

The background is a gradient of green and yellow, with a large, faint circular graphic on the left side. A vertical line is positioned on the right side of the page.

# Green Growth

**From labour to resource productivity**

Best practice examples,  
initiatives and policy options

# Green growth

FROM LABOUR  
TO RESOURCE  
PRODUCTIVITY  
BEST PRACTICE  
EXAMPLES,  
INITIATIVES  
AND POLICY  
OPTIONS



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION





## Preface

First at the United Nations Environment Programme (UNEP) and then heading the Global Environment Facility (GEF), I have been the privileged witness of the developments that we have lived through and brought about between Rio and Rio+20.

20 years ago, we recognized the need to provide the financial incentive that leverages change in developing nations when they incorporate global environmental benefits into their traditional development efforts.

The GEF was, therefore, created as a direct expression of this new – at that time – desire to act. It already centered around joining forces in a bid to achieve a more sustainable environment, with emphasis on support for environmental projects.

Twenty years later, we stand before a society that is more keenly aware of the challenges to be addressed in order to make the necessary transition to sustainable production and consumption. Much progress has been made since 1992, but still, we are now undoubtedly at a critical juncture. We need to act with a sense of urgency to craft new economic development models that allow for a significant reduction in greenhouse gas emissions, the preservation of natural resources and future growth.

This is precisely this theme I have been working on for over five years.

Because green growth must combine at once business strategies and aspirations towards a better life for all, a balanced mix of political, regulatory and tax reforms is essential;

Because increasing resource productivity will not only create jobs, it will also directly and indirectly positively enhance peoples' quality of life;

Because the economic and financial crisis is threatening the stability of the current development paradigm;

Because the time when resources were considered inexhaustible is over, because resource use has to decline globally;

A radical change is required to rehabilitate the minds of each of us, regardless of our role as economic actors, politicians, industries or consumers.

We need to rethink the economic paradigm currently in force so as to get back to the fundamentals and return to the center of our individual and collective choices, the true value of work and respect for our planet and its gifts.

*Monique Barbut, Special advisor to the CEO, French Development Agency*

A handwritten signature in dark ink, appearing to read 'Barbut', with a long horizontal stroke extending to the right.



## Foreword

### **Toward green, solidarity-based growth**

The international community has launched a movement for dialogue and action around the concept of “green growth”. This process prompts us to consider the environment and natural capital as constraints that must be respected, but also as new opportunities for sustainable economic development.

These efforts are a response to the need to question traditional approaches to the link between development, environment and resources. They also aim to make the necessary conditions for sustainable development a reality and examine the question of how to organise “global economic governance”. This change will have a substantial impact on how development is funded, and by whom.

In a world still at risk of falling into the Malthusian trap, and one that continues to be dictated by the scarcity of fossil resources, it is urgent that we rethink and advance our energy production methods and energy consumption patterns, with their major economic, social and environmental consequences. This will involve many sectors (energy, transport, building, industry and more) and actors (States, public institutions, funding agencies, local authorities, private enterprises and consumers).

As the main provider of official development assistance in France, the French Development Agency (AFD) has assumed a leading role amongst international funding agencies, through its incorporation of the principles of green, solidarity-based growth in its own projects and actions. This position has allowed AFD to achieve a twofold objective:

— From an operational perspective, AFD is able to guide Southern countries in the sustainable exploitation of their own natural and mineral resources (in which these countries are particularly rich) in order to, first, reduce their vulnerability to global changes and their exposure to the increasing shortage of natural resources and, second, to build up their natural capital for use as an endogenous lever for development.

— From a strategic point of view, AFD brings a unique vision and original proposals to international discussions of green, solidarity-based growth, whilst ensuring that its recommendations take development policies into account.

With this context as its backdrop, this book summarises and provides clear illustrations – by means of the many case studies it presents – of the multiple (institutional, economic and operational) facets of the concept of green, solidarity-based growth. By focusing the reader’s attention on the need to reconsider production facilities from a perspective of the efficiency and productivity of natural resources, the guide provides an innovative yet pragmatic approach to effectively implementing the principles underlying the concept of green, solidarity-based growth. We heartily salute SERI for this text, so rich in ideas and examples, which will serve as a reference for scientists, public policy analysts and development operators and which will, furthermore, enhance public and citizen-driven dialogue on the subject.

*Dov Zerah, General Director French Development Agency*



## Foreword

Over the last five years, the economic and financial crisis has taken hold of the global economy. So far, all efforts to overcome this crisis have failed. One of the main reasons for this failure lies in the fact that its root causes have been given only little attention. Our planet's resource base is limited and as more people participate in global trade, these limitations are becoming ever more apparent. Only if we succeed in multiplying the economic output of one litre of oil, one tonne of copper or one hectare of land, can we ensure to meet a growing world population's demands on quality of life. This holds especially true for those parts of the world that have benefitted very little from the achievements of the global economy so far.

Around the globe, a number of approaches to tackle this problem already exist and are being translated into strategies for national governments and businesses to pursue. They serve as a basis for the development of an innovative and comprehensive concept, which introduces new ways out of the multiple crises in economy, society and environment. This new concept should not only be applied at the European level but throughout the world. Just as the increase in labour productivity has been the driving force behind global development during the last 200 years, so too will a dramatic increase in resource productivity underpin today's global development. Only in that way, can we succeed in overcoming the global stagnation of the economy and politics to achieve "green growth".

Such a process needs committed stakeholders who support and help achieve this global transformation. We are grateful to support the French Development Agency (AFD), the United Nations Industrial Development Organization (UNIDO) in their efforts to spread these ideas and best-practice examples throughout the world. Through such undertakings, many individual actions can be merged into a single self-reinforcing process, in which representatives of politics, economy and the civil society see their efforts as complementary and act together, on the basis of a shared vision, in order to achieve a common goal. We are pleased to be part of this movement.

May this publication form a cornerstone for the establishment of increased resource productivity – a new paradigm in the global economic policy that succeeds in bringing the economy, society and the environment into greater global harmony.

*Fritz Hinterberger, President of SERI (Sustainable Europe Research Institute)*



## Foreword

The United Nations Industrial Development Organization (UNIDO) strongly supports the call for a new economic paradigm that no longer revolves around labour productivity, but instead emphasizes resource productivity. As material resources become ever scarcer, and the world's population continues to grow, achieving resource-efficient growth is more vital than ever to sustain the planet's ecosystems and protect our natural resources.

In this regard, UNIDO's Green Industry initiative places industrial development in the context of global sustainable development challenges. Simply put, Green Industry refers to modes of industrial production that do not harm ecosystems and can improve the quality of human life at the same time. It provides a strategy to create a global system of production that minimizes pollution and does not require an ever-growing use of natural resources.

Business as usual is therefore no longer an option. UNIDO, together with partners such as UNEP, AFD and SERI, is working to encourage the decoupling of economic growth from the use of natural resources and related negative environmental impacts. A number of initiatives UNIDO is currently undertaking involve the promotion of resource efficient and cleaner production methods, Chemical Leasing, water resource conservation and the sound management of waste, to name a few.

By greening existing industrial activities and creating new sustainable modes of production, we can protect the environment while creating new jobs, which in turn helps reduce poverty and raise living standards.

SERI's research, presented in this publication, explores issues of resource efficiency and productivity more broadly and deeply, and will help identify alternative approaches to economic growth and development that are less dependent on resource usage than current models.

UNIDO supports this report knowing that now more than ever, we must secure resource-efficient, low-carbon growth to ensure a healthy planet for future generations.

*Kandeh K. Yumkella, Director-General, UNIDO*

A handwritten signature in dark ink, appearing to read 'K. Yumkella', is positioned above a solid green horizontal line.





# GREEN GROWTH: FROM LABOUR TO RESOURCE PRODUCTIVITY

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## **BEST PRACTICE EXAMPLES, INITIATIVES AND POLICY OPTIONS**

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# EXECUTIVE SUMMARY

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GROWTH RATES ARE DECLINING, UNEMPLOYMENT IS RISING

economic and financial crisis is threatening the stability of the development paradigm the world has pursued in the past century. The crisis has thrown millions of people into poverty, especially the most vulnerable in the developing world, but also increasingly in developed countries. While economic growth rates are declining, unemployment is rising in particular in early industrialised regions such as Europe. Traditional remedies of growth policies are failing in the face of these unprecedented challenges. This in turn is contributing to widening social and economic inequalities both between and within countries.

CHEAP NATURAL RESOURCES LED TO HIGH RESOURCE CONSUMPTION

glaringly apparent that if we continue with our current patterns of growth and consumption, we will face irreversible damage to the planet's natural environment upon which our very existence depends.

Innovation in the last decades focused mainly on increasing labour productivity, without at the same time promoting resource and capital productivity and reducing the environmental impacts of growth. A new economic paradigm must find a firm footing in future political, economic and social discourse and must be mainstreamed in all aspects of life. There is no other alternative.

## THE STARTING POINT: A GLOBAL, MULTIPLE CRISES

Our world is facing severe and multi-faceted challenges brought about by our economic system and the pursuit of the idealised western lifestyle. The current

At the same time, global crises, including food, water, energy and climate are placing additional stress on many societies already teetering on the brink. Our economic development over the past century was built on an ever increasing exploitation of cheap natural resources. It is

FROM LABOUR PRODUCTIVITY TO RESOURCE PRODUCTIVITY

these new development concepts, which aim at improving human wellbeing and social equity and at increasing resource productivity to ensure more sustainable patterns of growth and industrial development.

The world and its population is not just about its economies, it is an intricate web of communities, citizens, families and far more. The human dimension needs to have equal standing with the economic and environmental pillars of the green discourse. We need effective and new strategies and policies – a change in paradigm, which at its core, focuses on switching from efforts to increase labour productivity to substantially improve resource productivity.

RESOURCE USE HAS TO DECLINE GLOBALLY: DOING BETTER WITH LESS

Labour productivity has increased twentyfold in the last 200 years. Today, with ever increasing unemployment rates mirroring this fact, labour is far from being in short supply. On the contrary, natural resource scarcity is putting our societies at risk and the environmental effects of global resource use, such as climate change, desertification, or food shortages are threatening the security of mankind as well as undermining the stability of the world's economic and security systems. As a consequence, it is paramount that increased resource productivity becomes the central driver of technological progress in the future, with incentives for those who are more productive with scarce resources. This will stimulate our economies in many ways, e.g. in terms of higher economic multiplier

## GREEN GROWTH BY MEANS OF RESOURCE PRODUCTIVITY

From around 2007 onwards, several “green” initiatives have been introduced as a response to the global economic and financial crisis. “Green Economy”, “Green

Growth”, and “Green Industry” are the most prominent of these new development concepts, which aim at improving human wellbeing and social equity and at increasing resource productivity to ensure more sustainable patterns of growth and industrial development.

effects as well as with the creation of (mostly local) green jobs. “Green Growth” must be understood as a goal for national, regional and global policies. This goes beyond sheer technical progress and involves structural change and transition towards less capital and resource intensive activities, especially in the early industrialized and therefore highly resource consuming parts of the world. It will involve business as well as household engagement and requires new forms of public-private interaction. If growth is to be understood as a means to enhance human wellbeing, it should not only be environmentally sustainable but also socially and economically viable. Guided by enabling policies and a strong ethical framework, such a development can help to ensure that everyone on the planet has enough to eat, work and live in decent conditions, is embedded in social networks and enjoys a good quality of education, health and community networks.

