November 4, 2014

# Eco-product for Sustainable Green Growth

Ryoichi Yamamoto Tokyo City University, Japan Vice Chairperson of Green Productivity Advisory Committee (GPAC)

## **ANTHROPOCENE**

approx. 1945 A.D. - present



A new geologic era with no precise start date. Marked by significant human impact on climate and ecosystems.

Goined by Peol Crutzen. Rise of agriculture. Detwestation. Cement. Combustion of Issaid Ruels. Coat, oil and gas roused from the earth. Estraction and emission. Operation Crosssbads vaporizes 70 acres of Bákin Also. Deep geológic repositories. Pacific Teach Vortex, a seirling gyre of marine litter and plastic. 6.7 billion humans + growing. Palo Vorte Muclear Power Plant. Hull-Rust Mahoung open ph mine. Three Gorges Sum. Fresh Kills Landfill. Las Vegas. Duba.

# Are we living in the Anthropocene?





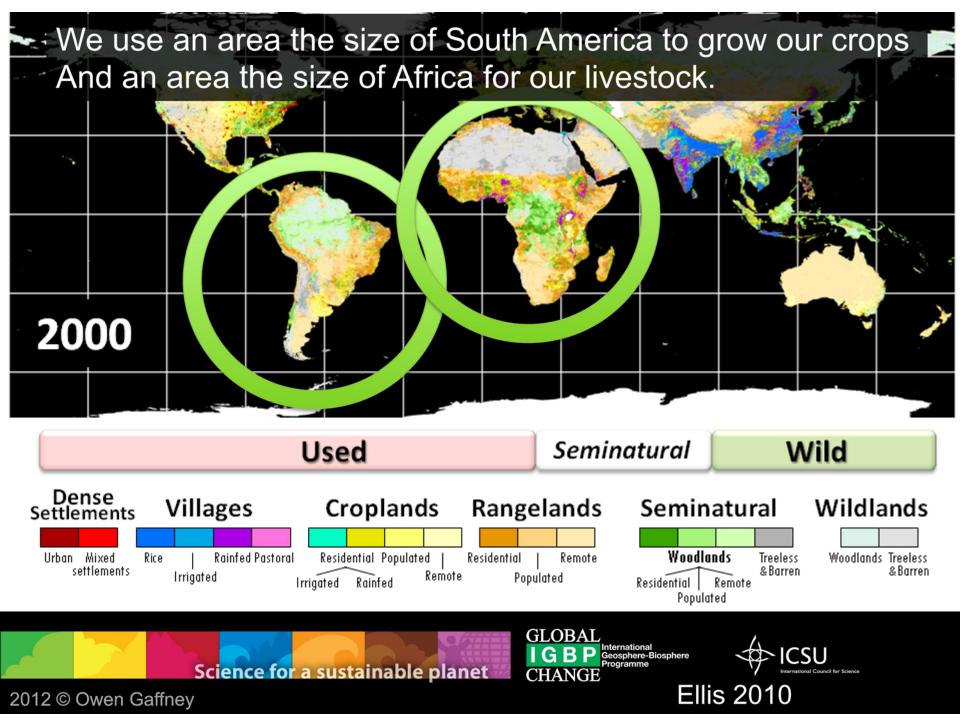
### Why is the modern age called the Anthropocene?

Global changes in earth systems as a result of

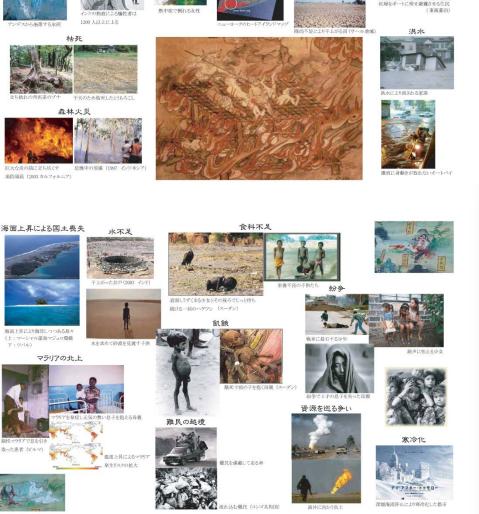
Dramatic increase in human activities

Diamatic increase in numan activities	that increase in human activities
World population	Atmospheric CO <sub>2</sub> concentration
World GDP	Atmospheric N <sub>2</sub> O concentration
Overseas direct investment	Atmospheric CH <sub>4</sub> concentration
Number of dams	Rate of disappearance of the ozone layer
Amount of water use	Average temperature of the Northern
Amount of fertilizer use	Hemisphere
Urban population	Frequency of large floods
Amount of paper consumption	Ocean ecosystems
Number of McDonald's restaurants	Coastal area configurations
Transport, number of automobiles	Coastal area bio-geochemistry
Communication, number of telephones	Disappearance of tropical rainforests and forests
Number of international tourists	Developed land area
	Global biodiversity

ref. The Anthropocene: From Global Change to Planetary Stewardship Will Steffen et al

