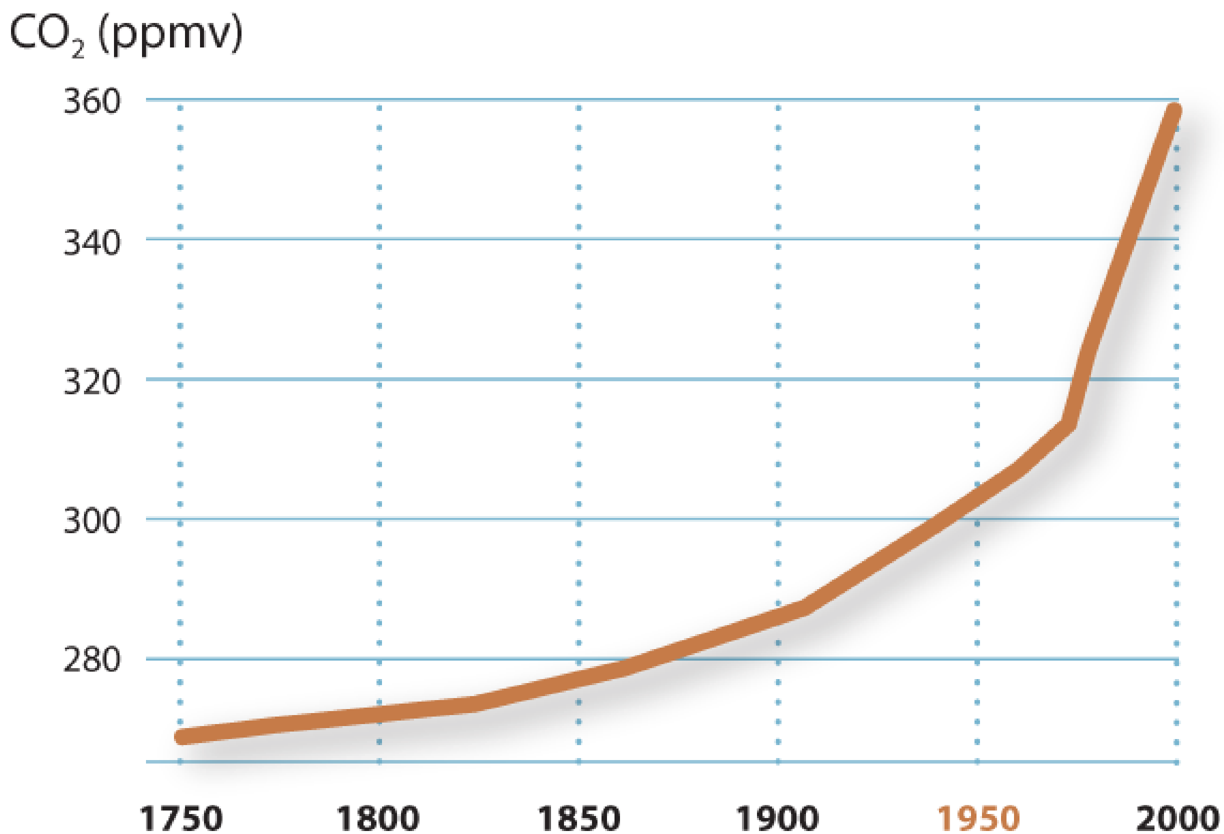
FII

Figure 1. Global material extraction in billion tons, 1900–2005



Source: Krausmann *et al.*, 2009

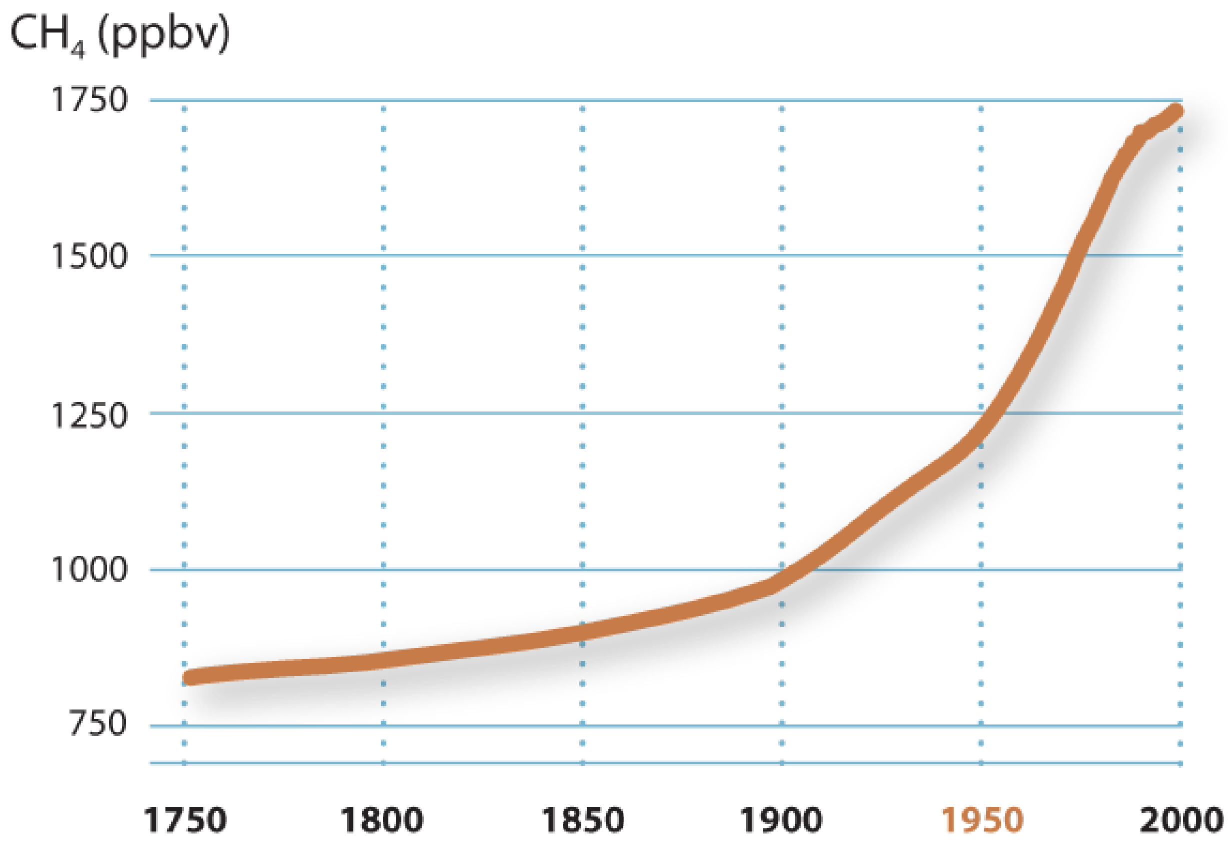
Atmospheric CO_2 concentration



Etheridge et al. Geophys Res 101: 4115-4128

IGBP synthesis: Global Change and the Earth System, Steffen et al 2004

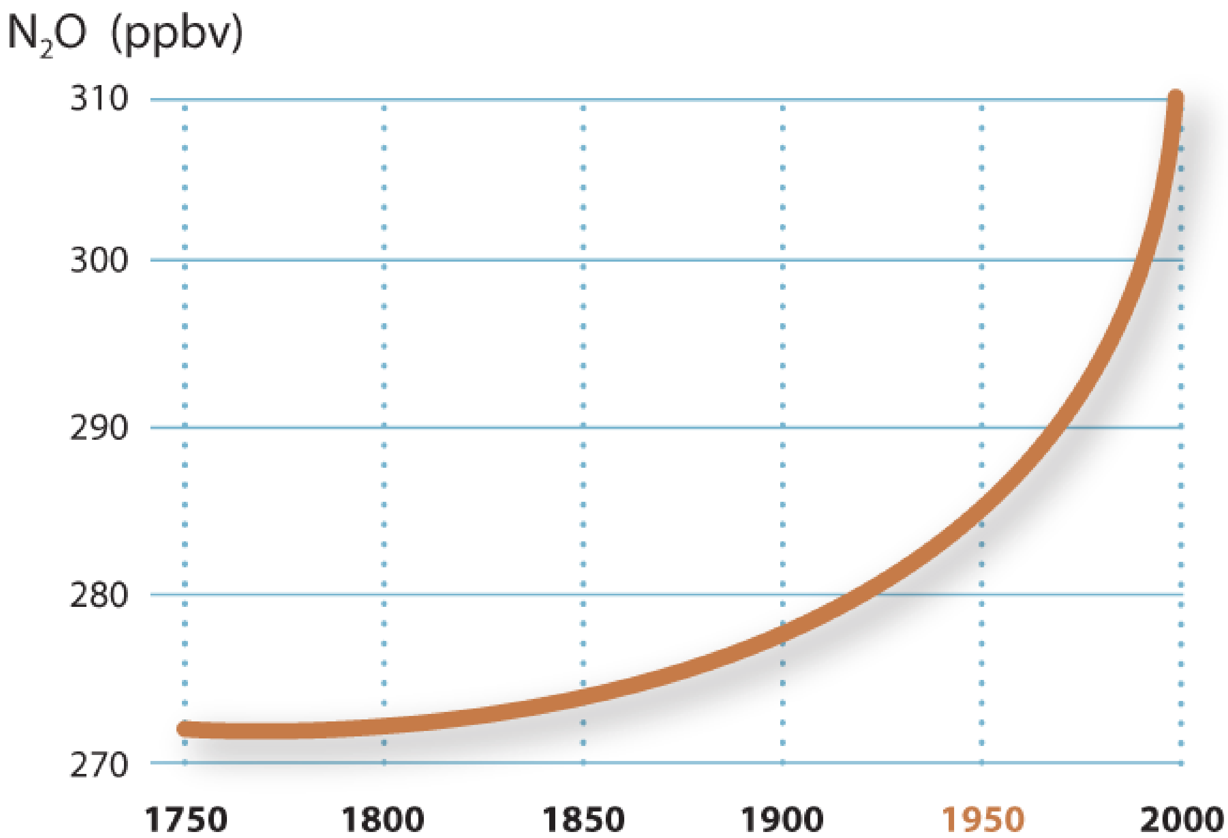
Atmospheric CH_4 concentration



Blunier et al J Geophy Res 20: 2219-2222

IGBP synthesis: Global Change and the Earth System, Steffen et al 2004

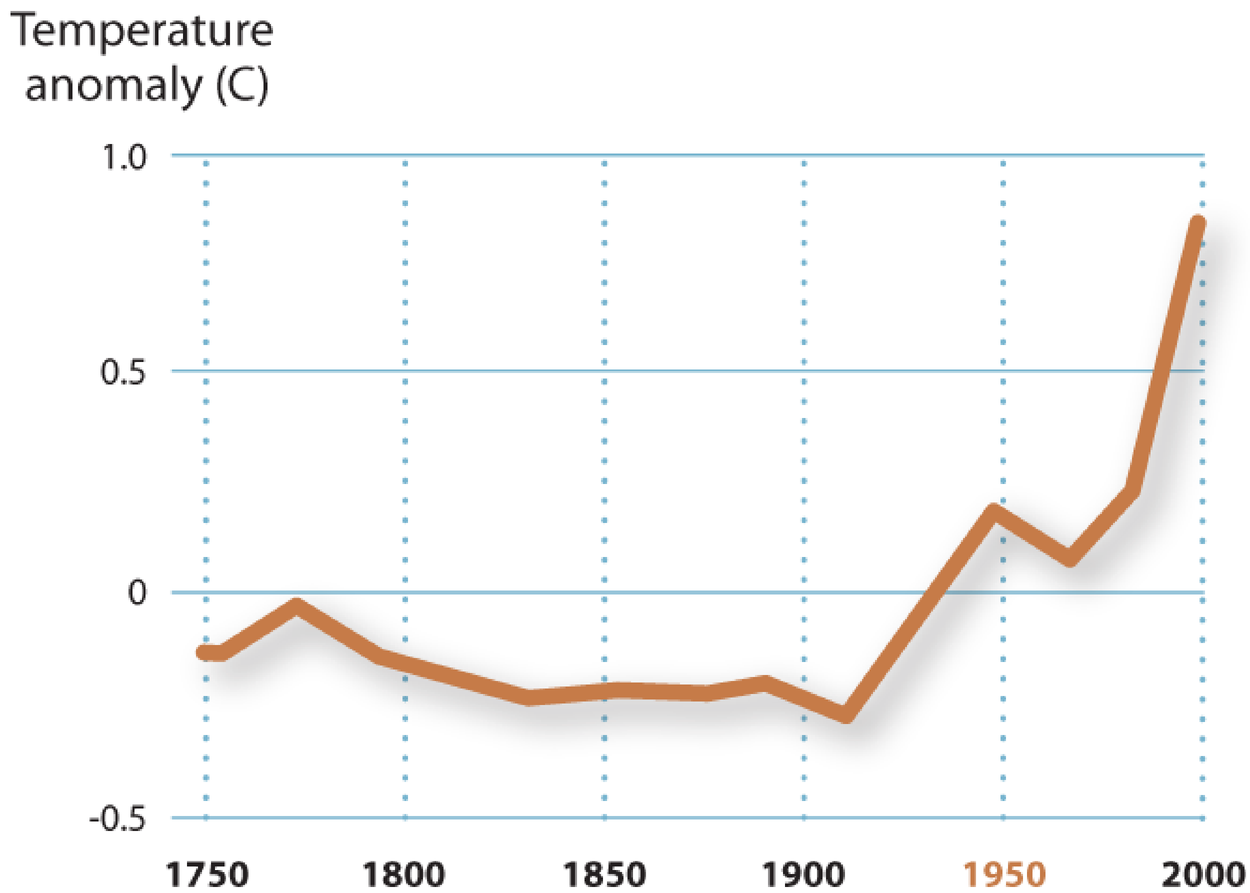
Atmospheric N_2O concentration



Machida et al Geophys Res Lett 22:2921-2925

IGBP synthesis: Global Change and the Earth System, Steffen et al 2004

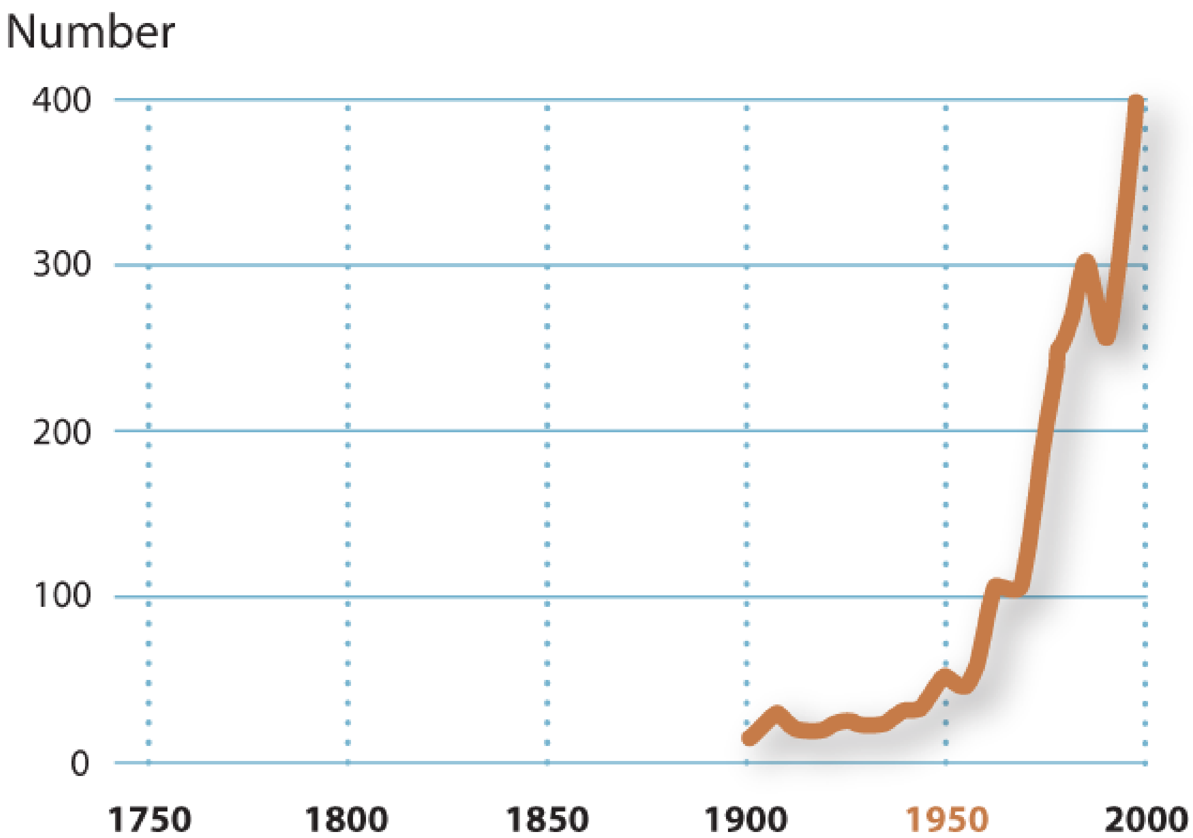
Northern hemisphere surface temperature



Mann et al Geophys Res Lett 26(6): 759-762

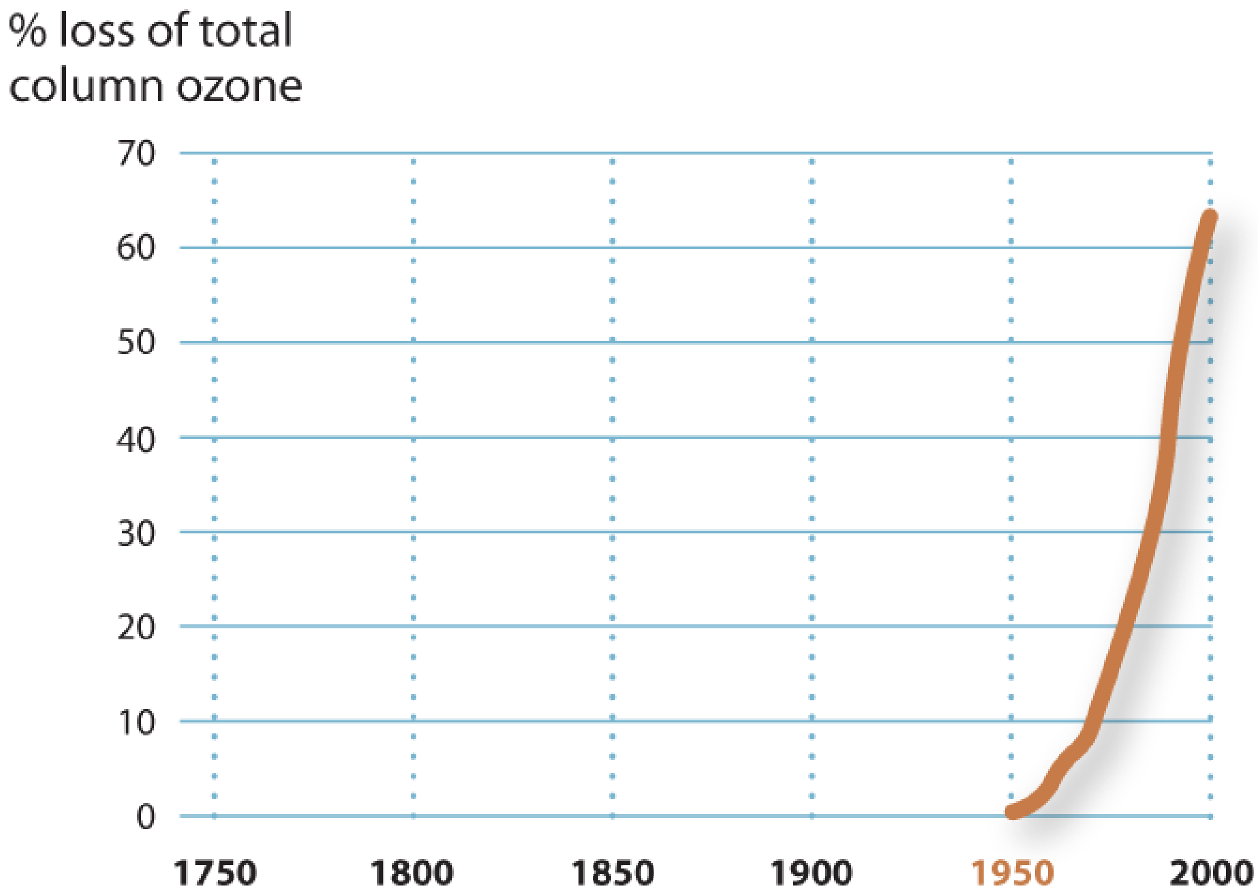
IGBP synthesis: Global Change and the Earth System, Steffen et al 2004

