

Dr Darren Phillips

Sustainability Imperatives and the implications of Global Peak Oil.

“The need for sustainability incentive schemes to support living system changes are greater than ever at all levels of Government. The key drivers for this change are global climate change, global peak oil and the massive overshoot of the renewable capacity of the world's natural systems (natural capital). The level of change required will need to be nothing less than revolutionary. Revolutionary not in an anarchic sense, but revolutionary in the way our whole way of living is directed, designed and structured in its relationship to the natural world around us, and the way we interact with it. The system changes required are beyond the scope of any one individual, organisation, community or region. It will require unified action, carefully targeted to best provide support to enable individuals to make all necessary changes to sustainable patterns of resource consumption to which they have 'control over', further to that needed to be implemented by Local and State Government services and infrastructure along with that of private industry and commerce. **What is it going to take, to awaken in us the sea change in values about living systems that we so desperately need ?**”

SUSTAINABILITY IMPERATIVES & THE IMPLICATIONS OF GLOBAL PEAK OIL

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- Q1:** What is sustainability ?
- Q2:** What are the imperatives for conversion to sustainable living systems ?
i.e. what are the key drivers for the need for change to sustainability principles
- Q3:** Is there a need for sustainability incentives to assist such conversions ?

What does Sustainability mean ?

Alternative definitions of a what may represent a ‘sustainable society’ include:

- “*meets the needs of the present without compromising the ability of future generations to meet their own needs*” (Meadows et al. 1992, *Beyond the Limits*; pg. 209, taken from ‘The World Commission on Environment & Development’)
- The notion that the development of sustainable living systems are only truly sustainable if they are not ‘dependent’ on the free availability and abundance of cheap oil
- “A sustainable society is one that can persist over generations, one that is far-seeing enough, flexible enough, and wise enough not to undermine either its physical or its social systems of support” (Meadows et al. 1992, *Beyond the Limits*; pg. 209)

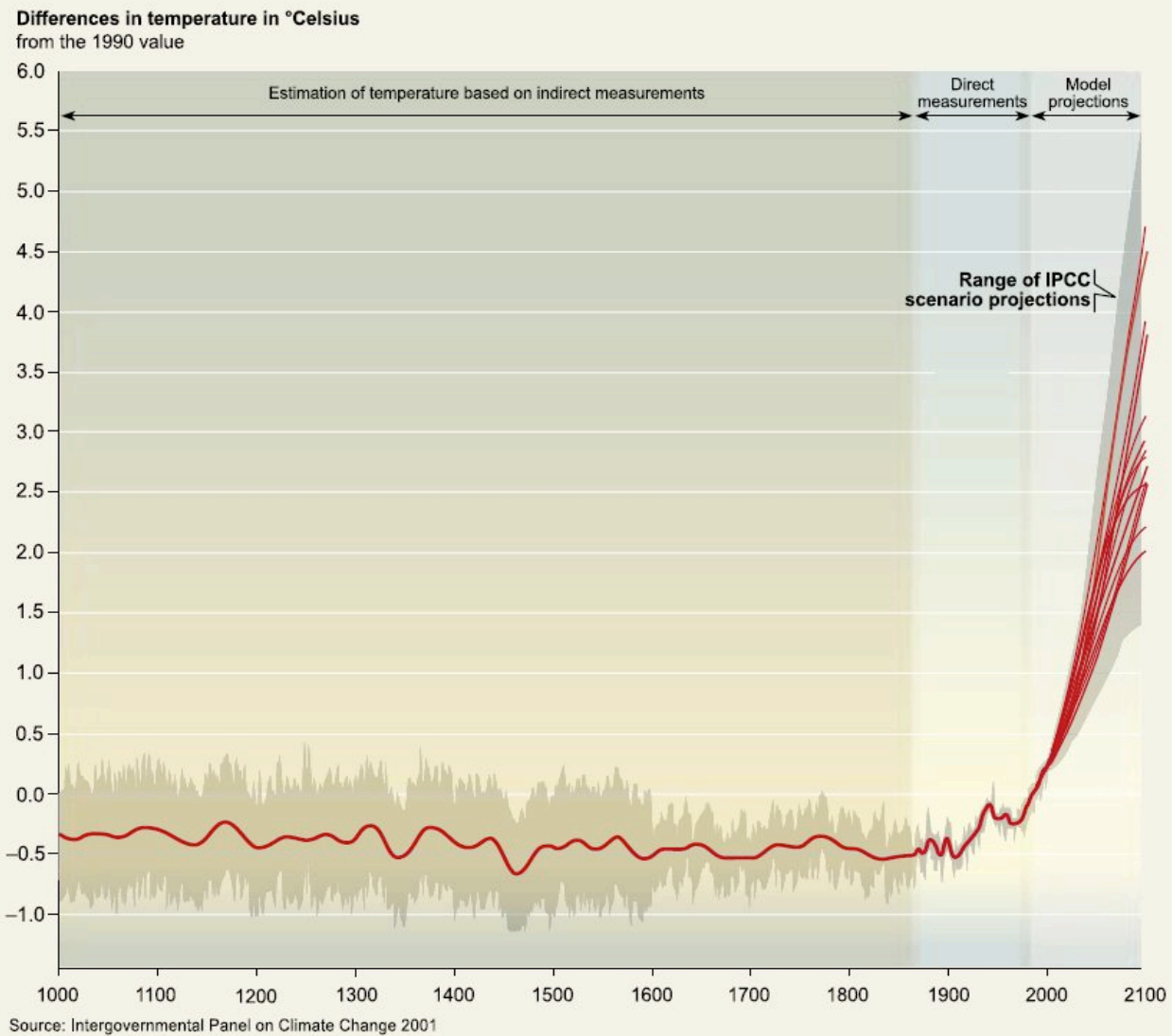
KEY DRIVERS (IMPERATIVES) FOR THE NEED TO SHIFT TO SUSTAINABLE LIVING SYSTEMS are:

- GLOBAL CLIMATE CHANGE PRESSURES
- GLOBAL PEAK OIL & THE DECLINE OF THE GLOBAL FOSSIL FUEL ECONOMY AND OTHER KEY NON-RENEWABLE RESOURCES
- OVERSHOOT OF THE RENEWABLE CAPACITY OF THE WORLD'S NATURAL SYSTEMS (NATURAL CAPITAL)

1. Global Climate Change Pressures

- International consensus that rapid global climate change is real, significant and essentially anthropogenic in cause, compressing massive climate shifts into a 150-200 year timeframe
- Rising greenhouse gas emissions, such as CO₂ and methane
- Rising global temperatures
- Rapid melt of the world's glaciers and polar ice sheets & rising sea levels,
- Defrosting of permafrost zones in northern hemisphere, worsening methane & CO₂ release
- Potential failure of key oceanic currents such as Gulf Stream conveyor belt, which heats much of Europe (one in two chance that one of the most important sources of heat in the world will just disappear within the next 50-100 years),
- Potential rapid freezing of northern hemisphere & failure of equatorial rainforests & monsoons
- Oceanic acidification due to carbon dioxide absorption; will increase global temp. cause sudden release of CO₂ stores, thereby exacerbating temperature rises & global ice melt ?
- 'Global dimming' is believed to be concealing the true situation in respect of global warming effects from CO₂ emissions by >20%.

Estimated global temperature averages for the past 1,000 years, with projections to 2100 depending on various plausible scenarios for future human behavior.