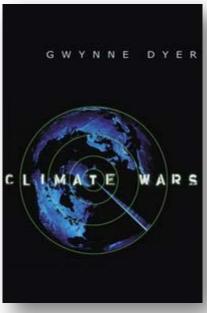


# From global warming hell to climate wars

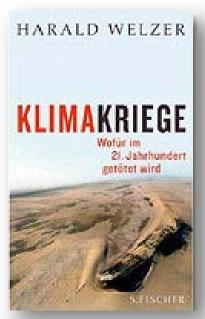


ヒートアイランド

乾燥化









# Thames flooding causes chaos in England



ロンドン近郊エガムの洪水被災地であふれたテムズ川 時事ドットコム 2014年2月10日



ANN NEWS 2014年2月11日



ANN NEWS 2014年2月11日

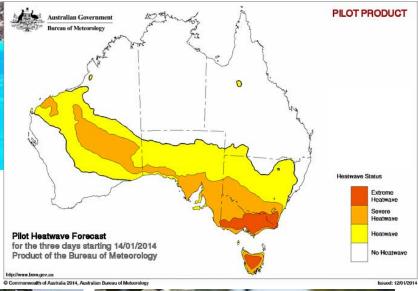


英南部ダチェットのテムズ川沿いで浸水した家 2014年2月11日

## Heat wave in Melbourne, Australia



Honey the Syrian Brown Bear (13 female) enjoys an ice-block consisting of meat, fish, fruit, vegetables and strawberry topping at Melbourne Zoo, Parkville. 2014/1/14









Merbourene:2014.1.14

Australian Open Tennis in Melbourne 2014.1.15

## Pine Island Glacier melting past "The point of no return"



A NASA satellite image snapped Nov. 13, 2013, shows open water between Pine Island Glacier and its massive iceberg. (Photo: NASA)





2013年7月にパインアイランド氷河から分離した700平方キロメートルの氷山。シンガポールの国土と同じ大きさ。



# Floods in Indonesia



ジャカルタ中心部50センチ、ベカシおよびデポクでは1.8m~4m、2013年2月7日



インドネシアの首都ジャカルタで、冠水した通りを進む住民ら=2013 年1月18日(ゲッティ=共同)

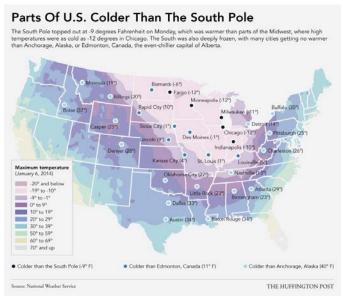


チリウン川が氾濫し、東ジャカルタ・チャワンの平屋は屋根まで水に浸かった=2013年1月16日、アンタラ通信



ジャカルタ中心部が冠水、2013年1月18日

### Cold hits US



アメリカでは2014年1月6日(アメリカ時間)から、北極から冷気を運ぶ大気の「極循環」現象が、南西部を中心に極寒をもたらしている。



一晩で雪に埋もれた車、2014年1月6日





Temperatures in Houston bottomed out in the 10s and 20s early Tuesday morning. 2014.1.8

Niagara Falls pictured from Canadian side *Credit: REUTERS/Aaron Harris*, 2014.1.8