Natural climactic disasters



IGBP synthesis: Global Change and the Earth System, Steffen et al 2004

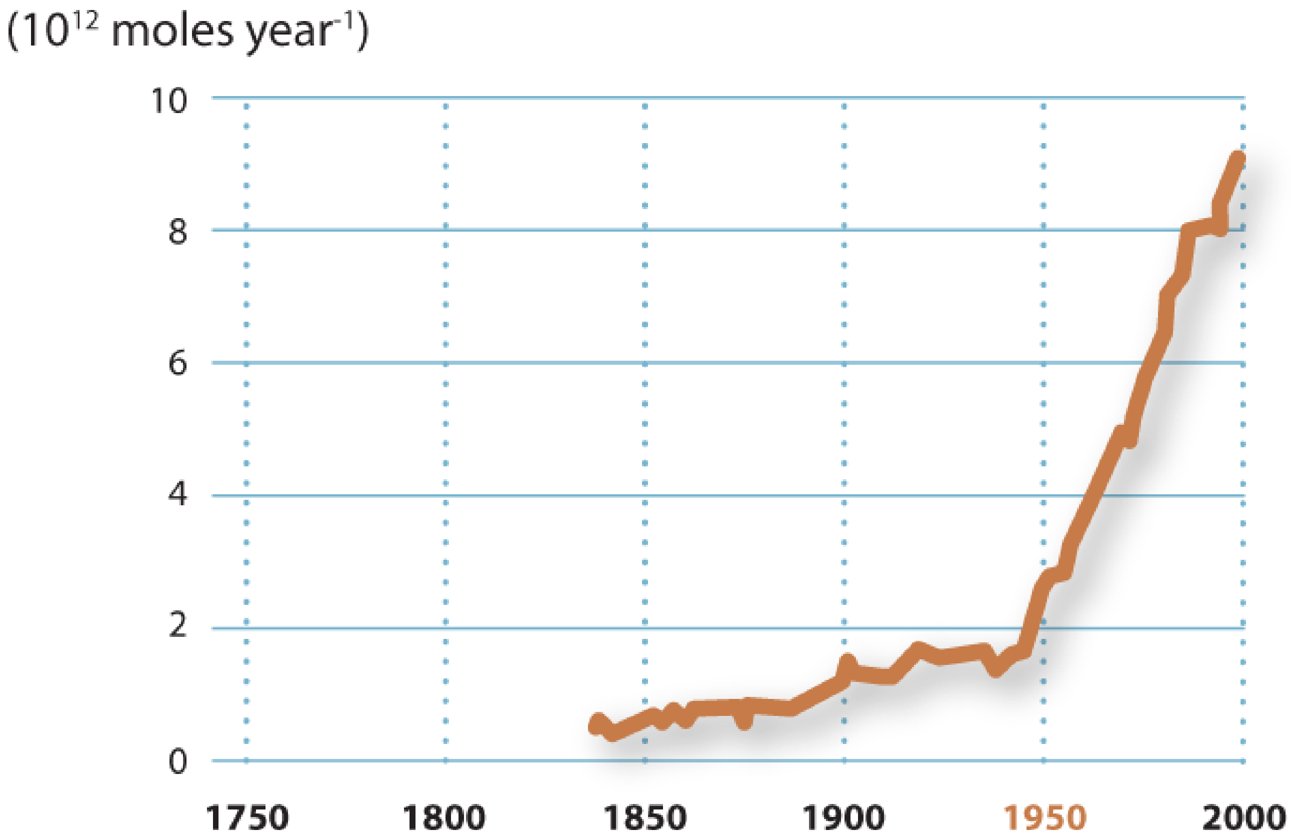
Ozone depletion



JD Shanklin British Antarctic Survey

IGBP synthesis: Global Change and the Earth System, Steffen et al 2004

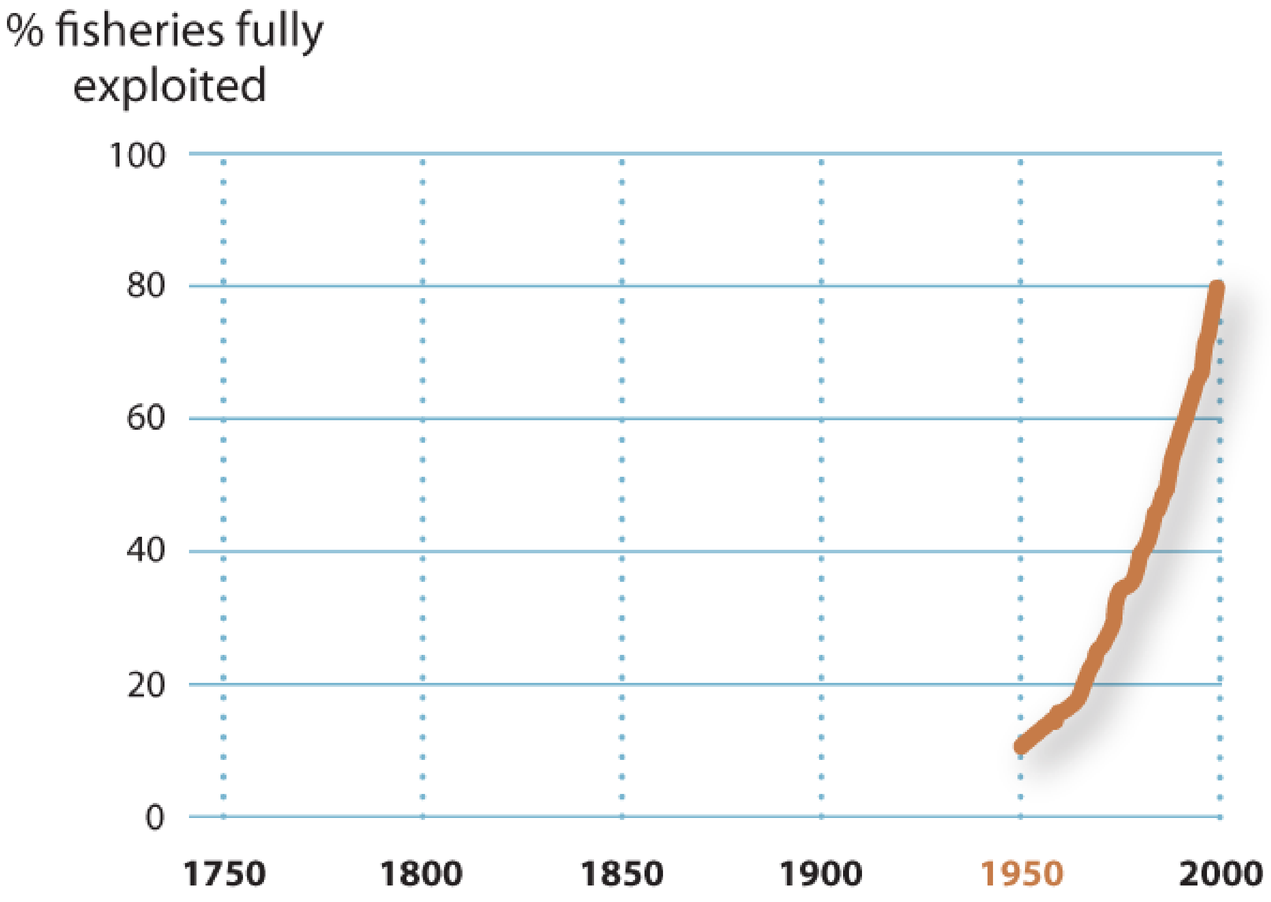
Coastal zone nitrogen flux



Mackenzie et al 2002.