## **WHERE ARE WE GOING: TARGETS AND INDICATORS**

In view of the above mentioned multiple crises, it is important to set ambitious targets for further economic development that reflects these multi-dimensional challenges. Such a vision should combine the environmental, social and economic dimensions of sustainability, under the umbrella of macro-economic resource efficiency. Knowing exactly what kind of future growth we want will enable realising the future we aim to create.

In that spirit, the Rio+20 UN Conference on Sustainable Development in June 2012 highlighted the need for concrete targets, laying down a work plan for developing these objectives. It is argued that only if ambitious targets are defined, which embrace all dimensions of sustainability, and only if all stakeholders as well as whole supply chains are taken into account can measures to achieve a more resource-efficient world be developed and implemented. This is essential in order to unlock the current global predicament of unsustainable development and ensure

inter-generational equity for the future generations to come. From this, 3 key targets that should be reached by 2050 can be derived:

1. An inclusive and competitive economy
2. A high standard of living
3. A reduction of natural resource consumption within global environmental limits

Rigorous targets are not only needed to measure progress on improving resource efficiency, but also to reflect the overarching capacity of sustainable supply within the world's biocapacity. There have been suggestions of several quantitative indicators to monitor the economic, environmental and social development in Europe and other world regions towards the attainment of these three key targets.

This is important in order to support political decision processes with more comprehensive information and tackle the challenge of creating inclusive and sustainable development in the long term.

## **LABOUR PRODUCTIVITY INCREASED FASTER THAN GDP**

## **LABOUR PRODUCTIVITY: HUGE INCREASES OF THE PAST CANNOT BE SUSTAINED**

One of the most fundamental principles of economics predicates that economic growth will generate jobs and reduce unemployment rates. However, even with our economies growing, unemployment rates did not diminish over the last couple of years. A simple explanation for this can be found in the fact that the growing GDP was not able to keep pace with growing labour productivity, which means that fewer people are required to produce the same economic output. Productivity growth depends on capital, innovation and structural change, and an increase in intensity of work per hour.

Balanced and inclusive economic development cannot be reached if economic policy exclusively focuses on an increase in labour productivity. Only by substantially increasing capital

and resource productivity economic, social and environmental targets can be achieved. Capital and resource productivity facilitates an increase in employment, provides stronger incentives for investment and reduces the consumption of natural resources. Increasing resource productivity and energy efficiency can contribute to higher capital productivity.

### **NATURAL RESOURCES: GLOBAL OVERCONSUMPTION AND INSUFFICIENT DECOUPLING**

The world's economy has an insatiable hunger for natural resources, such as raw materials, water and land. Today, humanity extracts and uses more than 70 billion tonnes of virgin materials each year; almost 80% more than 30 years ago. This is putting severe environmental pressures on the planet's ecosystems and several ecological boundaries have already been surpassed, most notably in the area of climate change. While industrialised countries keep consuming at high per-capita levels, consumption levels in emerging economies such as China and Brazil are rapidly on the rise, already reaching similar levels to those in European countries. At the same time, billions of people still live in material poverty, not able to satisfy even basic human needs.

#### **RESOURCE EFFICIENCY AND RESOURCE CONSUMPTION INCREASED**

The world's economy achieved a relative decoupling on the global level; today, we extract around 40% more economic value from each tonne of raw material. However, these efficiency gains have been undermined due to economic growth of 150% in the same period, which lead to an actual increase in material consumption. Therefore, the required absolute reduction of resource use on the global level is still far from being achieved.

#### **COMPANIES ARE REDUCING THEIR RESOURCE USE**

**RESOURCE PRODUCTIVITY:  
AN ECONOMIC OPPORTUNITY  
FOR COMPANIES**  
High costs and expected shortages of natural resources have been major drivers of companies to reduce their use of natural resources. There is increasing evidence that companies have improved resource productivity in their production processes. Increasing uptake of environmental management and certification has been registered in Asia and Europe. Yet there is much scope for material efficiency improvements in companies and the development and

implementation of more radical and systemic eco-innovations. This can be supported by science, such as Life Cycle Assessments, to provide information on more sustainable solutions for longer term investments.

Many business opportunities can be reaped in growing markets such as organic agriculture, renewable energy and eco-tourism. New opportunities, especially in the environmental technologies, arise in areas such as waste management, green chemistry and bio-based products. The closing of material loops and the shift to product- service systems will be important steps towards a greener economy.

#### **A STRONG POLICY FRAMEWORK TO SUPPORT ECO-INNOVATION IN COMPANIES**

Access to technology and development of local capacities will be key to drive eco-innovation, together with external financing for business to choose and implement resource efficiency measures. Technical advisory services such as the UNIDO-UNEP National Cleaner Production Centers, available in 47 developing and emerging economies, will need to reach scale. Business and industry activity will, however, also need a strong policy framework to provide a level playing field for economic activity while safeguarding natural resources.

International policy, possibly modelled on the success of the Montreal Protocol, can majorly support the phase out of unsustainable products and be a driver to open up new markets. Partnerships between business, governments and civil society, such as the one leading to the development of the LEED certification for buildings in North America, can provide inspiration for the development of more sustainable products.

A policy mix and especially the support of more sustainable consumption can drive companies to develop more sustainable and safer products.

#### **A CHANGE OF VALUES AND LIFESTYLES FOR A BETTER QUALITY OF LIFE**

**GREEN GROWTH AND  
RESOURCE-EFFICIENCY FOR  
A BETTER QUALITY OF LIFE**  
Increasing resource productivity will not only create jobs, it will also directly and indirectly positively enhance peoples' quality of life. Current resource intensive western lifestyles are not environmentally sustainable. Ironically, those affluent lifestyles are not making people happy either – there is a high incidence of burn out, job dissatisfaction,

depression and social isolation, yet this lifestyle paradigm is aspired to in many parts of the world. Current life-style habits thus need to be rigorously questioned. It is also essential that governments and institutions create the enabling framework for this essential shift to a green and socially just society.

In addition to this top down transformation of the general framework, a transition towards sustainable lifestyles requires bottom-up initiatives. Those initiatives are being developed all over the world and comprise activities such as transition town movements, food cooperatives, bicycle and car-sharing systems, co-housing projects and community currencies.

### A POLICY MIX SUPPORTING GREEN GROWTH

Only if changing patterns of consumption are aligned with corresponding transformations in governance systems and companies, can a real green growth transition occur. Therefore green growth needs to combine business and household strategies towards a better life for all.

#### POSITIVE ENVIRONMENTAL AND ECONOMIC EFFECTS: THE DOUBLE DIVIDEND OF ENVIRONMENTAL TAX REFORMS

A well-coordinated portfolio of market-based, regulatory and information-based policy measures is essential to promote an effective and fair shift to a sustainable economy. Many examples illustrate the positive economic and environmental effects of environmental tax reforms in a broad sense, thus shifting the tax burden from labour to material, water and land use or greenhouse gas emissions.

Currently environmental and resource taxes have only a minor role to play in many countries, but could potentially make an important contribution. At the same time, environmentally harmful subsidies, such as subsidies for fossil fuel use, need to be phased out. A green economy is likely to depend crucially on innovation (in particular eco-innovation) and investments in green technologies. In this respect, public finance has also a crucial role to play, e.g. in order to provide incentives for private investors.

As shown by numerous additional examples (e.g. green public procurement, emission trading, regulations to name only a few) there is evidence that existing green growth strategies and policies present a strong basis on which to build new approaches that balance economic, social and environmental considerations.

#### A FAIR AND SUSTAINABLE SHIFT TO A GREEN ECONOMY IS ESSENTIAL TO TACKLE A NUMBER OF CURRENT PROBLEMS

While policies can cause shifts in the composition of employment, evidence suggests that any negative effects on polluting products and processes are at least balanced by growth in less pollution-intensive ones. Nevertheless, the fear of diminished competitiveness and job losses remains one of the barriers to following a green development. A fair and sustainable shift to a green economy is therefore essential that also addresses problems such as, potential skills shortages, income security and social exclusion is therefore essential. Overall, the right policy mix has the potential to directly and indirectly stimulate economic growth, competitiveness, employment and environmental improvements.



*Henderson, Las Vegas  
suburb, Nevada,  
United States.*

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*Green algae in  
the Bay of Saint-Brieuc,  
Côtes d'Armor, France.*











# 1\_INTRODUCTION

## THE WORLD FACES GROWING ECONOMIC, SOCIAL AND ENVIRONMENTAL CHALLENGES

Our world is facing severe and growing challenges. The current economic and financial crisis is threatening the stability of the development model the world has pursued in the past decades. The crisis throws millions of people into poverty, especially the most vulnerable in the developing world, but also increasingly in developed countries. This contributes to widening economic and social inequalities both within and between countries.

At the same time, environmental crisis, including the food, water, energy and climate crises are placing additional pressure on our societies. Our successful economic development over the past century was based on the ever increasing use of natural resources, including materials, energy carriers, water, land and the atmosphere (climate). Nonetheless, if we continue with our current patterns of growth and consumption, we will face irreversible damage to the planet's natural environment that our societies and economic systems are dependent upon.

Economic growth was primarily driven by the availability of cheap natural resources while innovation focussed mainly in increasing labour and capital productivity, without at the same time promoting resource productivity and reducing the environmental impacts of growth.

The current multiple crisis is therefore fundamentally questioning the patterns of development and growth of the past.

## QUALITY OF LIFE IS STILL MISSING IN MANY POOR COUNTRIES AND ENDANGERED IN RICH COUNTRIES

The above trends also have negative implications for the quality of life of many people. This is true for poor countries where the majority of people do not have enough resources even to meet their basic needs. But it is also true for industrialized countries where people's quality of life is decreasing due to the affluence of a minority. Too much work, too much stress, too much unhealthy food is leading to a lack of meaning in life, a lack of deep relations, to illnesses and to various addictions.