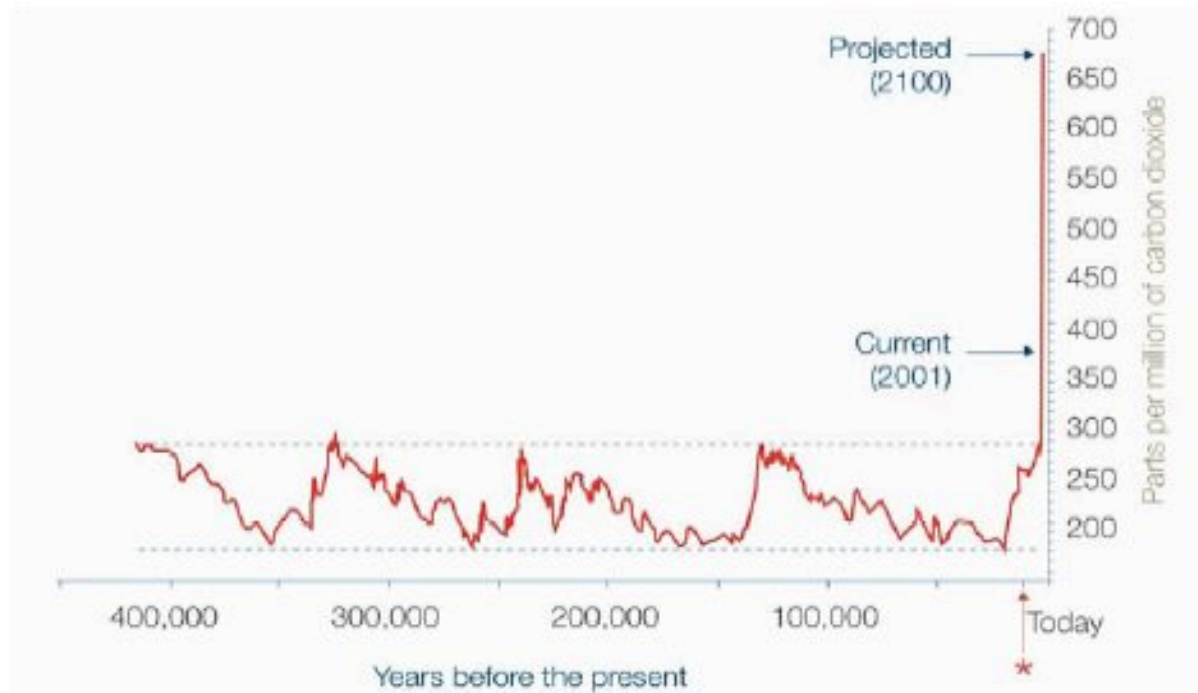


Source:

Millenium Ecosystem
Assesment (2005) *Living
Beyond Our Means*; pg.10)

Figure 2.5

CARBON DIOXIDE CONCENTRATIONS IN THE ATMOSPHERE: DATA FROM 440,000 YEARS BEFORE PRESENT TO TODAY



Source: Cooperative Research Centre for Greenhouse Accounting.

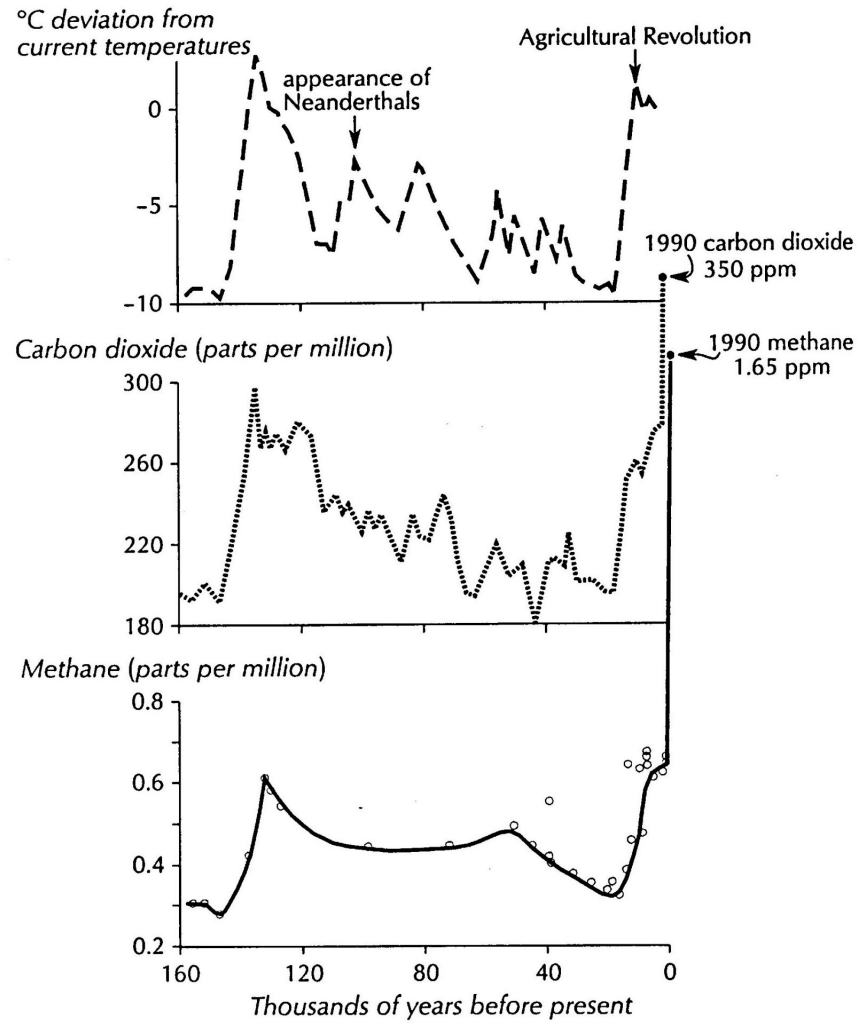
Source:

Allen Consulting Group (2005) *Climate Change Risk and Vulnerability. Promoting an efficient adaptation response in Australia*, Report to the Australian Greenhouse Office, Department of the Environment and Heritage, Canberra; pg. 42

Source:

Meadows et al. (1992) *Beyond the Limits*; pg. 98

Figure 3-23 GREENHOUSE GASES AND GLOBAL TEMPERATURE OVER THE PAST 160,000 YEARS



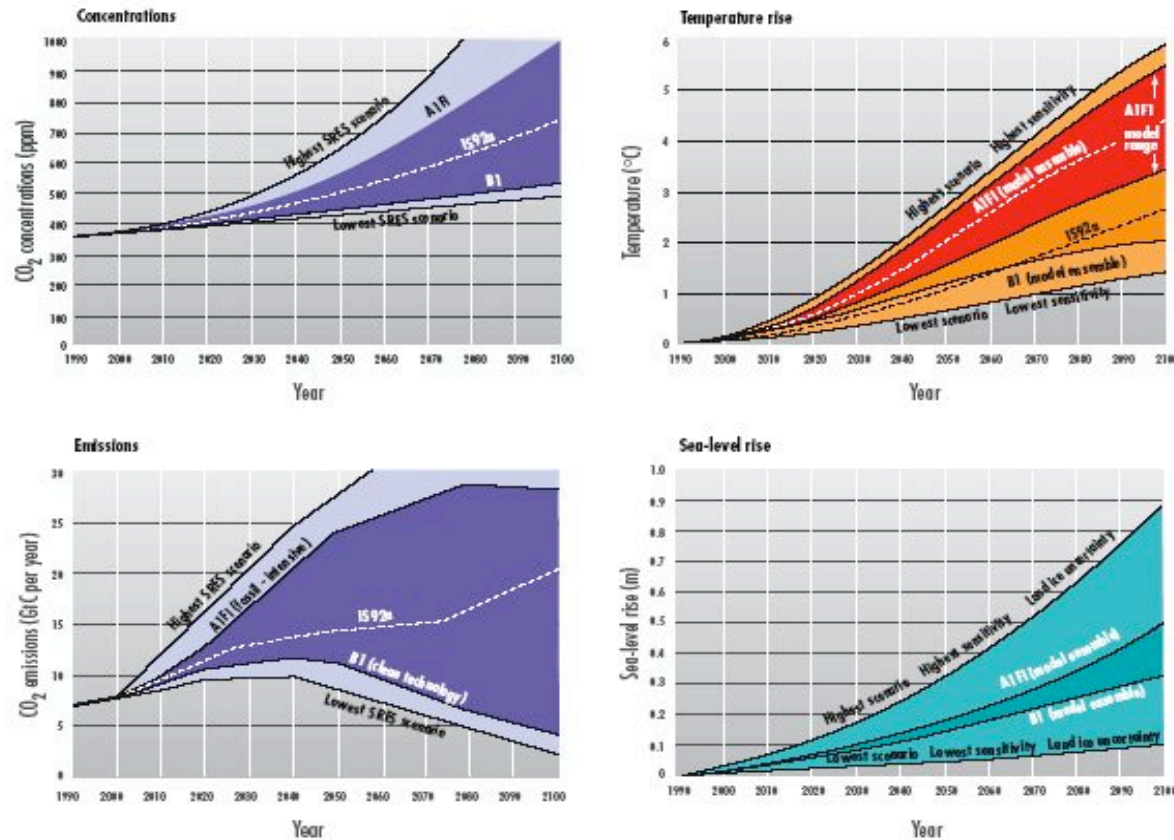


Figure 75. Using a wide range of climate models, the IPCC TAR demonstrated the projected response of the climate system to various scenarios of greenhouse gas and other human-induced emissions. Clockwise from lower left (a) the range of IPCC carbon dioxide emissions scenarios from the IPCC Special Report on Emissions Scenarios (SRES), noting in particular the A1F1 (Fossil Intensive) and B1 (clean technology) ‘marker’ scenarios and, for reference, one of the 1992 IPCC scenarios, IS92a; (b) the carbon dioxide concentrations that would result from the IPCC carbon dioxide emissions scenarios as shown in (a); (c) projected global mean surface temperature changes from 1990 to 2100 for the full set of SRES emissions scenarios, illustrating, for example, the range of model projections derived using the A1F1 emissions; and (d) projected global mean sea-level changes from 1990 to 2100 for the full set of SRES emissions scenarios as well as for the A1F1 and B1 scenarios in particular.

Source:

Bureau of Meteorology - Australian Government (2005) *'The Greenhouse Effect and Climate Change'*, pg. 60

2. Global Peak Oil Implications

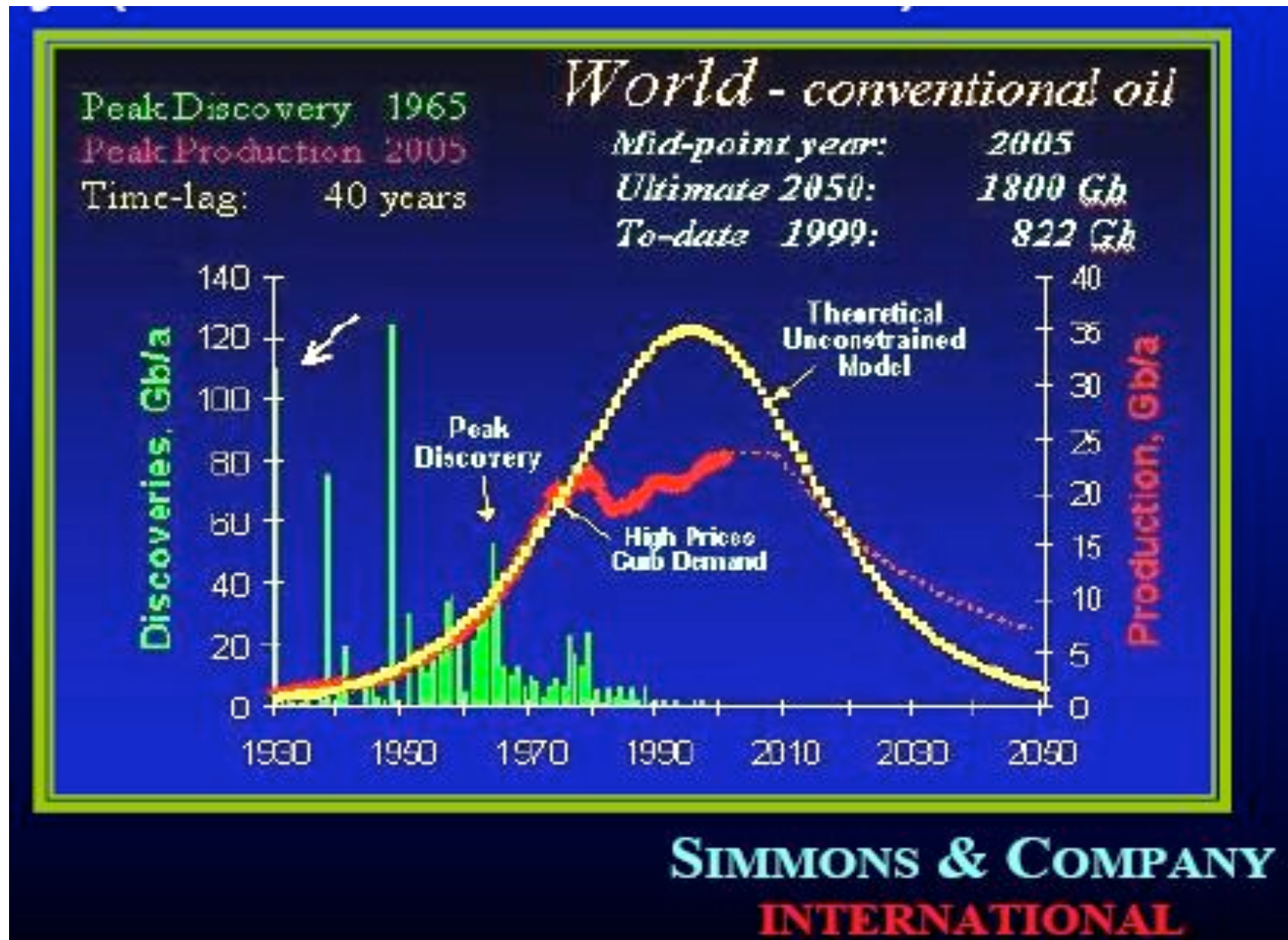
- Global peak oil production is here (2005-2007)
- Global oil production is crossing the 'tipping point' where demand for energy, as represented by fuel, has exceeded supply of all known future oil reserves (Campbell, C. 1997; Klare 2004b, 2005; Kunstler 2005; Meacher 2004; Savinar 2005a, 2005b; Simmons 2005b, 2005a)
- Global trade, import and export of cheap commodities, is founded on the availability of cheap, abundant oil reserves (Savinar 2005a).
- Days of cheap international travel are over ?
- The squeeze on the cost of all other commodities and their supply will increase, with potential hyperinflationary outcomes (Savinar 2005a), e.g. In Australia, truckies are going out of business at \$1.30-1.40/litre; cut flower exporters to Japan have lost 80% of their business demand supply
- March 2005, report for the US Department of Energy, entitled 'The Mitigation of the Peaking of World Oil Production' noted: "Previous energy transitions were gradual and evolutionary. Oil peaking will be abrupt and revolutionary"