IGBP synthesis: Global Change and the Earth System, Steffen et al 2004

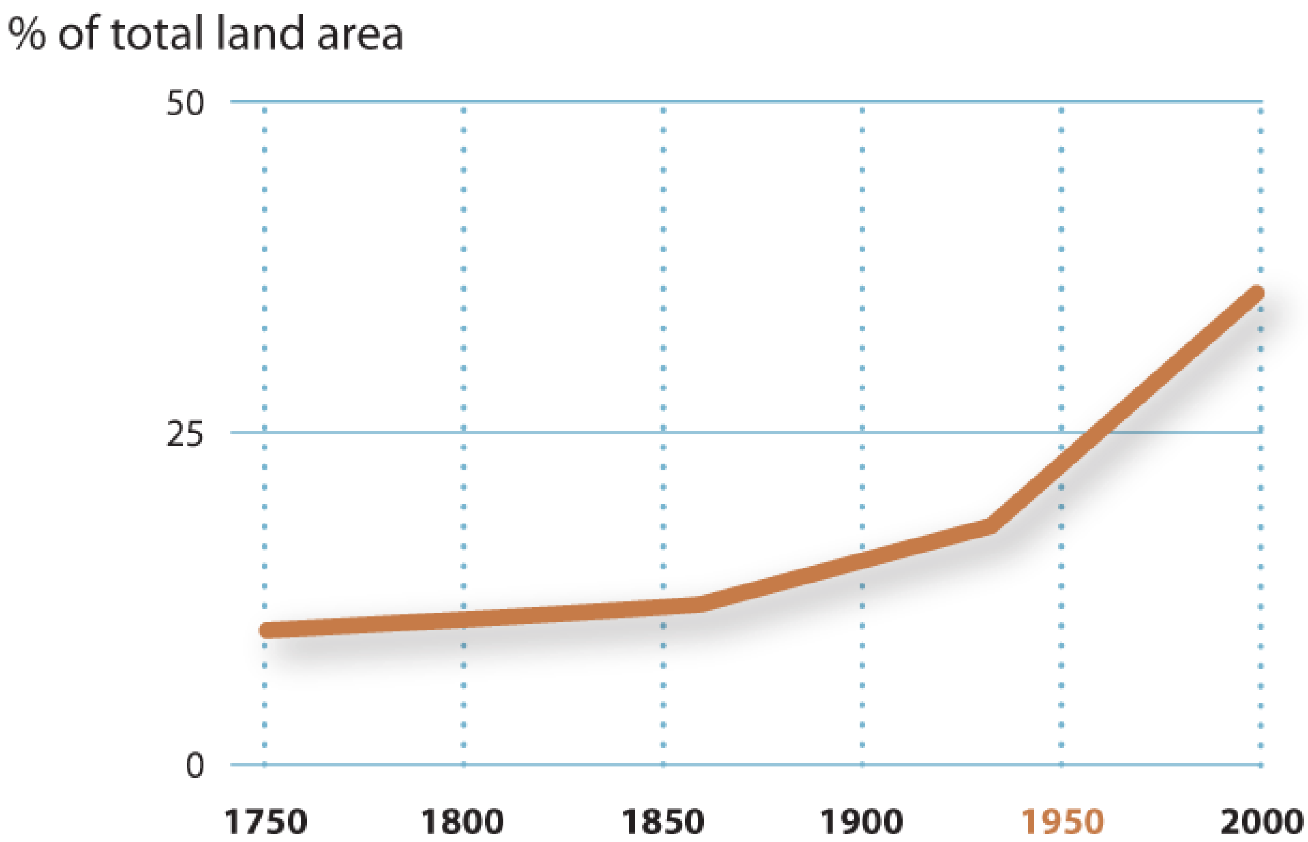
Ocean ecosystems



FAOSTAT 2002 Statistical database

IGBP synthesis: Global Change and the Earth System, Steffen et al 2004

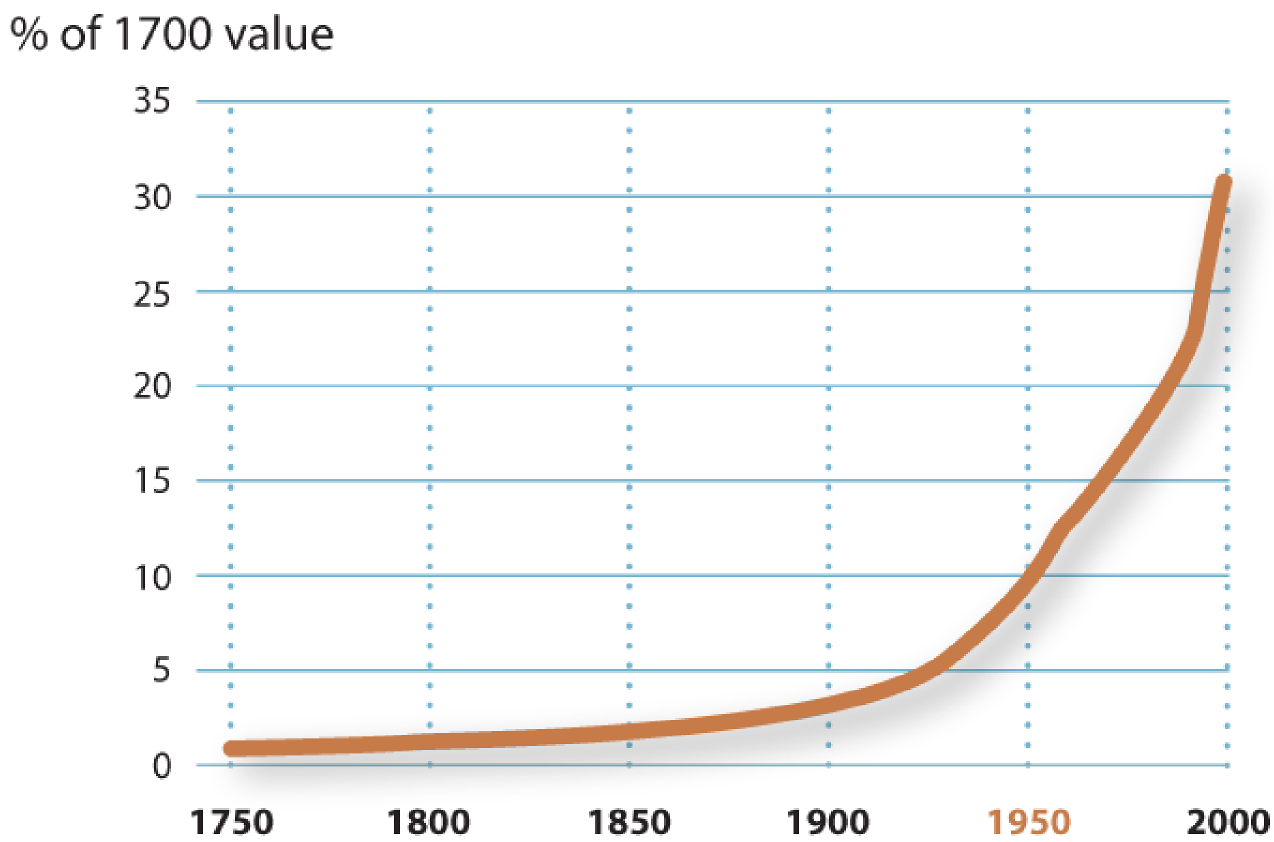
Domesticated land



Klein Goldewijk and Batties

IGBP synthesis: Global Change and the Earth System, Steffen et al 2004

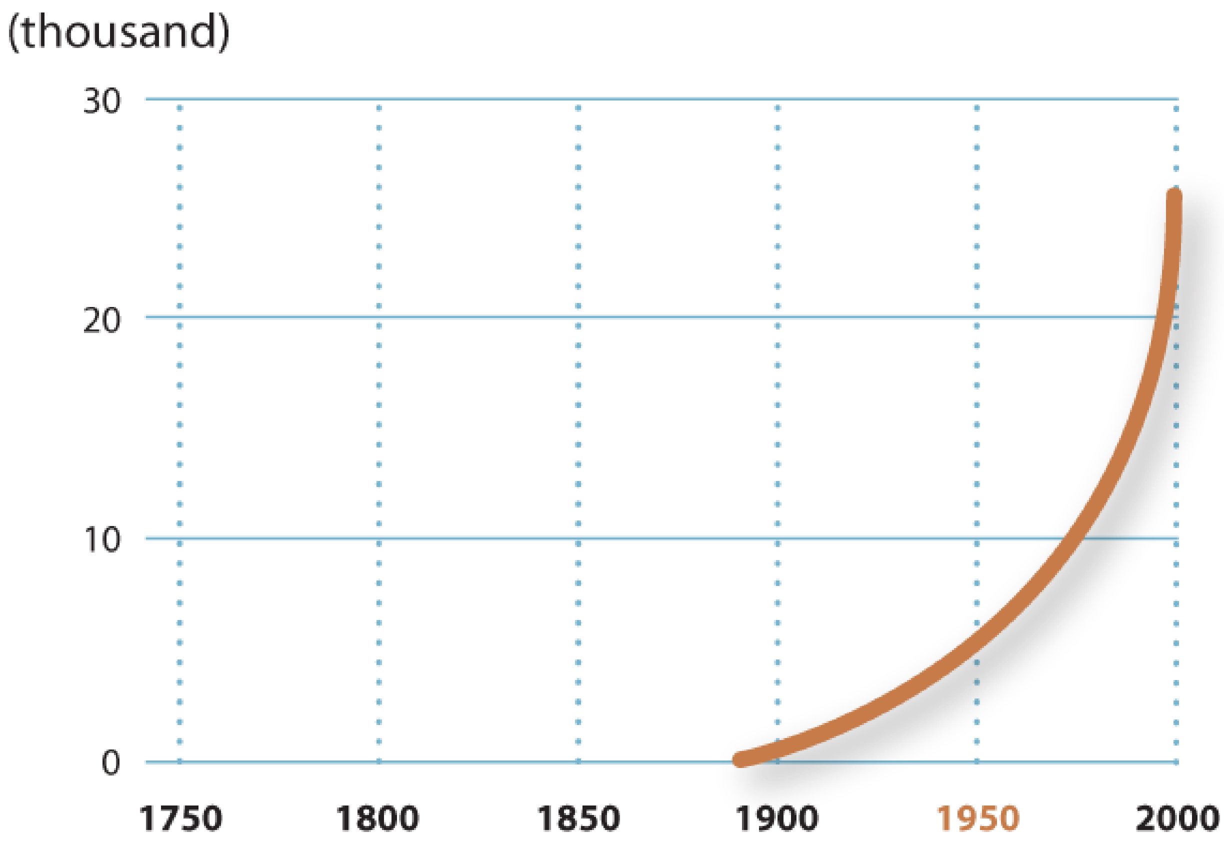
Tropical rainforest & woodland loss



Richards, the Earth as transformed by human action, Cambridge University Press

IGBP synthesis: Global Change and the Earth System, Steffen et al 2004

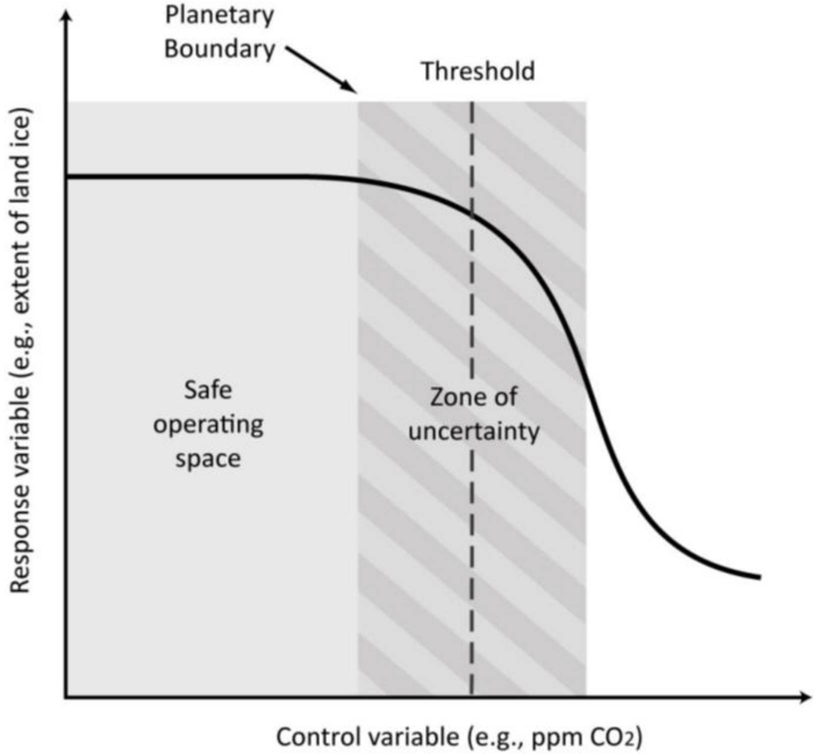
Species extinctions



Wilson, the Diversity of Life.

IGBP synthesis: Global Change and the Earth System, Steffen et al 2004

“Planetary boundary”



nature Vol 461|24 September 2009

FEATURE

A safe operating space for humanity

Identifying and quantifying planetary boundaries that must not be transgressed could help prevent human activities from causing unacceptable environmental change, argue **Johan Rockström** and colleagues.

SUMMARY

- New approach proposed for defining preconditions for human development
- Crossing certain biophysical thresholds could have disastrous consequences for humanity
- Three of nine interlinked planetary boundaries have already been overstepped

ROAD TO COPENHAGEN

Although Earth has undergone many periods of significant environmental change, the planet's environment has been unusually stable for the past 10,000 years[1–3]. This period of stability — known to geologists as the Holocene — has seen human civilizations arise, develop and thrive. Such stability may now be under threat. Since the Industrial Revolution, a new era has arisen, the Anthropocene[4], in which human actions have become the main driver of global environmental change[5]. This could see human activities push the Earth system outside the stable environmental state of the Holocene, with consequences that are detrimental or even catastrophic for large parts of the world.

During the Holocene, environmental change occurred naturally and Earth's regulatory capacity maintained the conditions that enabled human development. Regular temperatures, freshwater availability and biogeochemical flows all stayed within a relatively narrow range. Now, largely because of a rapidly growing reliance on fossil fuels and industrialized forms of agriculture, human activities have reached a level that could damage the systems that keep Earth in the desirable Holocene state. The result could be irreversible and, in some cases, abrupt environmental change, leading to a state less conducive to human development[6]. Without pressure from humans, the Holocene is expected to continue for at least several thousands of years[7].

Planetary boundaries

To meet the challenge of maintaining the Holocene state, we propose a framework based on 'planetary boundaries'. These boundaries define the safe operating space for humanity with respect to the Earth system and are associated with the planet's biophysical subsystems or processes. Although Earth's complex systems sometimes respond smoothly to changing pressures, it seems that this will prove to be the exception rather than the rule. Many subsystems of Earth react in a nonlinear, often abrupt, way, and are particularly sensitive around threshold levels of certain key variables. If these thresholds are crossed, then important subsystems, such as a monsoon system, could shift into a new state, often with deleterious or potentially even disastrous consequences for humans[8,9].