One main reason for the endangered quality of life lies in the current use of natural resources which itself is based on the current form of lifestyles and aim for ever increasing economic growth. Resources are used in a very unfair way; their distribution is unjust not only on a global level but within countries. Rich countries use too many resources for production and consumption with only limited gains reflected in well-being, while a majority of the world's population deal with a lack of food, clean water, education and health care.

For all those reasons, an alternative development path is urgently needed.

## NEW "GREEN" CONCEPTS FOR INCREASING RESOURCE PRODUCTIVITY AND WELL-BEING

Recently introduced "green" concepts, such as „Green Growth“, „Green Economy“ or „Green Industry“ (see next chapter for a detailed discussion of the different terms), are seen as a path where economic development can progress with lower resource use and environmental impacts while increasing human well-being through providing new job opportunities, strengthening social cohesion and reducing inequalities. To bring us onto the path towards real „Green Growth“, effective and completely new strategies and policies are needed – a change in paradigm,

which in its core focuses on switching from efforts to increase labour productivity to substantially improved resource efficiency to support a global development model that allows for a high quality of life for everybody now and in the future.

“Green Growth” should be understood as a goal for national, regional and global policies. This goes beyond sheer technical progress and involves structural change and a transition towards less capital and resource intensive activities, particularly in the early industrialized and therefore highly resource consuming parts of the world. It will involve action from all levels: from international organizations, to governments and businesses as well as individuals, it requires dynamic thinking and new forms of public-private interaction.

**“GREEN”  
AND “COLOURFUL”  
GROWTH  
FOR HIGHER  
WELL-BEING**

Moreover, if growth is understood as a means to enhance our well-being, it should not only be environmentally sustainable (“green”) but also socially and economically viable (“colourful”). Guided by deliberate policies and a strong ethical framework, growth can help ensure that everyone on the planet has enough to eat, work and live in decent conditions, is embedded in social networks, enjoys a good quality of education, health and community networks, is able to develop personally and that production is fair and sustainable.

The elements outlined above are important dimensions of a high quality of life, which consists of an objective component (existing framework conditions, resource availability, institutions, income) and a subjective component (how the person is feeling given his/her conditions she is in and her freedom to choose a way of life she/he wants to live). Many surveys and research on happiness have consistently shown that once the basic needs are met, social relations, freedom and health, are essential to happiness. Thus it is evident that a high quality of life is possible by using fewer resources to meet one’s needs.

The need for relations, participation and freedom can be met by immaterial strategies as well as by strategies using many resources. A new paradigm would support the awareness of people using rather immaterial strategies as well as policies enabling the supply of such lifestyles.

**ACTION IS  
REQUIRED  
ON ALL LEVELS:  
COMPANIES,  
INDIVIDUALS  
AND COUNTRIES**

This publication shall serve as a background document highlighting initiatives which have been successfully implemented to facilitate a transformation to a green development on different levels: the level of single companies, the household level and the macro-economic level (countries).

By bringing together the large number of existing best practice examples, an argument is made that a concerted effort could realise the transition towards the urgently required systemic change. In addition concepts that go beyond “Green Growth”, resulting in a more “colourful” development are being discussed.

The publication starts with an explanation of the current multiple crisis phenomena and societies face today, including economic, environmental and well-being aspects. Global trends for the three factors that are considering in this publication are being described: labour, capital and natural resources. Furthermore, the different concepts presented so far to tackle the current crisis, such as Green Growth, Green Economy and Green Industry, are being discussed (Chapter 2). Chapter 3 outlines a general vision for a sustainable future and describe headline targets for a new policy framework, oriented towards significantly increased resource productivity. The following chapters concentrate on the ways and strategies to reach a green and sustainable future. Chapter 4 addresses companies, Chapter 5 households and Chapter 6 countries, since actions on all these levels are necessary for the transition to a sustainable future. Based on the results and findings of these chapters we derive recommendations how the multiple crises can be solved in an integrated manner (Chapter 7).

*Outdoor coal mine,  
Arizona, United States.*

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## 2\_ MULTIPLE CRISES: BUSINESS AS USUAL IS NOT AN OPTION ANYMORE

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### FOCUSING ON ECONOMIC POLICY RESPONSES IS NOT ENOUGH

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cussed mainly on the economic side of this multiple crisis with the hope that they also solve the others have reached a stalemate. There is a growing recognition from all parts of society that we simply cannot continue in a business as usual manner. But why have the early industrialized economies of Europe, America and Japan reached such a difficult situation?

1. Economic growth has considerably slowed down in those parts of the world: it is not only natural resources that are becoming scarcer, work cannot be intensified endlessly, and the realms of what can be commercialised are also reaching their limits.
2. Increasing numbers of people are experiencing society as being unjust. Democracy, the way we used to know it, is facing numerous challenges, including influence of specific interest groups.

### WESTERN LIFESTYLES ARE ASSOCIATED WITH OVERPRODUCTION AND OVER- CONSUMPTION

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#### 2.1\_ WHY IS THE CURRENT SITUATION HARMFUL AND ALARMING?

The world is currently facing global multifaceted crises that are affecting the very foundation of our economy, society and environment. Policy responses that fo-

The human economic activity is destroying the very basis of our existence. The high material standard of living which is built on the foundations of high resource consumption, and increasing labour productivity is figuratively and literally eroding the very basis of the planet, which

is physically limited. Western lifestyles have become associated with overproduction and overconsumption that uses up valuable resources while not even ensuring long-term happiness. The environment in industrialized countries has become cleaner in the immediate surroundings, but often only because the resources those countries consume increasingly come from faraway places. The “ecological rucksacks” of Western consumption are becoming heavier. Today, an average European already consumes between 40 and 55 kg of natural resources each day (Dittrich et al., 2012). If also those resources are included, which are extracted from nature but not used in our economic system (such as overburden from mining), these numbers would augment to around 60-80 kg per day. In contrast, an average inhabitant of a poor country in development only uses around 8-12 kg per day.

### INEQUALITIES ARE INCREASING AT NATIONAL AND GLOBAL LEVELS

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Moreover, those lifestyles have resulted in an unequal distribution of prosperity on a national as well as a global scale. All in all it can be argued that the impacts of those lifestyles are putting too much pressure on the natural resources and have adverse environmental, economic, social and health effects.

Generally speaking, economic growth is mainly driven by increases in supply and demand factors. If these factors cease to grow, economic growth will decline. In this study we deal with the challenge of successfully managing the use of resources, labour and capital, in order to transform our current economic system in a sustainable one and reach a high quality of life.

Focus is put on the productivity of the mentioned factors, since productivity is the key to prosperity. It was in the past, in which labour productivity has risen steadily and has thus, inter alia, secured international competitiveness, enabled the financing of social security systems and has given scope for redistribution. And it will be the key in the future, if it is possible to significantly increase the productivity of resource use.



## 2.2 GLOBAL TRENDS OF CAPITAL, LABOUR AND RESOURCE PRODUCTIVITY

In the context of sustainable development, capital is defined very broadly, including human, social and natural capital (see Glossary). In economics, “capital” is more narrowly defined and actually has two interrelated meanings: manufactured or physical capital (machinery, buildings, infrastructure, etc.) and financial capital (funds for buying physical capital). Capital productivity is the measure how well manufactured capital is used in providing goods and services.

### PHYSICAL CAPITAL PRODUCTIVITY PUSHES INCREASED EFFICIENCY

History reveals that technological improvements to physical capital increased both the productivity of nature (materials, energy, land) and labour. For example, due to new technologies it was possible to use more of the wood from each tree, or to turn coal and petroleum into energy enormously augmenting human capabilities. On the other hand, the accumulation of produced capital enormously raises labour productivity. For example, an American worker who is able to use equipment worth USD 15,000 can produce much more output than an Indian who might be using only USD 15 worth of equipment (Goodwin, 2003).

Resource productivity has also increased, albeit much slower than labour productivity. This might (partly) be explained by the fact that the costs of labour also grew faster than the costs of materials inputs over the last 50 years. The price of resources remained more or less constant over the past decades - except since 2003, when commodity prices began to rise due to rapidly growing demand from emerging economies, such as China (de Bruyn et al., 2009).

### Resource, labour and capital productivity for the European Union

The following figure compares the development of the different forms of productivity in the European Union (for a definition of different forms of productivities see the Glossary).

*Labour productivity* (measured as gross domestic product (GDP) by hours worked) constantly raised from 2000 until 2007. During the economic crisis, it decreased slightly because less GDP was generated with an almost constant labour input. *Capital productivity* (measured as GDP over consumption of manufactured capital) remained on a constant level from 2001 until 2007. Then, with the economic crisis, it dropped considerably implying that more or less the same annual consumption of physical capital generated less GDP. EU's *resource productivity* – the ratio of GDP over material consumption – has increased by 17% in the period 2000 until 2009. However, after a constant increase between 2000 and 2003, it dropped significantly in 2004. From there, it continued its constant growth path until 2008. In 2009 it increased significantly as a result of the economic crisis, because the crisis affected the material-intensive industries much more than the services industries, leading to savings in material consumption (Moll et al., 2012).

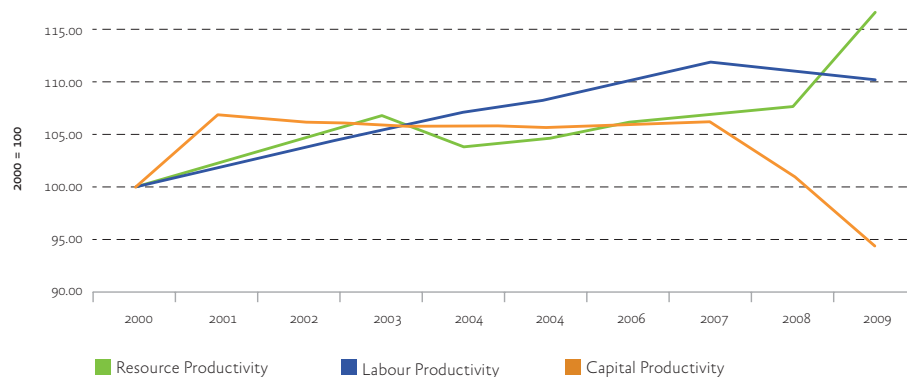
1\_RESOURCE, LABOUR AND CAPITAL PRODUCTIVITY FOR THE EUROPEAN UNION

While the increase of labour productivity has already reached a level that causes many negative effects (intensification of labour, burn-out, etc.) or reduces the quality of output (e.g. in the care sector), resource productivity still has enormous potential to increase.

