



SustainAbility

One Planet Business

Creating Value Within Planetary Limits

2007 FIRST EDITION

Since the 1980's, human demand on planetary resources has exceeded supply. Globally, we now use over 20% more of the Earth's biocapacity than it can renewably generate. Under business as usual, by 2050 we will be living as if we had two Planets, rather than just one.

One Planet Business. The dawning of a new era in a resource-constrained world.



Foreword



WWF's Living Planet Report - a health check for the Planet - confirms that we are using natural resources faster than they can be renewed.

Humanity's Ecological Footprint, our impact on the planet, has more than tripled since 1961. Our Footprint now exceeds the world's ability to regenerate by about 25%.

People are turning resources into waste faster than nature can turn waste back into resources. Effectively, we are in ecological overshoot.

It's time to make some vital choices. The challenge is to find ways of improving standards of living while reducing human impact on the natural world.

To meet this unprecedented global challenge, we will need to explore new methods of production, address wasteful consumption and develop innovative business models.

WWF believes that government, business and civil society must work through new alliances and partnerships

to catalyse the changes that the transition to sustainability will require.

One Planet Business offers business leaders, policy-makers, investors, consumer groups and other NGOs a forum to jointly understand these issues and explore transformative ways for business to create value and meet human demand in an increasingly resource-constrained world.

In this report, WWF outlines both this change process and our new research on the ecological impacts of different industry sectors. Our approach is challenging because we believe that only by working together can we achieve the large-scale system change essential for One Planet Living.

On behalf of WWF, I invite you to join us on this next stage of the journey to a sustainable future.

A handwritten signature in white ink, appearing to read 'James P. Leape'.

James P. Leape

Director General, WWF International



The last century was radically different from its predecessor — and the 21st will be at least as different again. Interestingly, though, that

overhanging tsunami of change was not at all obvious to most people alive in 1900, and the same is true today. As *One Planet Business* demonstrates, looming demographic, geopolitical and environmental challenges mean that the next decade will be pivotal in our evolution as a global community and economic species.

It's not just that 2007 marks the point at which humankind becomes a predominantly urban species, but that the risks and opportunities associated with poverty, hunger, pandemics, water scarcity and climate change are now pressing in with increasing urgency. These challenges routinely surface at top-level meetings like the annual summits of organisations such as the Clinton Global Initiative and the World Economic Forum. And journals such as the *Harvard Business Review* now feature the likes of Michael Porter and Clayton Christensen laying out their advice

for corporate boards on how to tackle the emerging strategic challenges.

Against this backdrop, it is increasingly clear that the new century needs few things as urgently as a new accounting language that's able to track, value and reward (or punish) the different dimensions of value creation — and destruction. No longer is it enough to track physical, financial and intellectual capital; we must also account for human, social and, most critically of all, natural capital.

True, it took us 500 years to develop the accounting methods that, with a few hiccups, business and financial markets now take more or less for granted. But this is our equivalent of the 'man on the moon by 1970' stretch target. *One Planet Business* offers a new framework for thinking, an emerging accounting methodology for addressing the problem of ecological overshoot, and an ongoing business-oriented process that will cover such critical sectors as housing, food and mobility.

A stylized white signature of John Elkington on a dark blue background.

John Elkington, Founder and Chief Entrepreneur,
SustainAbility

The Authors



WWF-UK

Oliver Greenfield:

Director of One Planet
Business and Head of
Sustainable Business Unit



WWF-UK

Michael Narberhaus:

Sustainable Business
Manager



WWF-UK

Charlotte Salazar:

Sustainable Business
Manager



SustainAbility

John Elkington:

SustainAbility Founder
and Chief Entrepreneur



SustainAbility

Seb Beloe:

Director of Research
and Advocacy



SustainAbility

Shelly Fennell:

Freelance Writer and
Editor

The mission of WWF is to stop the degradation of the planet's natural environment, and to build a future in which humans live in harmony with nature, by:

- conserving the world's biological diversity;
- ensuring that the use of renewable natural resources is sustainable; and
- reducing pollution and wasteful consumption.

The mission of SustainAbility – Established in 1987, SustainAbility advises clients on the risks and opportunities associated with corporate responsibility and sustainable development. Working at the interface between market forces and societal expectations, it seeks solutions to social and environmental challenges that deliver long-term value.

Contents

	Executive Summary	2
	Introduction	5
Chapter 1	Understanding Overshoot	9
Chapter 2	Business Risks	27
Chapter 3	New Competitive Landscapes	35
Chapter 4	One Planet Business	41
Chapter 5	Personal Mobility Within Ecological Limits	45

WWF working with business – WWF is one of the world’s largest and most experienced environmental organisations with some five million supporters and a global network active in more than 100 countries. It has partnerships with business, government and civil society groups throughout the world and is committed to addressing global threats such as climate change and to building sustainable solutions. Among WWF’s business partners are HSBC, Lafarge and Nokia. One Planet Business is a new global initiative that builds on this collaborative approach. It will bring together business, government and civil society to develop ways in which human demand for natural resources can be kept within the limits of our one planet.

Executive Summary

Global society is on a direct collision course with the finite limits of our one planet. More resources are being consumed more quickly than at any time in human history. The impacts associated with this consumption significantly outstrip the ability of the planet's ecological systems to replace and repair the damage being done.

The starkest example of this is climate change. As the recently published *Stern Review on the Economics of Climate Change* notes, this global phenomenon, if left unchecked, will cause economic impacts greater in scale than the two world wars and the Great Depression put together. Indeed, as much as 20% of global GDP could be at risk¹. We are in a situation of significant overshoot – liquidating ecological assets at a rate that is wholly unsustainable.

There is no immediate prospect of these impacts being reversed. As the world's population swells inexorably towards nine billion in 2050, and as the economies of Brazil, Russia, India, China and others continue to surge forward, the planet and its people could face disastrous consequences if urgent action is not taken.

This report seeks to translate this alarming reality into a framework that enables the engagement of the business community. To do this, WWF and its research partners have collated a global evidence base to measure:

- the aggregate global impact of human consumption;
- the impacts associated with underlying human demands;
- the industries and value chains that meet these demands; and
- the impacts of the individual companies that make up these sectors

The undeniable conclusion of this research is that to avoid ecological catastrophe, business and its stakeholders must find ways to meet human demand within the limits of one planet. This is particularly true for the three areas of demand that place the most strain on the Earth: housing, transport and food, which together account for 63% of the global Ecological Footprint, 65% of total CO₂ emissions and 72% of the world's material use.

This report draws out the key implications of overshoot for business: from increased resource prices and the risk of investment withdrawal to supply disruptions and growing regulatory pressure. In our resource-and carbon-constrained world, a new framework for business decision-making is evolving where ecological limits are paramount and will be a key success criterion for future business operations. Companies that do not grasp this face being forced out of the market.

But these very constraints and pressures are also creating enormous opportunities. This report concludes that there are huge business opportunities to meet demand and create value in radically new ways. It is the ability of business to see constraints as opportunities that is central to releasing their creative and innovative capacities that will generate the solutions to overshoot.

However, “business as usual” will not unleash these opportunities. WWF believes that urgent change is required to adapt the systems through which businesses serve human demands and to bring them in line with ecological limits. Only by engaging in system change can companies shape the new rules of the game that will create the innovation required to transform the way they create value and meet human demand.

Achieving this is clearly beyond the capacity of any individual business, or even group of businesses – which is why WWF is launching its One Planet Business programme. Together with far-sighted businesses, NGOs, investors, governments and consumers, WWF will build a system-change network that questions what we consume, how we do so and how much we consume. The first area of focus is personal mobility; subsequent phases will examine other high-impact areas such as housing and food.

With the growing sense of urgency for action on hugely disruptive issues such as climate change, One Planet Business aims to help bring about workable solutions that can meet human demand and create value within ecological limits.

Our ambition is profound – and imperative. Creating Value Within Planetary Limits represents our first step on this journey. We welcome your comments and input and plan to report on our progress in 2009.



The defining challenge of the 21st century will be to transform the system governing markets so that they work for, rather than against, sustainability.

Introduction

Until now, the Earth's natural resources have been more than ample to support human needs. From time to time, localised resource calamities have been problematic for specific communities – sometimes with disastrous consequences? – but at a global level, natural resources have always been sufficient, if not abundant. This is emphatically no longer the case.

With the world population set to increase to 9 billion in 2050 and as human demand for resources grows, the Earth's life-supporting natural capital will be liquidated at ever-increasing rates.

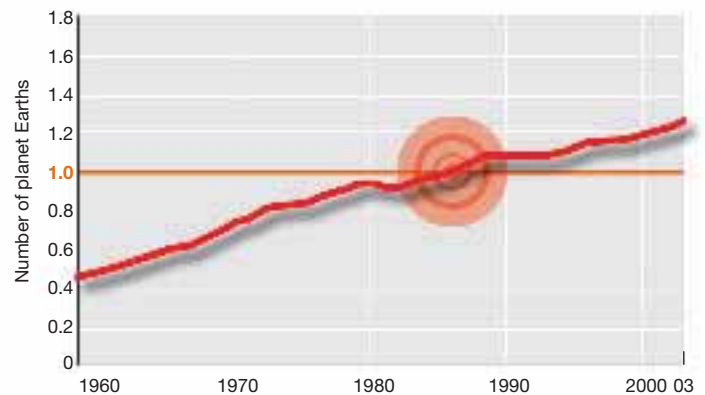
The Earth cannot keep up with the demand our economy is placing on its ecological assets. Evidence is mounting that the sheer volume of resources flowing through the global economy has become today's key environmental challenge. With the world population set to increase to 9 billion in 2050 and as human demand for resources grows, the Earth's life-supporting natural capital will be liquidated at ever-increasing rates. Signs of ecological pressure include climate change, collapsing fisheries, species extinction, deforestation and desertification.

These issues will have immense impacts on economies and the societies of which they are part. Sir Nicholas Stern, a former chief economist at the World Bank, argued in the *Stern Review on the Economics of Climate Change*, his seminal report to the UK government, that "business as usual" could cause economic impacts greater in scale than the two world wars and the Great Depression put together – in effect placing up to 20% of global GDP at risk. He argues that we have 10 years to get this right before irreversible and potentially catastrophic change sets in.

In its 2006 Living Planet Report, WWF concluded that we are now living in severe ecological overshoot: global

society is consuming 25% more than the reproductive capacity of the planet. We are in effect drawing down natural stocks of capital, enabling overall consumption to temporarily exceed the planet's ecological limits. Just as personal expenses can be greater than income for a period, global society can operate on "ecological credit". But the longer this continues, the greater the likelihood that the regenerative capacity of the planet's ecosystems will be irreversibly degraded.

Figure 0.1: World Ecological Footprint, 1961 – 2003



Source: WWF Living Planet Report 2006

The scale of the challenge for business

Resource and CO₂ emissions constraints are beginning to cause irreversible shifts in the operating environments of all industries. With only 10 years to halt the potentially disastrous impact of climate change, the business world must meet demand and create value in new ways. Proactive businesses are starting to look at ways of doing this. Those that don't risk market share loss and closure.

Pressure is mounting. Whether it is through the growing market in carbon or increasing scarcity of freshwater, businesses are being forced to confront the limits of our one single planet. In turn, broad value chains and economies themselves will have to learn to operate and thrive within the disciplines increasingly imposed by these planetary constraints. While these constraints have become today's decisive environmental challenge, they are also fast becoming tomorrow's critical economic challenge.

Market failure

Industrial progress has brought about huge increases in living standards, particularly in high-income countries. But today's market systems are also fatally flawed because they do not automatically ensure that the progress they generate is environmentally sustainable – or that the overall scale of the human economy will be within planetary capabilities. As a result, the defining challenge of the 21st century will be to transform the system governing markets so that they work for, rather than against, sustainability.

No one player has a complete grasp of the problem, much less the full range of potential solutions. Making real and enduring progress depends on the key players understanding and working towards transformational change.

One Planet Business

Overshoot has fundamental implications for all sectors of society. That is why WWF is now working with consumers, governments and other stakeholders as part of the One Planet Living® programme. This joint initiative with BioRegional aims to create a world in which people everywhere can lead happy, healthy lives within their fair share of the Earth's resources (see panel 0.2).

One Planet Business is part of One Planet Living. It offers business leaders, policy-makers, investors, consumer groups and other NGOs a forum to understand and help achieve the system changes required to ensure that our market economies are

sustainable. One Planet Business will bring together these stakeholders to explore transformative ways for business to create value and meet human demand in a severely resource-constrained world.

Each project will focus on particular areas of demand, with the first phase of work addressing mobility, and subsequent phases picking up other areas such as food and housing. Each will use a global evidence base gathered by WWF and its research partners to assess the impacts of specific changes to demand and supply patterns. From there, stakeholders will analyse where interventions for change could be most effective in reducing global overshoot. With this in mind, stakeholders will experiment with new ideas and solutions for meeting human demands (first mobility) within ecological limits. A joint action plan will be developed to enable participants to scale up these solutions in practice.

Business' engagement on environmental matters has frequently centred on managing societal expectations. Uniquely, One Planet Business places the fundamental environmental reality of overshoot at its core and invites business and its stakeholders to find ways to operate within this reality. With the growing sense of urgency for action on hugely disruptive issues such as climate change, One Planet Business aims to help bring about workable solutions that can meet human demand and create value within ecological limits.

Panel 0.2: One Planet Living® Initiative

One Planet Living® is based on a set of 10 guiding principles designed to make sustainable living easy, affordable and attractive.

1 Zero carbon

2 Zero Waste

3 Sustainable Transport

4 Local and Sustainable Materials

5 Local and Sustainable Food

6 Sustainable Water

7 Natural Habitats and Wildlife

8 Culture and Heritage

9 Equity and Fair Trade

10 Health and Happiness

Report purpose

This report is intended for a business audience and while concepts of ecological footprinting, biocapacity and overshoot may seem far removed from current reality, their importance in shaping the business environment of the near future is profound. Our objective is to demonstrate why this is the case, and how these issues are already transforming the operating environment for business and the market opportunities for solutions. Our One Planet Business process is described in Chapters 4 and 5.

Chapter 1: Understanding Overshoot explains how overshoot is measured and demonstrates how the measurement tools and related analyses can be used:

- to measure the aggregate global impact of human consumption;
- to understand the impacts associated with underlying human demands such as food, transport and housing;
- by the industries and value chains that meet these demands; and
- to measure the impacts of the individual companies that make up these sectors.

Chapter 2: Implications for Business explores the significant impacts that resource constraints will have on business, and identifies early signals on how these constraints are already shaping businesses' operating environment.

Chapter 3: New Competitive Landscapes concludes that there is great potential to exploit new market opportunities resulting from overshoot. We show how companies that grasp the competitive implications are positioning themselves to prosper in a more resource-constrained world and we highlight the importance to business of engaging in shaping the market system to address overshoot.

Chapter 4: One Planet Business describes how companies and their stakeholders are joining with WWF and other organisations to build a shared understanding of the changes needed – and to make shared commitments to bring them about.

Chapter 5: Personal Mobility Within Ecological Limits explains how the first project will inspire and catalyse transformational change towards mobility and access solutions within planetary limits.



“Human activity is putting such strain on the natural functions of Earth that the ability of the planet’s ecosystems to sustain future generations can no longer be taken for granted.”

The 2005 Millennium Ecosystem Assessment

Chapter 1: Understanding Overshoot

The need for measurement

In addressing environmental issues, one key frustration that business leaders experience is the frequent lack of precision and clarity in the debate. The ever-growing list of issues confronting management, coupled with the shortage of specific guidance, does not assist constructive engagement in what and how much needs to be done.