Most of these thresholds can be defined by a critical value for one or more control variables, such as carbon dioxide concentration. Not all processes or subsystems on Earth have well-defined thresholds, although human actions that undermine the resilience of such processes or subsystems — for example, land and water degradation — can increase the risk that thresholds will also be crossed in other processes, such as the climate system.

We have tried to identify the Earth-system processes and associated thresholds which, if crossed, could generate unacceptable environmental change. We have found nine such processes for which we believe it is necessary to define planetary boundaries: climate change; rate of biodiversity loss (terrestrial and marine); interference with the nitrogen and phosphorus cycles; stratospheric ozone depletion; ocean acidification; global freshwater use; change in land use; chemical pollution; and atmospheric aerosol loading (see Fig. 1 and Table).

In general, planetary boundaries are values for control variables that are either at a 'safe' distance from thresholds — for processes with evidence of threshold behaviour — or at dangerous levels — for processes without

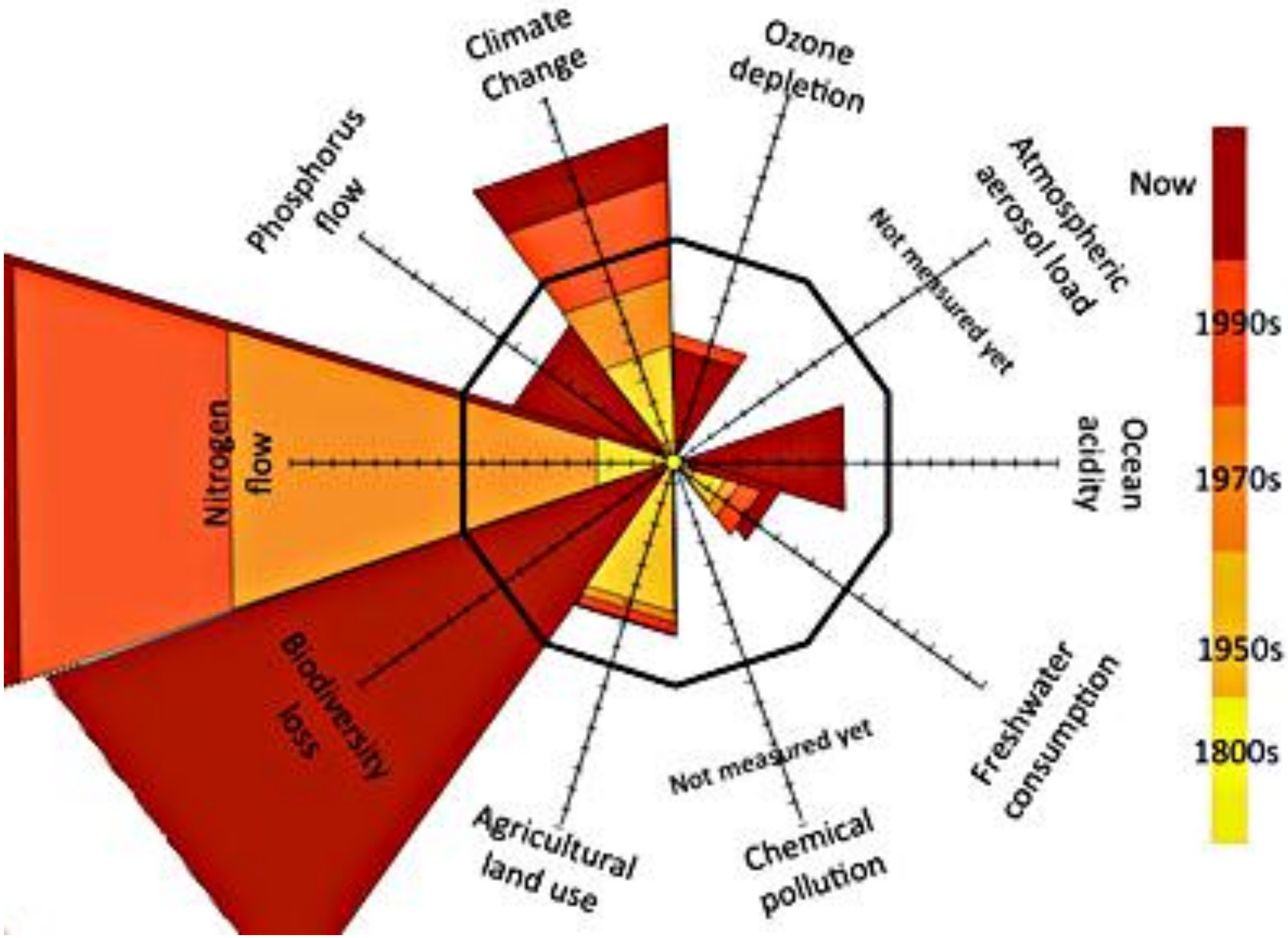
Figure 1 | Beyond the boundary. The inner green shading represents the proposed safe operating space for nine planetary systems. The red wedges represent an estimate of the current position for each variable. The boundaries in three systems (rate of biodiversity loss, climate change and human interference with the nitrogen cycle), have already been exceeded.

Rockström et al. 2009 Nature, 461 (24): 472-475

PLANETARY BOUNDARIES

Earth-system process	Parameters	Proposed boundary	Current status	Pre-industrial value
Climate change	(i) Atmospheric carbon dioxide concentration (parts per million by volume)	350	387	280
	(ii) Change in radiative forcing (watts per metre squared)	1	1.5	0
Rate of biodiversity loss	Extinction rate (number of species per million species per year)	10	>100	0.1–1
Nitrogen cycle (part of a boundary with the phosphorus cycle)	Amount of N_2 removed from the atmosphere for human use (millions of tonnes per year)	35	121	0
Phosphorus cycle (part of a boundary with the nitrogen cycle)	Quantity of P flowing into the oceans (millions of tonnes per year)	11	8.5–9.5	~1
Stratospheric ozone depletion	Concentration of ozone (Dobson unit)	276	283	290
Ocean acidification	Global mean saturation state of aragonite in surface sea water	2.75	2.90	3.44
Global freshwater use	Consumption of freshwater by humans (km^3 per year)	4,000	2,600	415
Change in land use	Percentage of global land cover converted to cropland	15	11.7	Low
Atmospheric aerosol loading	Overall particulate concentration in the atmosphere, on a regional basis		To be determined	
Chemical pollution	For example, amount emitted to, or concentration of persistent organic pollutants, plastics, endocrine disrupters, heavy metals and nuclear waste in, the global environment, or the effects on ecosystem and functioning of Earth system thereof		To be determined	