Matt Savinar; www.lifeaftertheoilcrash.net

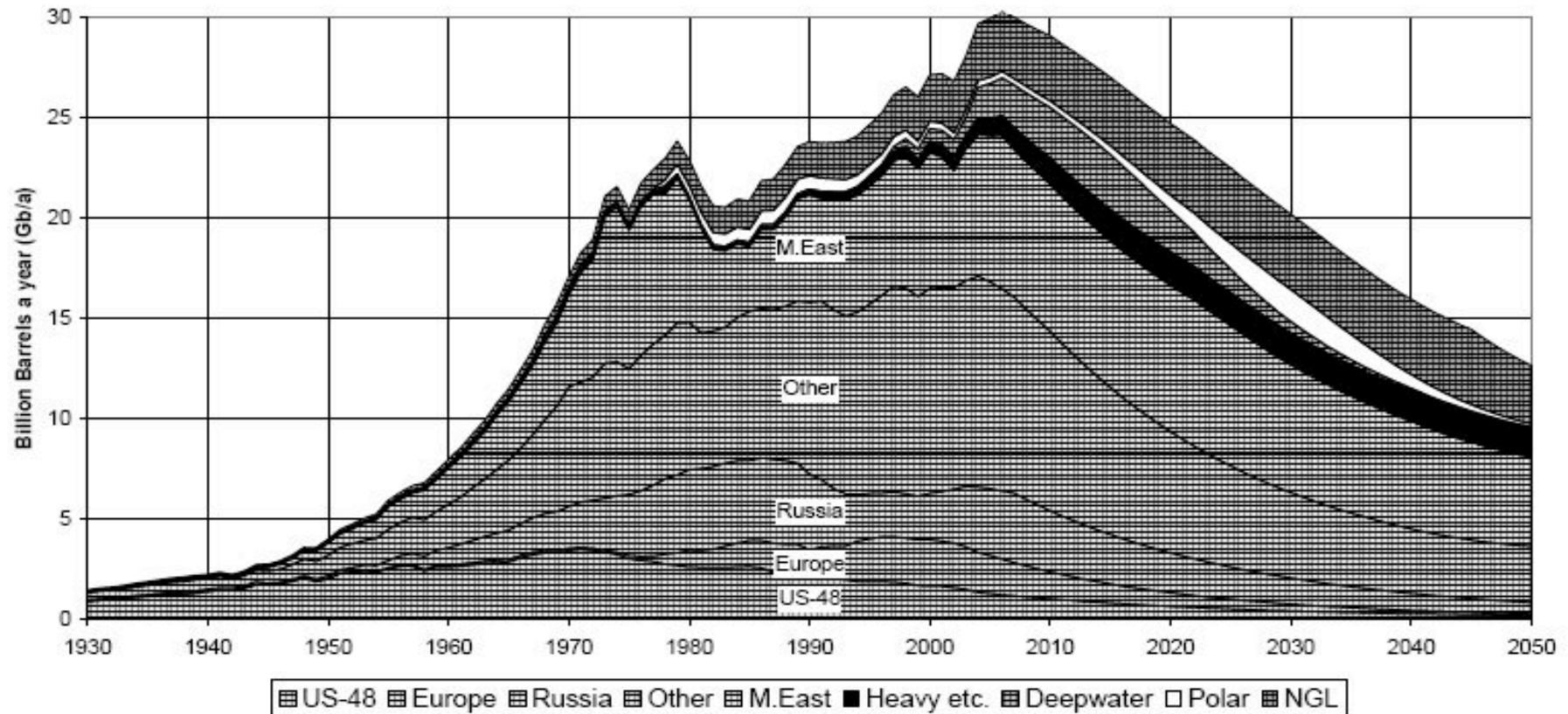
- In April 2005, French Investment Bank Ixis-CIB warned “crude oil prices could touch \$380 a barrel by 2015”
- Osama Bin Laden’s primary goal is said to have been to force oil prices into the \$200 range; Why ? Oil prices this much greater than \$100/barrel would most likely trigger a collapse of the global economy and massive global resource wars
- Why a potentially massive crash in the global economy ? Because like the human bodies loss of water “A shortfall between demand and supply as little as 10-15 % is enough to wholly shatter an oil-dependent economy
- During the 1970’s oil shock shortfalls in production of 5% caused a quadrupling in the price of oil.
- Such shocks were short-lived, while we are looking at a new, permanent condition of decline in energy production
- US Vice President Dick Cheney, as CEO of Haliburton in 1999 stated “By some estimates, there will be an average of two-percent annual growth in global oil demand over the years ahead, along with, conservatively, a three-percent natural decline in production from existing reserves

Cost Implications of Rising Oil Prices

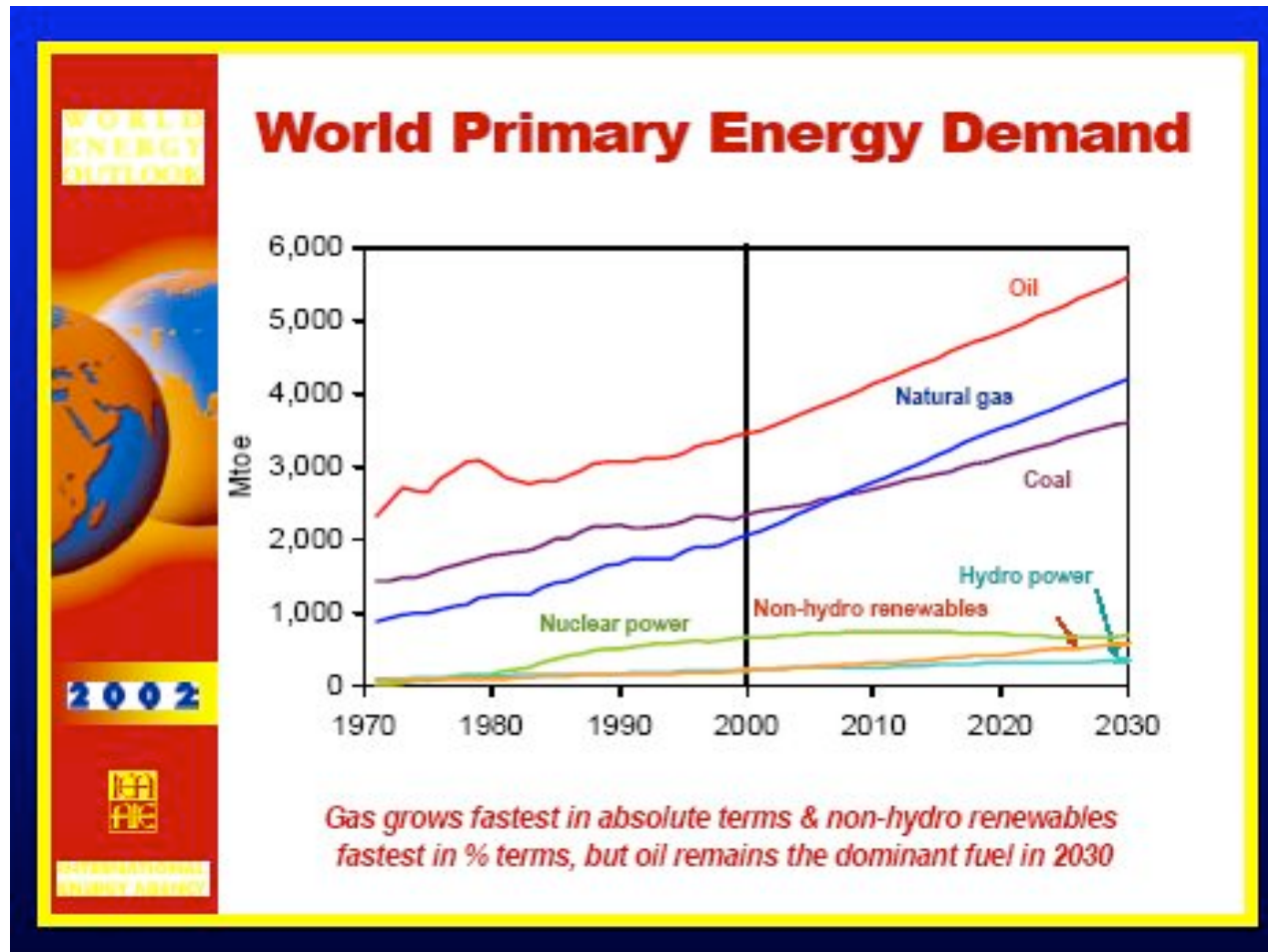
- Geologist Dale Allen Pfeiffer notes approx. 10 calories of fossil fuel are currently required to produce 1 calorie of food eaten in the US
- In the US, the average piece of food is transported almost 1,500 miles before it gets to someone's plate; in Canada it's 5,000 miles; in Australia > 750 km ?
- Japan is one nation which represents an economy highly vulnerable to global oil decline as it is heavily dependent on imported goods and foodstuffs
- The construction of the average desktop computer consumes 10 x its weight in fossil fuels
- Matt Saviinar points out "*The so called 'alternatives' to oil are actually 'derivatives' of oil*", i.e. we need oil in order to make them such as plastics, solar cells, etc. !