Recognising this barrier, One Planet Business has sought to translate the essential environmental challenges into a framework that will engage the business community. Together with its research partners, WWF has collated a global evidence base of Ecological Footprint data, as well as wider flows of materials and overall CO₂ emissions (detailed in panel 1.2).

These methodologies have been used to measure the global impact of key areas of consumer demand such as mobility, food and housing, and the supply chains that meet these demands.

This analysis is proposed in a four-level framework:

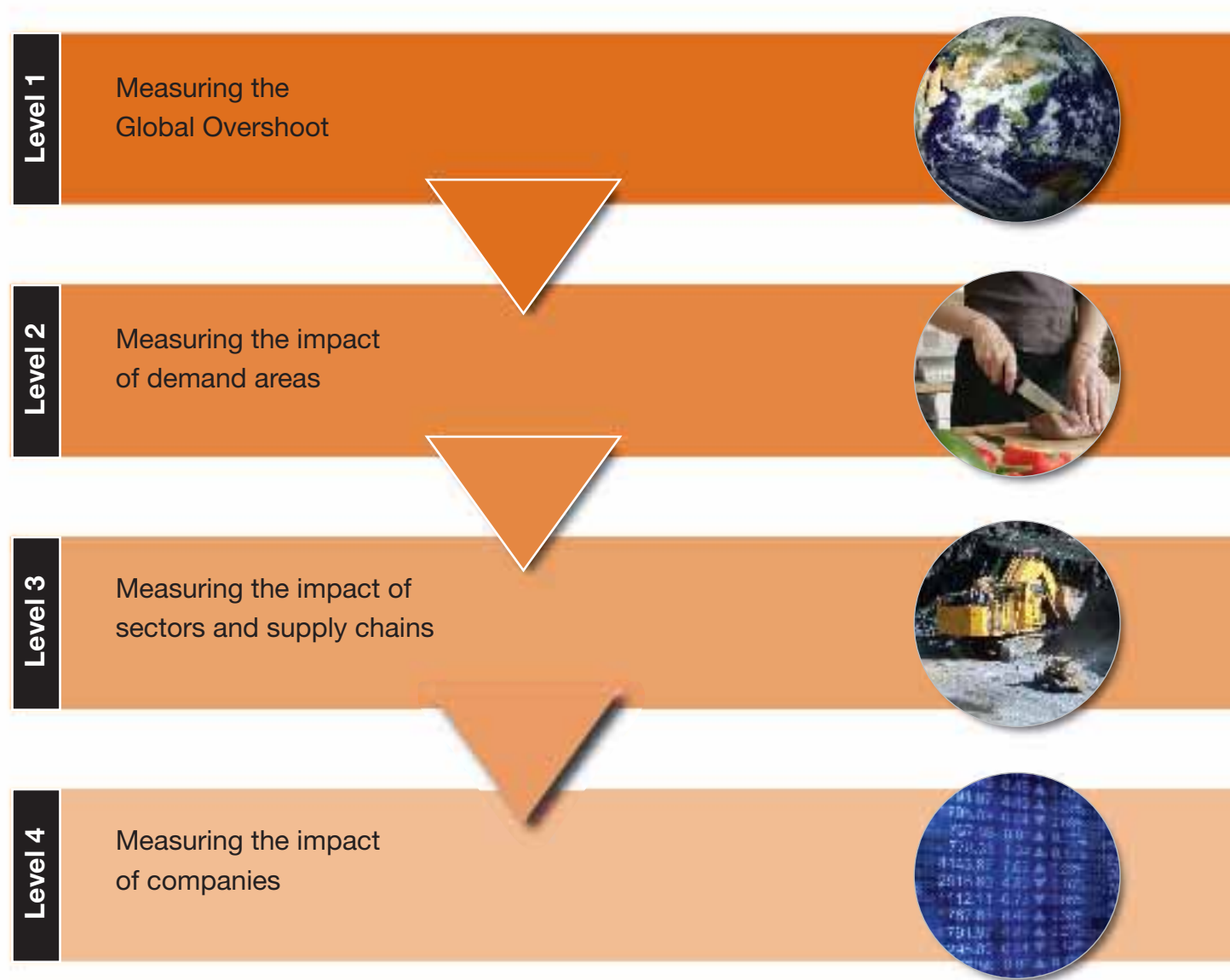
- The aggregate global impact of human consumption;
- the impacts associated with underlying human demands;
- the industries and value chains that meet these demands; and
- the impacts of the individual companies that make up these sectors.

This analysis has been supplemented with WWF's water assessment research, together with data from organisations such as the OECD and United Nations and leading think tanks such as the Wuppertal Institute for Climate, Environment and Energy.

“One of the questions facing companies that want to be part of the sustainability transition is ‘how far do we have to travel?’ Uniquely, One Planet Business will offer a series of robust answers to this fundamental question. Drawing from WWF’s global assessment of environmental trends, One Planet Business will provide clear sector guidance on how innovation can transform key goods and services so that profit can go hand in hand with planetary stewardship”

Nick Robins, Head of SRI Funds, Henderson Global Investors

Figure 1.1: Four Level Framework: From Macro to Micro





Food



Personal
mobility



Housing



Supply chain



Production
efficiency



Product use



Companies



Influence



Boundaries

Measuring and allocating impacts

Innovatively, this framework connects environmental and economic realities at the global macro level with the meso levels of consumption areas and their associated industry sectors. It then maps this down to the micro level of individual companies and products.

This helps pinpoint the areas of most significant impact at the different levels of production and consumption. Coupled with an understanding of the economic and legal systems at the macro, meso and micro levels, it is then possible to highlight where the most effective levers for change exist and where the responsibilities lie.

The framework:

- **focuses on overall consumer demand areas rather than specific industry sectors**, thereby enabling an overall analysis of how particular demand areas might better be met outside existing technical and sector paradigms;
- **enables individual companies to connect to the bigger picture** by allowing overall assessments of global overshoot to cascade down to specific company targets; and
- **illustrates the importance of collective action.** The analysis reveals the uncomfortable fact that individual actions will not be sufficient to tackle the planet's accelerating decline. It is only through system change that humanity can shift towards sustainable patterns of consumption and production.

Armed with new insights from this analysis, **governments** will be better equipped to intelligently and strategically address the problem of overshoot in the context of meeting human needs and aspirations.

Investors can draw on the extensive resource mapping information to pinpoint emerging pressure points and areas of risk, enabling them to adjust capital allocation decisions.

Companies can use the sectoral analysis to better understand pressures on their industries as well as potential risks and opportunities.

“Concrete measures such as the Ecological Footprint and the Living Planet Index form the groundwork for wiser economic planning”

EO Wilson, Harvard University

In the following pages, we summarise the relevant data at each of the four levels of analysis and draw out some of the implications for business and other key market actors.

Panel 1.2: The Ecological Footprint, CO₂ Emissions and Material Flow Analysis

The Four Level Framework uses the following methodologies for its analysis:

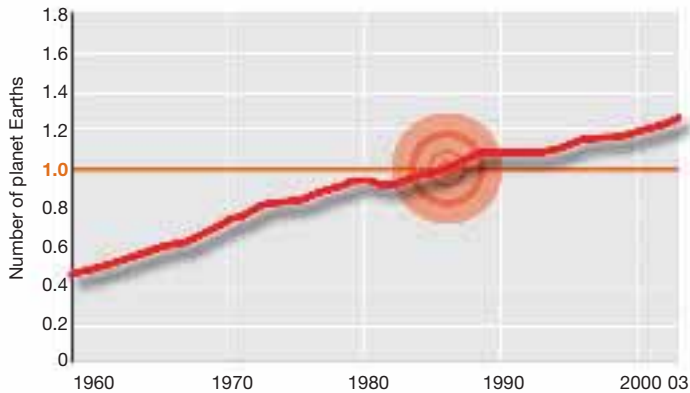
1. **Ecological Footprint** is an estimate of how much of the planet's resources (biocapacity) are being used up through the material consumption and waste generation associated with human activities. The approach calculates the quantities of different categories of land needed to produce resources and absorb waste. This includes land used for infrastructure, for the provision of food, fibre and timber, and to absorb CO₂ and other waste matter. By converting diverse demands on ecological services into a simple and easily understandable quantity – use of land³ – the technique models a complex web of interactions into an easily grasped single figure.
2. A measurement of the **CO₂ emissions** embedded in the products and services that meet the final areas of consumer demand.
3. **Material flow analysis** measures the flow of natural resources such as metal, construction material and biomass throughout the global economy from their extraction to their consumption.

Each methodology is based on current best practices and, in the spirit of peer review and the open source movement, is open to full scrutiny. For further information on these methodologies and a summary of results go to www.oneplanetbusiness.org/research

Level 1. Global Overshoot: the finite natural resource base

It is at the global level that the finite nature of our natural resource base is clearest. Currently, most human activities take little or no account of the fact that there are planetary limits. As a result, resource use already exceeds the regenerative capacity of the planet by 25%.

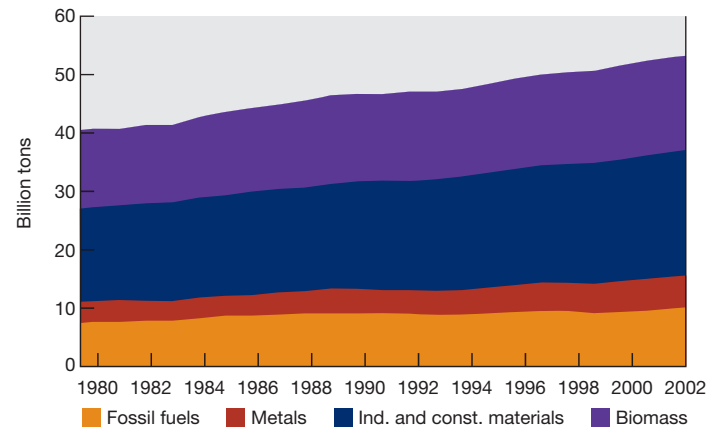
Figure 1.3: World Ecological Footprint



Source: WWF Living Planet Report 2006

This unprecedented global overshoot is the consequence of rapid economic and population growth as well as the related increases in material flows and energy use. Flows of fossil fuels, metal, industrial and construction material and biomass have increased by almost 700 million tonnes per annum in the past 25 years.

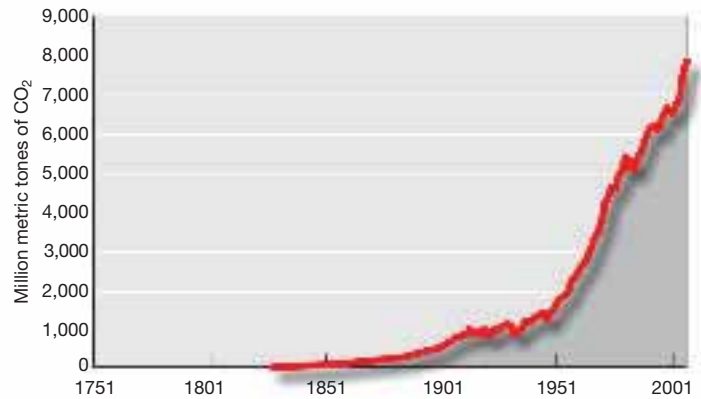
Figure 1.4: Global Material Flows



Source: MOSUS Material Flow Database 2006 (www.materialflows.net)

Carbon emissions have seen even more startling increases, rising from 2 billion metric tonnes per year in 1950 to nearly 7 billion in 2000.

Figure 1.5: Global CO₂ Emissions 1751 – 2005



Source: Earth Policy Institute

Concentrations of carbon dioxide in the atmosphere are now at approximately 380ppm, up from around 280ppm at the beginning of the Industrial Revolution.

The Intergovernmental Panel on Climate Change (IPCC) warns that concentrations must be kept at or below 450 ppm to avoid potentially catastrophic consequences. This translates into cuts in global CO₂ emissions of 60% by 2050. Indeed, many experts believe that these cuts are too modest, and that emissions from fossil fuel use need to be cut by more than 70%⁴.

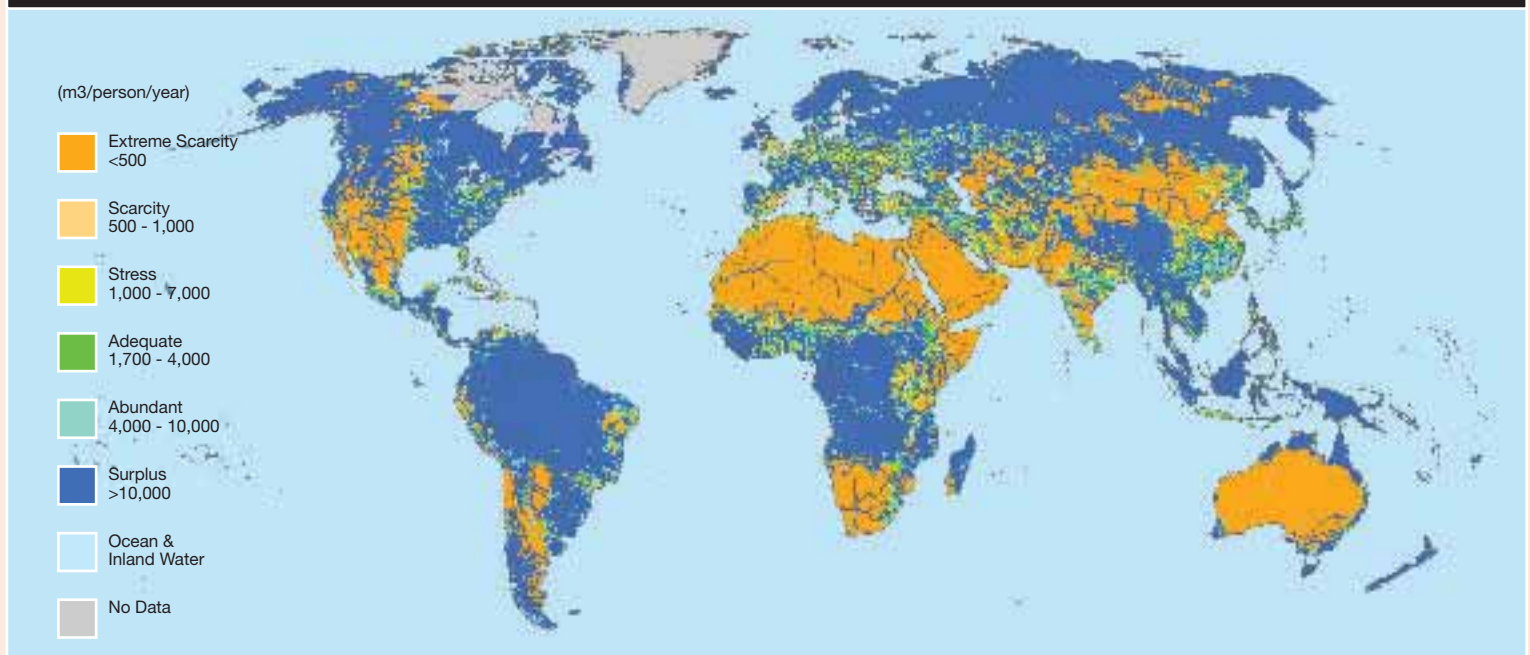
The *Stern Review on the Economics of Climate Change* commissioned by the UK government concluded that achieving such reduction targets would require extremely aggressive action to cut global greenhouse gas emissions. It mapped out a trajectory whereby global emissions would need to peak in the next 10 years and then fall at more than 5% a year, reaching 70% below 2006 levels by 2050.