Transgressing safe boundaries



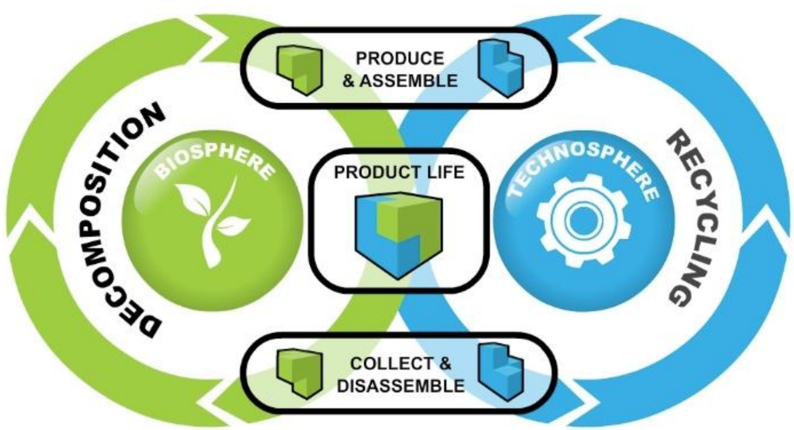
New ways of thinking

Sustainable development

Green building

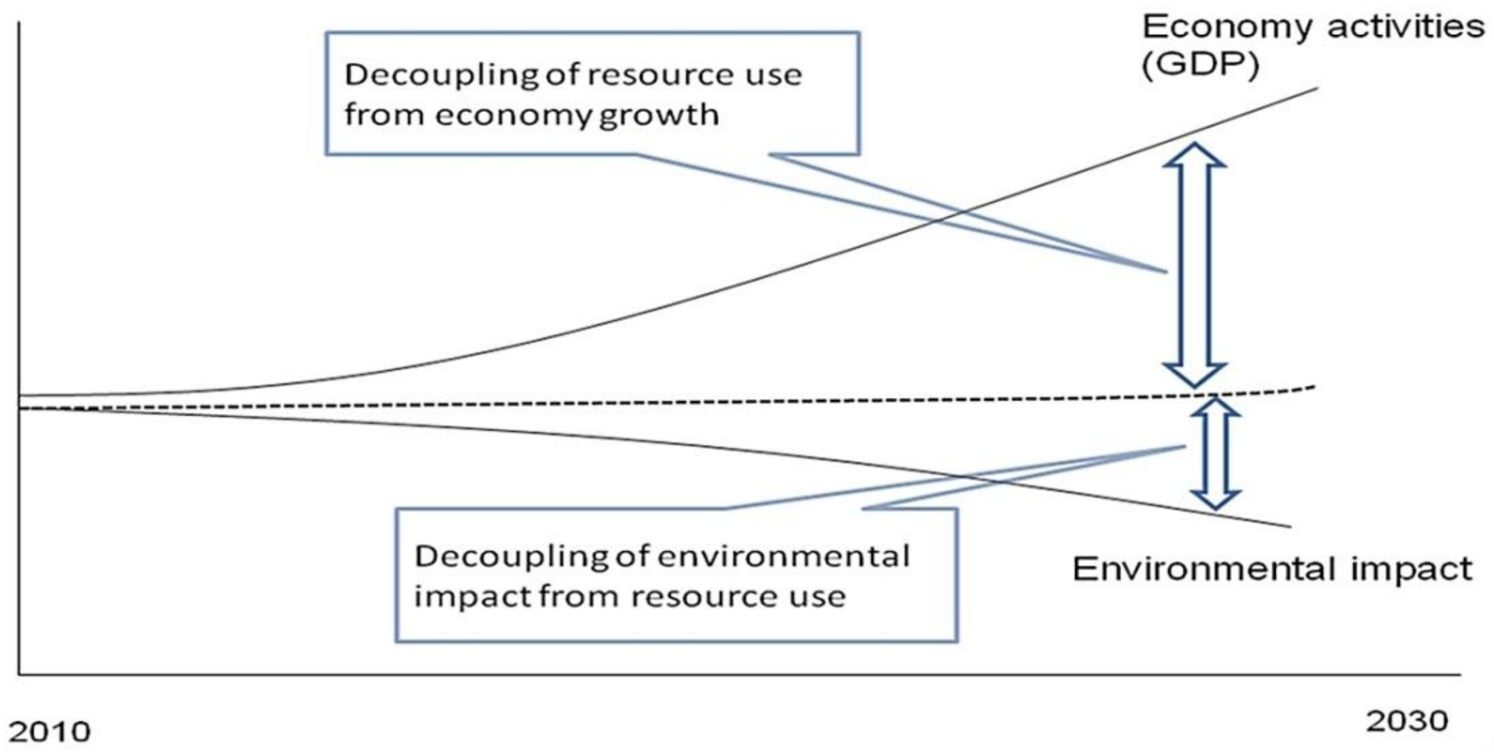
GREEN BUILDING ALLIANCE™

SMART SOLUTIONS FOR THE BUILT ENVIRONMENT



Cradle to Cradle Product Design

Economic growth that enhances the environment



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US hardwood: a major "win-win" opportunity for the global community

- Expanding resource
- Carbon store
- Energy efficient
- Biodiversity benefits
- Soil & water protection
- No fertilisers
- Toxin free
- Naturally biodegradable
- Socially equitable
- US hardwood trade = trade in "virtual water" & "virtual carbon"

American hardwood: could this be the most environmentally friendly building material on the planet?

By Rupert Oliver (image below), **Director, Forest Industries Intelligence Limited.**

AMERICAN HARDWOOD EXPORT COUNCIL

The American hardwood industry believes it has an environmental profile that is hard to beat. In fact it's so confident of this claim that it is subjecting its production and distribution chain to independent environmental assessment. It also wants its major buyers around the world to impose tough measures requiring the removal of environmentally risky materials from supply chains.

Of all the numerous environmental benefits of American hardwoods, just one should make many users and specifiers of building materials sit up and take notice

American hardwood forest is composed of hundreds of species, of which at least 30 are of significant commercial value. In the Eastern states, red and white oak species are the most prevalent hardwoods, followed by hard and soft maples, tulipwood, hickory, sweetgum and ash. Red alder is the main commercial hardwood species produced in the North-Western states.

While softwood tends to be used for structural applications in construction, where the need for volume supply at low cost outweighs the need for good

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Wood trade perceived to be the problem not the solution

- Emphasis on single issue impacts in developing countries
  - "Deforestation"
  - "Illegal logging"
- FSC certification promoted as universal solution by NGOs and parts of industry
- Only covers forestry
- Wider environmental impacts rarely considered

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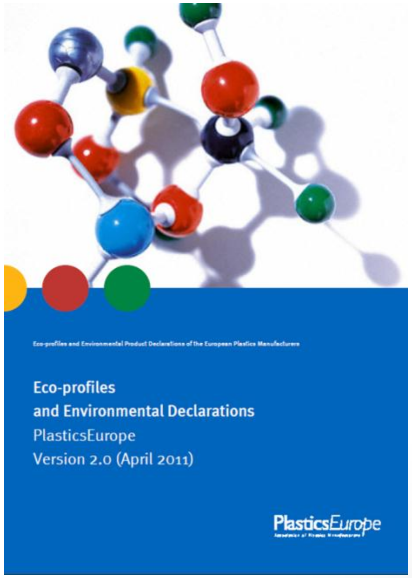
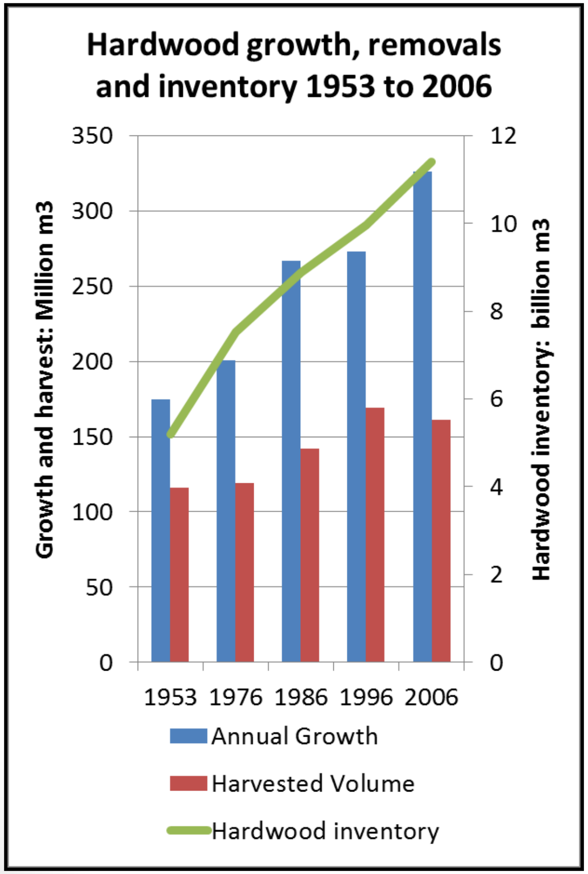
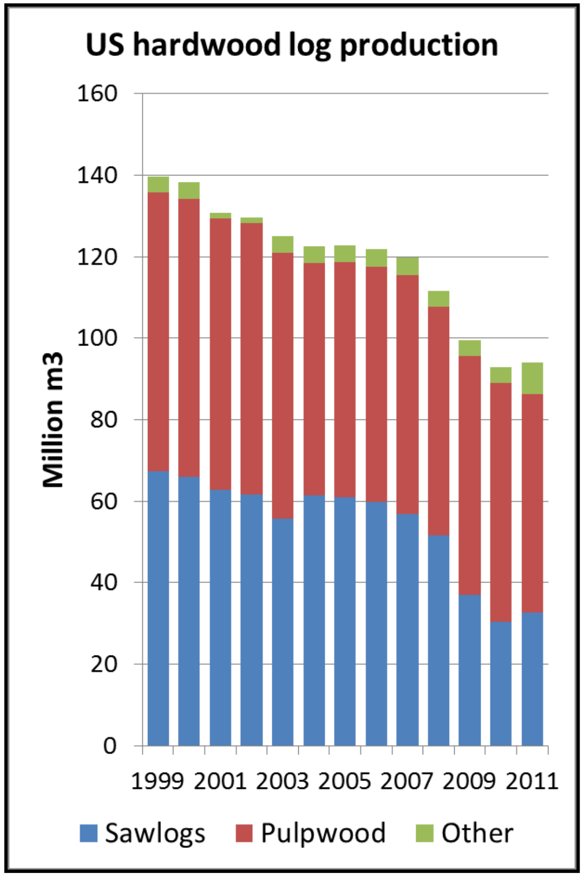
Wood struggles to compete against other materials - even on green issues!

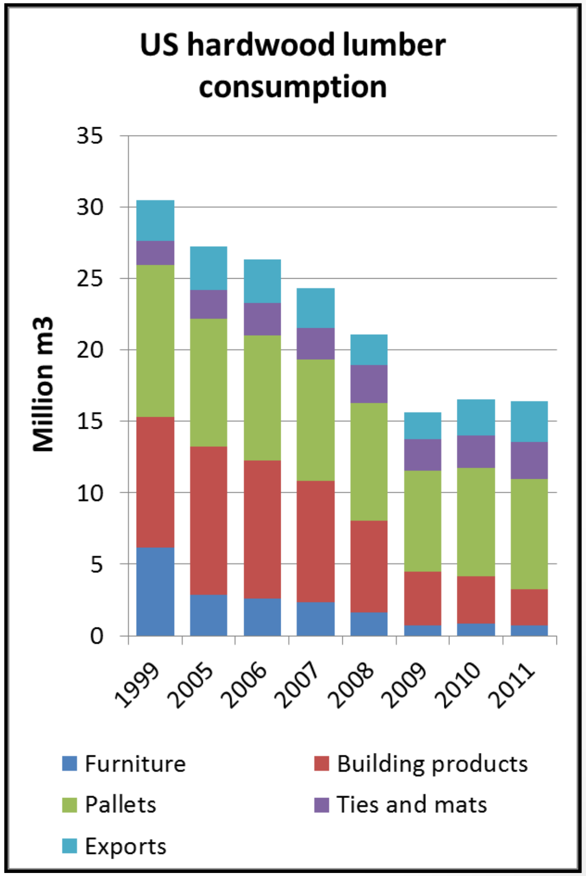
- Associations embrace LCA and play a key role in generating and distributing data
  - e.g. PlasticsEurope website has 70 eco-profiles covering full range of products & processes
  - World Steel Life Cycle Inventory
- Co-ordinated industry wide programmes:
  - Identify strengths and weaknesses
  - Establish targets to tackle “hot spots”
  - Lobbying to ensure progress is rewarded
  - Manage expectations so that the industry can claim it has “exceeded targets”
- Plastics, metals stress EoL & recycling
- Concrete, reduced carbon emissions through fly ash replacement, thermal mass qualities