2014年1月8日、シカゴのディビジョン駅で

# Moscow warmest weather in a century



The Voice of Russia, 2014.1.3



The Voice of Russia, 2013.12.26



日本新華夏株式会社、2013.12.22



五輪の舞台ソチは、実は亜熱帯だった! 日経BP、2014.1.9

Heavy snowfall in Tokyo



http://blogs.yahoo.co.jp/watasihashinya/38770412.html



毎日新聞、2014.2.8



毎日新聞、2014.2.15



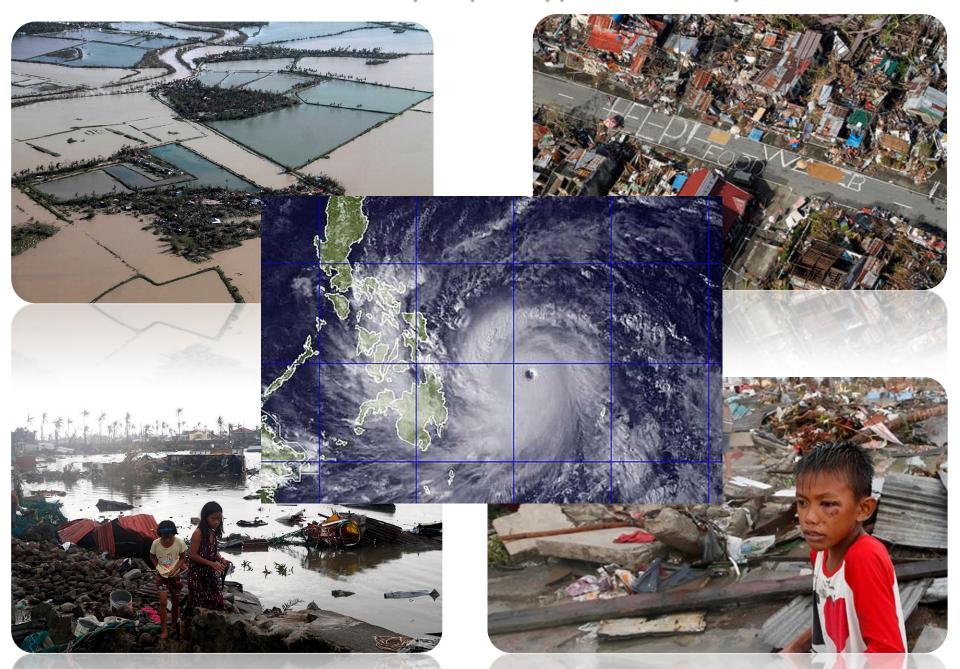
http://cyclist.sanspo.com/119247/cxtokyo0819, 2014.2.8

# The highest temperature 41.4°C was recorded in May, Beijing.

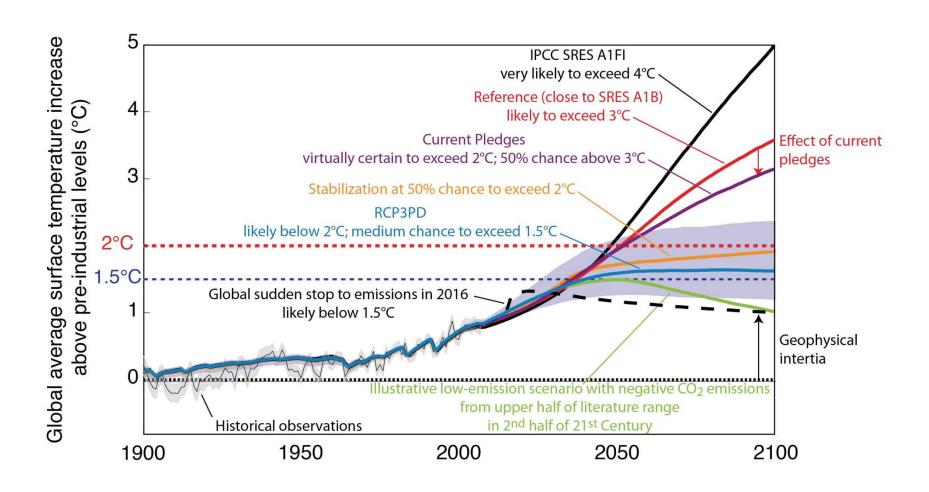


TBS Newsi http://news.tbs.co.jp/20140529/newseye/tbs\_newseye2213022.html

The disaster by super typhoon "Haiyan"



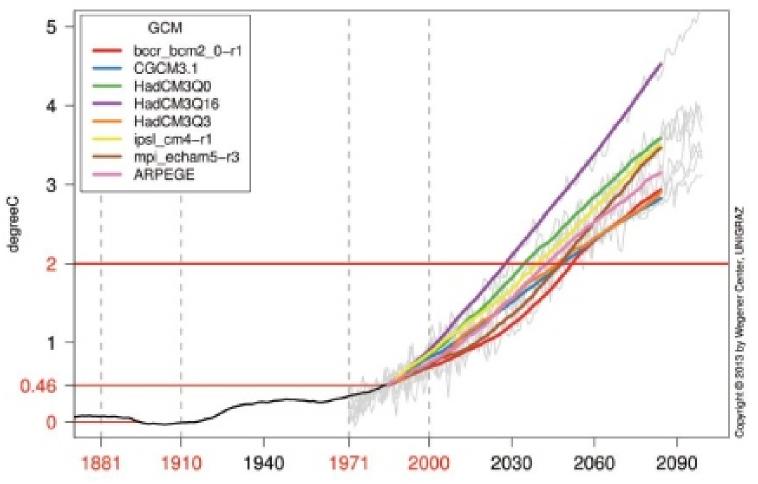
## Global sudden stop to emissions in 2016 likely below 1.5°C



Internationally pledges emission reductions are inadequate, but options remain to close the "Gap"

Adequacy and feasibility of the 1.5°C long-term global limit, July 2013 Authors; Michiel Schaeffer, Bill Hare, Marcia Rocha, Joeri Rogelj (Climate Analytics)