### IN CONTRARY TO LABOUR, RESOURCES ARE BECOMING SHORT IN SUPPLY

Today, with ever increasing unemployment rates mirroring this fact, labour is far away from being short in supply. On the contrary, supply of natural resource is indeed the limiting factor, and resource scarcity is putting our societies at risk.

**FIGURE\_1**  
Comparison of resource, labour and capital productivity (for EU27).  
Source: Moll et al., 2012.



As a consequence, increased resource productivity has to become the main feature of technological progress, with incentives for those who are more productive with scarce resources. This will stimulate our economies in many ways, e.g. in terms of higher economic multiplier effects as well as the creation of green jobs.

By turning innovations toward higher resource and energy productivity, ecological restraints can be reduced without touching the economic and social sustainability. Although this is a longer term process, it can be accelerated by a switch of economic policy from fostering labour productivity to fostering capital and resource productivity.

#### HIGH ECONOMIC WELFARE WITHOUT FURTHER GROWTH

Increasing resource productivity can assure high economic welfare without high rates of economic growth. In a knowledge economy higher resource productivity will augment employment and wages without reducing the profit rate on the reduced capital stock. By augmenting resource and capital productivity stronger than labour productivity the productive system can become smaller and, depending on the desired level of consumption in industrialized countries, real capital exports to developing countries can augment (Hoedl, 2011).

High economic growth is not an adequate approach for solving environmental and economic problems in high-consuming countries of the global North. On the contrary, it can even exacerbate the problems and challenges countries are facing. It is important to develop a new factor combination (labour, capital and resources) with less capital inputs for a desired level of economic welfare. In general terms, capital productivity has to be augmented by a capital-saving technological progress. As natural resources account for nearly half of total capital inputs, augmenting resource productivity is the main strategy to make development more viable in both environmental and economic terms (Hinterberger et al., 2011).

#### THE ECONOMY GROWS, BUT EMPLOYMENT RATES DECLINE

rates. Nevertheless, although the economy was growing, it did not lower unemployment rates during the last couple of years. This was particularly visible in Western countries, such as Europe. One of the basic reasons for this can be found in the fact that growing GDP was not able to keep up with growing labour productivity. Higher labour productivity means that it takes fewer people to produce the same economic output. Productivity growth depends on capital, innovation and structural change, and an increase in intensity of work per hour.

### 2.3 LABOUR PRODUCTIVITY: HUGE INCREASES OF THE PAST CANNOT BE SUSTAINED

One of the most fundamental economic principles predicts that economic growth generates jobs and reduces unemployment

Productivity has been a major source of long-run economic growth, but also of social development and improvements in living standards in a broader sense. Those economies that are characterized by the highest per-capita income today are also those that recorded the most extensive increase in labour productivity over the past two centuries. This becomes obvious when taking a look at the development of the twelve core countries of Western Europe. Between 1870 and today their per-capita income increased almost tenfold. The per-capita income of the United States, which became the world's leader in terms of productivity by the end of the 19th century, increased by more than factor 11 and labour productivity increased by a factor 15 (Maddison, 2001, 2007), (van Ark et al., 2009).

In developed economies a process called "tertiarisation" has been taking place over the last decades – an increase in the labour force share working in the tertiary sectors (service sectors). In the United States, for example, over 80% of all employees work in the service sector, while in the 1950s, only slightly more than half the working population found a job in this sector. In Western Europe, 71% of all employees are working in the service sector, while the figure was only 35% in the 1950s (Bormann et al., 2009).

#### MANY ECONOMIES EXPERIENCE A SHIFT TOWARDS SERVICE SECTORS

With the change to a service economy economic growth rates could be slowed down, as labour productivity can only be increased to a certain extent. In principle the service sector is more labour intensive than manufacturing and processing industries (Fretschner et al., 2002). Also due to demographic trends, i.e. an aging population, services (especially the care sector) will bind an increasing number of people. Today, qualified personnel is already scarce, in particular in sectors such as education and care. Therefore, especially in this sector, a further increase of labour productivity would, not make economic sense.

#### LABOUR PRODUCTIVITY REACHES LIMITS IN THE SERVICE SECTORS

Additionally, it becomes increasingly obvious that the intention to infinitely increase labour productivity in the service sector has resulted in a densification of work. In the meantime, this development has very negatively affected the costs of the social security system (health insurance contributions, early retirement, etc.) and burdened the production factor labour in form of ancillary wage costs. The same goes for sectors with a high share of unqualified or personal services or for the retailing sector, which is characterised by low increases in production and whose relatively low productivity will be compensated by falling wages. This is another unsustainable trend that generates rising costs for other sectors in politics.

#### ECONOMIC REQUIRES THE FORMATION OF CAPITAL

that are needed to produce our goods and services (such as machines, fabrics, houses, bridges, grids and canalization) but also to financial capital, which is an instrument of exchange between all other forms of capital. In that sense it differs from manufactured capital discussed above that is used as input into production (production factor; see also the glossary above for different definitions of capital). In general, companies possess equity – but most of them also work with liabilities. In order to generate economic growth, consumers, investors, importers and the state need money. Companies have to pre-finance their means of production (e.g. machines, raw materials, energy and labour). The economy as a whole needs capital in order to grow and it grows because at the end of the economic cycle the national product is bigger by some percentage points. In general there is an output, which contributes to the growth of the capital base.

If capital gets scarce, the economy grows at a slower pace. However, this also applies vice versa: if the amount of money is too large, the capital claims on the economy, the individual households and the state become too high and capital itself starts to become an obstacle to future growth. This is because the interest proportion rises at the expense of freely disposable income and investment.

At this point, banks get into the game. Today, the money supply can only increase that quickly because banks provide companies and private households with loans almost unlimitedly.

#### UNLIMITED CREATION OF MONEY AS ONE ROOT CAUSE FOR FINANCIAL CRISES

#### 2.4. FINANCIAL CAPITAL: A BOTTLENECK

In order to produce goods and services, entrepreneurs need capital. Growth enables and requires the formation of capital. Capital does not only refer to things

This process is called money creation. Many observers of the financial market argue that this type of unlimited money creation is the root cause of the financial crisis. Not only companies, but also states attain loans from the financial markets this way and thus contribute to expansion of the money supply.

In the past it was the task of the state to control and regulate money supply. Money was and still is a symbol of claims that humans hold against each other. It is based on trust. In times of crisis money only exactly attains the value that matches this money-claim held against the real economy. The more money is in circulation, the more difficult it is to match these growing claims. Especially the interest-principle is responsible for the fact that these demands are growing ever faster: faster than the real economy and thus faster than the real value.

Those return expectations, that have surpassed the growth rate of the real economy by far, have contributed to the financial crisis. This is exactly why economic activities should return to the roots of the real economy and its key parameters, such as productivity, employment, demand and distribution (Bormann et al., 2009).

#### ARTIFICIAL BUBBLES OF ECONOMIC GROWTH

The financial crisis in 2008 and the current banking crisis in European countries such as Spain were only possible, because banks handed out unsecure loans to private households and investors. An unsustainable economic growth was generated in an artificial way. This has later led to the bursting of this bubble and resulted in an economic slow-down affecting all inhabitants in those countries. (Hinterberger and Ax, forthcoming, 2013)

#### GLOBAL RESOURCE USE IS RAPIDLY INCREASING

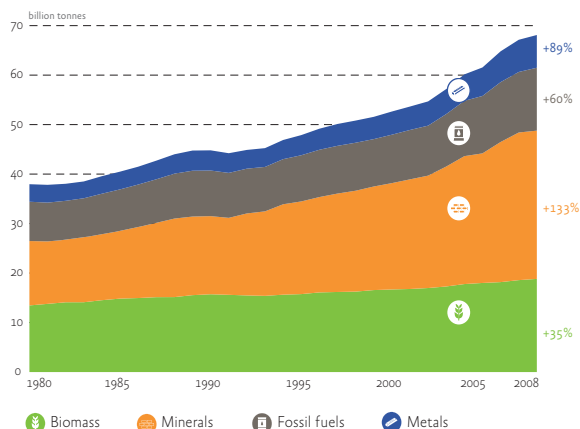
Growth rates in the time period after 2003 were significantly higher than in the 20 years before (3.7% annually compared to 1.7% per year before 2003), in particular due to the rise of emerging economies, such as China, India and Brazil. Growth has been observed in all major material categories, but is most pronounced for industrial and construction minerals and metal ores (Dittrich et al., 2012).

#### HUMANITIES' RESOURCE USE IS SURPASSING PLANETARY BOUNDARIES

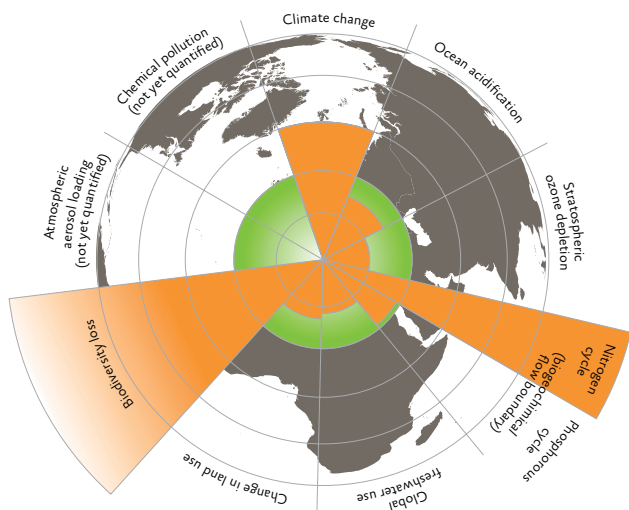
Many of today's most pressing environmental problems, such as climate change, loss of biodiversity and pollution are caused by the overall growth of our natural resource use as observed in the past decades. In their famous study, Rockström and colleagues (2009) estimated to what extent humanity has already crossed the global ecological capacities with regard to nine specific environmental problems. The result is alarming: according to their estimations, humanity has already surpassed three of the planet's nine planetary boundaries (biodiversity loss, climate change and nitrogen cycles) and a fourth (our unsustainable use of phosphorous) is close to being breached. The following figure provides an illustration of the studies' results. The green area marks the ecological capacities human could use without destroying the Planet's natural capital. If the pressures (marked in red colour) surpass this limit, the planetary boundaries are crossed.

#### 2.5. NATURAL RESOURCES: GLOBAL OVERCONSUMPTION AND INSUFFICIENT DECOUPLING

Today, humans extract more material resources than ever before in history.