Global freshwater scarcity

The availability of freshwater is also rapidly declining. At present, 1.1 billion people lack access to water and 2.6

billion lack adequate sanitation services; most of these are in the poorest countries (areas in orange in Figure 1.6). These countries will not only be most affected by negative climate change impacts, but are also where 95% of future population increases are expected. In the coming decades, pressure on water resources will increase with rising demands from agricultural, municipal, industrial and environmental uses. Because of the enormous quantities of water required to produce food, agriculture will remain the main consumer. Without improvements in land and water productivity or major shifts in production patterns, water use in agriculture is likely to increase by 60-90% in 2050 to 11,000-13,500 cubic kilometres, up from 7,200 cubic kilometres today. This may mean that countries lacking freshwater come to rely more and more on the abundant water resources of other nations in the form of “virtual water” (the water embedded in the products they import)⁵.

Figure 1.6: Annual Renewable Freshwater Supply Per Capita (ca. 2000)



Source: The Coca-Cola Company/ISciences

The emerging economies

Resource constraints, in the form of declining supplies of freshwater and in ecological services needed to assimilate waste from economic production, have emerged largely as a result of consumption and waste generation in the developed world.

The average Ecological Footprint in most developing countries, for example, is well within ecological limits. But while overall the global population now has a footprint equivalent to 1.3 planets, the picture is shifting rapidly, not least due to the fast-growing global “consumer class” which crosses the traditional boundaries between the developed and developing worlds. Assuming that China and India’s economic growth continues at its current pace, in 2015 one third of the world’s population will belong to this group, half of them in developing countries. As a result, these countries’ average footprints will begin to resemble the average European impact – equivalent to three planets. And if levels of consumption were to continue to escalate towards North American levels, overall impacts would be equivalent to five planets.

In terms of CO₂ emissions, a similar picture is evolving. According to a recent PricewaterhouseCoopers report, China is set to overtake the US as the world’s leading carbon emitter by 2010, while total emissions of the seven leading emerging economies would be more than double total G7 emissions by 2050⁶.

As a consequence of its rapid economic growth, China is facing rapid ecological degradation. Half of its largest rivers are now so contaminated as to be useless for domestic or industrial use, a quarter of its citizens lack clean drinking water, a third of its urban population breathes polluted air and less than a fifth of waste is treated and processed effectively⁷.

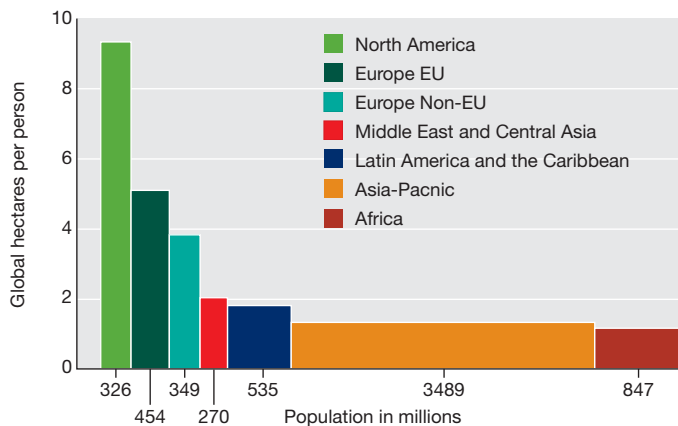
“China’s economic miracle will end soon because the environment can no longer keep pace” Pan Yue, Chinese Deputy Environment Minister

The flip side of the coin is that countries such as China are emerging as potential incubators for many tools and technologies that a sustainable world of 9-10 billion will require. In many ways, China is experiencing the realities of severe resource constraints that overshoot threatens for the planet as a whole. As a result, President Hu announced in 2006 that sustainable development would be one of his top priorities in the coming years.

Notwithstanding China’s own development path, the global perspective underscores the uncomfortable truth that planetary health depends upon significant reductions in absolute human impact. And all of this comes at a time when much of the world aspires to levels of development similar to those in the developed economies of Europe, Japan and North America.

But there are alternative paths. “Shrink and Share” is a concept that has gained acceptance as a way to address global issues in the face of regional inequities. Much of the Kyoto discussions have grappled with how to build an international framework to curtail global emissions, given major differences across countries in various stages of economic development.

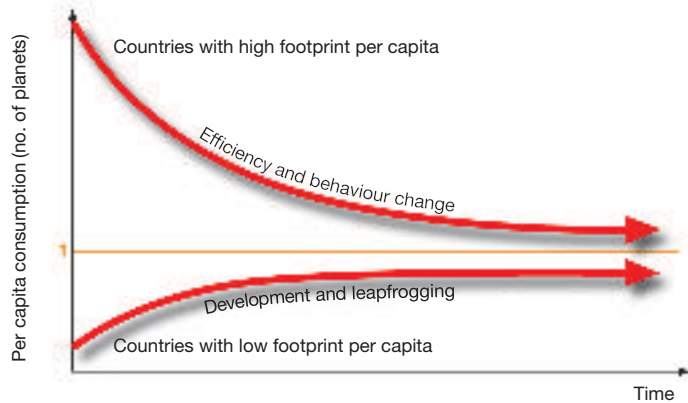
Figure 1.7: Ecological Footprint by Region, 2003



Source: WWF Living Planet Report 2006

Under this strategy, industrialised countries would reduce their higher per capita footprint through greater efficiency and behaviour changes. And developing countries would reduce the projected increase in their footprint by implementing infrastructure and high-efficiency technologies (“leapfrogging”).

Figure 1.8: Shrink and Share



Source: Adapted from Wuppertal Institute, *Fair Future*

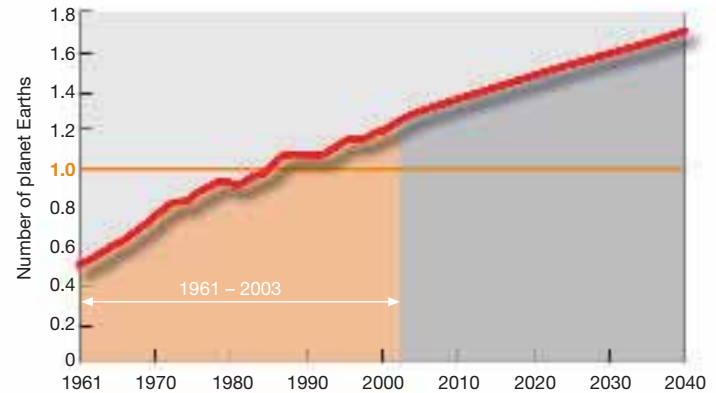
Where are we headed?

Addressing rising demands in the emerging economies and other developing countries, and seeking to reduce overall impacts in the developed world, is an enormous task. In spite of efforts to rein in impacts, resource use continues to accelerate. World energy demand, for example, has been increasing twice as fast since 2000 (at 2.6% per annum) as it did in the previous decade, and rates of resource use can be expected to accelerate further⁸.

Projecting the impacts of these trajectories on the economy's overall Ecological Footprint suggests that, even at moderate rates of growth, the equivalent of 1.5 planets will be needed to meet demand by 2025 and two planets by 2050 (see figure 1.9). This forecast is based on the UN's most conservative assumptions and represents a best case scenario. Assumptions include

slow growth in global resource demand and moderate demographic growth leading to a human population of 9 billion by 2050.

Figure 1.9: Ecological Footprint Scenario to 2040



Source: WWF Living Planet Report 2006

This “business as usual” trajectory is also very modest in assuming slow increases in CO₂ emissions and the continuation of current trends in food and fibre consumption. This is in addition to factoring in improvements in technology and resource management that enable increases in total global productivity at a rate similar to that of the last decade.

Yet even within this best-case scenario, humanity would be using the biological capacity of two Earths by 2050. There is simply not enough “natural capital” to cope with this level of overshoot. Within 40 years the growing stresses on the Earth's climate and biosphere will cause the marked degradation and eventual collapse of the ecosystems and natural processes on which the economy and human wellbeing depend.

Key Message



In order to avoid ecological catastrophe and its disastrous consequences for humanity, it is essential that business and its stakeholders find transformational ways to meet human demand within the limits of one planet.

This means that economic growth can only occur if it is aligned with shrinking resource use and greenhouse gas emissions.

Level 2. Demand: consuming the natural resource base

A key feature of this analysis is focusing attention on core demand areas of the economy. Ultimately the market – and the activities of particular businesses – is driven by demand, and that demand is created by people.

By disaggregating overall resource use at a planetary level into demand areas as defined by the UN⁹, this analysis permits a more precise understanding of which demand areas are driving overshoot, and directs attention to the potential for conflict between competing demands. While this is one of the first attempts to undertake such an analysis on a global level, the approach has proved successful elsewhere in establishing what parts of an economy impose the greatest environmental burden.

In the UK, for example, in their recent Counting Consumption report, WWF and its partners identified food, housing and transport as the key impact sectors of the national economy. Similarly in Germany, a study by the Wuppertal Institute concluded that per capita material intensity per year is 76 tonnes. Of this, 29% is allocated to housing and 20% to food production while leisure activities have a share of 13%¹⁰. At a European level too, work done as part of the Environmental Impact of Products (EIPRO) study and a separate study by the

European Environment Agency both concluded that the highest impact of demand is in the areas of food, housing and mobility. The EIPRO study concluded that these three areas are collectively responsible for 70-80% of the environmental impact of consumption¹¹.

Planning for future demand: competing for natural resources

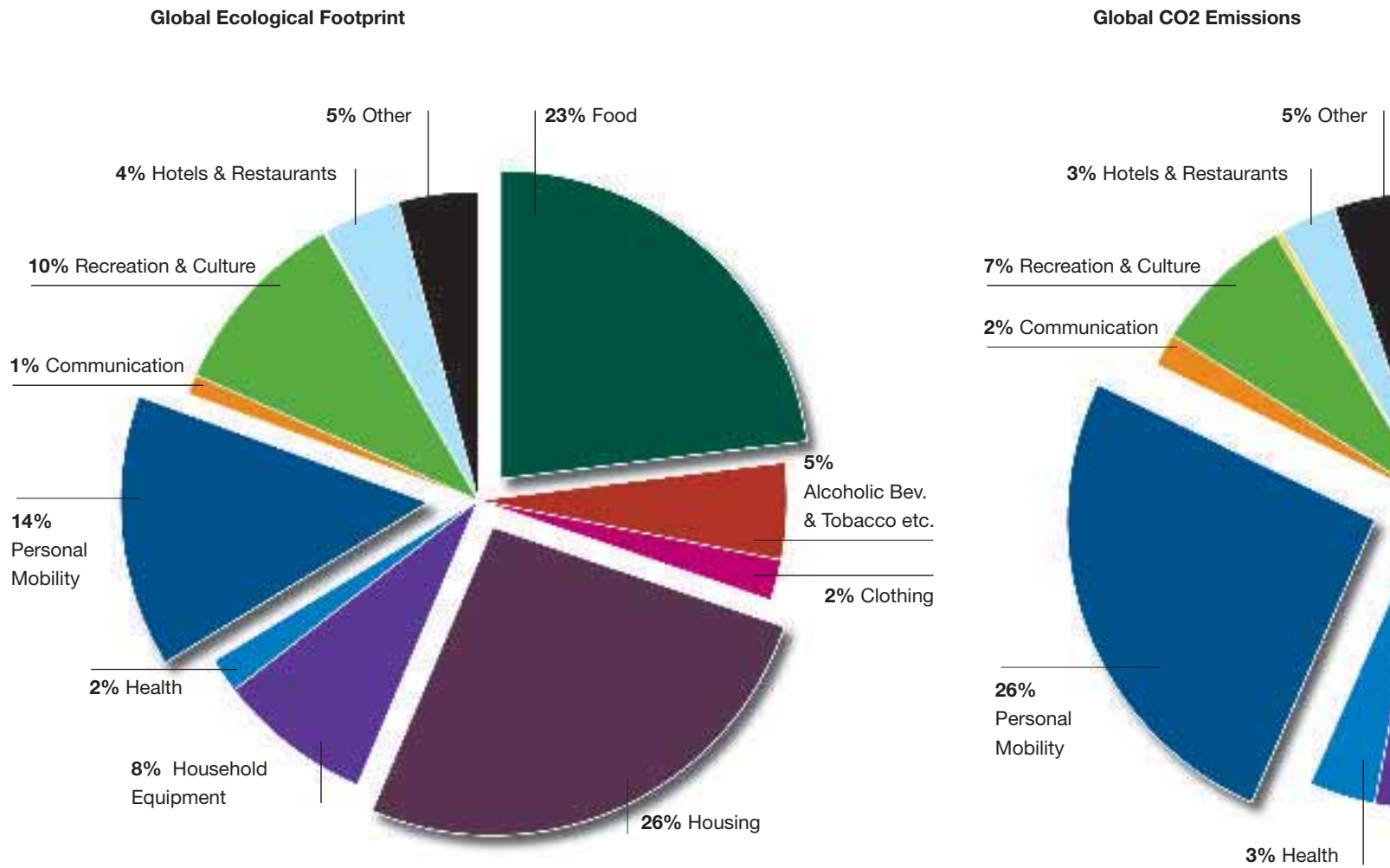
This analysis also demonstrates that across different demand areas such as housing, transport, food and recreation, there are very different resource impacts. The data illustrates that for the three different lenses used to assess overall impact (Ecological Footprint, CO₂ emissions and materials use) there is also significant variation between demand areas. Nonetheless, three demand areas in particular stand out as having a major ecological impact: housing (including use of water, gas, electricity and other fuels), transport and food.

Together, at a global level these three demand areas account for 63% of Ecological Footprint, 65% of CO₂ emissions and 72% of material use.