### The two degree target will be exceeded around 2030~2050.

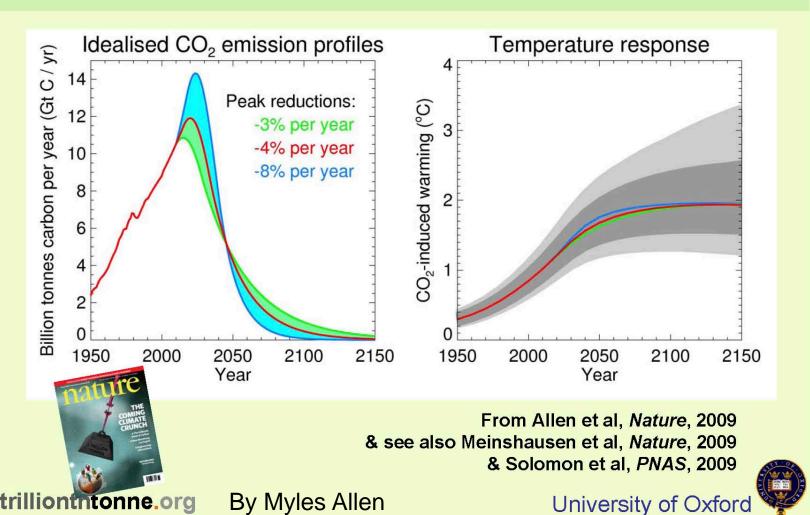


Analysis of global temperature changes and the two degree target with the SRES A1B scenario (medium-high scenario without emission restrictions) indicates that the two degree target will be exceeded in 30 years, immediately after 2040. Different climate models show slightly different projections. In the worst case scenario, the two degree target is exceeded in 2030, and even in the most optimistic cases, the two degree target will be passed around 2050.

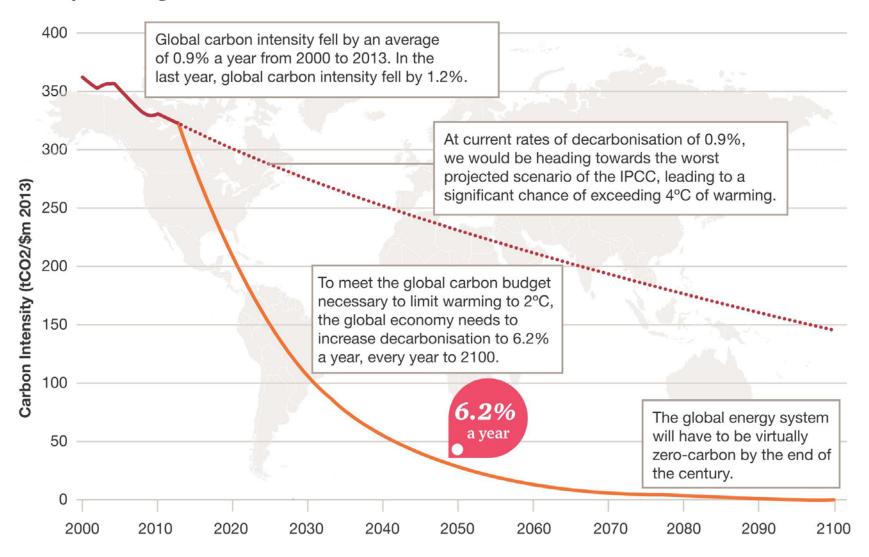
Observed historical data for 1861-2000 (black line). The time series has been smoothed out with a 30-year running average value and the value in the chart for 1971 to 2000 is reported for 1985. Historical climate (1971-2000) and future projections (2001-2100) from various global climate models are based on emission scenario SRES A1B, where grey lines show annual mean values and the coloured lines show running 30-year annual mean values. The two degree threshold is highlighted in red.

Source: Vautard et al. 2014 and Policy Update on 2° C Warming (2013), graphics Wegener Center, UNIGRAZ 2013.

To keep two degrees target, 3%/yr (from 2015) and 8%/yr (from 2025) GHG reduction are necessary worldwide.



### Pathway to two degrees



Ref. PWC report "Two degrees of separation: ambition and reality"

# From resource depletion to resource wars

1 Things for which current reserves will be almost entirely used up by 2050:

Fe, Mo, W, Co, Pt, Pd

2 Things for which the amount of use will be more than double current reserves by 2050:

Ni, Mn, Li, Ga

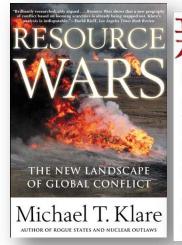
3 Things that will also surpass the reserve base by 2050:

Cu, Pb, Zn, Au, Ag, Sn

Reserve base = The amount of resources that technically can be mined but are not subject to mining because of economic reasons, etc.