**FIGURE\_2**  
Global material extraction and growth rates by main categories. Source: Dittrich et al, 2012.



**FIGURE\_3**  
Planetary boundaries. Source: Rockström et al. 2010.

## A FEW COUNTRIES ARE RESPONSIBLE FOR THE MAJORITY OF GLOBAL RESOURCE USE

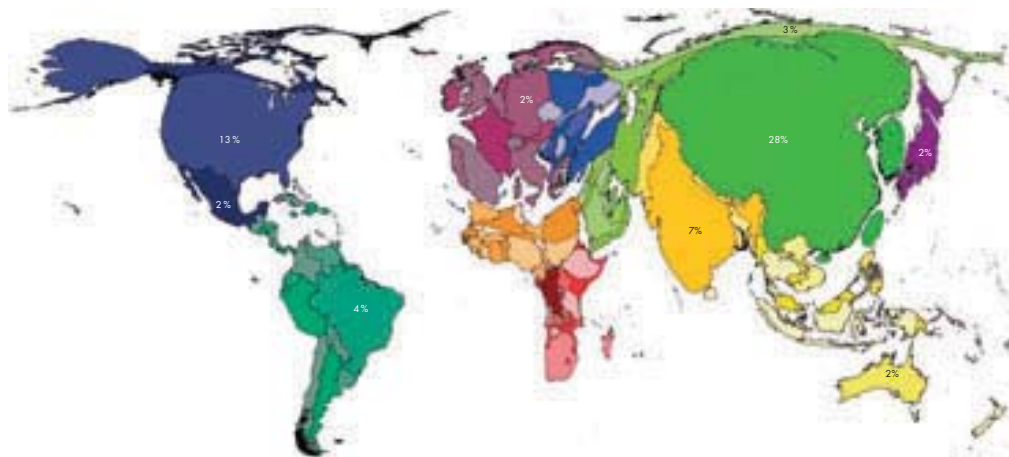
### 2.5.1 GLOBAL PATTERNS OF MATERIAL TRADE AND CONSUMPTION

If the five dominant material consuming countries – China, the United States, India, Brazil and the Russian Federation – were to enter into a global resource management agreement, together, they would be deciding how more than half of all globally consumed materials would be used. In 2008, China already consumed 28% of all globally extracted raw materials, up from only 8% in 1980. China is followed by the US (13% in 2008, a decrease by 6% compared to 1980), India follows as the third biggest resource consumer in the global economy (7% in 2008, up from 4% in 1980).

Combined with the 15 high consumer countries that follow those five big consumers, this group of 20 countries could influence about three quarters of global material consumption. By contrast, the 100 countries with the lowest absolute material consumption together consume only around 1.5% of all globally consumed materials (Dittrich et al., 2012).

**FIGURE\_4**  
Material consumption of countries. Source: Dittrich et al, 2012.

Note: Country size is proportional to its share in global material consumption.





### IMPORT DEPENDENCY IS INCREASING IN MANY INDUSTRIALISED AND EMERGING ECONOMIES

In the past few years, an important shift has occurred between resource importers and exporters. For a long time, developing countries competing in the world market have expressed concern over the low prices their raw material exports fetch from a few industrialized countries. Today, an increasing number of emerging economies process raw materials to semi-finished or finished goods. This has had a significant impact on the global demand for raw material imports, changing prices and power relations. Today, a major concern for many industrialized and industrializing countries is the secure supply of raw materials, and the increasing expense of procuring them. Some world regions, such as Europe, are particularly vulnerable as large shares of the raw materials for production and consumption have to be imported from abroad. This is mostly visible for fossil fuels and metal ores: for iron ores, the import share is 83%, for bauxite 80% and for copper 74% (European Commission, 2008).

On average, each human being consumed around 10 tonnes of materials in 2008, 1.6 tonnes more than in 1980. However, per capita consumption varies significantly between the different world regions. With more than 100 tonnes of material consumption per capita, rich, oil-exporting countries in the Middle East are leading the global ranking. Large construction activities, such as the Palm Project in Qatar, and luxurious life-styles cause this huge per capita pressure on the environment. European countries typically have a consumption level of around 12-20 tonnes per capita. In France, each inhabitant consumed 14.5 tonnes of raw materials in 2008.

### EMERGING ECONOMIES RAPIDLY CATCH UP IN RESOURCE CONSUMPTION

It is interesting to observe that emerging economies, such as China and Brazil, have significantly increased their consumption levels over the past 10-15 years and today already have a per capita consumption level almost equal to the one of an average European. This is particularly the case, as those countries are rapidly building up their infrastructure (buildings, transport systems, power plants, etc.). Emerging economies thus are following the resource-intensive development path the industrialized countries have followed in the decades after World War II.

### PER CAPITA CONSUMPTION VARIES BETWEEN 2 TONNES AND MORE THAN 100 TONNES

Given the rapidly growing trends in material consumption in those parts of the world, no signs for alternative, green development paths can be observed on the macro level so far. On the other hand of the spectrum, the world's poorest countries, such as Afghanistan, Bangladesh

or Congo, have a per capita consumption of only around 2 tonnes, which includes materials for the basic needs of food and shelter. This illustrates the material poverty still prevailing in large parts of the world. Thus, on a global level, a factor 50 can be observed between the richest and the poorest countries. This situation clearly is far away from any considerations of a "fair share" of all inhabitants of the planet to the global natural resources. EE2

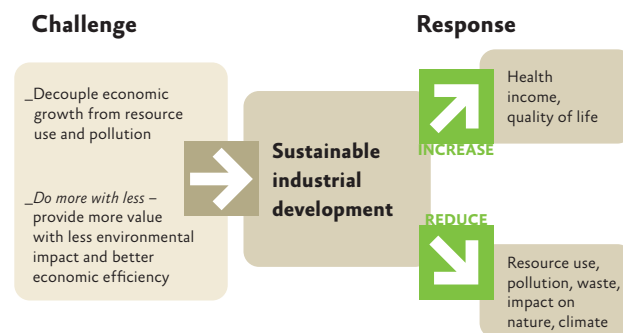
### 2.5.2 RESOURCE PRODUCTIVITY: INSUFFICIENT PROGRESS

Assessing the extent to which an economy has achieved green growth requires an understanding of so-called "decoupling" (see Box 2).

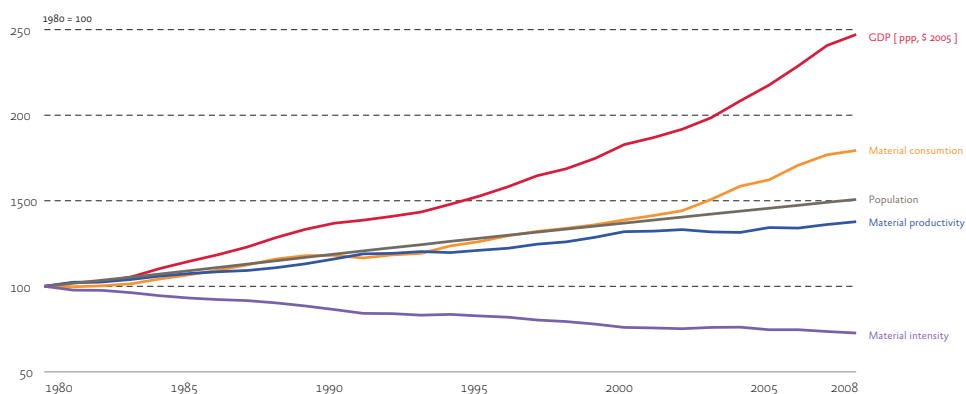
#### The concept of "decoupling"

In the context of resource productivity, decoupling refers to the amount of materials used in relation to economic output. According to UNEP (UNEP, 2011) "resource decoupling means reducing the rate of use of (primary) resources per unit of economic activity. This 'dematerialization' is based on using less material, energy, water and land resources for the same economic output. Resource decoupling leads to an increase in the efficiency with which resources are used."

Two types of decoupling need to be distinguished. *Relative decoupling* means that material consumption is increasing at a pace slower than economic output. This is a good start towards sustainable development but not sufficient in the long term, as environmental pressures continue to increase. Given that environmental pressures are already above sustainable levels on the global scale, *absolute decoupling* must be the objective, in particular for the high-consuming rich countries. This can be achieved when GDP grows while material use and associated environmental pressures decrease in absolute terms. On the other hand, growth in material consumption will be necessary for poor countries, in order for them to achieve at least minimum acceptable material



**FIGURE 5**  
Decoupling strategies  
for sustainable industrial  
development.  
Source: UNIDO, 2011.



**FIGURE 6**  
Growth rates of population, GDP, material consumption and material productivity and intensity. Source: Dittrich et al., 2012.

standards, which is needed not only to meet basic needs but to allow for a decent quality of life. However, globally and in the medium term, an absolute decrease of material consumption should become the main benchmark for green growth.

Decoupling has been in the core of the work of the International Resource Panel initiated by UNEP (see, for example, UNEP, 2011) and is also a core concept of the United Nations Industrial Development Organization's (UNIDO) Green Industry initiative. The following figure provides a summary of the decoupling concept as implemented by UNIDO.

According to this approach, sustainable industrial development can be achieved by de-coupling economic growth from the use of natural resources and by increasing efficiency through producing more economic value with less environmental impacts.

## 2 THE CONCEPT OF DECOUPLING

Figure 6 illustrates to what extent the global economy has achieved de-coupling over the past 30 years.

### ECONOMIC GROWTH OVER-COMPENSATES EFFICIENCY GAINS

Between 1980 and 2008, the world economy increased the amount of economic value created per unit of consumed material by about 40%. Or to put it differently: material intensity of each dollar fell by around one third. Significant progress was thus achieved with regard to resource productivity. However, global GDP grew significantly faster (almost 150% in the past 30 years). Therefore, on the world-wide level, efficiency gains were overcompensated by economic growth, explain the almost 80% absolute increase in material consumption. So far, no sign of absolute decoupling (or dematerialisation) can be observed.