“The world is no longer divided by ideologies of ‘left’ and ‘right’, but by those who accept ecological limits and those who don’t”

Wolfgang Sachs, Wuppertal Institute, 2003

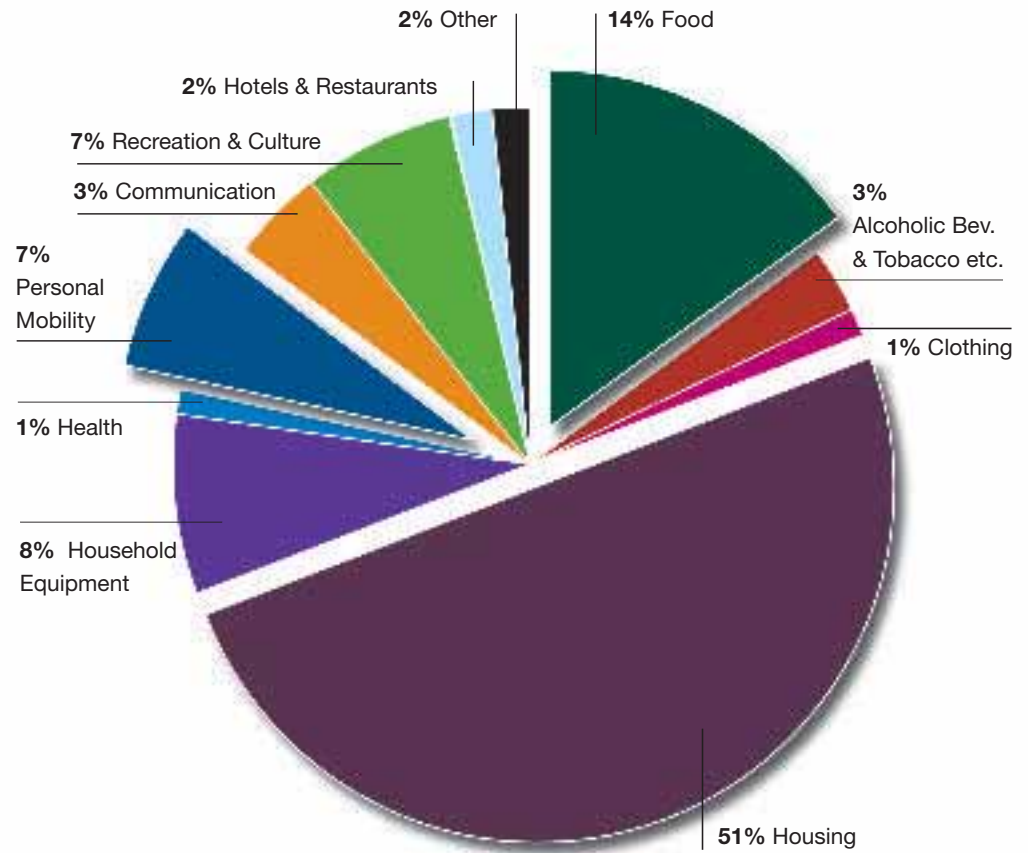
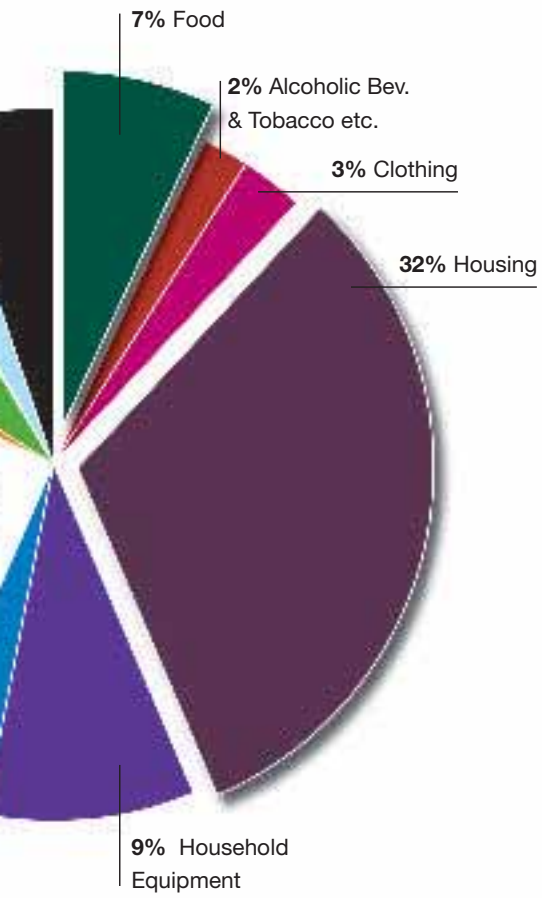
Figure 1.10: Global Ecological Footprint, CO2 Emissions and Material Flows of Human Demand



At a global level housing, personal mobility and food account for 63% of Ecological Footprint, 65% of CO₂ emissions and 72% of material use.

Source: WWF One Planet Business Global Evidence Base 2006

Global Material Flows



Of course, this analysis does not provide a complete picture. There is, for example, enormous variation in regional resource use within these demand categories, with the vast majority of Ecological Footprint and resource use stemming from demand in the developed world. The developing world, to date, has a markedly lower impact per capita.

Implications and future trends

Clearly these figures are expected to grow substantially as emerging economies continue to develop. However, different rates of technological advancement and alternative development paths mean that the relative impact of different demand areas is also likely to shift. Steps that China might take to radically increase energy efficiency in buildings, for example, could significantly shift the overall impact of this demand area.

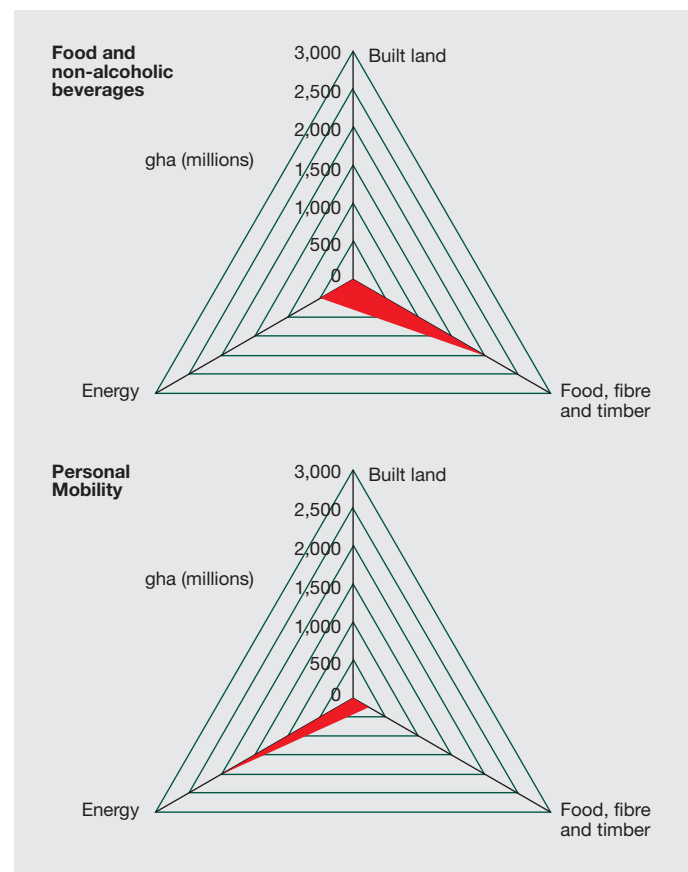
That said, it is also clear that bringing development back in line with ecological limits will have enormous implications for all sectors. Competition for key resources between demand areas is inevitable. Already there is some discussion about the relative contribution between demand areas to CO₂ emissions reductions (housing vs. transport, for example) and these can be expected to intensify in discussions over energy use and greenhouse gas emissions as well as over water use, access to land and other issues.

Panel 1.11: Food Versus Fuel

One area where competition is already being felt is in the debate about biofuels. The grain required to fill a 90-litre SUV petrol tank with ethanol every two weeks over a year would feed 26 people for that year. It is estimated that the amount of corn used in US ethanol distilleries has tripled in five years from 18 million tonnes in 2001 to an estimated 55 million tonnes in 2006. As the major exporter of world grain, diverting US corn supplies in this way is expected to have impacts on food prices around the world¹². Eric Holthusen, Shell's Asia/Pacific fuels technology manager, has gone so far as to argue that biofuels based on food crops are "morally inappropriate".

Figure 1.12 shows how the demand areas for food and transport currently require different proportions of land types for their associated supply chains. But if transport technology were to shift towards biofuels to reduce CO₂ emissions and away from fossil fuels, this would use the same land presently needed for agricultural food production. With projections for significant growth in food production to eradicate under-nutrition and to feed an additional three billion people by 2050, this shows how demand areas can enter into competition in an increasingly resource-constrained world.

Figure 1.12: Type of Land Used by the Demand Areas "Food" and "Mobility"

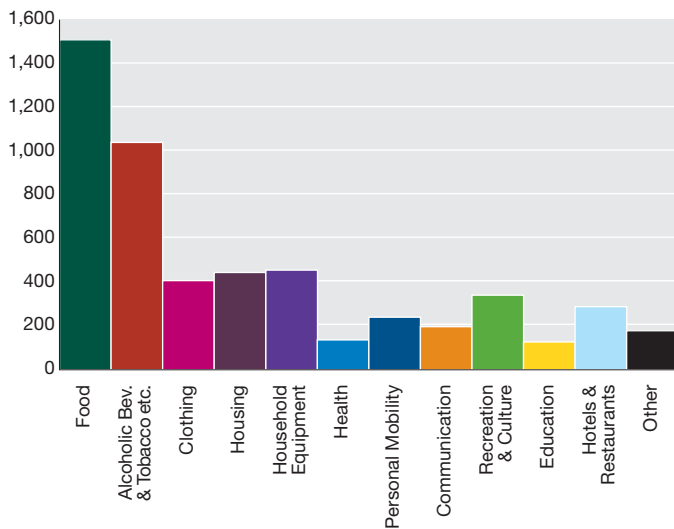


Source: WWF One Planet Business Global Evidence Base 2006

Similarly, water use requirements for biofuel production could also lead to increasing competition with other vital water uses, most notably food production. While world food production has doubled in the past 30 years to meet food demand from growing populations, the amount of water used has tripled. Where the water required to grow biofuels will come from has not yet been properly considered. However, when 600-800 tonnes of water are needed to grow one tonne of sugarcane, the tasks of reconciling human and environmental water needs, meeting our stated Millennium Development Goals and providing significant amounts of water for new biofuels looks daunting indeed¹³.

One way such pressures may begin to be exerted is in analysis that draws comparisons across demand areas. For example, as shown in figure 1.13, the relative ecological impact of spending US\$1 million in different demand areas produces vastly different results – with food sourcing and production carrying a much higher ecological load per dollar spent than other demand areas.

Figure 1.13: Ecological Footprint per US\$1m Spent



Source: WWF One Planet Business Global Evidence Base 2006

The scale of the challenge is so immense that new ways have to be found for products and services to meet human demand, while drastically reducing their resource use and greenhouse gas emissions.

With increasing competition between demand areas, questions will be asked about who will use what resource and for what purpose. Eventually this may lead to significant changes (and potential reductions) in consumption patterns.

Key Message

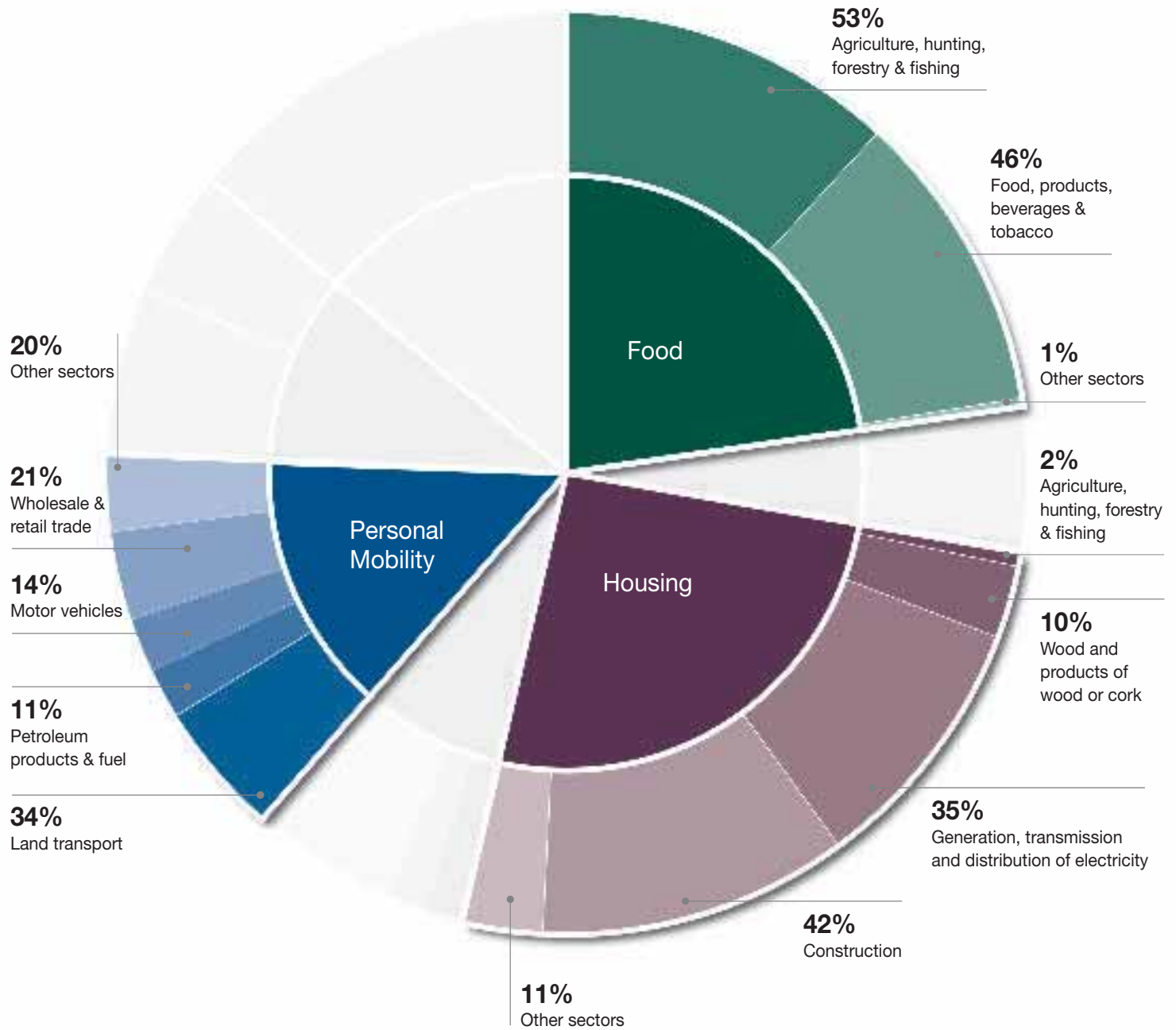


Level 3. Supply chains that govern natural resource use

If Level 2 focuses on demand, telling us for what purpose we are using planetary resources, then levels 3 and 4 tell us who is using them.

Level 3 puts the spotlight on the supply chains comprising different industrial sectors that currently satisfy the many areas of human demand. This supply chain perspective helps to illuminate which industry sectors use how much of which global resource and to compare relative efficiencies across sectors.

Figure 1.14: Global Ecological Footprint of Major Demand Areas and Their Contributing Industry Sectors

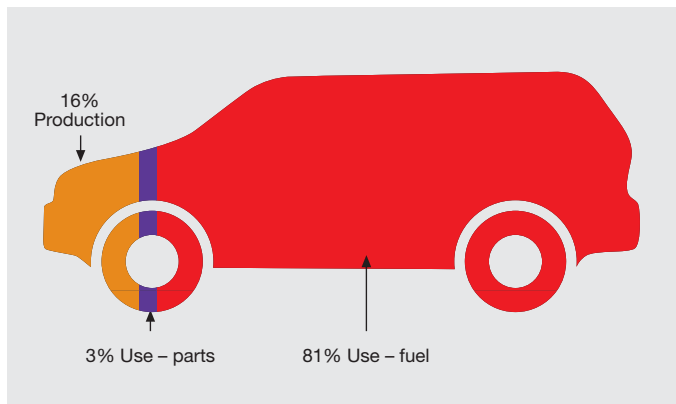


Source: WWF One Planet Business Global Evidence Base 2006

Where do impacts occur and who has influence?

This level of analysis shows where the biggest environmental impacts occur along the supply chain servicing a particular demand area. In some cases, the major impact will be in the production of a particular good such as in food. In others it will be in the “use” phase such as private road transport (see figure 1.15). In turn, this analysis can help identify the most effective levers for reducing impacts – for example through changes to manufacturing standards or through consumer education.