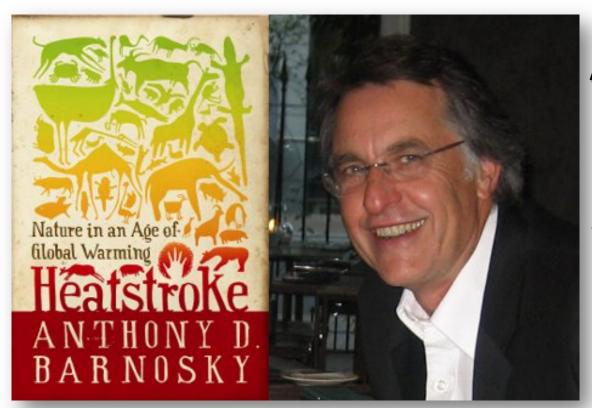








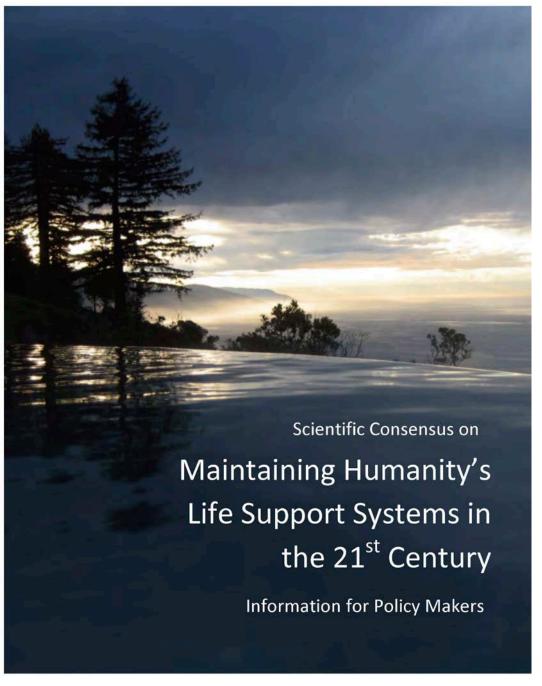
# Humans' mass-killing of species



Approaching a tipping point in the earth's biosphere

Approaching a State
Shift in Earth's Biosphere
Anthony Barnosky et al,
Nature, June 2012

- ◆ Human activities dominate 43% of land surface.
- ◆ Humans use 1/3 of fresh water.
- ◆ 20% of the primary products on the earth's surface are harvested for humans.
- ◆ The speed of extinction of organisms is comparable to the speed at the time of dinosaur extinction.



Anthony Barnosky and Elizabeth Hadly in the laboratory.



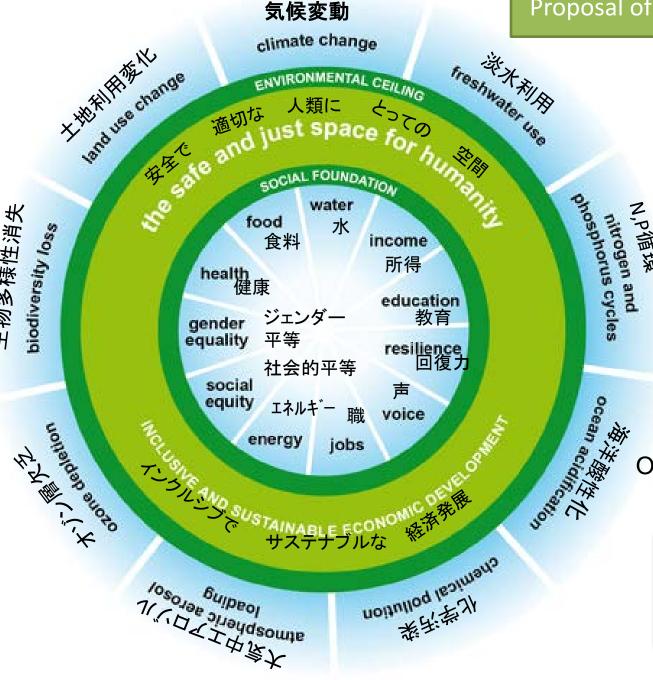
# Essential points for policy makers

"Earth is rapidly approaching a tipping point. Human impacts are causing alarming levels of harm to our planet. As scientists who study the interaction of people with the rest of the biosphere using a wide range of approaches, we agree that the evidence that humans are damaging their ecological life support systems is overwhelming.

We further agree that, based on the best scientific information available, human quality of life will suffer substantial degradation by the year 2050 if we continue on our current path."