The performance of countries with regard to resource efficiency and de-coupling in the past 30 years varied significantly. The

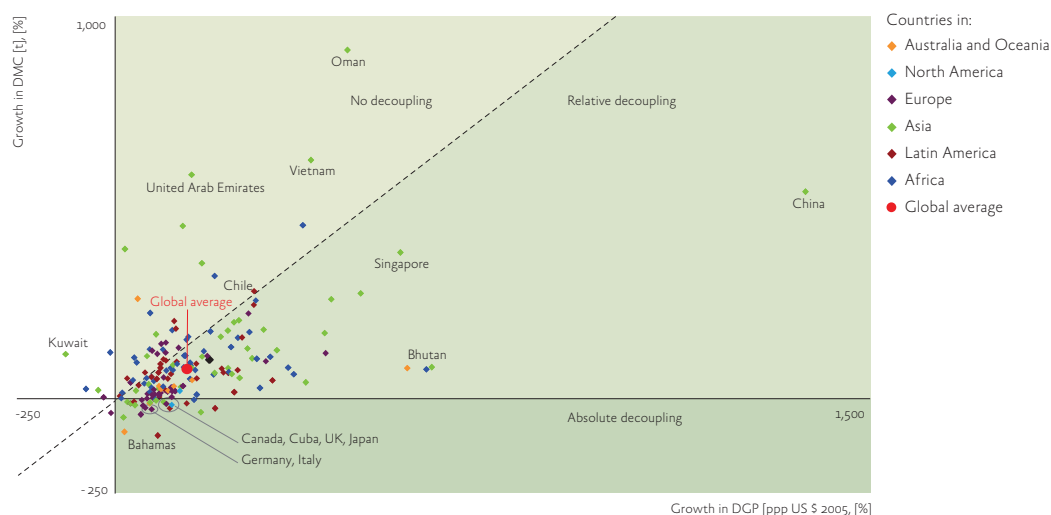
following figure shows the growth rates in per capita GDP (x axis) plotted against the growth rates in per capita material consumption. The indicator for the latter is Domestic Material Consumption (DMC), which is calculated as the domestic extraction of materials plus the mass of imports minus the mass of exports (all expressed in tonnes).

Countries which find themselves directly on the diagonal line (e.g. Chile), have increased both GDP and DMC at the same rate between 1980 and 2008. Below that line are all countries whose GDP increased faster than their material consumption and who thus achieved a relative decoupling. Altogether, relative decoupling was the dominant trend across countries worldwide over the period, including the world economy as a whole. Absolute decoupling, i.e. GDP growth and falling material consumption, was less common. Among the 34 OECD countries, only Canada, Germany, Italy, Japan, and the UK achieved an absolute decoupling (Dittrich et al., 2012).

### ABSOLUTE DECOUPLING A DIFFICULT GOAL

However, it is important to emphasize this does not necessarily signify green growth, but could also be the results of outsourcing material-intensive production to other parts of the world. Those aspects of dislocated environmental pressures through trade are not covered by the currently available global data on material consumption and would require more comprehensive indicators which reflect materials embodied in trade. It is also obvious that absolute decoupling was only possible in countries with relatively low economic growth. At higher growth rates, huge improvements in material productivity would be required to achieve absolute decoupling. In some countries, growth in material consumption outstripped even GDP growth (e.g. Vietnam, the UAE and Kuwait).

### OUTSOURCING ENVIRONMENTAL BURDEN FACILITATES DECOUPLING



**FIGURE 7**  
Trends in GDP and DMC  
growth, 1980-2008.  
Source: Dittrich et al., 2012.

In general global dynamics during the past thirty years have shown that economic growth entailed increased material extraction and consumption. Although most countries made improvements in material productivity, the current amount of used materials and the continued unequal distribution of consumption between different world regions are far from being sustainable. Some current trends are extremely alarming. The development process itself and the perpetuation of highly material-intensive life-styles in rich countries and in an increasing number of emerging economies require large amounts of resources. The quantities are so huge that this model of development cannot realistically be provided for all humans. Many countries with a relatively higher performance of material use and resource productivity achieved this by outsourcing their material-intensive economic activities. Those countries which increased their activities in material intensive economic sectors had a worse performance. Nevertheless, both developments are two sides of the same coin in the interlinked system of international specialization and trade.

#### “GREEN” AS A SYNONYM FOR ALTERNATIVE POLITICAL DISCOURSES

“green” initiatives, championed by international organizations and national governments. Those new “green” terms are thus a relatively recent addition to the international environment and development regime as a response to the lack of traction with “sustainable development”.

## 2.6\_EXISTING RESPONSES TO THE CRISIS: NEW “GREEN” CONCEPTS

From around 2007 onwards, in the context of the global financial crisis, political and economic discourse has been reinvigorated by a proliferation of various

The three most important concepts introduced in this context are “Green Growth”, “Green Economy” and “Green Industry”. The differences between those concepts may appear to be merely semantic, and indeed, they are closely related concepts. However nuances in their definition can lead to a different focus of emphasis and this is practical, considering the differing levels of development of countries around the world and their differing developmental needs. What these various terms have in common is their overarching objective to influence and thereby alter the prevailing political discourse to transform the financial, economic and ecological crisis into win-win situations.

The following sections outline the main “green” concepts and some of the initiatives to support them.

### 2.6.1\_GREEN ECONOMY

In 2008, the United Nations Environment Programme (UNEP) launched the Green Economy Initiative. UNEP defines green economy as an economy which “results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.”

#### IMPROVING HUMAN WELLBEING WHILE REDUCING ENVIRONMENTAL RISKS

The objective of the Green Economy Initiative is to motivate policymakers to support increased investments in environmentally significant sectors such as renewable energy, clean technologies, energy-efficient buildings, public transport, waste management and recycling, and sustainable management of land, water, forests, fisheries and eco-tourism. A ma-

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### UNIDO's Green Industry Platform

The Green Industry Platform acts as a forum for catalyzing, mobilizing, mainstreaming and scaling up concrete and measurable action on Green Industry around the world. It provides a framework for bringing together governmental, business and civil society leaders to secure concrete commitments and mobilize action in support of the Green Industry agenda. By encouraging the more efficient use of energy and raw materials in manufacturing processes and services, as well as the reduction of negative environmental impacts of manufacturing, the Platform will contribute both to cleaner and more competitive industrial development, and will help reduce pollution and reliance on unsustainable use of natural resources.

3\_UNIDO'S GREEN INDUSTRY PLATFORM

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#### 2.6.4\_COMMON FEATURES OF ALL "GREEN" INITIATIVES

The various new "green" concepts are broad and can be applied differently in different contexts depending on the various needs. This flexibility can have both positive and negative outcomes. Whilst flexibility is needed to accommodate to different national and regional circumstances this also leaves it open to "green washing".

For the purposes of simplicity and the way in which the "green terms" have evolved over the space of the last years, we shall rely on the following guiding principles to guide the discussion in this book:

- \_ Emphasis and respect of the role of natural capital for future development.
- \_ Efficient use of natural resources and reduction of negative environmental impacts.
- \_ Reduced consumption, in particular in the early-industrialized countries.
- \_ Emphasizes on the well-being of all people within the carrying capacity of the world's biosphere.

#### RESOURCE EFFICIENCY AND HIGH QUALITY OF LIFE AS COMMON FEATURES "GREEN" INITIATIVES

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In general, it is important to note that in addition to strong economic and environmental arguments, it is equally important to address the social dimension of sustainable development and augment the quality of life. Those three key pillars are also the core of the three headline targets discussed in the next chapter. countries, the lack of highly skilled labour continues to be a challenge. Better access to environmental technologies including training and funding can be major source for new market opportunities.

A strong policy framework will however be needed to provide a level playing field for economic activity while safeguarding natural resources. This requires setting clear and binding environmental targets and limits of both resource use and emissions based on scientific evidence of planetary boundaries and wider societal trends. But decoupling economic development from environmental degradation also calls for a combination of supporting policies, technological innovations and important lifestyle changes. Lifestyle changes will be key to bring economies onto a less resource-intensive and competitive path. These will be explored in the following chapter.



major operational element of a green economy approach thus is its emphasis on shifting policies and public and private investments towards clean technologies, and strengthening ecosystem services, the natural resource base, education, health services and institutions to ensure social protection and equity.

To achieve this objective, the initiative focuses on demonstrating the contributions that green investments can make to the growth of income and jobs, and to improved access by the poor to clean energy, safe water and sanitation, apart from reducing environmental pressure. The Green Economy Report, published in 2010, demonstrates how greening the economy can be a new engine for growth, a net generator of decent jobs and a vital strategy for the elimination of persistent poverty.

In 2012, the Business Case for the Green Economy report builds on a multi-stakeholders dialogue promoted by UNEP with businesses, governments and civil society organizations (held in 2011) and their understanding of the contribution of the private sector to greening the economy. The report also reflects UNEP's experience in resource efficiency and green economy activities with the private sector and along the value chain through eco-innovation, design for sustainability, risk management, clean technologies, sustainable goods and services, supply chain management and sustainability reporting.. The UNEP Green Economy reports, as well as activities in the resource efficiency area will help underpin the operations of the Green Industry Platform (see section 2.6.3).

#### 2.6.2 GREEN GROWTH

Since 2009, the OECD has been actively discussing on a green oriented growth concept. Many strategies around "Green Growth" are influenced by the „Green Growth Declaration“, which decided the OECD Ministers at their meeting in June 2009. The primary aim was to overcome the global financial crisis by "green investments" that were part of the global investment programs. The OECD has also contributed to set up the Global Green Growth Institute which is supported by a number of governments and which has been created to advise countries on its implementation (see <http://www.gggi.org/about/overview>).

#### SUSTAINABLE RESOURCE USE AS A POTENTIAL DRIVER OF GROWTH

Recently, the World Bank has also published a report on "Inclusive Green Growth" (World Bank, 2012). The World Bank states that rapid economic growth on the one hand is necessary to meet the urgent development needs of the poor. On the other hand, growth will be unsustainable, if it fails to be socially inclusive and green.

Green Growth thus presents an alternative to the conventional economic paradigm of resource exploitation and is built around a concept of growth that integrates concepts such as the sustainable use of natural resources including greater energy and resource efficiency and improved natural capital as a driver of growth.

The OECD's (2011) definition integrates the economic growth concept with an emphasis on the economic aspect of "natural assets", though introducing the concept of "well-being." The emphasis is on the continuation of economic growth, valuing natural capital with a focus on innovation and competition though with an explicit reference to "well-being." Thus, the OECD strategy only refers to the intersection of the economy and the environment – so, only two of the three pillars of sustainability are addressed.

#### INDUSTRIAL PRODUCTION WITH REDUCED ENVIRONMENTAL IMPACTS

#### 2.6.3 GREEN INDUSTRY

The Green Industry Initiative, launched by UNIDO can be considered the sector strategy for the manufacturing and associated sectors to achieve a Green Economy. Green industry is defined by UNIDO as "industrial production and development that does not come at the expense of the health of natural systems or lead to adverse human health outcomes." Its objective is the mainstreaming of social and environmental considerations into the operations of enterprises in all countries and regions of the world through the more efficient use of energy and raw materials, innovative practices and applications of new green technologies.

Green industry is particularly relevant for developing and emerging economies which are transitioning their economies and which can either choose to go down the traditional "brown" resource intensive path, or the greener path. Green industry is a rapidly expanding and diverse sector that covers all types of services and technologies that help to reduce negative environmental impacts and resource consumption. This includes material recovery, recycling, waste treatment and management, as well as the provision of environmental and energy consulting and services, such as energy service companies and companies that provide monitoring, measuring and analysis services.