OIL AND GAS LIQUIDS 2004 Scenario



Campbell, CJ compiler 2005, 'Association for the Study of Peak Oil and Gas Newsletter No. 53', p. 11. viewed 25 May 2005, <<http://www.peakoil.net/Newsletter/NL53/newsletter53.pdf>, see also <http://www.peakoil.net>>.



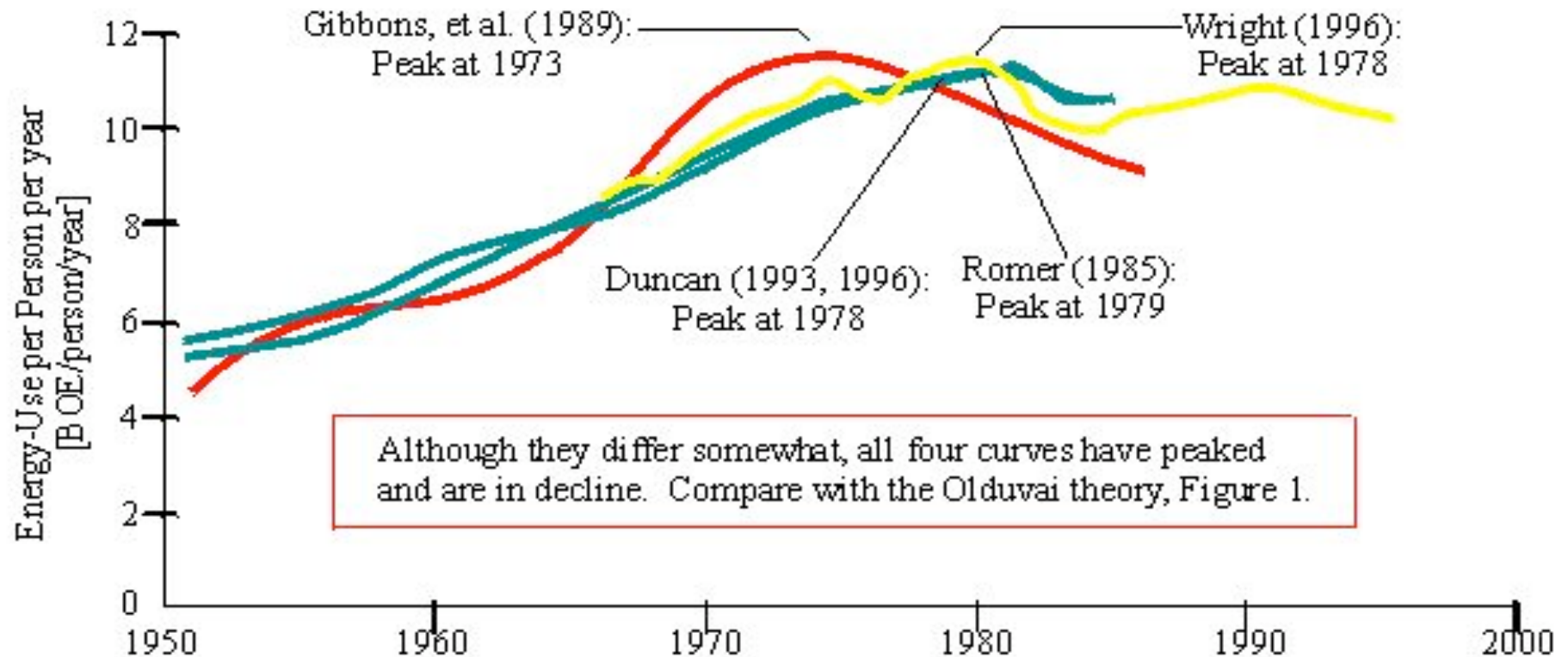
Simmons, MR 2005, *Twilight in the Desert: The coming Saudi oil shock and the world economy*, Boston Committee on Foreign Relations, Boston, MA, United States, 12th April 2005, Power Point presentation,

<<http://www.simmonsco-intl.com/files/Boston%20Committee%20on%20Foreign%20Relations.pdf>,

and important listing of all his key speeches at:

<http://www.simmonsco-intl.com/research.aspx?Type=msspeeches>>

Energy Use Per Person



Duncan, RC 1996, 'The Olduvai Theory: Sliding towards a post-industrial stone age', pp. 12., viewed 7th June 2005, <http://dieoff.org/page125.htm>

3. OVERSHOOT OF THE RENEWABLE CAPACITY OF THE WORLD'S NATURAL SYSTEMS (NATURAL CAPITAL)

➤ *“Human activity is putting such a strain on the natural functions of the Earth that the ability of the planet’s ecosystems to sustain future generations can no longer be taken for granted” (Millenium Ecosystem Assessment, 2005; pg. 2)*

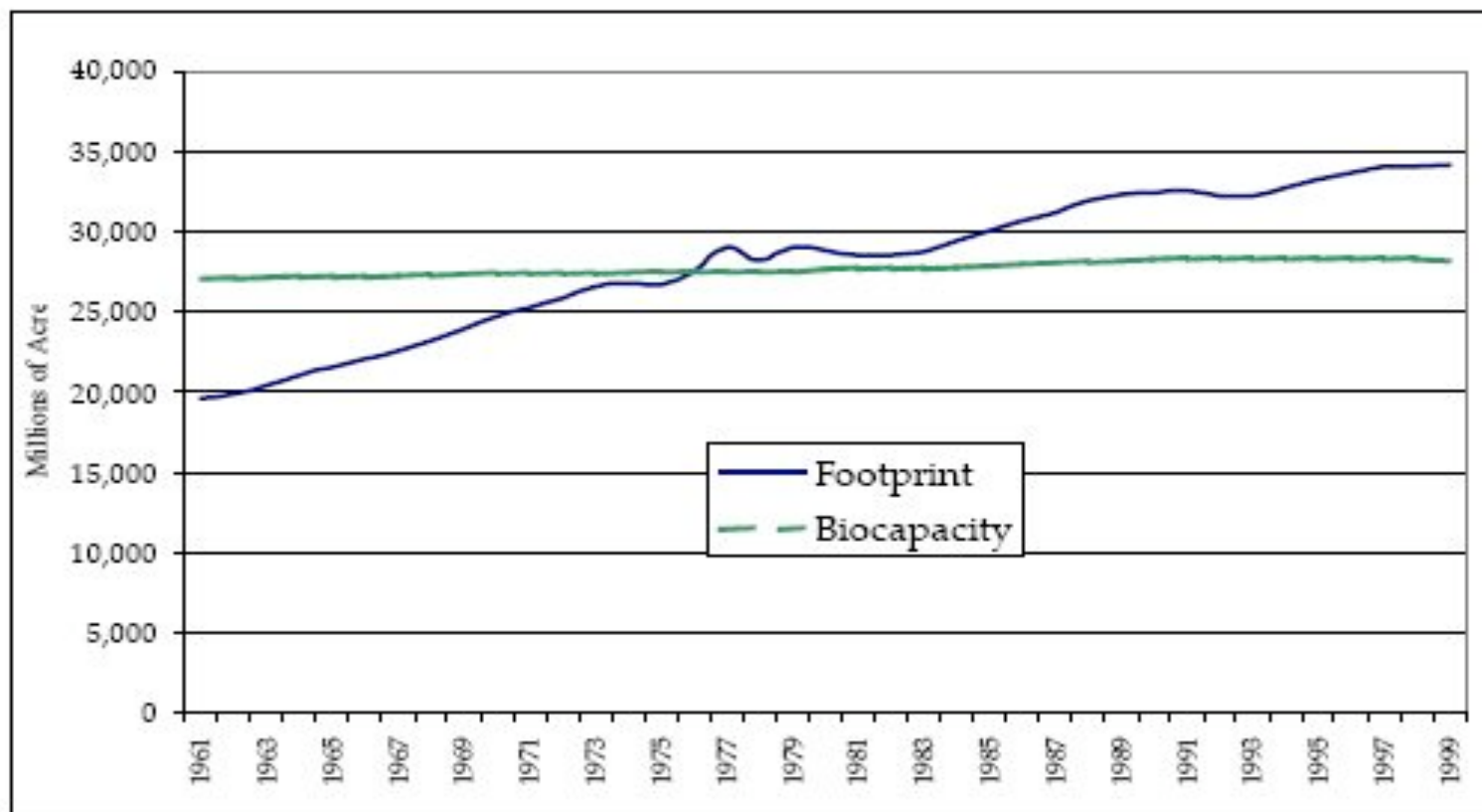
➤ *“If the signal or response from the limit is delayed and if the environment is irreversibly eroded when overstressed, then the growing economy will overshoot its carrying capacity, degrade its resource base, and collapse” (Meadows et al. 1992; pg. 128)*