Anthony Barnosky et al

### Proposal of 2 boundary conditions



生物多様性消失

biodiversity loss



Kate Raworth Oxfam Discussion Papers

> Can we live within the donut?

industrialization

280

0

0.1 - 1

0

-1

290

3.44

415

Low

(2009)

387

1.5

100 or

higher

121

8.5 - 9.5

283

2.90

2,600

11.7

boundary

350

1

10

35

11

276

2.75

4,000

15

Planetary	Bounda	ries
	10	han Rockstrom

	1 10110001 / 20011001100			
		Johan Rockstrom, et al.		
Earth system	Parameters	Proposed	Current value	Value before

Flatietaly	boullualles
	Johan F

Atmospheric CO<sub>2</sub> concentration (ppmv)

Amount of nitrogen removed from the

Ozone concentration (Dobson units)

atmosphere for human use (1 million tons /

Amount of P that flows into the ocean (1 million

State of global average saturated aragonite in

Ratio of change of global land to arable land

species each year)

year)

year)

tons / year)

the ocean surface

Global use of fresh Amount of fresh water used by humans (km<sup>3</sup>/

Change in the power of radiation force  $(W/m^2)$ 

Extinction rate (number of species per 1 million

process

Climate change

biodiversity loss

Nitrogen cycle

Speed of

P cycle

Loss of

ozone

Ocean

water

use

stratospheric

acidification

Changes in land

# Biomass should be the tenth planetary Boundary ref. A Measurable Planetary Boundary for the Biosphere Steven W. Running

Science 337, 1458 (2012)

For more than 30 years, global NPP (Net Primary Production) has stayed near 53.6 PgC/yr, with only 1 PgC of interannual variability.

6 PgC)
; (

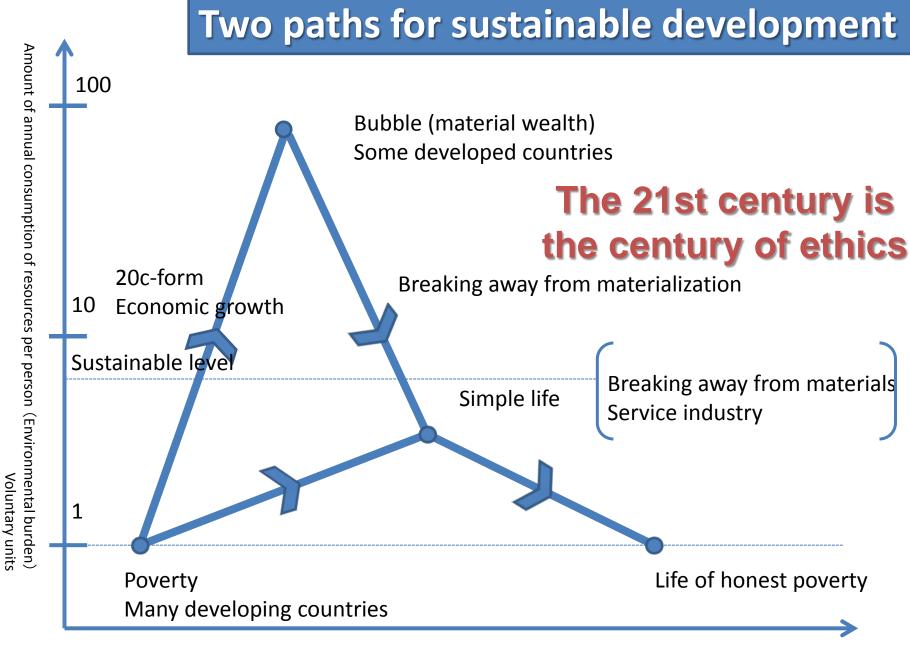
The projected 40% increase in human population by 2050, combined with goals to substantially improve standards of living for the poorest 5 billion people on Earth, implies at least a doubling of future resource demand by 2050. As suggested 40 years ago, the limits to growth as measured by human consumption of NPP may well be reached in the next few decades.