The initiative was first announced in September 2009 by UNIDO Director General Kandeh K. Yumkella at the International Conference on Green Industry in Asia in Manila, Philippines. Building on the outcome of this conference and the follow-up conference in Tokyo, Japan, in November 2011, UNIDO and UNEP are now implementing the Initiative through a global, high-level, multi-stakeholder action partnership, known as the Green Industry Platform.



*New Orleans after  
Hurricane Katrina,  
Louisiana, United States.*

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*Sanlúcar la Mayor  
solar thermoelectric power  
station, near Seville,  
Andalusia, Spain.*

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# 3\_ A SUSTAINABLE FUTURE: VISIONS, TARGETS AND INDICATORS

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## BUSINESS AS USUAL IS NOT AN OPTION ANYMORE

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In view of global phenomena such as economic crisis, climate change, resource scarcity and increasing global inequalities, it becomes obvious: business as usual is not an option anymore. Rather than pushing further towards the limits of our planet, industrialized economies need to find ways that ensure a high quality of life for all while reducing consumption of natural resources drastically. This requires taking responsibility for human societies as well as natural systems that sustain human societies in order to preserve the freedom of action for our generation as well as for our children.

## QUALITY OF LIFE IS A COMBINATION OF OBJECTIVE LIVING CONDITIONS AND SUBJECTIVE WELLBEING

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A global vision for sustainable economic development thus puts high quality of life of all inhabitants of the planet as one cornerstone. Quality of life is a combination of objective living conditions and subjective well-being. Objective conditions mean resources and opportunities to meet needs and include, for instance, health, education, income, political voice or environmental conditions. The possibility to feel well once attaining these objective conditions is the subjective part within quality of life (Rauschmayer et al., 2011). The most important needs of human life to flourish do not necessarily ask for a high resource input. By being aware of more such resource extensive strategies and behavioural patterns and by imple-

menting policy measures, which support such strategies, the resource use can be reduced while well-being can increase.

## A REDUCTION OF NATURAL RESOURCE CONSUMPTION BY AROUND A FACTOR OF 5 TO 10 IN THE MEDIUM TERM IS REQUIRED IN THE INDUSTRIALISED COUNTRIES

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As the second cornerstone, humanity needs to ensure that the environmental boundaries of our planet are not surpassed. The generalisation of the resource-intensive economic model in Europe and other developed parts of the world to all people in the future is neither environmentally possible nor can it be economically and socially sustained. The issue of resource consumption and material welfare is therefore inseparably linked to global justice and a fair distribution of global natural resources between all inhabitants of planet Earth. A reduction of natural resource consumption by around a factor of 5 to 10 in the medium term is required in the industrialized countries, in order to make the environmental space available for other world regions to increase their material welfare.

Those cornerstones for a vision are also reflected in recently adopted policy documents at the global and European level. For example, in the context of the Rio+20 Summit, representatives from governments, the private sector, NGOs and research from all around the world formulated a common vision:

*“We recognize that poverty eradication, changing unsustainable and promoting sustainable patterns of consumption and production and protecting and managing the natural resource base of economic and social development are the overarching objectives and essential requirements for sustainable development.”* (Our Common Vision, UN, 2012).

Rio+20 thus contributed to the global acceptance of the challenges facing sustainable development that ensures access

to basic human needs in all parts of the world, now and in the future. The challenges addressed in Rio were the limited planetary resources (fresh water, land, etc.), the growing world population and the increasing gap between the resource use of the rich and the poor. It was concluded that in order to handle these challenges and ensure equal access to resources required to meet the needs for subsistence for all people on this planet, especially the industrialized countries need to change their behavioural patterns which are currently leading to overconsumption and pollution.

This vision combines environmental, social and economic dimensions of sustainability under the umbrella of macro-economic resource efficiency. Knowing what kind of future is wanted by the society enables the development and implementation of measures, such as eco-innovation efforts and societal transformations, to be directed toward that future.

### 3.2\_AMBITIOUS TARGETS FOR REALISING THE VISION

In order to turn the vision outlined above into reality, especially the high-consuming regions in the world, such as Europe, the United States, Japan or Australia have to play a pro-active role. To do so, ambitious targets for all three dimensions need to be defined: the economic, the social and the environmental.

Three key targets can be derived from the cornerstones of the long-term vision to be reached by 2050:

- 1\_An inclusive and competitive economy
- 2\_A high quality of life for everybody
- 3\_A reduction of natural resource consumption within global environmental limits

'GREEN'  
ECONOMIC  
GROWTH WILL  
NOT REDUCE  
POVERTY,  
IMPROVE  
EQUALITY AND  
PRODUCE HIGH-  
QUALITY JOBS

#### 3.2.1\_TARGET 1: AN INCLUSIVE AND COMPETITIVE ECONOMY

An economy, which drastically reduces the number of poor people, increases social equality and which promotes the integration of those suffering from social exclusion is possible. It should be the goal of every economy to enhance the well-being of all people living on this planet, regardless of where they live in

the world. However, our economy as it is currently organized, does not succeed in achieving this. If the economy is understood as a means to enhance well-being, it needs not only to be environmentally sustainable but also socially and economically viable. We need to realize, that 'green' economic growth will not reduce poverty, improve equality and produce high-quality jobs, unless it is also 'inclusive' and 'competitive'.

Given the increasingly challenging social situation of high unemployment, the aging-population, social inequalities, poverty, pressures on social security systems, etc. and the related deterioration of living standards, it seems even more important that an 'inclusive economy' is an integral objective of any green economy. An inclusive economy needs to be guided by deliberate policies and a strong ethical framework, which can help to secure a healthy and reliable food supply, decent work and living conditions, strengthen social and community networks, provide high-quality education, and offer individuals and groups the ability to develop personally.

CREATE MORE  
AND BETTER JOBS  
FOR ALL PEOPLE  
BELONGING  
TO THE WORKING-  
AGE POPULATION,  
PARTICULARLY  
WOMEN, AND  
YOUNG PEOPLE

One important aspect of an inclusive and competitive economy is its ability to create more and *better* jobs for all people belonging to the working-age population, particularly women, young people and older workers. This implies an increasing employment rate and paves the way towards a more equal distribution of employment. However, an inclusive economy should not only increase the quantity of employment by providing

more jobs, but also the quality of employment. This implies a modernization of labour markets and welfare systems with the ultimate aim of ensuring decent working conditions and includes job and income security, social services, operational safety, work-life balance, gender equality, qualification and job satisfaction (Ax, 2009).

Education and qualifications are among the key topics related to the aim of increasing quality of work. Especially in these times of profound social and economic changes in the labour market, promoting inclusive growth also means helping people of all ages to anticipate and manage change through *investment in skills & training*. Education has to become attainable for everyone, whether rich or poor, whether old or young.

An inclusive economy also ensures that the *benefits of growth reach all* parts of the society in all regions of the world. Hence, economic development should mobilize support to help people from different social classes and different global regions to participate, get training, find a job and have access to social benefits.

Inclusive growth is therefore a necessary prerequisite for guaranteeing respect for the fundamental rights of people experiencing poverty and social exclusion. It enables them to live in dignity and take an active part in society. Only promoting the inclusiveness of economic development can reduce disparities among social classes as well as global regions and make sure that the benefits of growth are within reach for all.



A COMPETITIVENESS SUPPORTING ECONOMIC ENVIRONMENT CAN BE ESSENTIAL IN HELPING NATIONAL ECONOMIES TO WEATHER BUSINESS CYCLE DOWNTURNS

*Competitiveness* is another key target to reach this goal. Especially in difficult economic times, decision makers often serve short-term urgencies and forget about the importance of long-term competitiveness. The result is an increasingly unsustainable and instable economy that generates social distress and environmental damage. A competitiveness supporting economic environment can be essential in helping national economies to weather business cycle downturns and ensure that the mechanisms enabling solid economic performance now and in the future are

in place. Hence, a competitive economy is characterized by factors driving the productivity enhancements on which a society's present and future prosperity is built (WEF, 2009).

According to the Global Competitive Report 2009-2010, competitiveness is defined as "the set of institutions, policies, and factors that determine the level of productivity of a country. The level of productivity, in turn, sets the sustainable level of prosperity that can be earned by an economy" (WEF, 2009). In other words, more competitive economies tend to be able to produce higher levels of prosperity for their citizens.

Thus, economies with foresight, that renounce financial short-termism and exploit the opportunities of 'green markets', have the chance to gain a competitive advantage. They will benefit from the creation of new jobs, higher GDP in the medium term, improved returns on investment and reduced individual and collective risks. In the meantime competitive economies stimulating the development of green markets also strengthen environmental, social and human capital.

QUALITY OF LIFE IS DEFINED AS "SUBJECTIVE WELL-BEING AND PERSONAL GROWTH IN A HEALTHY AND PROSPEROUS ENVIRONMENT"

3.2.2\_TARGET 2:  
A HIGH QUALITY OF LIFE  
FOR EVERYBODY

As mentioned in the beginning of this section, the final aim for a sustainable society is to increase people's quality of life. Quality of life is defined as "subjective well-being and personal growth in a healthy and prosperous environment" (Lane, 1996).

This requires being able to transform individual capabilities and opportunities into *strategies* that meet one's needs and feel well about it.

Needs per se are neutral and universal, neither sustainable nor unsustainable. Different lists of needs have been defined. Most popular is Maslow's pyramid of needs. Another list,

which has been empirically developed, has been introduced by Max-Neef (1991) who groups needs into the categories of subsistence, protection, affection, understanding, participation, leisure, creation, identity, freedom and transcendence. Individual strategies chosen to meet those needs depend on one's socialisation, the values of the society one is living and his/her own values, available opportunities, resources, culture, habits, or preferences and are using more or less resources.

The aim of enabling a high quality of life for everybody now and in future is endangered - in the poor countries as well as in the industrialized world. The reasons however differ strongly.

The majority of the world's population is far from meeting all even their basic needs such as food, water, shelter and clothing. This is due to the fact that the rich part of this world is using most of the resources (see the target below). Thus their quality of life is low due to a *lack of resources and chances*.

PEOPLE SUFFER INCREASINGLY FROM STRESS, DEPRESSION, BURN-OUT, OBESITY, OR LONELINESS

In the early industrialized parts of the world on the other hand, people suffer increasingly from *affluence*. They experience stress, depression, burn-out, obesity, or loneliness. Although, from a material point of view, the needs are met, more and more people do not feel well.