➤ *“All the evidence suggests that we have consistently exaggerated the contributions of technological genius and underestimated the contributions of natural resources....We need...something we lost in our haste to remake the world: a sense of limits, an awareness of the importance of the earth’s resources” (Stewart Udall, as quoted by Meadows et al. 1992, pg. 161)*

➤ *“In the Living Planet Reports 2000 and 2002,WWF International and Redefining Progress reported that in the late 1970’s humanity’s collective Ecological Footprint breached the sustainability mark for the first time, and has remained unsustainable ever since” (from Venetoulis et al. 2004, Ecological Footprint of Nations; pg. 7)*

ILLUSTRATION 1:

HUMANITY'S TOTAL FOOTPRINT 1961-2000



Source:

Venetoulis et al. 2004, *Ecological Footprint of Nations*; pg. 7)

Global Biocapacity vs Ecological Footprint

As a result of increasing human demand and declining ecological wealth, Europe is losing room to manoeuvre. It

Time matters: the longer Europe procrastinates, the more expensive the investment required, and the greater the risk that

Tony Long
Director, WWF European Policy Office

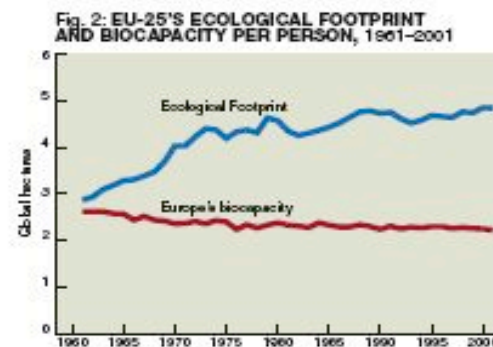
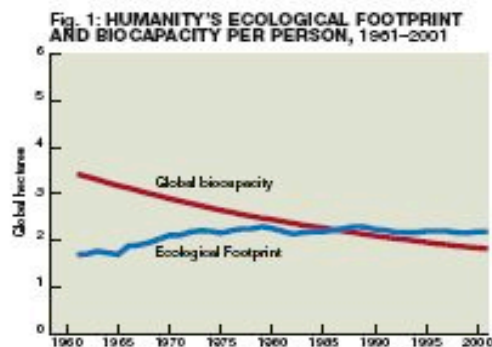


Figure 1: The Ecological Footprint measures our use of ecological resources. Biocapacity tracks the planet's biologically productive capacity. By 2001, humanity required 2.2 global hectares of productive area per person to sustain current lifestyles, 1.3 times more than in 1961. But the Earth currently has just 1.8 global hectares available per person. This overshoot of some 21 per cent depletes the Earth's natural capital, and is thus possible only for a limited period.

Figure 2: The Ecological Footprint of the EU-25 has risen by almost 70 per cent since 1961. Europeans now require 4.0 globally average hectares per person to provide for their lifestyle. As the continent can only supply 2.2 global hectares per person, Europeans rely on the rest of the world to make up this increasing deficit – effectively more than another Europe.

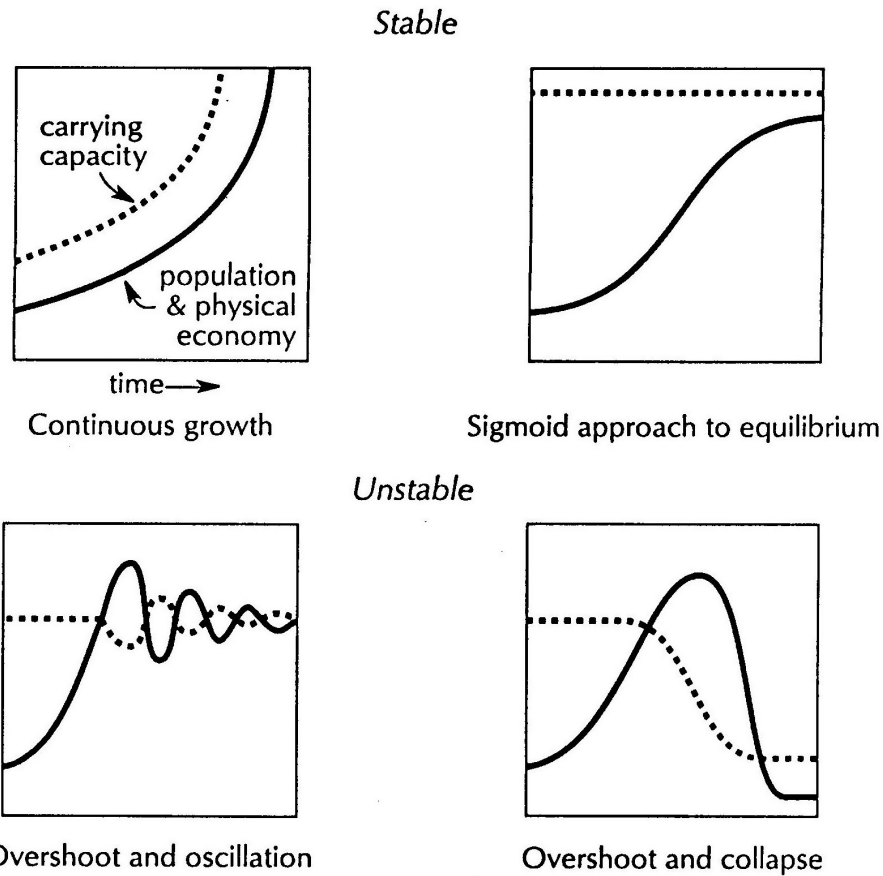
EUROPE 2005: THE ECOLOGICAL FOOTPRINT 3

Source:

Wackernagel et al. 2005, *Europe 2005: The Ecological Footprint*. ' ; p. 28. viewed 23rd June 2005, (Global Footprint Network)

http://www.footprintnetwork.org/gfn_sub.php?content=download

Figure 4-2 POSSIBLE MODES OF APPROACH OF A POPULATION TO ITS CARRYING CAPACITY



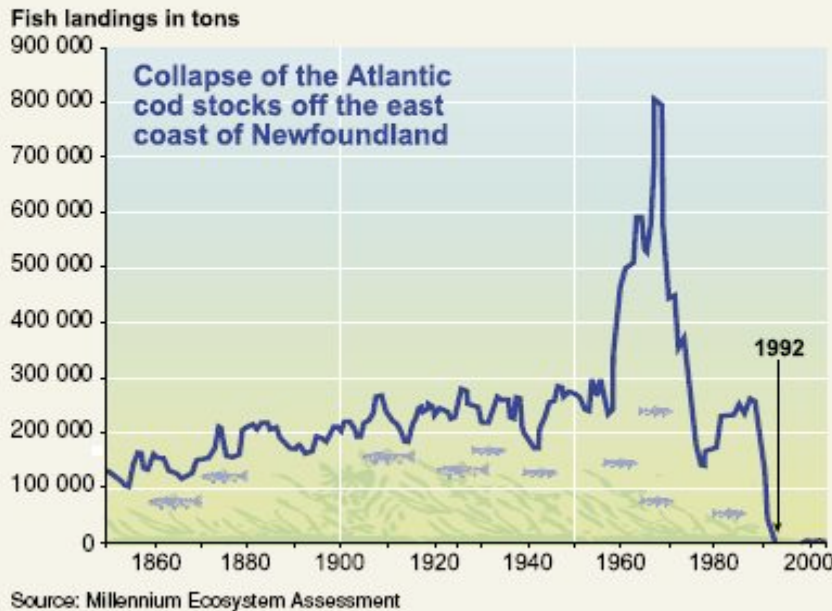
Source:

Meadows et al.
1992; pg. 108

The central question addressed by the World3 model is: Which of these behavior modes is *likely* to be the result as the human population and economy approach their carrying capacity?

MARINE FISHERIES

The dramatic collapse of cod stocks off Newfoundland illustrates how quickly the services of an ecosystem can disappear when its resources are overexploited.



Source:

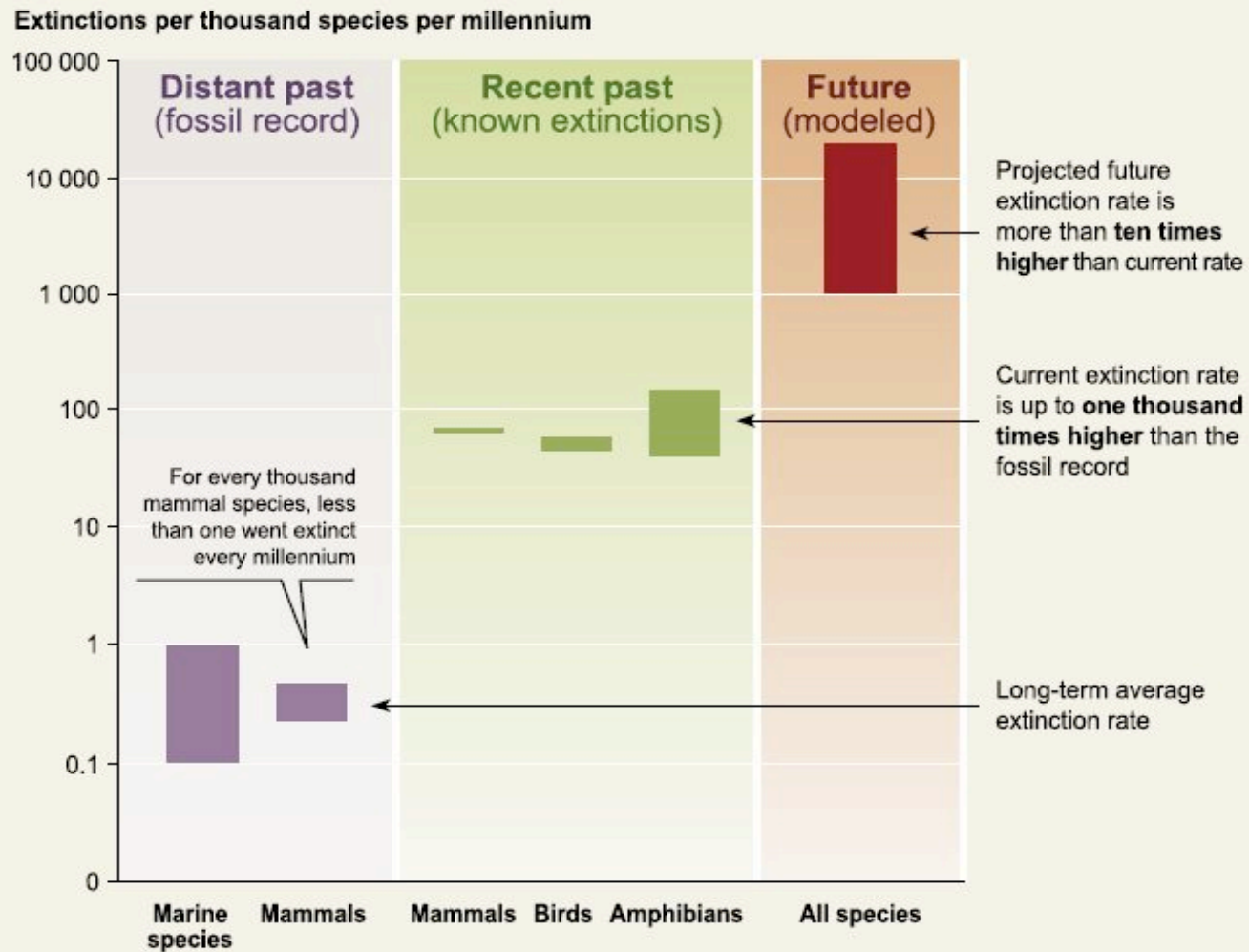
Millennium Ecosystem
Assessment (2005; pg.15)

➤ With world population currently at approx. 6 billion, and still exponentially growing, reaching potentially > 8 billion by 2015, the demand for basic resource living needs such as water will be massive

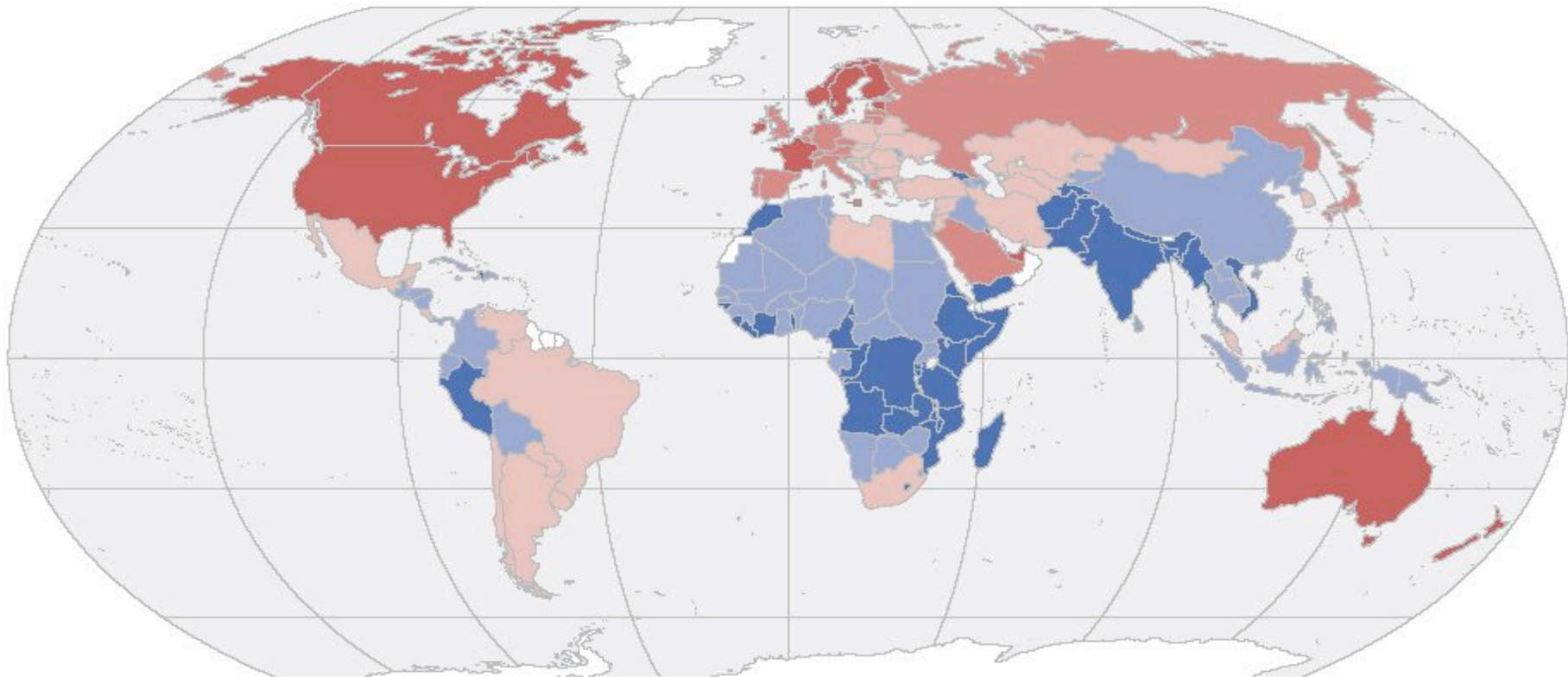
A classic example of Meadows et al's scenario of "*Overshoot and Collapse*"