### Unset social boundary conditions (social boundaries)

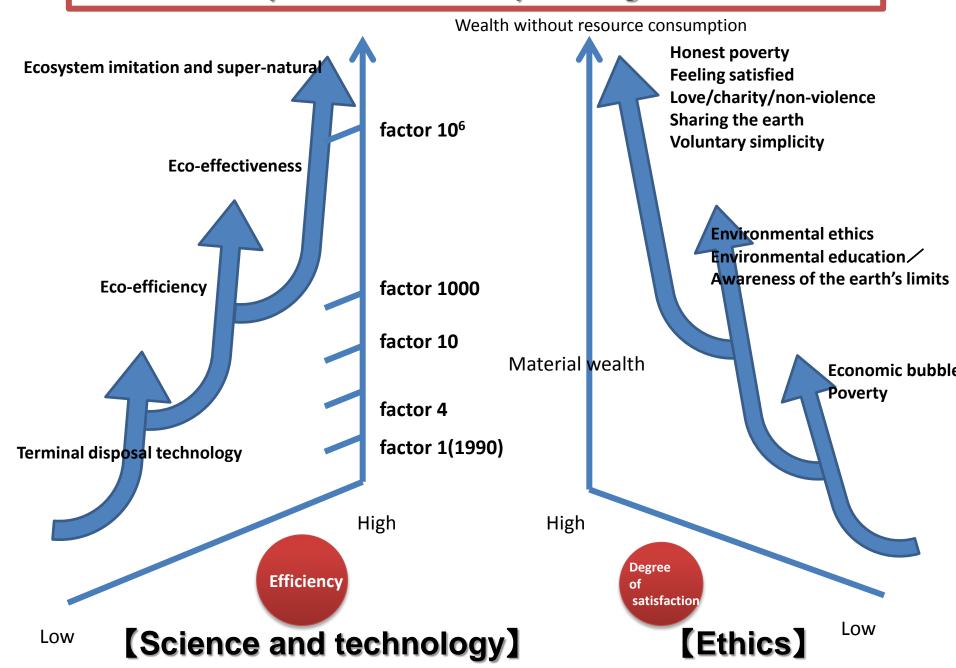
according to Kate Raworth

Ratio of world population with nutritional deficiencies	13% (2006—2008)
Ratio of world population that lives on USD 1.25 per day (PPP) or less	21%(2005)
Ratio of population that cannot access good running water	13%(2006)
Ratio of population that cannot access appropriate medicine	30%(2004)
Ratio of child population that cannot attend elementary school	10%(2009)
Ratio of population that cannot access electricity	19%(2009)

11% of the world population accounts for 50% of carbon emissions, and 10% of the world population takes in 57% of the world's income.



### Simultaneously increase efficiency and degree of satisfaction



# Development stages for eco-materials to deal with resource and environmental restrictions

(1)	Conversion of conventional materials in consideration of the environmental burden of their lifecycle
(2)	Improving the functions of and technological innovations for environmental cleanup materials and energy materials
(3)	Materials to bring about sustainable service systems
(4)	Harmonization and integration of those materials with the cycles of nature

At present, we are mainly at stages (1) and (2).

It is not easy to break away from materialization.

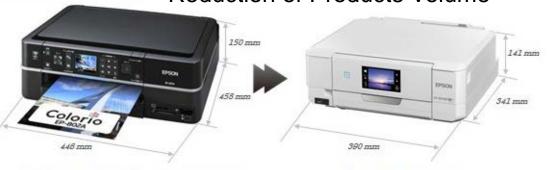
# **Ecodesign Innovation**

	H. Brezet	Factor X
First step	Product Improvement	2
Second step	Redesign	5
Third step	Function Innovation	10
Fourth step	System Innovation	20



エプソンの環境活動 👨

商品の小型・軽量化 Successful Ecodesign Practices Reduction of Products Volume



小型化 約39%

軽量化約29%

容積: 30,640 cm<sup>3</sup> 質量: 9.7 kg

※1 目動内面印刷コ 装着時の比較 容積: 18,752 cm<sup>3</sup> 質量: 6.9 kg

EP-802A<sup>※1</sup> (2009年)

EP-807Aシリーズ (2014年)

### 個装箱の小型化

### Reduction of Packaging



小型化 約23%

本体の輸送効率向上

Increase of Transportation's efficiency

http://www.epson.jp/SR /environment/products/ printer.htm



**768**箱/40ftコンテナ

EP-802A (2009年)





1,008箱/40ftコンテナ

EP-807Aシリーズ (2014年)



# **Product Improvement**







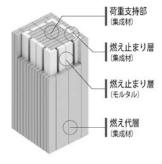




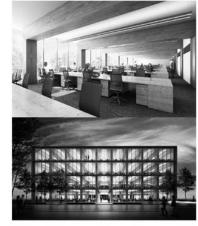




# Redesign



大断面耐火集成材「燃エンウッド」





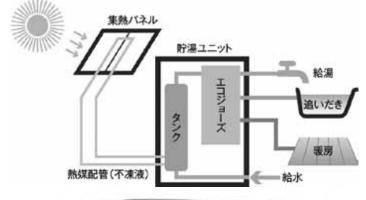
\$ 155€1回Je## 600 洗たく用洗剤



marian Carlo mann 61 Baren Gri









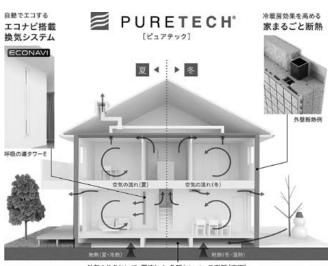


# Function Innovation







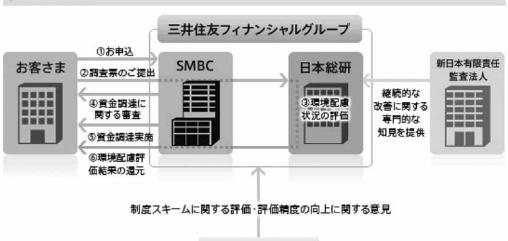




外気よりきれいで、夏涼しく、冬暖かいベース空間(床下)