US hardwood is under-utilised







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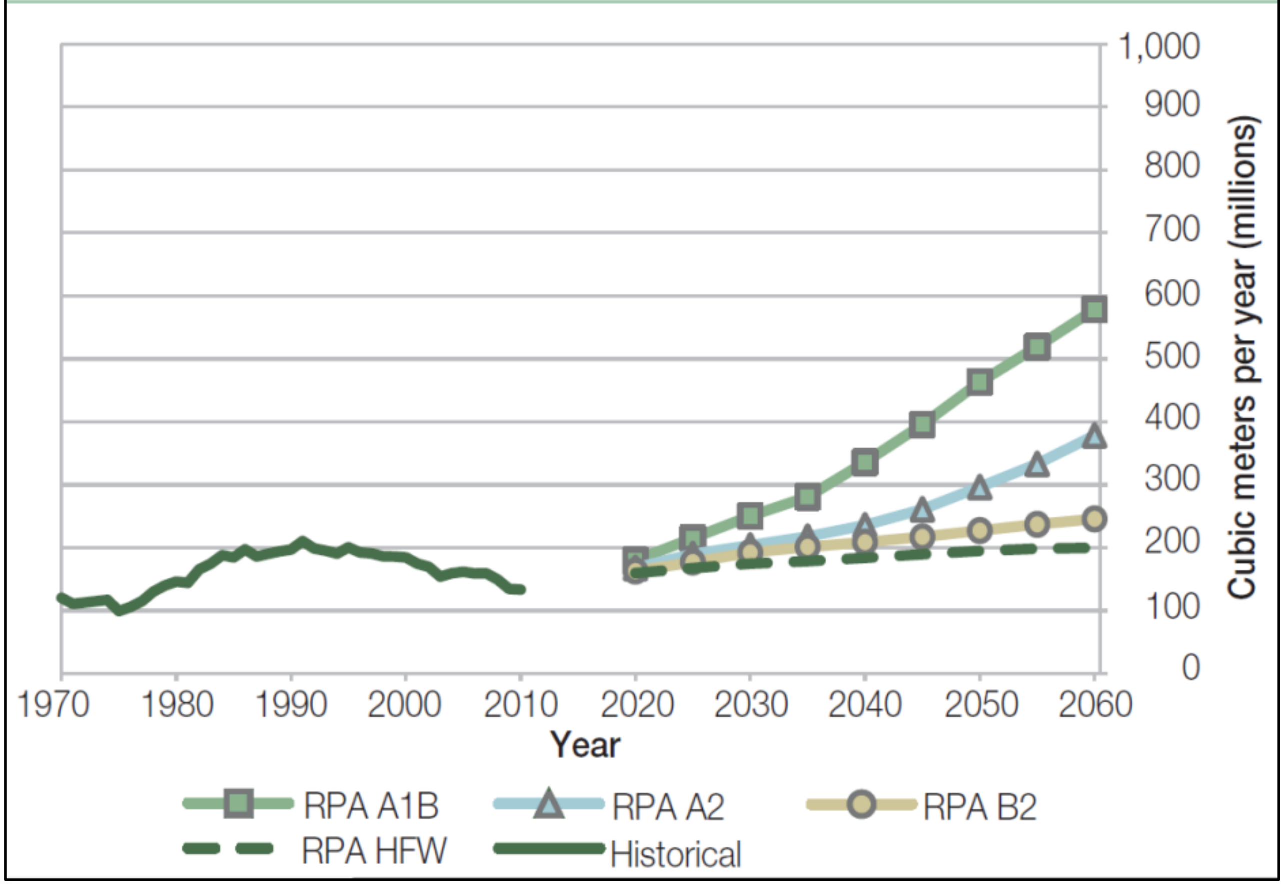
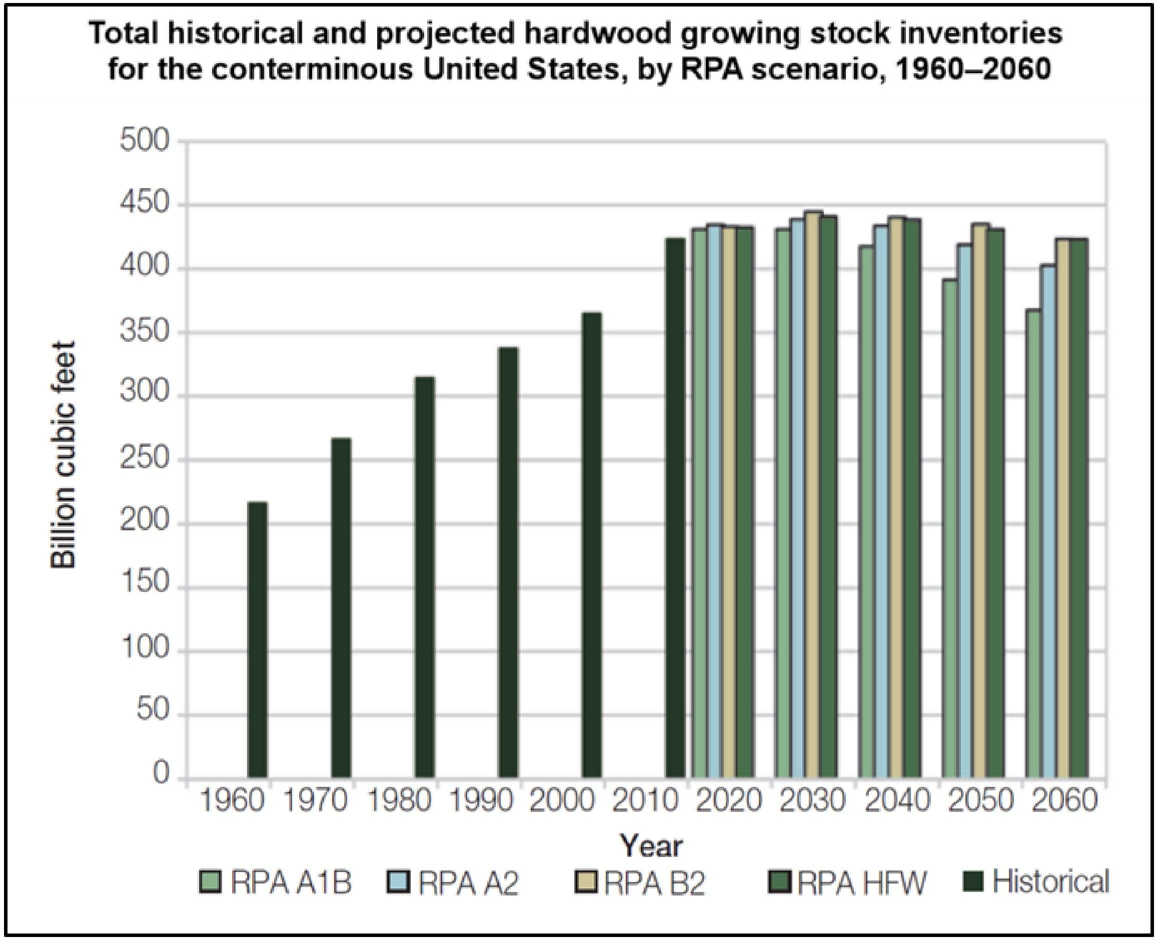
2010 RPA Assessment

Figure 82. Annual U.S. hardwood timber harvest volumes, 1970–2010, and projections, by RPA scenario, 2020–2060.



All scenarios project rising hardwood harvest:
- draw on IPCC
- assume rising timber demand & forest conversion driven by economic & population growth & requirement for biofuel

2010 RPA Assessment (cont)



Bad news

- Increase in growing stock levelling out
- Mortality catching up with growth
- Forests ability to sequester more carbon declining

Good news

- Even 4 fold increase in harvest does not lead to rapid decline in inventory
- Critical need to increase hardwood utilisation

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What is Life Cycle Assessment?

- Collection and evaluation of quantitative data on all the inputs and outputs of material, energy and waste flows associated with a product over its entire life cycle so that the environmental impacts can be determined.
- Universally applicable to all material sectors so that objective, science based comparisons can be made of true environmental impact.
- A tool allowing industry to identify the most efficient ways of reducing environmental impacts.
- Ensures that efforts to reduce one impact do not result in environmental degradation elsewhere.
- ISO 14040 – guidance on how to conduct and use LCA

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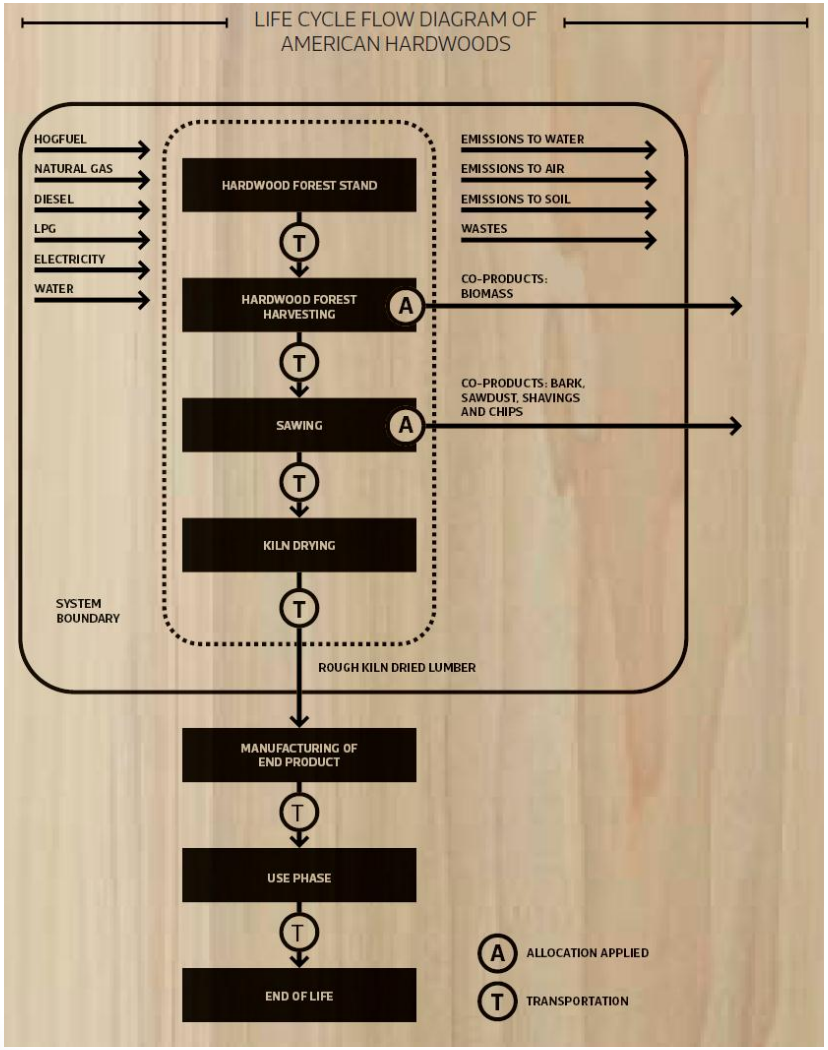
LCA of U.S. hardwood lumber



- PE International commissioned by AHEC
- "Cradle to gate plus transport into export markets"
- Builds on existing data:
  - US Forest Inventory
  - CORRIM (LCA of US forestry processes)
- Adds data from AHEC members on wood processing + transport

LCA Impact Categories

Icon	Name	Description	Units of measurement
	Embodied energy – not renewable	Energy from fossil fuels	MJ
	Embodied energy – renewable	Energy from renewable sources	MJ
	Greenhouse potential	Emissions that contribute to climate change	kg CO_2 equivalent
	Acidification potential	Emissions that damage vegetation, buildings, aquatic life, and human health	kg SO_2 equivalent
	Ozone depletion potential	Emissions that cause thinning of the earth's stratospheric ozone layer adversely affecting human health, natural resources and the environment	kg R11 equivalent
	Eutrophication potential	Emissions that increase the nutrients in water or soil affecting the natural biological balance	kg phosphate equivalent
	Photochemical ozone creation potential	Emissions of chemicals that cause smog, adversely affecting human health, ecosystems and crops	kg ethene potential
	Human toxicity potential	Emissions of materials toxic to humans, animals or plants	kg DCB equivalent

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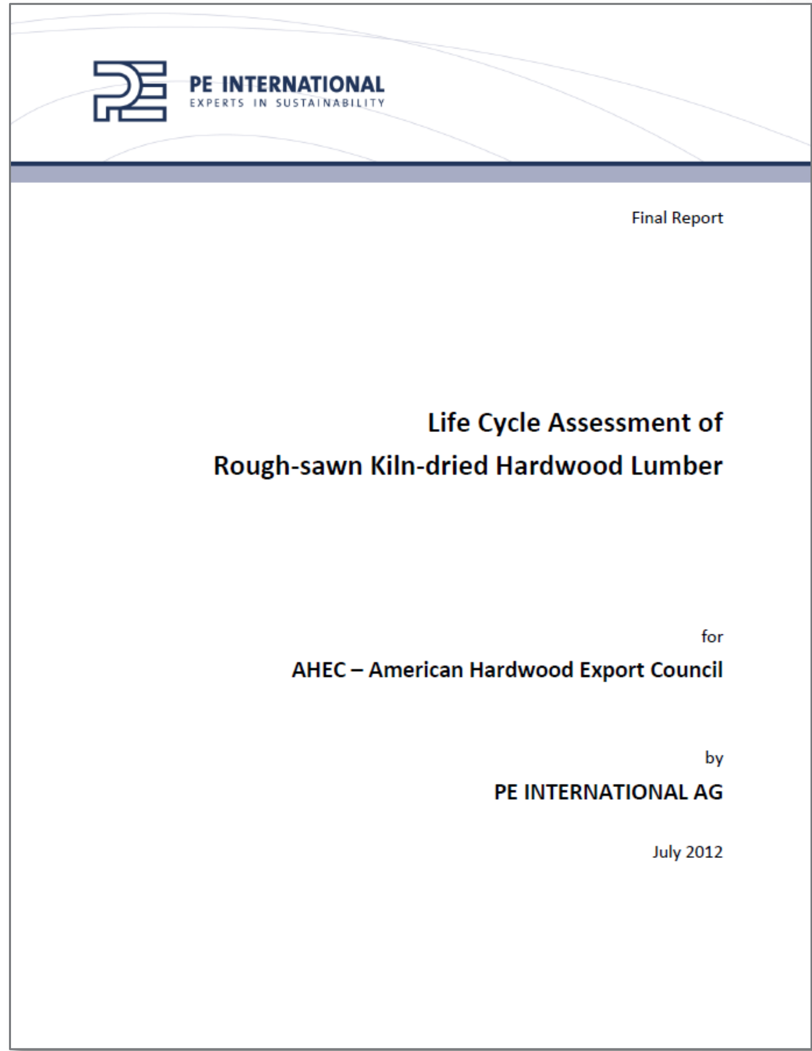
AHEC LCA Project: ISO report