SPECIES EXTINCTION RATES

Comparisons with the rate at which species have disappeared from the planet over a long period of Earth's history indicate that humans have already increased extinction levels dramatically. Projections suggest this rate will take another big leap due to changes over the next 50 years. The bars represent the range of estimates in each case.

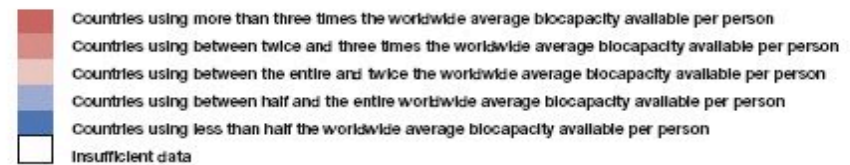


Source: Millennium Ecosystem Assessment



Map 3: LIVING ON LESS, LIVING ON MORE
2001

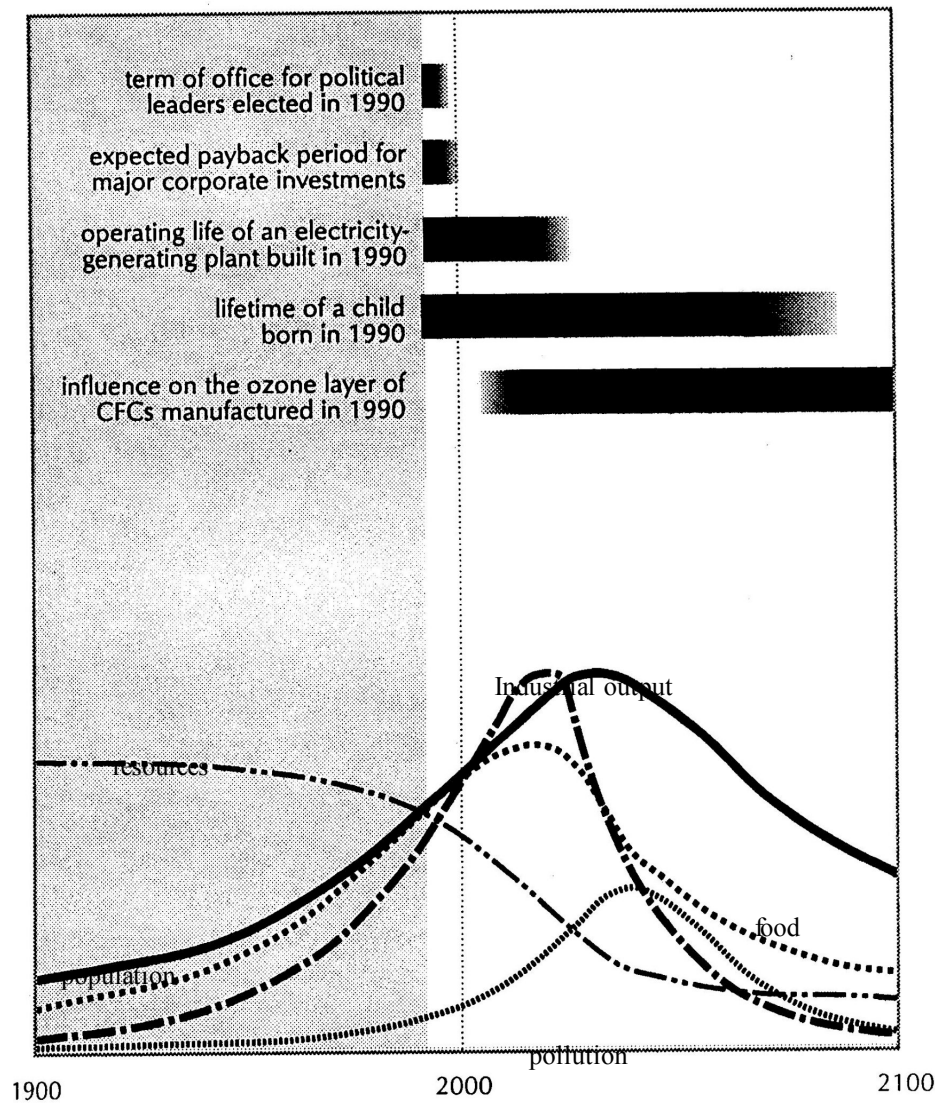
The average resident in 89 countries, out of the 150 countries analysed, uses more biological capacity than is available per person worldwide. In 33 countries, the average resident uses more than double, in 13 countries more than three times. Even if the average footprint in a country is less than what is available per person globally, the country's total footprint may exceed its own biocapacity. As global ecological overshoot increases, countries with large footprints may realize the risks associated with a high resource demand.



EUROPE 2005: THE ECOLOGICAL FOOTPRINT 13

Source: Wackernagel et al. 2005, Europe 2005: The Ecological Footprint (pg. 13)

Figure 8-1 TIME HORIZON OF THE WORLD3 MODEL



Source:

Meadows et al. (1992); pg. 235

Question is:

*Do we wish to witness such
a scenario for this planet
and future generations
lives, never alone our own ?*

*“Sometimes it falls upon a
generation to be great. YOU can be
that great generation.”*

*Nelson Mandela, 2005; from “The Girl in the
Café”, 2005, HBO Films for BBC Wales*

Other Key References

- *THE END OF SUBURBIA: Oil Depletion and the Collapse of The American Dream* 2004; <http://www.endofsuburbia.com/>
- Natural Capital; Lovins, H 2005, *Recommended resources; Natural Capital Solutions info. website*; <http://www.natcapsolutions.org/resources.htm>
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- Hargroves, K & Smith, MH (eds) 2005, *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*, Earthscan/James & James; <http://www.naturaledgeproject.net/NAON.aspx>
- Wackernagel et al. 2005, 'Europe 2005: The Ecological Footprint.' p. 28. viewed 23rd June 2005, <http://www.footprintnetwork.org/gfn_sub.php?content=download>.
- See also on the internet; Global Public Media; Post Carbon Institute; The Community Solution; DieOff; 'Lifeaftertheoilcrash', Matthew Simmons seminars, etc.