# System Innovation

### 【スキーム図



外部評価委員会









# Green products and ethical products





### Green Products





















Fair Trade Wedding Rings













































## What is sustainable public procurement (SPPI)?

### UNEP's definition

Sustainable procurement is a single process. In that process, various organizations satisfy demand for their own products, services, labor power, and facilities at a price measured by a currency that covers the entire lifetime, while minimizing damage to the environment, by creating benefits not only for themselves but also for society and the economy, and also

Sustainable procurement pursues an appropriate balance among the three pillars of sustainable development, which are the economy, society, and the environment.

- Economic factors conduct good finance management, including costs throughout the entire life cycle of a service, for example final disposal costs that include acquisition, maintenance, operation, and waste handling.
- > Social factors include social justice, social equality, safety and security, human rights, and employment conditions.
- ➤ Environmental factors are emissions to the atmosphere, land, and water throughout products' entire life cycles, climate change, biodiversity, use of natural resources, and scarcity of water.

### **Eco Products 2013**

Date: Dec. 12 (Thu.)-14 (Sat.)

Venue: Tokyo Big Sight

(East Hall 6)

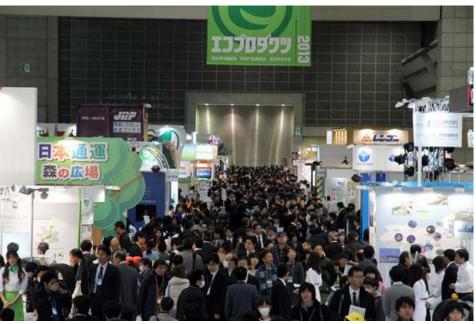
Hosts: Japan Environmental Management

Association for Industry,

Nikkei Shimbunsha

Number of visitors: 170,000 people

















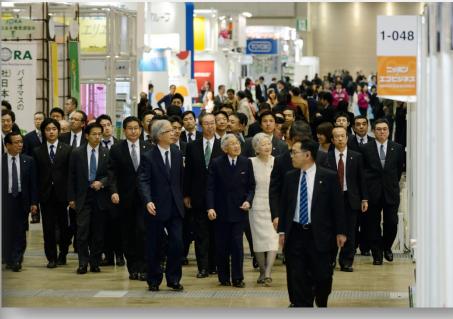












# "Ethical Procurement" in the Olympic and Paralympic in London (2012)

### **Principles**

(1) Responsible Sourcing

Sustainability related certified products

Animal welfare and testing

Animal and planet products

Timber and timber products

Publications and other printed materials

Labour practices

Health and safety

Diversity and inclusion

- (2) Use of secondary materials
- (3) Minimizing embodied impacts
- (4) Healthy materials



# Launch of The Japan Ethical Initiative

May 30th 2014, Fri. 13:00-17:00

Global Environmental Outreach Center (GEOC) Seminar room in Tokyo

Photo: Kankyoshimbunsha, Shinichi Kudo

# Planning for an Ethical Focus for the 2020 Olympic in Tokyo

### **Basic Concepts**

- (a) People-and Environment-Friendly Ethical Olympics
- (b) Ethical Procurement and Management
- (c) Establishing Ethical Standards
- (d) Applying Japanese Ethical Traditions
- (e) Strengthening and Establishing a Tradition of Social Bond
- (f) Making Tokyo an Ethical City and Spreading Ethical Culture Nationwide

By 2020: Realization of Ethical Tokyo Olympics 2020 and make Tokyo an ethical model city

2050: Transition of Japan into an ethical country

### Conclusion

- 1) The name of the geological age is proposed to change from the Holocene era to the Anthropocene era. As a result, humans' responsibility for the earth's sphere of life has become clear, and we should embark on active planetary stewardship. In doing so, we must not forget that humans are a part of nature and that we should be in awe of nature.
- 2 Ecodesign and APO/GP have been the main drivers of ecoinnovation and important for sustainable green growth.
- 3 In order to expand green markets and ethical markets, the government must rapidly disseminate sustainable public procurement.
- 4 Utmost efforts should be made to do things such as hold ecoproduct exhibitions in places throughout the world, create ecoproducts databases, disseminate eco-label systems, and conduct education about sustainable consumption.