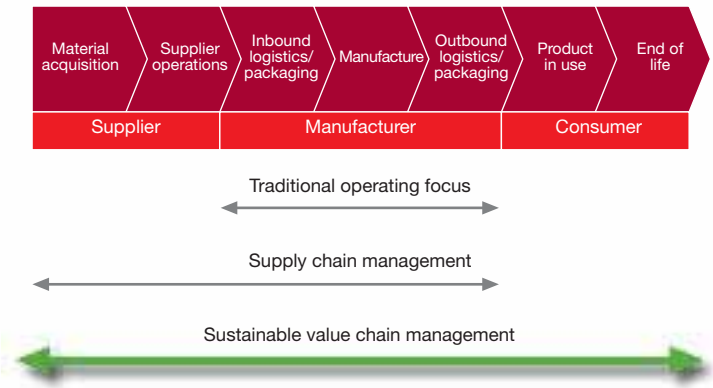
Figure 1.15: CO₂ Emissions Over the Life Cycle of an Average Vehicle



Source: WWF One Planet Business Global Evidence Base 2006

This approach seeks to understand more precisely where interventions for change would have the greatest impact. For example, will this be in sectors dealing with resource extraction, with product design, with manufacturing and assembly, in the retail sector or with consumers themselves?

Figure 1.16: Acknowledging Responsibilities Along Value Chains



Source: Triple Innova

Panel 1.17: Drawing Boundaries

IKEA, the global home furnishing retailer, has more than 160 stores in some 33 countries. In gathering data for its greenhouse gas inventory, the company reviewed three levels of emissions, including those associated with its own operations and those from its customers' trips to and from its stores which the company perceived to be important to its business. The analysis confirmed that emissions associated with customer travel accounted for 82% of its total emissions. IKEA has since worked to influence these emissions through, for example, the site selection of new stores¹⁴.

Chains of influence

In addition to understanding where impacts occur, it is equally important to understand which actors in the value chain have the influence to reduce resources and emissions. In a sense, this approach shifts the “responsibility” perspective from one where industries are assigned their respective, mutually exclusive responsibilities and held accountable for their own direct resource use, to an “influence” perspective, where industries can focus on their power and ability to reduce humanity's footprint through their “chain of influence”.

While the first perspective leads itself to drawing boundaries as narrowly as possible, the latter encourages industry to define boundaries as broadly as possible (to include supply chains, joint ventures, and especially the use and disposal of products) in order to maximise its sphere of influence and find opportunities for creating footprint reductions.

Different value chains have different power structures. For example, in the food sector, retailers potentially have the most influence to steer suppliers' performance and exert upstream pressure on consumers by "editing out" their unsustainable products¹⁵.

Consumers also play an important role in shifting the impacts of food production. Servicing the demand for food and beverages can be addressed in very different ways – with very different Ecological Footprint and resource burdens. In particular, the current global shift to meat consumption over vegetables creates significant additional ecological impact – even shifting between crops can result in different land efficiencies and water demands.

The alternative supply chains that provide mobility and transport services also present a striking example of how consumer choices can have enormous impacts on the overall Ecological Footprint and resource burden

of any given demand area. This information can be normalised to compare the relative performance of different industrial supply chains supplying a given quantity of demand (in this case for 1,000km of travel) but it is equally applicable to other areas, such as production of a given quantity of calories.

Efficiency as competitive advantage

These different efficiencies in meeting human demand will increasingly be a competitive factor in a resource- and carbon-constrained world. Carbon- and resource-intensive products and services will become more expensive and consumer choices will change.

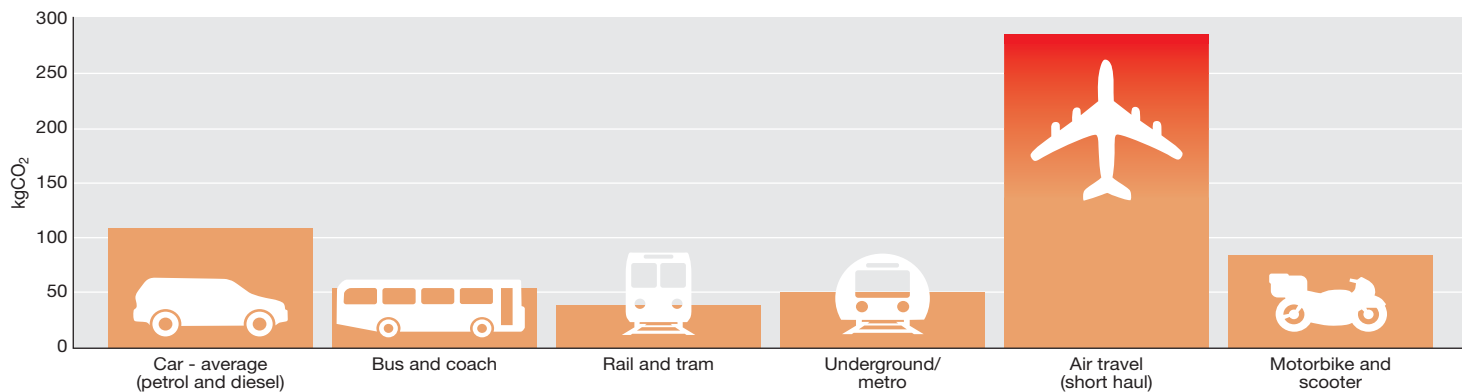
As resource constraints begin to bite, policy-makers, investors and other stakeholders will focus their attention on parts of the value chain where impacts are greatest, and on those with the highest influence to achieve change.

Pressure to drive out inefficiencies (and exploit efficiencies) in value chains can be expected to increase markedly as downstream customers, investors and government seek to identify and support lower impact approaches.

Key Message



Figure 1.18: kgCO₂ per 1,000 Passenger Kilometres by Mode



Source: WWF One Planet Business Global Evidence Base 2006

Level 4. Companies: who's winning and losing

This analysis provides a much greater level of precision in understanding how different demand areas impact upon the planet and how industry sectors contribute to this. But any analysis will increasingly be taken to its logical conclusion and brought down to the individual company level. Already this is becoming more common. Ford Motor Company, for example, has reported what it considers to be the overall contribution from its products to global CO₂ emissions, and BP has attempted a similar analysis in terms of the contribution of the hydrocarbons it creates.

As this type of data becomes more robust, comparisons between companies in the same sector will increasingly be drawn. The implications are likely to be profound as companies will be held accountable for their precise contribution to global environmental issues. Furthermore, variance in the individual performance of companies will be much clearer, putting additional pressure on laggards to improve their performance. This is likely to be particularly true where economic value is put at risk through poor performance.

Again there are early signals of this beginning to play out. For example, the Ecological Footprint and the water footprint (tools traditionally used to measure environmental trends) are being accepted as valid complementary measurements of company performance. Using tools that link their individual impact with global ecological limits, companies are better positioned to take effective steps to reduce their impact (see panel 1.19).

Investors are also increasingly demanding tougher measures of companies' environmental performance. Reflecting their growing concern about climate change, the Investor Network on Climate Risk, which was founded by 10 investors representing \$600 million in 2003, now represents more than \$3 trillion from 50 members. The Carbon Disclosure Project (CDP), representing an even larger coalition of over 200 institutional investors

representing \$31 trillion in assets, annually calls upon the world's largest companies to disclose information on their greenhouse gas emissions. In 2006, the CDP targeted more than 2,100 companies¹⁶.

Panel 1.19: Water Footprint

In an analysis by Unilever in 2002 of its total water use in raw materials, manufacturing, consumer use and disposal, the company estimated its water footprint to be about 0.1% of all the water extracted for use globally each year. The vast majority of water associated with Unilever's products is either "embedded" in raw materials (for food), or needed for consumer use in its home and personal care products. As a result, the company is engaging on water issues outside its direct control (for example catchment water), as well as improving its own water efficiency in manufacturing¹⁸.


These trends point to a shift from companies' focus on managing societal and environmental expectations to a recognition of ecological limits as an issue of strategic importance. However, in most cases there is a significant inconsistency between the scale of the challenge facing the planet and the environmental objectives that companies set themselves. As Jonathon Porritt, Chair of the UK's Sustainable Development Commission, points out, "there is still a massive mismatch between a socially responsible fossil fuel company on the one hand and a genuinely sustainable energy company on the other"¹⁷.

Companies will increasingly be held responsible for their individual contributions to global environmental degradation and a range of tougher performance measurement tools are evolving to account for this.

Companies that truly want to integrate environmental realities into their operations will need to reflect overall global reductions in resources and emissions in their business plans.

Key
Message





“Business cannot function if ecosystems and the services they deliver – like water, biodiversity, fibre, food and climate – are degraded or out of balance.”

**World Business Council for
Sustainable Development (WBCSD)**

Chapter 2: Business Risks

Overshoot has profound implications for the societies and economies of which business is a part. Major businesses are already acutely aware that resource constraints (and government, public and investor reaction to them) are beginning to transform company operations. But the scale of this transformation is little understood.

Issues such as climate change will fundamentally disrupt the business landscape and change will happen at an exceptionally fast pace. In this section, we explore how overshoot is already creating risks for companies, and we look at the implications for the business community.

How is overshoot affecting companies?

1. Overshoot is eroding the natural base of our economies

The importance of the natural resource base to economic development and commercial success is routinely undervalued. Insects alone are thought to be worth up to \$57 billion to the US economy through their role in pollinating agricultural crops¹⁹. Yet such estimates can only partially capture the value of ecosystems, because many ecosystem services such as climate regulation cannot be substituted. Rather, the value of this approach is in the signal that we are liquidating something of great value to human wellbeing.

Freshwater scarcity is already constraining economic growth – most acutely in Africa and west Asia, but also in many other areas including China, India and Indonesia. This situation will be aggravated by the projected growth in the number of regions expected

to suffer from extreme droughts: from 1% of the planet now to 30% in 2100²⁰.

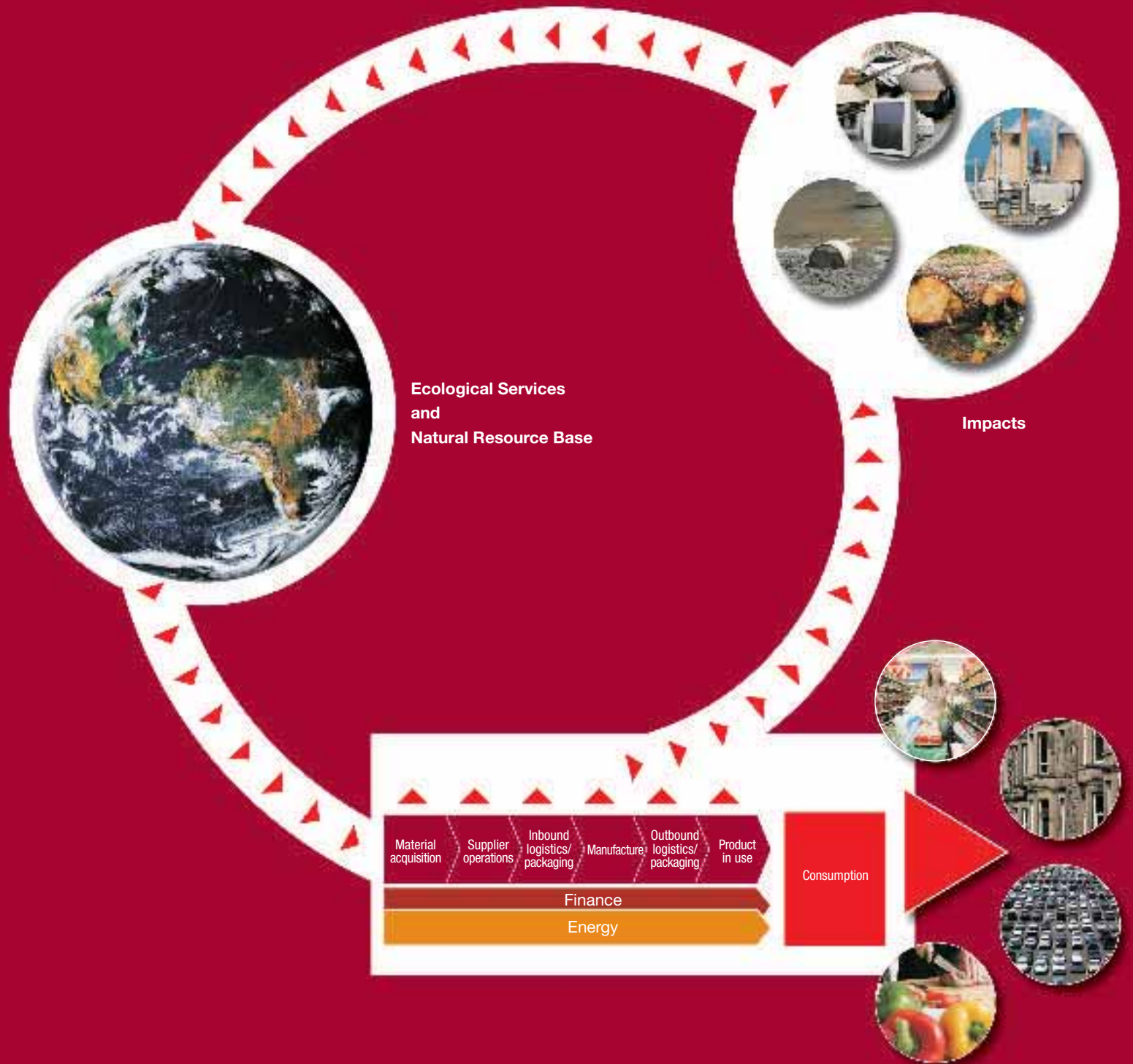
Topsoil loss and degradation are undermining the economic contribution of agriculture in some countries. Globally, two billion hectares of soil have been degraded, leading to as much as \$400 billion in losses. UNEP estimates that economic losses from desertification alone are more than \$42 billion²¹. World Bank research suggests that the lost farm output resulting from soil erosion amounts to between 0.5% and 1.5% of GDP. Farmers are often forced to pay for chemical and energy inputs to compensate for the loss of the free ecological services once provided by soil. An estimated 10% of on-farm energy use is now aimed at countering the effects of soil problems²².

“Global warming is causing significant harm to California’s environment, economy, agriculture and public health. The impacts are already costing millions of dollars and the price tag is increasing.”

Bill Lockyer, Attorney General, California



Figure 2.1: Consumption to Extinction Cycle



“Most companies routinely fail to recognise the link between healthy ecosystems and their business interests.”

Business and Ecosystems, 2006²³

Panel 2.2: Water Scarcity

Today, lack of water is a constraint on business activities in a growing number of areas around the world. In most cases this is treated as a one-off local management concern rather than as a strategic global resource issue.

Water as a business constraint

China's looming water shortages have led government to constrain the location of new textile, leather, metal smelting and chemical industries, and to set water conservation criteria for other manufacturers. Even companies with minimal water needs for on-site operations can be seriously affected by shortages, due to vulnerabilities in their supply chain. Anheuser-Busch experienced shortages in key production inputs, including grain and aluminium, as a result of water shortages affecting its suppliers.

Water as a reputation risk

Local water issues that may occur when a company use comes into conflict with local users can also reverberate internationally and affect a company's global brand values. The Nestlé Corporation faced local lawsuits calling for it to close its bottled water plant in Michigan, US, due to concerns over impacts on local groundwater resources. The Coca-Cola Company has faced similar local issues in Kerala, India and in the UK. Due to the way that global brands and media networks function, local problems in one part of the world make headline news on all continents²⁴.

“The availability of safe and adequate water may be as crucial to economic development for some sectors in the coming years as access to oil was to development in the 20th century.”

Pacific Institute and Bio Economic Research Associates

2. Increased exposure to risk

Climate change is fundamentally altering the competitive landscape for business. It exposes companies to physical risks such as increased intensity and frequency of weather events, droughts, floods, storms and sea level rise; and regulatory and competitive risk associated with mitigation strategies such as exposure to increasing costs of carbon.