- Demonstrates conformance to:
  - ISO 14040/44 for LCA
  - EN 15804 core "product category rules" for all construction products and services in the EU
- Carried out independently
- Subject to critical review
- Basis for valid comparisons between materials


PE INTERNATIONAL
EXPERTS IN SUSTAINABILITY

Final Report

Life Cycle Assessment of
Rough-sawn Kiln-dried Hardwood Lumber

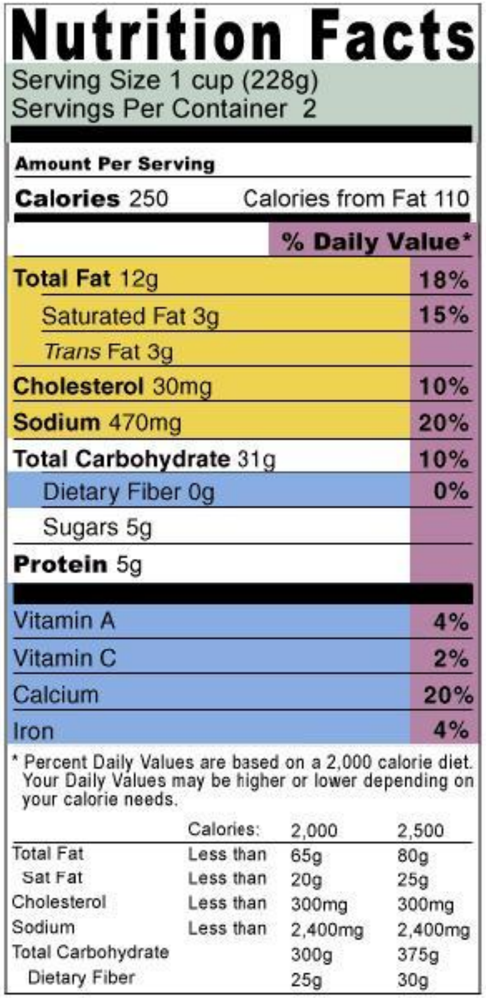
for
AHEC – American Hardwood Export Council

by
PE INTERNATIONAL AG

July 2012

Environmental Product Declarations

- Emerging demand for product-specific LCA information in EPDs
- Science based, verified and comparable environmental information along product's entire supply chain
- Quantitative information on environmental performance per functional unit (e.g. m3 of timber, item of furniture)
- Neutral with no value-based judgements – like food labels
- Allow fair comparison of products and services
- Standardised (ISO 14025)


Nutrition Facts

Serving Size 1 cup (228g)
Servings Per Container 2

Amount Per Serving

Calories 250 Calories from Fat 110

	% Daily Value*
Total Fat 12g	18%
Saturated Fat 3g	15%
Trans Fat 3g	
Cholesterol 30mg	10%
Sodium 470mg	20%
Total Carbohydrate 31g	10%
Dietary Fiber 0g	0%
Sugars 5g	
Protein 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%

* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

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Environmental Product Declaration

according to ISO 14025

EGGER
Laminate Flooring

Declaration number
EPD-EHW-2008211-E

Institut Bauen und Umwelt e.V.
www.bau-umwelt.com

Institut Bauen
und Umwelt e.V.

	**Summary** **Umwelt-Produktdeklaration** *Environmental Product-Declaration*
Institut Bauen und Umwelt e.V. www.bau-umwelt.com	**Program holder**
EGGER Retail Products GmbH & Co. KG Im Kissen 19 D – 59929 Brilon	**Declaration holder**
EPD-EHW-2008211-E	**Declaration number**
Egger Retail Products laminate flooring – class of application 31, 32 and 33 (AC3 through AC5) This declaration is an environmental product declaration according to ISO 14025 and describes the environmental rating of the building products listed herein. It is intended to further the development of environmentally compatible and sustainable construction methods. All relevant environmental data is disclosed in this validated declaration. The declaration is based on the PCR document "Wood-based materials", year 2007.	**Declared building products**
This validated declaration authorises the holder to bear the official stamp of the Institut Bauen und Umwelt. It only applies to the listed products for one year from the date of issue. The declaration holder is liable for the information and evidence on which the declaration is based.	**Validity**
The declaration is complete and contains in its full form: - Product definition and physical building-related data - details of raw materials and material origin - description of how the product is manufactured - instructions on how to process the product - data on usage condition, unusual effects and end of life phase - life cycle analysis results - evidence and tests	**Content of the declaration**
9. April 2011	**Date of issue**
Prof. Dr.-Ing. Horst J. Bossenmayer (President of the Institut Bauen und Umwelt)	**Signatures**
This declaration and the rules on which it is based have been examined by an independent expert committee (SVA) in accordance with ISO 14025.	**Verification of the declaration**
Prof. Dr.-Ing. Hans-Wolf Reinhardt (chairman of the expert committee) Dr. Frank Werner (tester appointed by the expert committee)	**Signatures**

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Summary

Umwelt-Produktdeklaration

Environmental Product-Declaration

Product description

The listed products are decorative hard surface flooring elements according to EN 13329 with a highly abrasion-resistant surface, which are installed as floating floor without glue using a click connection. The decorative design is achieved through the use of printed decorative paper. Corundum is added to the uppermost layer in order to achieve a highly abrasion-resistant surface.

Application

The applications for the declared laminate flooring are:

Interior areas; laid as floating floor either on concrete or other existing subfloor such as wood, tile, PVC, etc. A skilled end user can install the flooring themselves. Due to the low panel thickness the flooring can also be used for renovating.

Scope of the LCA

The **Life Cycle Assessment (LCA)** was performed according to DIN ISO 14040 following the requirements of the Institut Bauen und Umwelt guideline for type III declarations. Both specific data from the reviewed products and data from the "GaBi 4" database were used. The life cycle assessment encompasses the raw material and energy production, raw material transport, the actual manufacturing phase and the end of life as waste incineration with energy recovery. The laminate flooring product mix was declared.

Results of the LCA

Laminate Flooring

Evaluation variable	Unit per m²	Total	Manufacturing	End of Life
Primary energy, non renewable	[MJ]	67.8	125.2	-57.3
Primary energy, renewable	[MJ]	119.9	120.8	-0.94
Global warming potential (GWP 100 years)	[kg CO_2 eqv.]	3.05	-3.09	6.14
Ozone depletion potential (ODP)	[kg R11 eqv.]	2.58E-07	4.55E-07	-1.97E-07
Acidification potential (AP)	[kg SO_2 eqv.]	0.037	0.022	0.015
Eutrophication potential (EP)	[kg Phosphate eqv.]	0.0095	0.0063	0.0032
Photochemical oxidant formation potential (POCP)	[kg Ethylene eqv.]	0.00857	0.00810	0.00045

Prepared by: PE INTERNATIONAL, Leinfelden-Echterdingen
In cooperation with EGGER Retail Products GmbH & Co. KG

PE INTERNATIONAL

Evidence and verifications

In addition, the results of the following tests are shown in the environmental product declaration:

- VOC emissions according to AgBB (German operational fire protection working committee) method
  Testing institute: WKI Fraunhofer Wilhelm-Klauditz-Institut
- Formaldehyde:
  Testing institute: WKI Fraunhofer Wilhelm-Klauditz-Institut
- Toxicity of the fire gases:
  Testing institute: MFPA Leipzig GmbH
- PCP / lindane
  Testing institute: WKI Fraunhofer Wilhelm-Klauditz-Institut
- EOX (extractable organic halogen compounds)
  Testing institute: MFPA Leipzig GmbH
- Eluate analysis according to DIN 38406-4
  Testing institute: MFPA Leipzig GmbH

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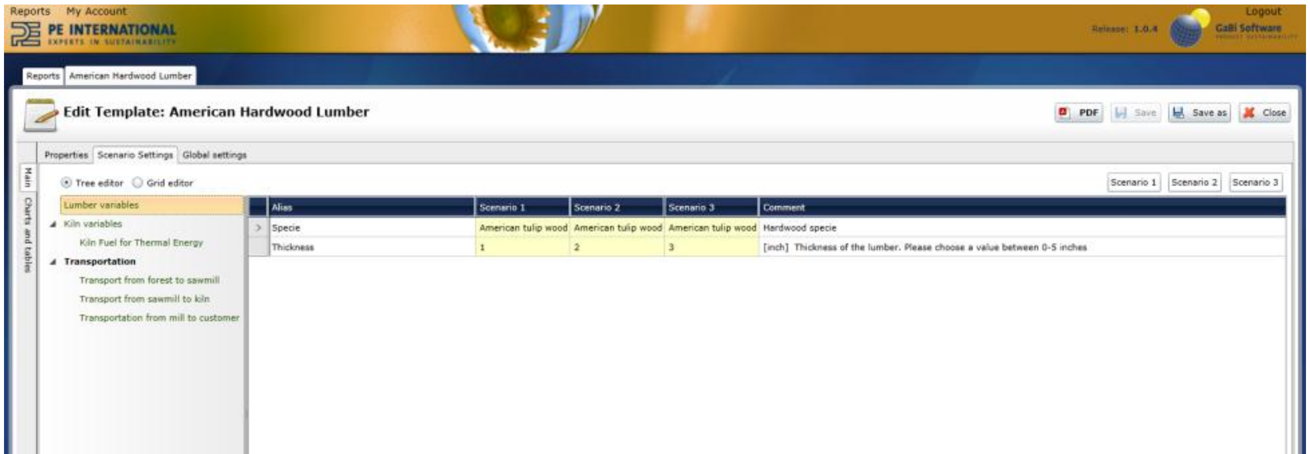
AHEC/PE project output:
i-report for U.S. hardwood lumber



Dynamically generate environmental profiles

Vary results for:

- 19 US species
- Mill's energy mix
- Lumber thickness
- Transport mode & distance

Species and project specific environmental profiles

Environmental profile of U.S. tulipwood kiln dried sawnwood delivered to the S.E. Asian market

Objective

This paper aims to provide information from which a South East Asian timber product supplier, specifier and/or manufacturer might draw valid conclusions on the environmental impact of sourcing 1 m3 of American tulipwood kiln dried lumber. It combines data from the PE International cradle-to-gate life cycle assessment of U.S. hardwood lumber with information on U.S. hardwood forests from the U.S. Forest Service forest inventory program and the 2008 Seneca Creek risk assessment of legality and sustainability in U.S. hardwood exports.

Key conclusions

- The AHEC-commissioned Seneca Creek study indicates a negligible risk of any U.S. origin tulipwood being derived from an illegal source.
- The Seneca Creek study suggests that tulipwood procured from the U.S. be considered Low Risk in all five risk categories of the FSC controlled wood standard.
- The latest U.S. forest inventory data shows that the United States tulipwood resource is not only renewable, but is expanding.
- Cradle-to-gate life cycle inventory data indicates that, if the carbon stored in the wood is excluded, the Global Warming Potential (GWP) of 1 m3 of kiln dried tulipwood lumber delivered to South East Asia is 312 kg (CO_2 equivalent) for 1" lumber, 405 kg for 2" lumber and 520 kg for 3" lumber.
- Even allowing for significant transport distances between the Eastern United States and South East Asia, processing issues such as efficiency of kilning and thickness of lumber tend to be more important than transport in determining the overall carbon footprint.
- The carbon stored in 1 m3 of tulipwood kiln dried lumber is equivalent to 678 kg of carbon dioxide.
- Therefore if carbon storage is included, the GWP can be claimed to be negative.
- However the contribution that this stored carbon may make to carbon emission reductions and climate change mitigation is heavily dependent on product design strategies that seek to maximise the lifetime of the product in use and promote efficient waste management.