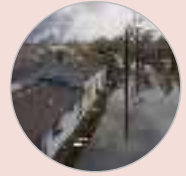
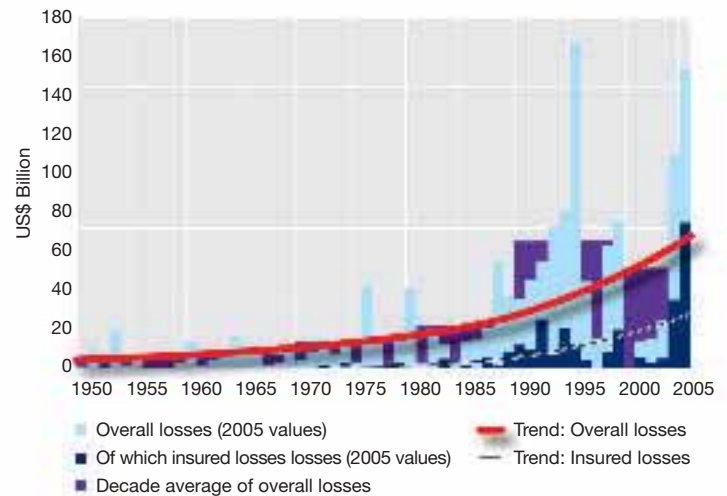


Figure 2.3: Insurance Losses



Source: Munich Re, Topics Geo, Annual Review Natural Catastrophes 2005

Research by Munich Re confirms that insurance losses due to natural disasters have increased markedly since the 1950s. Much is due to weather-related disasters with losses due to hurricanes in the North-East Atlantic increasing from \$24 billion in 1999-2003 to \$63 billion in 2004 and \$165 billion in 2005. Munich Re argues that much of this increase is attributable to rises in the surface temperature of tropical oceans caused by climate change.

The financial implications are profound. Henderson Global Investors and the environmental research organisation Trucost calculated that “if companies had

to pay the UK government's estimate of the economic damage done by a tonne of carbon – around £20 a tonne – then over 12% of the FTSE 100's earnings (in terms of earnings before interest, taxation, depreciation and amortisation) would be at risk. For some companies, well over 50% of earnings would be exposed to carbon costs²⁶.



3. Increased costs

Many companies already find they are paying more for resources, including energy, fuel, water, grain and, increasingly, the right to emit carbon. Costs are also rising for resource-intensive commodities – those that embody significant amounts of natural resources such as energy, water, grain, steel, paper and carbon (see Panel 2.4). In the summer of 2006, Kellogg described its increased costs for energy, fuel and commodities as “unprecedented”²⁷ and the German Association of Food Industries warned of rising food prices brought on by increases in energy and raw materials.

In some industries, companies are seeing increases in the overall cost of natural resource inputs due to greater use of energy (typically fossil fuel-based) to compensate for declining ecological productivity – such as increased use of fertilisers to substitute for lost soil fertility, water pumping in lower water tables, or fishing boats that are forced to travel to more remote fishing grounds.

Critically, beyond the sectors most obviously impacted by these issues, many other companies have not yet assessed the implications of resource price increases for their businesses. McKinsey found that while 69% of manufacturing businesses expected natural resource constraints to be a major issue in the coming years, 30% of businesses as a whole said that they were not preparing for shortages or steep increases in the price of raw materials²⁸.

This represents an important oversight. As issues that were once localised to particular regions or sectors become more global in nature, so the ripple effects on wider industries will be profound.


Companies that fail to account for these issues are ill prepared for the costs of responding to more stringent regulatory and investment frameworks. For example, as rating agencies start to integrate resource and emission constraints into their risk assessments of companies, so the cost of capital is set to increase for companies particularly exposed to these constraints. Moreover, once rapid innovation is under way, investments will be reallocated to low-carbon and resource-light business models. Similarly, as governments increasingly try to manage depleted resources and set limits on emissions, companies can expect costly adaptations to align business operations with new regulation.

Panel 2.4: Greenhouse Gas Trading

The EU Emissions Trading Scheme and the flexible Kyoto mechanisms (the CDM and Joint Implementation) achieved volumes of nearly 700 million tonnes of carbon in the first half of 2006, and the market value for the year was projected to reach €22 billion.

In the EU ETS, trading prices have risen well beyond initial expectations of €5-6 per tonne, at one point reaching €30 per tonne. That said, prices have been volatile: in April 2006, the carbon price plunged in response to revelations by some EU countries that their emissions were not as high as their allocations.

Although details of future carbon markets are still sketchy, the potential price will be influenced by future carbon allocations, which will in turn be influenced by perceptions of the gravity and urgency of the climate threat.



“The world does not have the resources for another 5 billion or so people to behave the way Americans do today. It may not be about to run out of energy and commodities, but higher prices will certainly force big changes in lifestyle. The era of cheap raw materials is over.”

The Economist



4. Supply disruptions

As we have seen, acceleration in economic growth, particularly in emerging markets, is placing unprecedented demands on natural resources across a broad range of commodities.

Demand is expected to continue rising rapidly. Over the next decade, nearly one billion new customers will enter the global marketplace, reaching the \$5,000 annual household income threshold that marks the beginning of discretionary expenditure²⁹. In China, demand for copper, steel and aluminium has nearly tripled in the past decade³⁰. This has led China to seek access to strategic resources, not least by developing closer relations with African countries controlling resources such as copper and oil. In 2005, China used 26% of the world's crude steel, 32% of its rice, 37% of its cotton and 47% of its cement.



5. Reduced quality

Overshoot is also likely to have direct impacts on the quality of inputs upon which many businesses rely. High water quality is an essential component in many businesses and an increasingly scarce resource. The Global Environmental Management Initiative (GEMI) found that significant cost increases are occurring in treatment costs, wastewater treatment and pollution mitigation costs³¹.

Air quality is also beginning to impact upon economic productivity across economies as a whole. According to the scientific journal *Nature*, in China about 300,000 deaths a year are attributed to air quality problems with wider pollution and ecological damage causing losses of between 7% and 20% of GDP.³²

In the food and beverage sector, quality and availability of raw materials is a particularly pressing issue. As Citigroup argued in a briefing note on the food producers and processors sector, “investors should favour companies that understand how [quality and other sustainability trends] will affect their business; that demonstrate preparedness ahead of their competitors;

that ensure sustainability and security of supply in important crop areas; and that profit from high margin ‘sustainability products’”³³.

6. Tougher policy frameworks

Regulatory drivers are still a (if not the) principal factor in driving companies to consider environmental issues in core business decision-making. As *The Economist* has argued, “business is becoming more environment-minded, but only because government is pushing”.³⁴

In such sectors as automotive, chemicals, engineering, electronics and consumer products, regulatory attention is seen as a key driver of the environmental agenda for business. This is most clearly the case in Europe, where legislation on chemicals, energy efficiency, emissions trading and product take-back and recovery has become a defining feature of the landscape. But regulatory action is not limited to Europe. China is moving aggressively in some areas, aiming to cut air pollution by 10% in by 2010, to increase energy efficiency by 20% per unit of GDP and to achieve a 30% reduction in water use (per unit of industrial value added).

Internationally, in some jurisdictions regulators are becoming more insistent in seeking higher standards. Among recent examples: the decisions by the Californian state government to launch legal action against automotive manufacturers over climate change and to cap greenhouse emissions, and the decision (whatever the motivations) by the Russian government to revoke an environmental licence for the Sakhalin oil field development.

True, there are many regions where standards continue to be weak or poorly enforced. Worse, the pace and scale of regulatory action even in the most ambitious jurisdictions are still likely to be wholly inadequate in driving change at the scale that required – a point increasingly acknowledged by the business community itself.





7. Societal shifts

Societal pressure on business is likely to increase directly through consumer action. As resource- and carbon-intensive products and services become more expensive, so consumer choices will shift. In addition, there is a growing class of consumers that choose products and services that are less damaging to the environment, putting pressure on business models.

There is also growing awareness and readiness among people in many countries for increased government action on issues such as climate change. This then provides governments with the mandate they need to restrict overall emissions and resource use, which applies further pressure on businesses.

Risk and opportunity

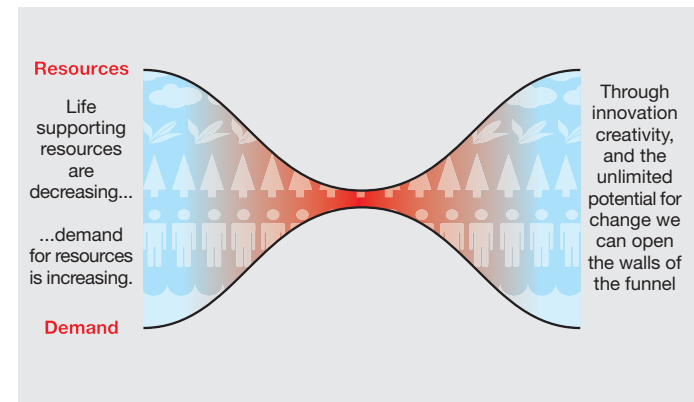
Concepts such as overshoot, biocapacity and Ecological Footprint may seem esoteric and far removed from the day-to-day reality of business. But their very real impacts on business operations and success are increasingly apparent.

The examples cited in this chapter represent early warning signals of a much more profound change. As growth accelerates, and resource limits become more apparent, these pressures – particularly competition for remaining resources – can be expected to become much more brutal as ecological, chemical and physical buffers are overwhelmed. In effect these issues are going from ad hoc, localised management concerns to strategic characteristics of the market environment.

Not surprisingly, any significant challenge to the status quo is generally perceived in terms of risk. The same is true for the environmental agenda more widely, which has traditionally been seen as imposing constraints on the business community's operational freedom.

These constraints, which will become much more severe, are often represented as a narrowing funnel caused by deteriorating ecological capacity and increasing demands on the remaining resources.

Figure 2.5: The Natural Step Funnel



Source: © The Natural Step

Yet, as we conclude in Chapter 3, these very constraints and pressures on traditional business models and operations are also creating enormous opportunities. “Creativity loves constraints”³⁵ as the saying goes, and this lens – the role of business as solutions-provider – is central to the next chapter.

A new framework for business decision-making is evolving where ecological limits are paramount and will be a key success criterion for future business operations.

Companies that do not grasp this face being forced out of the market.

Key Message





“Every industry needs to be an environmental industry in one sense or another. Every business needs to take resource productivity as seriously as it takes labour productivity.”

**David Miliband, Secretary of State for Environment,
Food and Rural Affairs, November 2006**

Chapter 3: New Competitive Landscapes

A common complaint among business leaders is that the sorts of transformative change required to address overshoot are simply not encouraged by markets today. There is a key tension, argues Ford Motor Company, between “recognition that climate change is a major and growing environmental, social and economic challenge and the slowness of markets and policy-makers to provide signals on which we can responsibly act”³⁶.

Some of the necessary changes will be driven voluntarily by visionary entrepreneurs and business people, but change on the scale required will depend on new forms of production and consumption and new standards in governance and regulation.

Incremental change

Despite the lack of real transformational change, in a relatively short period, the business community has become sensitised and responsive to a much wider environmental, social and governance agenda. Leading companies have, for example, built their capacity to understand, interpret and manage emerging issues. In many cases they are moving to reduce their exposure to supply-related risks by undertaking thorough reviews of their resource use patterns, and implementing aggressive approaches to improve resource use efficiency.

Groups such as the World Business Council on Sustainable Development (WBCSD), the Enhanced

Analytics Initiative (EAI) and UN Global Compact now enjoy significant mainstream support. Corporate environmental and sustainability reporting is practised by at least 2,000 companies worldwide and increasingly focuses on core business processes and functions³⁷.

Eco-efficiency

Faced with growing scarcity, the first response is naturally to conserve and increase efficiency. DuPont cut its greenhouse gas emissions by 72% between 1990 and 2003, saving \$2 billion as a result of reduced energy consumption³⁸.

In 2005, Wal-Mart set far-reaching targets on eco-efficiency. Its CEO has committed the company to creating zero waste, using 100% renewable energy and selling sustainable products. Objectives include increasing truck fleet efficiency by 25% over three years and doubling it within 10 years and reducing greenhouse gas emissions from existing stores by 20% within seven years³⁹.

Technology and innovation

A growing band of companies are undertaking significant programmes focused on delivering new technologies that address key social and environmental issues. They see this work as opportunistic, believing that the size of the market for technology solutions to environmental problems will be huge. GE claimed in 2006, and after only two years of its Ecomagination

programme, to be selling environmentally preferable technologies worth \$11 billion⁴⁰.

In most cases, the focus of these units is on incremental (however significant) improvements to existing production process or products to deal with resource constraints: in other words, making the product more eco-efficient to minimise potential risks. Many corporate responsibility frameworks, building on total quality logic, encourage this mindset, focusing attention on incremental improvement across a range of indicators. Relatively few companies see looming resource constraints as a market opportunity.

While these leadership examples are certainly impressive, it is clear that, on their own, these practices are wholly inadequate to address the scale of the challenge posed by overshoot.

There needs to be a radical re-think of what overshoot means for business. The risk agenda described in Chapter 2 is critical, but must be extended to embrace the enormous potential market opportunities that overshoot represents. The environmental services industry alone is now a \$515 billion industry, comparable to aerospace or pharmaceuticals⁴¹. And, given the scale of the necessary changes, climate change has been described as the world's best investment opportunity.

It is this capacity to see constraints as opportunities that is central to releasing the creative and innovative capacities of business that will generate the solutions to overshoot.

Need for system change

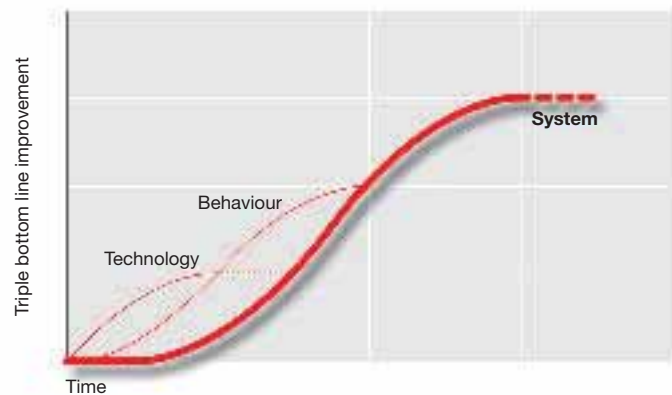
Many companies have achieved significant environmental improvements in their operations. But taken as a whole, these improvements have failed to make significant headway against the overwhelming growth in overall consumption and the associated Ecological Footprints.

“The corporate responsibility movement forces companies into thinking ‘what am I doing? They think more about what goes into their GRI report than how they connect to system change. Yet ultimately, this is not about reducing CO₂ emissions by 1% but about helping build a system that reduces society’s total emissions by 60%.”

André Fourie of South Africa’s National Business Initiative (NBI).⁴²

What is missing is a wider set of connections to the market system as a whole – that is, to the framework within which companies and markets operate. Resource constraints are starting to bite, while more and increasingly influential stakeholders are beginning to insist on radical action. Companies that wish to prosper in a resource- and emission-constrained world will need to focus on innovation that breaks down the barriers to true sustainability. Those that don’t now risk exposure to intense disruptive change caused by innovators who seek to change the system and create totally new markets.

Figure 3.1: Levels of Strategic Response



Source: SustainAbility, adapted from Philips

However, changing the rules of the game is not straightforward. Governments feel hamstrung by the perceived unpopularity of many policy solutions, and industry trade bodies continue to lobby energetically for the status quo. Furthermore, there is significant inertia in the system with huge investments in infrastructure and technologies that were designed assuming unlimited, cheap resources. We have policy frameworks that work against sustainability by subsidising environmentally damaging activities and keeping natural resources unpriced or artificially cheap.

But speed is now of the essence. As the Stern Review points out, we have 10 years to start reducing global CO₂ emissions. Similarly, in his film *An Inconvenient Truth*, Al Gore has sent a strong message to the world about the need for rapid action to combat climate change. Time constraints are also mounting to halt the rapid decline of other natural assets upon which economies depend such as water and fish stocks. And timescales to change the existing trajectories of the world's economies are long, which adds further urgency to the need to start now.

Delayed action is already causing irreparable damage to the life of future generations. The potential impacts on humans and ecosystems are also turning out to be greater and more difficult to reverse than once thought.

These realities underline the need for system changes. As former US President Bill Clinton has argued, the scale of the challenges the world now faces is such that continuous improvement will not be enough. Instead, he has called on business leaders to create integrated systems and infrastructures, focusing on how to “systematise” and scale responses.

Towards a market that rewards sustainability

One reason that system change is often so challenging is that no one actor can achieve the changes required. Collaborative action by business, investors, consumers, governments, civil society and others is required to rethink how markets are structured and encouraged.

Only as a group can they develop a holistic view that allows them to identify where changes in structures can lead to enduring improvements towards sustainability. It is through such collaborations that complexity can be reduced and it is possible to identify where well-focused actions can create significant change.

This is by far one of the most complex challenges facing business and society today. From an individual perspective, the global economic system seems massively complex and difficult to change. System change is also deeply threatening to many with a vested interest in maintaining the status quo which provides their profits, jobs and lifestyles. But it is the most effective and enduring way to achieve the changes that will allow future generations to thrive.

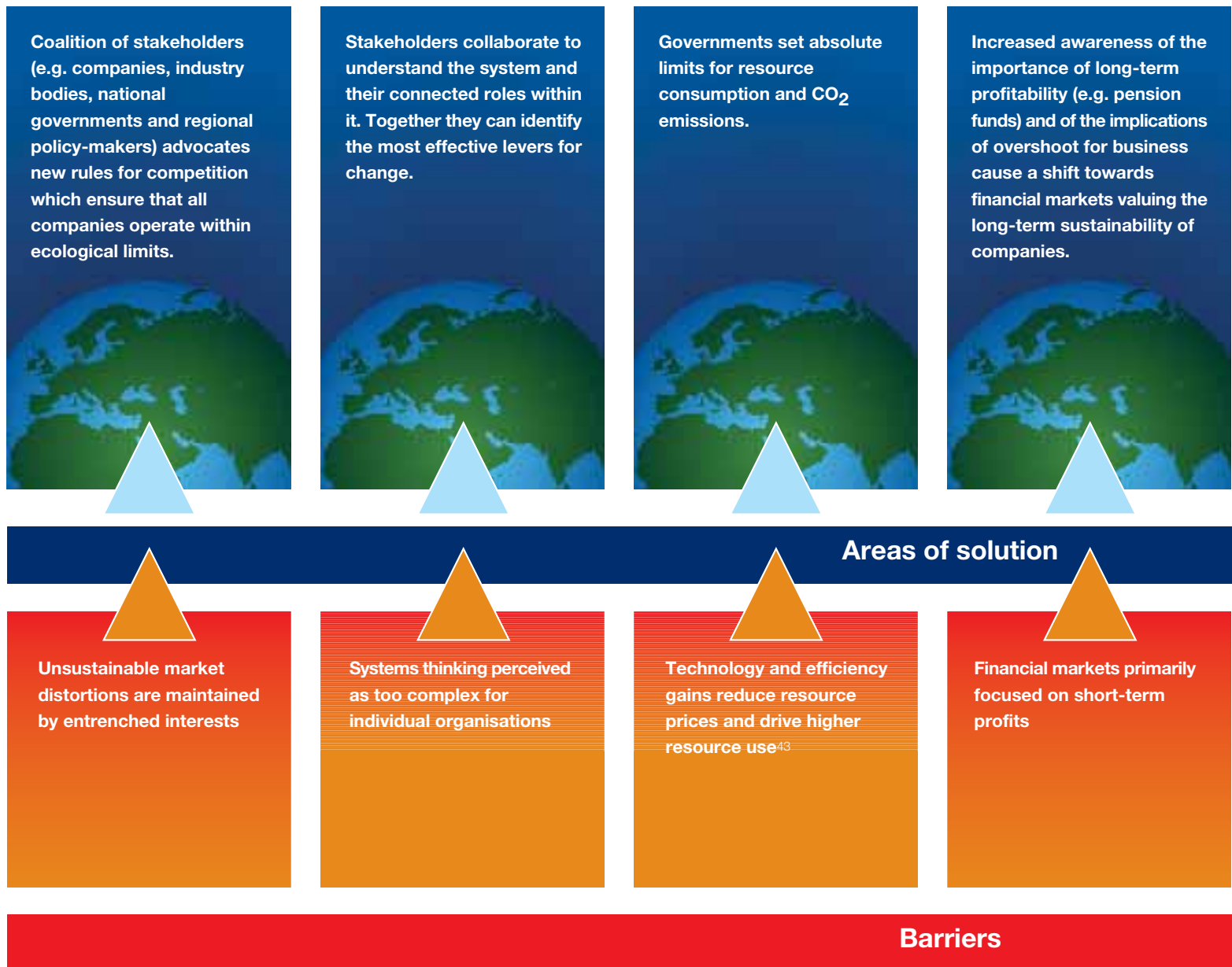
It is also the key to unlocking the greatest opportunities for business: environmental and societal prosperity, with rewards for the companies that can create value without degrading the planet. Without it, companies are locked into a vicious cycle of unsustainability, driving ever more resource - and CO₂ - intensive production and consumption. Companies attempting to mitigate these negative impacts fully would put themselves out of business because costs would become too high compared with those of companies pursuing business as usual.

So, from a business perspective, there is more potential return on investment in working with others to ensure that sustainability is rewarded for all, than merely spending time and money making incremental improvements to an unsatisfactory status quo.

“System change is based on the idea that committed leaders working together with larger society can find practical, reasonable ways to evolve our systems into sustainable forms. The goal is to do what humans always do – improve – [and] to combine ideas from the past that worked with new ideas, then develop something new and better.”

Frank Dixon, *Global System Change*, 2006

Figure 3.2: Opportunities for System Change



Markets will have to set prices that reflect environmental realities, such as resource scarcity and limits on CO₂ emissions.

Companies and their stakeholders push for legislation that creates a new market system that rewards sustainability. Voters provide governments with the mandate they need to restrict overall emissions and resource use.

Limited availability of ecological services and resources are not acknowledged in prices


Legislation does not produce fair competition, putting companies that try to be more sustainable at a competitive disadvantage

Bringing key partners together in “safe” collaborative environments to explore the potential for system change can be problematic. But there is growing understanding about how to remove key obstacles using multi-stakeholder initiatives. WWF’s One Planet Business programme is designed to help this experience.

The next chapter describes how the relevant processes will develop. It outlines the central objective of helping to enable the level of transformative change that overshoot now urgently requires.

The new resource- and emissions-constrained world will bring disruptive change and immense innovation opportunities for business. Engaging in the necessary system change to unleash these innovations and to shape the new rules of the game for business will give proactive companies a crucial competitive advantage in playing this game.

Key Message



“Business as usual, government as usual, and perhaps even protest as usual are not giving us the progress needed to achieve sustainable development.”

Paul Hohnen, Royal Institute of International Affairs

Chapter 4:

One Planet Business

One Planet Business is WWF's central contribution to addressing the system barriers facing the role of business in sustainable development. By focusing on the end demand for goods and services, the programme will invite a diverse range of players to consider transformational ways to meet human demand within ecological limits.

In its first phase, One Planet Business aims to find sustainable solutions to the need for personal mobility (see Chapter 5). It will then address other high impact areas including food, housing and power generation.

A key part of the task will be to identify the barriers to sustainable solutions. For example, even the most visionary corporate leaders can be heard explaining that they are hitting a wall because:

- “our consumers won't buy our sustainable products”;
- “our investors demand next quarter profits”;
- “the legislation is inconsistent and our global competitors can produce goods with little or no regard for the environment”; or
- “there is no business case for sustainability”.

Participants

As a unique, structured response to these market failures, One Planet Business will bring together the complete range of stakeholders necessary to drive changes to the system:

- companies
- investment and insurance companies

- global policy and legislative bodies
- national and regional governments
- civil society
- consumer groups

Structure

One Planet Business has two major components:

1. Global Evidence Base: determining the scale of the challenge

As outlined in Chapter 1, WWF has created a four-level measurement tool that allows business and its stakeholders to map global ecological overshoot onto different human demands, industry sectors and finally companies. This will be shared with stakeholders to help create a common understanding of the scale of the challenge and to aid planning for potential solutions to overcome this challenge.

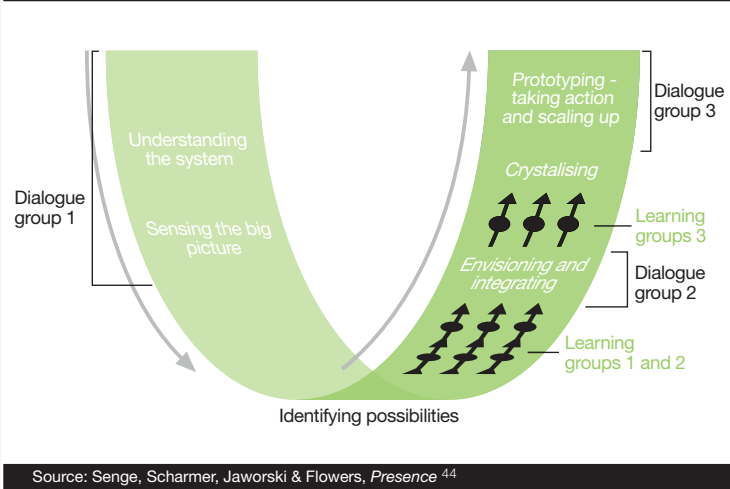
2. Multi-Stakeholder Process: a forum for system change

One Planet Business will create a forum where key decision-makers and change agents can think creatively about system change. Together, they will analyse where interventions for change could be most effective in reducing global overshoot. Stakeholders will experiment with new ideas and solutions for meeting specific human demands within ecological limits. A joint action plan will be developed to enable participants to scale up these solutions in practice.

Each project will be underpinned by an expertly designed process that encourages participants to think systemically about transformational change. It will also

facilitate workable solutions by allowing participants to experiment with action that can be implemented in practice. The process will consist of the following broad phases:

Figure 4.1: The One Planet Business Process



Potential outcomes

WWF is convening this programme, but stakeholders will gain full ownership of each process and will jointly decide the most effective outcomes for change. These could be:

- creation of a solid cross-sectoral network with shared commitments for transformational change;
- opportunities for participants to take their new learning and ideas into action – for example through establishing communities of practice for participants to share ways of implementing their new ideas; and
- a report that captures the outcomes and details the agreed vision for change and commitment to action.

Future developments

As described in Chapter 5, the first project will focus on personal mobility. Subsequent projects will develop plans for other high-impact areas of demand such as food and housing.

WWF will also work towards system change through One Planet Business partnerships with individual companies. The aim is to help selected companies consider more sustainable business models and practices, encouraging more sustainable investment criteria, promoting sustainable products to consumers, and advocating policy change.

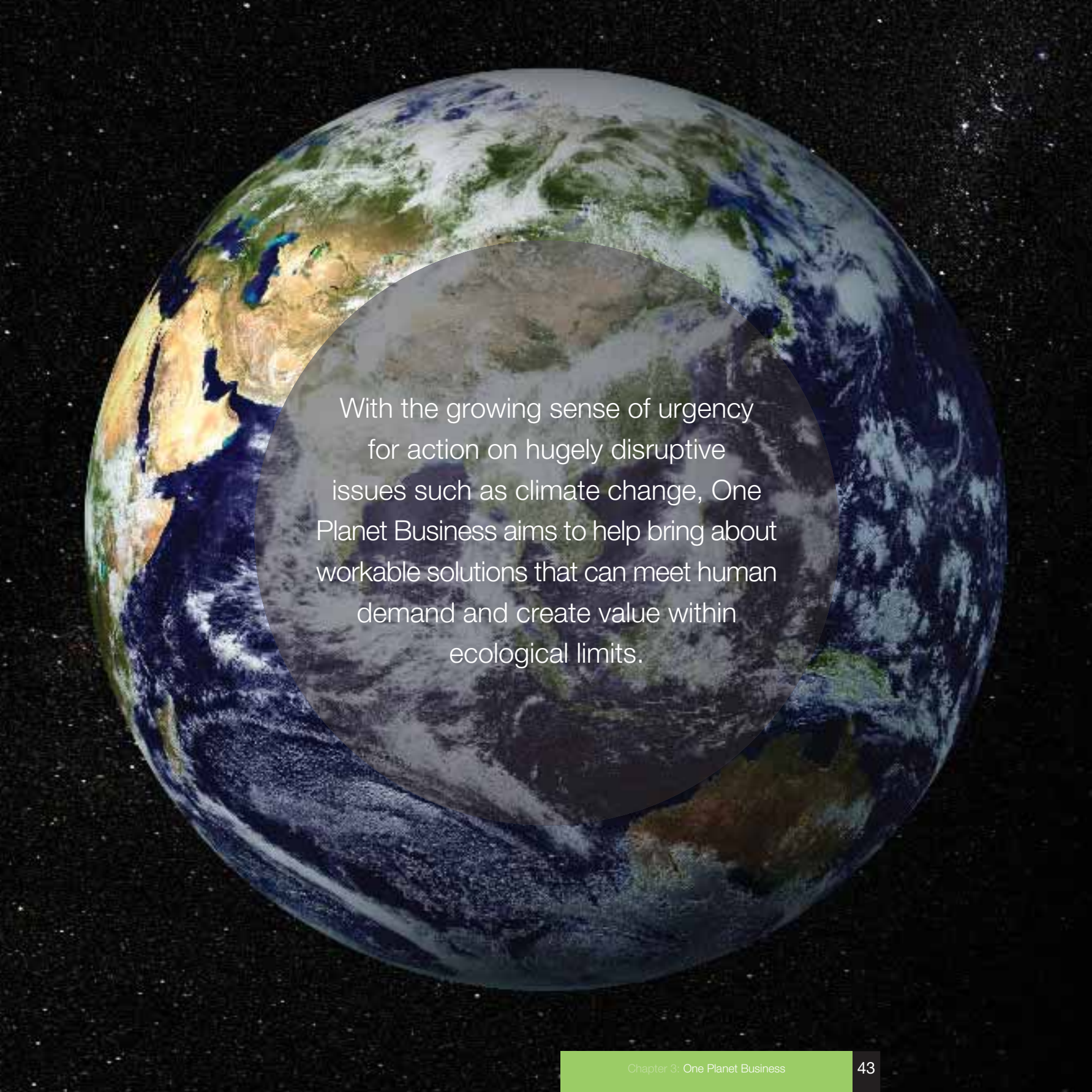
Uniquely, One Planet Business places overshoot at its core and invites business and its stakeholders to find ways to operate within this environmental reality.

With the growing sense of urgency for action on hugely disruptive issues such as climate change, One Planet Business aims to help bring about workable solutions that can meet human demand and create value within ecological limits.


WWF, as a trusted partner of business, government and civil society, is uniquely positioned to bring together leading organisations to find solutions to the global problem of overshoot.