Data sources

The cradle to gate environmental profile draws on data gathered by PE International[1] for AHEC as part of a larger Life Cycle Assessment (LCA) project of U.S. hardwood sawnwood and veneer supplied to U.S. export markets[2].
Specific data on growth and harvest of tulipwood species across the United States is derived from the United States Forest Service Forest Inventory and Analysis (FIA) program[3]. This system is comprehensive and statistically verified and widely acknowledged to be a model of its type. Data is collected from field plots established across the United States on public and private lands. However it also has limitations. Due to infrequency of some state inventory programs, growth and harvesting data for each state is not necessarily drawn from the same year so is not entirely comparable. Nevertheless, the overall trend in hardwood harvesting in most states has been sig-

Disclaimer

Although this briefing includes data typically found in an Environmental Product Declaration (EPD), it makes no claims to the status of a formal EPD. It does not "independently verify" or "certify" the environmental impact.
While the Life Cycle Inventory data contained in this briefing is now being subject to critical review in line with ISO LCA standards, this process is yet to be finalised, so no claims are made with respect to ISO-conformance of this data and nor should it be used for comparison with other materials.
As part of the PE International LCA project, formal EPDs are being prepared under several national programmes (initially in the EU) and should be available in the second half of 2012, at which point the data in the EPDs may be used to make valid comparisons between materials in those markets. EPDs for other export markets may be compiled as the need arises.
The AHEC/PE LCA project is a cradle-to-gate study (NOT cradle-to-grave). It identifies and measures environmental impacts of sawnwood and veneer from point of extraction in the U.S. through to delivery to the importers yard in export markets. It encompasses harvesting, sawing, kiln drying and transport at all stages. It does not include coverage of any further processing or product fabrication that may occur in the export market. No account is taken of the (likely significant) environmental impacts of different product designs, lifetimes, recycling strategies or final disposal options.

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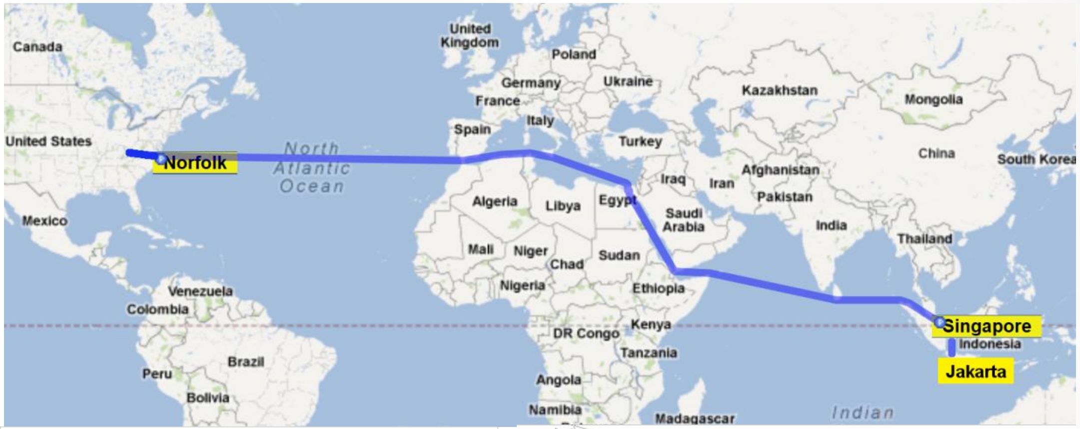

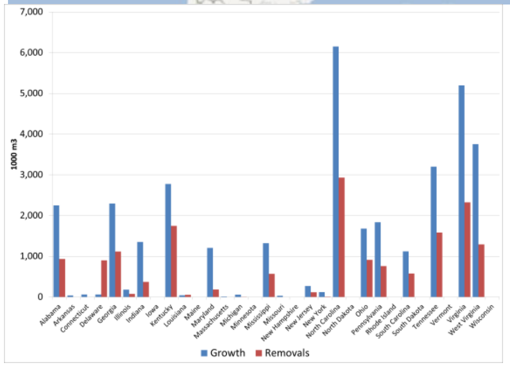

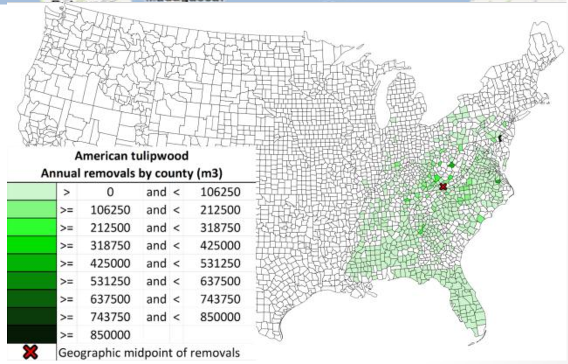

Impact category	1" lumber	2" lumber	3" lumber	Units
Abiotic depletion potential	0.000017	0.0000243	0.0000334	kg Sb equivalent
Acidification potential	5.30	6.02	6.92	kg SO2 equivalent
Eutrophication potential	0.490	0.541	0.605	kg Phosphate equivalent
Primary energy demand (resources)	4280	5710	7480	MJ
Primary energy demand (renewable raw materials)	7370	8720	10400	MJ
Global Warming Potential	-366	-273	-158	kg CO2 equivalent
Ozone Layer Depletion (steady state)	0.00000591	0.0000151	0.0000265	kg R11 equivalent
Photochemical Ozone Creation Potential	0.361	0.408	0.466	kg ethene equivalent

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"Out of the woods"

Assessing genuine sustainability in design in real time

Benchmark

English Contemporary Furniture

Sir Terence Conran

Wood processing

Quality wood crafts

Royal College of Art

Design, culture and history

Appealing products

Culturally relevant

London Design Festival

High profile event

Large consumer audience

AHEC

Sustainable forestry

Technical wood properties

LCA data on U.S. hardwood lumber

PE International

LCA science & standards

Proprietary LCA database covering wide range of regions, products and industries

Computer modelling system

Environmental product profiles

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“Out of the woods”: the task

- 12 teams of RCA students each tasked to design a “sustainable” chair
- Preliminary lecture on wood & environment
- 1 week at Benchmark to make prototype
- Precise recording of material & energy use
- Enter data into a computer model
- Model combines this with LCA data on US hardwoods
- Plus a vast amount of other data gathered by PE on environmental impact of all other materials and energy required.
- Output = environmental profile of each chair

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Testing assumptions about “sustainability” in design

- **"Back to nature"** - using unprocessed wood to reduce energy inputs.
- **"Recycling"** - reducing waste through use of small dimension offcuts and chips
- **"Design for keeps"** - simple classic and durable designs, 'timeless" and lasting for years, less need for replacement, more carbon stored
- **"Dematerialisation"** - products with more air than matter - less material used, lower transport weight, can be disposed of regularly without creating much waste.

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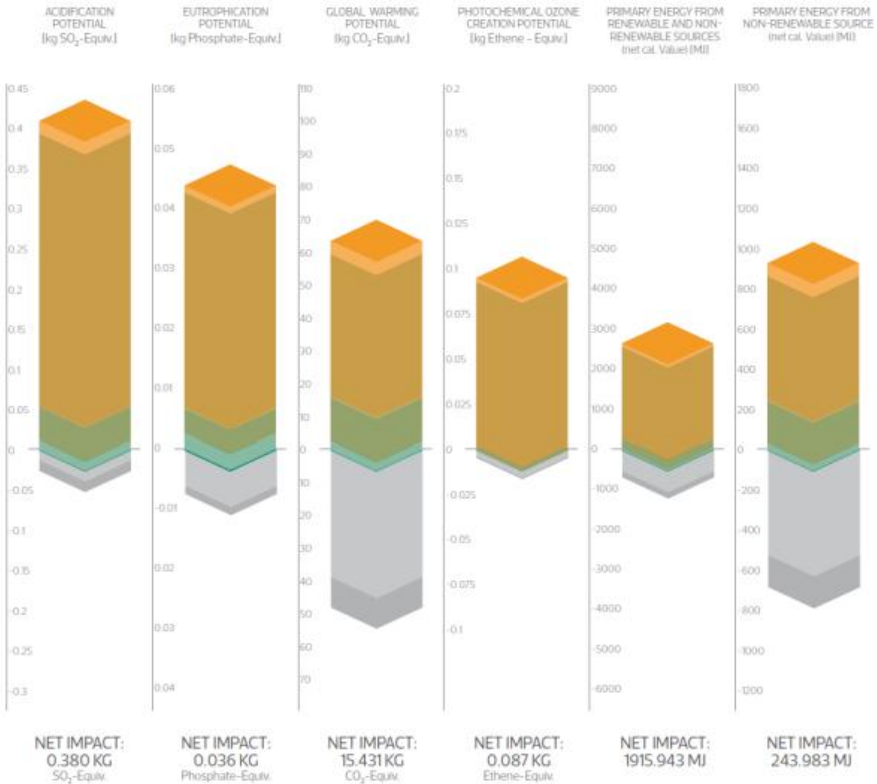
Beeench (Ash)



Estimated lifespan: 10-20 years

NB Assumed that waste & the chair at end of life used as bio-fuel substituting fossil fuels. This is assigned as a "credit" (negative value) in the profile

Positives

- Very high strength to weight
- Thin lumber reduces kilning

Negatives

- Large wood usage & waste
- Each piece cut & prepared individually => high energy use during processing

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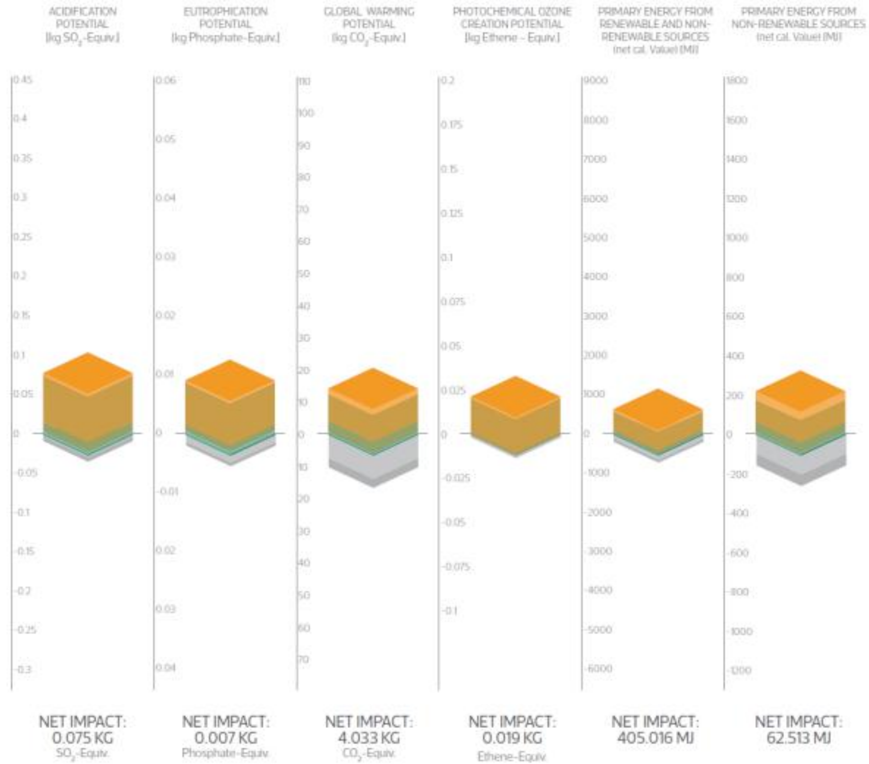
“No. 4” (Ash)



Estimated lifespan: 30-50 years

NB Assumed that waste & the chair at end of life used as bio-fuel substituting fossil fuels. This is assigned as a "credit" (negative value) in the profile

Positives

- Sturdy despite low material use
- Skilful jointing minimises glues
- No energy intensive materials
- Classic look - stand test of time

Negatives

- Not the most comfortable chair

1/8th GWP due to wax & glue

Exemplary "sustainable" design

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No “perfect” design strategy

- Always trade-offs
- Appropriate balance depends on function and context
  - Using unprocessed wood reduces upfront environmental impacts but means compromising on technical performance and function, reducing longevity
  - Recycling best if a reliable and good supply of recycled material close to hand, but not if huge amounts of energy required to separate and transport recycled material to the manufacturer
  - Dematerialisation suitable for light-weight fashion items or cheaper furniture, but inappropriate for products that need to be weight bearing or around for many years.

Out of the Woods exhibition at the Victoria & Albert Museum for London Design Festival 2012

Video

Life cycle in practice

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Building on LCA

- Data collection on US hardwood veneer nearly complete
- Develop environmental improvement and communication strategy for US hardwood based on sound knowledge of genuine impacts
  - E.g. emphasising importance of waste management, kiln efficiency, product durability, forest carbon flows & pools
- Integrate LCA data into every aspect of marketing:
  - E.g. architectural project case studies, technical species guides, design competitions, advertisements
- Provide AHEC members with i-report tools so they can do the same
- Encourage wider industry participation:
  - E.g. more i-reports for more products, LCA data for wider range of wood species, cooperation with manufacturers

Communicating US hardwood environmental profile

1. RPA Assessment

Government mandate

Sustained timber yield

Forest health

2. Risk assessment

Independent & peer reviewed

Good forest governance

FSC Controlled Wood

3. Responsible purchasing policy

Help drive corporate action

Link product to district of origin

4. LCA Analysis

Independent & peer reviewed

ISO Conformant

Wider impacts

5. EPDs

US Hardwood Environmental Profiles

I-reports

Thank you!

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