Key Message





With the growing sense of urgency for action on hugely disruptive issues such as climate change, One Planet Business aims to help bring about workable solutions that can meet human demand and create value within ecological limits.



“It is clear that current patterns of provision and consumption of mobility are not sustainable. Adequately addressing the highly complex challenges of sustainable mobility depends on the coordination of all stakeholders.”

International Association of Public Transport (UITP)

Chapter 5: Personal Mobility Within Ecological Limits

This first One Planet Business project will inspire and catalyse action towards transformational change for personal mobility within one planet limits.

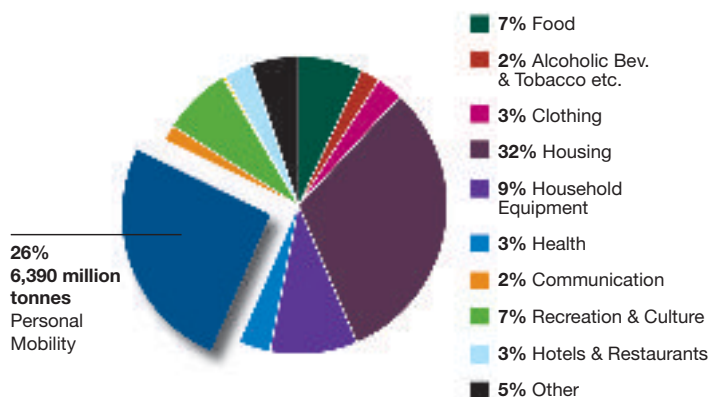
The increasing footprint of personal mobility

Personal mobility is WWF's first area of focus because passenger transport is placing an ever-growing demand on global resources and the climate's absorptive capacity. Currently, the final demand for personal mobility represents 26% of the world's CO₂ emissions.

With growth in transport expected to double by 2050, along with a predicted doubling of related greenhouse gas emissions (source: WBCSD⁴⁵), there is an urgent need to develop new access and mobility solutions that can serve a growing global population within the limits of one planet.

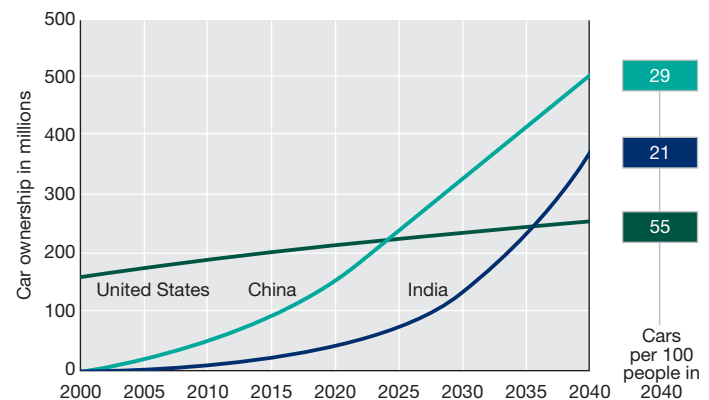
This need is massively enhanced by the explosive growth in markets for personal mobility in the emerging countries. With nearly 2.5 billion people, this growth in

Figure 5.1: Personal Mobility's Global CO₂ Emissions



Source: WWF One Planet Business Global Evidence Base 2006

Figure 5.2 Forecast of Car Ownership



Source: © Goldman Sachs

China and India will significantly influence the future environmental impact of mobility.

Much of the sustainable transport debate is about how vehicles should evolve. Technological progress has brought about significant efficiencies in some modes of road transport such as hybrid engines. However, these innovations still have far to go in penetrating the market and, as noted by the IPCC, the picture is even less positive in aviation, which will use kerosene fuel for the foreseeable future (see panel 5.3).

Panel 5.3: Aviation and Climate Change

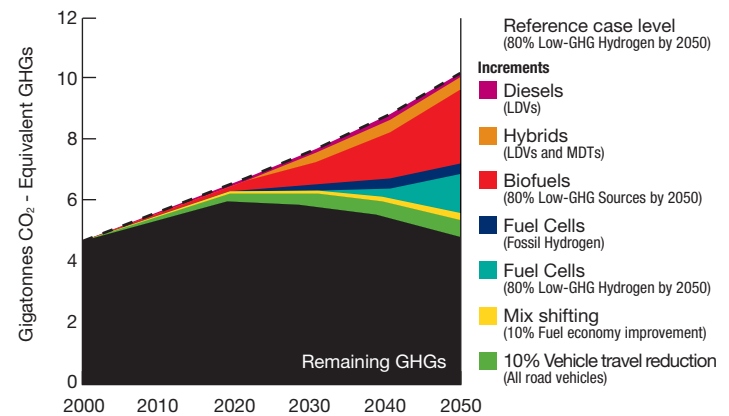
Aviation is the fastest growing source of greenhouse gas emissions. By some estimates, it is responsible for 4-9% of the climate change impact from human activity⁴⁶.

There are several reasons why aviation's contribution to climate change is more complicated to calculate than for most sectors. Not least is water vapour – harmless at the Earth's surface, but a potent greenhouse factor at the altitudes at which aircraft fly.

In addition, aircraft exhaust at high altitude can have two or three times the warming effect of carbon dioxide alone. This is due to the impact of the trails of ice particles that quickly condense in the wake of jet exhaust. These can spread in hours from a few metres wide to thousands of square kilometres.

As demand increases, those industries providing mobility and transport services must urgently understand these pressures and how they will inevitably impact upon their business models and strategies. For example, as figure 5.4 illustrates, even with a combination of the most advanced technologies and a 10% reduction in road travel, in 2050 road transport is still expected to emit a similar level of greenhouse gas emissions as in 2000. This trajectory is clearly on a collision course with the emissions reduction required to avoid catastrophic climate change.

Figure 5.4: Different Options for CO₂ Emissions Reductions in Road Transport



Source: WBCSD, Mobility 2030: Meeting The Challenges to Sustainability

Transformational change required

Current technological advancements are not keeping pace with the rate of growth or the scale of the challenge, not least the minimum 60% reductions required in CO₂ emissions. It seems clear that further solutions have to be explored. One Planet Business Personal Mobility will explore the fundamental drivers for change, such as:

- identifying the barriers impeding a complete technological revolution for low-carbon mobility;
- exploring the possibilities for switching to low-impact transport and how this could be encouraged;
- questioning the value of such high levels of mobility in promoting a better quality of life and identifying which areas of mobility consumers may actually like to reduce (e.g. commuting);
- understanding how shifts in lifestyles could reduce personal mobility;
- thinking through the economic consequences of changing mobility patterns; and
- exploring access to key services such as shops, schools, hospitals and employers, with reduced personal mobility.

Providing the framework for change

One Planet Business will bring together key decision-makers and change agents from the aviation, vehicle, public transport, infrastructure and fuel sectors, together with investors, consumers and policy-makers to explore these issues. They will understand where they can influence change and what can be done to catalyse inspired action for sustainability.

The early focus will be on the EU. This will provide a starting point for considering how to involve more stakeholders and expand to other regions.

The project will build on work done by others. It will highlight the need for an integrated approach to reducing CO₂ emissions by involving vehicle manufacturers, oil/fuel suppliers, customers, drivers and public authorities. For example, The CARS 21 Group recognised that “CO₂ reductions can be achieved more efficiently by exploiting the synergies of complementary measures and optimising their respective contributions rather than by focusing on improvements in car technology alone”⁴⁷.

Outcomes

Participants will develop a deeper-rooted understanding of what is required to deliver personal mobility within planetary limits.

By looking at the whole mobility system, they will gain new insights into how to achieve sustainability. They will also have a clearer understanding of how their collaborative actions can remove barriers to change.

Business will have the opportunity to:

- collaborate in prototypes to shape business models for a low-carbon future;
- learn how future carbon constraints will affect business models in the transport sector;
- learn how emerging access and mobility solutions will affect business models;
- shape effective sustainability strategies aimed at systemic change; and
- engage with government and the financial sector to explore their support for low-carbon transport solutions.

“We are going to have to use every instrument at our disposal to reduce energy consumption and carbon emissions in the transport sector. The challenges will be huge but so will the opportunities [including] new forms of housing, new patterns of work, new transportation systems, new energy conversion technologies.... Above all else the demand for mobility must be managed.”

John Wormald, Automotive Industry Strategist



Conclusion

If ecological catastrophe, with all its disastrous consequences for humanity, is to be avoided, business and its stakeholders must find ways to meet human demand within the limits of our one planet. This will be the decisive economic challenge in the coming decades. Companies that try to positively shape their environmental and economic operations will have a strong competitive advantage in being both a business solution provider and a steward for society.

It is time to accept the scale of the challenge and the urgency to act. If your organisation is interested in being part of this forum for system change, contact the One Planet Business team (details are on the inside back cover).

References

1. *Stern Review on the Economics of Climate Change*, October 2006, www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm
2. See, for example, Jared Diamond, *Collapse: How Societies Choose to Fail or Survive*, Penguin 2006.
3. The unit for measuring use of land is the 'global hectare' which represents a hectare of land of average biological productivity.
4. Tyndall Centre, *Living Within a Carbon Budget*, Manchester University, July 2006
5. International Water Management Initiative, *Insights from the Comprehensive Assessment of Water Management in Agriculture*, World Water Week, Sweden, August 2006
6. PricewaterhouseCoopers, *The World in 2050. Implications of Global Growth for Carbon Emissions and Climate Change Policy*, September 2006
7. Green Futures, *Greening the Dragon*, September 2006
8. The Economist, *The New Titans – A Survey of the World Economy*, 16 September 2006
9. The demand areas are based on a framework of 12 demand categories defined by the United Nations in its *Classification of Individual Consumption According to Purpose (COICOP)*, <http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=5>
10. Wuppertal Institute. *Environmental Accounting in Theory and Practice*, Uno, K. and P. Bartelmus, Eds, Kluwer Academic Publishers, 1998
11. European Commission, European Science and Technology Observatory and Institute for Prospective Technological Studies, *Environmental Impact of Products (EIPRO). Analysis of the Life Cycle Environmental Impacts Related to the Final Consumption of the EU25*, May 2006
12. Environment News Service, *INSIGHTS: Supermarkets and Service Stations Now Competing for Grain*, 15 July 2006
13. Stockholm International Water Institute, *Let it Reign: The New Water Paradigm for Global Food Security*, 2005
14. World Resources Institute, *Hot Climate, Cool Commerce: A Service Sector Guide to Greenhouse Gas Management*, 2006
15. UK Sustainable Development Commission and UK National Consumer Council, *I Will if You Will. Towards Sustainable Consumption*, May 2006
16. www.cdproject.net/
17. The Guardian, *Sustainability is Central to Survival*, 6 November 2006
18. Unilever, Unilever Water Care Initiative. www.unilever.com
19. Bioscience, *The Economic Value of Ecological Services Provided by Insects*, April 2006.
20. The Guardian, *Extreme droughts will spread, warn forecasters*, 4 October 2006
21. Lester R. Brown, *Eco-Economy: Building an Economy for the Earth*, WW Norton & Co, 2001

22. Kofi Annan, former UN Secretary General, speaking on World Day to Combat Desertification and Drought, 17 June 2002. www.grida.no/Newsroom.aspx?m=54&pressReleaseitemID=83
23. Earthwatch Institute, IUCN, WBCSD, WRI, *Business and Ecosystems*, November 2006
24. WBCSD, *Business in the World of Water: WBCSD Water Scenarios to 2025*, 2006
25. Munich Re, Topics Geo, *Annual Review Natural Catastrophes*, 2005
26. Henderson Global Investors and Trucost, *The Carbon 100*, June 2005
27. International Herald Tribune, *Snap, Crackle, Boom: Rice Poised to Double*, 15 August 2006.
28. McKinsey Quarterly, *Number 3*, 2006,
29. McKinsey Quarterly, *Ten Trends to Watch in 2006*, January 2006
30. McKinsey Quarterly, *Ten Trends to Watch in 2006*, January 2006
31. Global Environment Management Initiative, *Connecting the Drops. The Business Case for Pursuing Water. New Opportunities, New Challenges*, March 2004
32. For more see www.nature.com/nature/index.html
33. Citigroup, *Socially Responsible Investment: Crossing the River*, July 2005
34. The Economist, *A Coat of Green*, 9-15 September 2006
35. Business Week, *Creativity Loves Constraints*, 13 February 2006
36. Ford Motor Company, *Our Route to Sustainability – Connecting with Society – Ford Summary Sustainability Report*, 2005/6
37. SustainAbility/UNEP/Standard and Poor's, *Tomorrow's Value*, 2006.
38. Business Week, *Business Gets Serious About Carbon Emissions*, 12 December 2005
39. Wal-Mart, *Twenty First Century Leadership*, 24 October 2005
40. General Electric, *2006 Annual Meeting of Shareholders*,
www.ge.com/files/usa/company/investor/annualmeet/ge_shareownersmeeting_2006.pdf
41. UK Government Sustainable Development Strategy *Securing the Future*, March 2005
42. SustainAbility/UN Global Compact, *Gearing Up – From corporate responsibility to Good Governance and Scalable Solutions*, 2004
43. Herring, Horace, Open University, *Does Energy Efficiency Save Energy: The Implications of accepting the Khazzoom-Brookes Postulate*, April 1998
44. Peter Senge, C. Otto Scharmer, Joseph Jaworski and Betty Sue Flowers, *Presence: An Exploration of Profound Change in People, Organizations, and Society*, Currency, 2005
45. WBCSD, *Mobility 2030: Meeting the Challenges to Sustainability Full Report*, 2004
46. Intergovernmental Panel on Climate Change. *Aviation and the Global Atmosphere*. June 1999
47. European Commission, *Cars 21. A Competitive Automotive Regulatory System for the 21st Century. Final Report*, 2006

Contact

Contact Us

To contact the One Planet Business team, please email:

Oliver Greenfield: ogreenfield@wwf.org.uk

Michael Narberhaus: mnarberhaus@wwf.org.uk

Charlotte Salazar: csalazar@wwf.org.uk

Graphics acknowledgements

Figure 2.3 on page 29 is reproduced by kind permission of the Munich Re Nat Cat Service.

Figure 5.4 on page 46 is reproduced by kind permission of the World Business Council For Sustainable Development.

© WWF-UK, 2007

All rights reserved. No reproduction, copy or transmission of this publication can be made without the prior written permission of WWF-UK.

Published by WWF-UK. Panda House, Weyside Park, Godalming, Surrey, GU7 1XR.

WWF-UK registered charity number 1081247.

A company limited by guarantee number 4016725. Panda symbol © 1986 WWF World Wide Fund for Nature (formerly World Wildlife Fund) ® WWF registered trademark.

ISBN 1 85850 229 2

A CIP catalogue record for this book is available from the British Library.

All photographs and images © WWF-UK.

Designed by Coast Creative.

Printed by Arrowhead Printing Limited on Revive, a recycled paper made from 100 percent post consumer waste.

One Planet Business. The dawning of a
new era in a resource-constrained world.

Join us.

In collaboration with following organisations:



With support from the following organisations:



One Planet Business – is part of **One Planet Living**®, a joint initiative between WWF and BioRegional which aims to create a world in which people everywhere can lead happy, healthy lives within their fair share of the Earth's resources.

a joint initiative:



for a living planet

WWF-UK

Panda House, Weyside Park
Godalming, Surrey GU7 1XR
Telephone: 0044 (0)1483 426444
Fax: 0044 (0)1483 426409

Website: www.wwf.org.uk/oneplanetbusiness