As mentioned above, a third reason for endangered quality of life is the injustice between and within countries, the increasingly unfair distribution of resources and chances.

How can we – under these circumstances – achieve the target of a high quality of life for everybody now and in the future?

Many surveys and research on quality of life have consistently shown that once the basic needs are met, social relations, freedom and health, are essential to well-being. It is only to a certain extent dependent on income and material consumption. Above this, well-being cannot so much be increased by income and wealth, but by meeting needs such as creativity, identity, affection or transcendence by rather immaterial strategies. Thus it is evident that a high quality of life is possible by using fewer resources.

The target of a high quality of life requires (1) a new paradigm in politics, society and economy that supports the awareness of people using rather immaterial strategies as well as policies enabling the supply of such lifestyles and (2) frame conditions that allow everybody to have opportunities to live the life they chose to, within the boundaries given by available resources and the need for justice globally and inter-generationally.

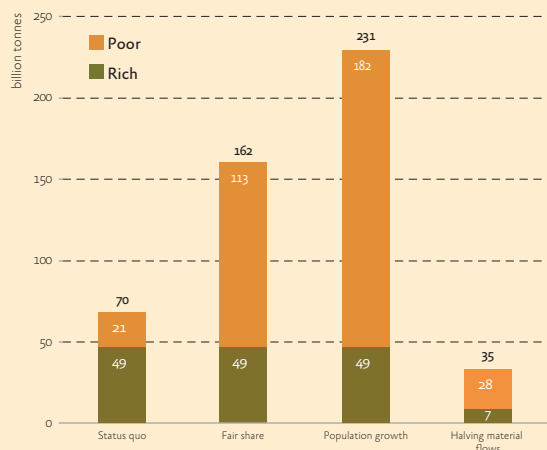
### 3.2.3 TARGET 3:

#### SUSTAINABLE USE OF NATURAL RESOURCES

Although the environmental and economic problems related to the current production and consumption system are already fully apparent, only around 30% of world population with high purchasing power (both in industrialized and emerging economies, to a small extent also in developing countries) benefit from global resource trade; 70% of world population still live in material poverty with an income of below 10 USD a day.

While already current levels of material consumption are surpassing the boundaries of the global ecosystems, developing countries are (legitimately) demanding further growth and material consumption in the future, in order to ensure poverty alleviation and a higher material welfare. At the same time, world population will inevitably grow to 9 or even 10 billion people in 2050, which will further increase the pressure on the global environment.

The following figure 8 provides different scenarios for global material consumption.



**FIGURE 8**  
Different scenarios for global material consumption (in billion tonnes), own estimations based on Dittrich et al., 2012

Currently, around 70 billion tonnes of material resources are extracted and used by the world economy each year. The majority, around 50 billion tonnes, is consumed by the fraction of world population with high income. Only around 20 billion tonnes remains for the low-income part, in particular in developing countries. To ensure an equal level ("fair share") with inhabitants of the rich countries, global material use would have to more than double and more than triple if population growth

is taken into account. Given that already today, humanity is putting pressure on the ecosystems beyond its carrying capacity (see Chapter 2 above), this trajectory clearly is not an option. To be on a safe corridor on the global scale, humanity needs to reduce environmental pressures related to natural resource use by around 50% from today's level (Schmidt-Bleek, 2009). Given that all people should in principle have the same right to use the resources the planet provides, this translates into a strong absolute reduction for the rich parts of the world (around a Factor 7 until 2050), while the poorer part of world population could still increase its absolute level of material consumption.

### 3.3\_A SUSTAINABILITY CORRIDOR FOR ACHIEVING THE TARGETS

Achieving the three targets laid out before requires an integrated approach. On the one hand, the challenge of reducing unemployment is one of the most serious social concerns in Europe and worldwide. The number of people employed increases only if during a given period the economy grows faster than the average labour productivity.

THE NUMBER OF PEOPLE EMPLOYED INCREASES ONLY IF THE ECONOMY GROWS FASTER THAN THE LABOUR PRODUCTIVITY

Employment can only increase if the increase in labour productivity per hour is smaller than economic growth - otherwise the working time must decrease to offset increases in the labour productivity per hour.

If we accept on the other hand that we are already close to (or even beyond) the limits of nature's carrying capacity, following the precautionary principle industrial economies must reduce their resource consumption in absolute terms (dematerialisation). With economic growth, this implies to increase resource productivity. Or in other words: economic growth can only be environmentally sustainable, if it is accompanied by resource productivity increases that substantially exceed the rate of economic growth. From that point of view it is important to see that in the rich parts of the world economic growth is less and less contributing to individual well-being.

ECONOMIC GROWTH CAN ONLY BE ENVIRONMENTALLY SUSTAINABLE, IF IT IS ACCOMPANIED BY RESOURCE PRODUCTIVITY INCREASES.

Combining the two relations of resource productivity and labour productivity with economic growth, we can derive the following corridor for sustainability: green growth is only possible, if the increase in labour productivity is smaller than the growth of GDP and if the growth of GDP is at the same time substantially smaller than the increase of resource productivity. This creates a clear trade-off between the environmental and

employment perspective. An environmentally sustainable path requires slow economic growth, whereas strong economic growth is necessary to reduce the unemployment rate. Labour productivity is decreasing with reduced working time. Hence (voluntary chosen) part time jobs reduced yearly working time and other forms of working time reduction (e.g. sabbaticals) can be seen as a solution for this trade-off (see also Section 6.1.2 for a more detailed discussion). However, differences on the sector level will also be important for the transition to a green economy. This transition will create new jobs in certain sectors (such as renewable energy), as those sectors are more labour intensive than other economic sectors.

#### A STRONGER INCREASE OF CAPITAL PRODUCTIVITY COMPARED TO LABOUR PRODUCTIVITY AUGMENTS EMPLOYMENT

However, there is another key area to address, namely the question of capital productivity. An increase of capital productivity means that for a given level of production less capital is needed. Fostering labour productivity augments the capital intensity of the economy and by this reduces employment. Correspondingly, a stronger increase of capital productivity compared to labour productivity augments employment. Or the other way around:

For a given rate of capital accumulation, more employment can only be generated if the growth rate for labour productivity is smaller than the growth rate for capital productivity.

The direction of investments and innovation into environmentally friendly instead of labour-saving technologies can support the maintenance of natural resources but also create jobs in “green” industries. Therefore it is not an increase in labour productivity but in capital and resource productivity that is the key strategy to make economic growth both ecologically and economically more viable (Hoedl, 2011). In addition, shift in investment patterns will be required for the transition to a green economy (UNEP, 2012).

#### TO TURN TO A MORE SUSTAINABLE ECONOMY, RESOURCE PRODUCTIVITY AND CAPITAL PRODUCTIVITY RATHER THAN LABOUR PRODUCTIVITY MUST BE AUGMENTED

Because we cannot assume that in the future labour productivity will grow in the same way as in the past (e.g. due to an increase of labour-intensive service sectors such as care and education) and also because the necessary economic growth for its increase cannot be guaranteed, it is a key strategy to increase investments in resource productivity.

High economic growth can no longer be considered as the adequate approach to solve environmental and economic problems. To turn to a more sustainable economy, resource productivity and capital productivity rather than labour

productivity must be augmented, so that less natural capital is needed for a desired level of economic welfare. This would also alleviate the pressure to maintain high levels of economic growth.

### 3.4 MEASURING TARGET ACHIEVEMENT

In order to monitor the economic, environmental and social development towards the attainment of the three key targets above, appropriate indicators are needed. To distinguish them from a larger number of existing so-called headline indicators, these “big three” indicators are called “frontpage indicators”.

Certainly Gross Domestic Product (GDP) per capita is the most appropriate indicator to measure economic prosperity. To monitor quality of life, Subjective Well-Being (SWB) can serve as a social frontpage indicator, while Total Material Consumption (TMC)<sup>1</sup> per capita is an appropriate environmental frontpage indicator. These three indicators provide directionally safe information: higher GDP in general implies higher economic performance; higher SWB implies a higher social performance and lower material consumption implies reduced pressures on the natural environment. To monitor the success or failure of overarching policies ensuring smart, sustainable and inclusive growth (target 1) that promotes a high quality of life (target 2) through the reduction of natural resource consumption (target 3). This is essential to support political decision processes with more comprehensive information.

Frontpage indicators inform about broad development trends, not about details. Highly aggregated indicators also have disadvantages as they possibly illustrate unwanted negative effects in a positive manner. Examples are positive GDP effects after a natural disasters, which destroyed economic values, such as infrastructure; or a reduction of material consumption through a substitution of materials with large volume (e.g. energy from biomass) for materials with low volume, but higher environmental impacts (e.g. energy from uranium). Those special cases need to be monitored with additional indicators. So the three frontpage indicators need to be complemented by a broader set of more specific indicators, which allow monitoring specific economic, environmental or social issues such as distribution, poverty, education, employment, biodiversity, etc.

1. In addition to the indicator Domestic Material Consumption already mentioned above, Total Material Consumption includes the materials embodied in imported and exported products (“ecological rucksacks”) as well as so-called unused materials (e.g. overburden from mining activities).



*Motorway interchange  
near the Yokohama port,  
Honshu, Japan.*

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## 4\_ BUSINESS AND INDUSTRY

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AN ABSOLUTE  
REDUCTION  
OF RESOURCE  
USE IS POSSIBLE.  
THERE IS AN  
IMPORTANT  
MARKET FOR  
MORE  
SUSTAINABLE  
PRODUCTS.

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The recent financial crisis has, among other things, fuelled a vital debate about what constitutes a healthy economy. It has caused mainstream economic theory to come under question, and enabled the mobilization of concepts such as Green Economy. The Green Economy represents an innovative joining of economic and environmental arguments towards systemic change that has not been done before (EIO, forthcoming, 2013).

Political instability and scarcity of natural resources are seen to be the major risks many businesses have to deal with in the near future. In the UNEP report on the 'Business case for the green economy' it is stated that, "conventional methods to promote economic recovery are becoming more limited and therefore business and governments are seeking new ways to create long-term prosperity in a resource-constrained world" (UNEP, 2012a) (UNEP, 2012a). This becomes especially apparent when taking a look at PwC's recent 'sustainable growth survey'. Accordingly, one out of three CEOs surveyed said that their companies have fundamentally changed strategies due to the global recession (EIO, forthcoming, 2013). Thus, also businesses seem to be starting to respond to the increasing challenges.

One strategy, that has been widely applied, is improving resource efficiency. During the last few years many studies have been published focussing on the economic opportunities of

efficiency gains. While most studies have focused on energy efficiency, there is a growing tendency towards exploring the benefits of material efficiency in more detail. For instance, at the company level, annual savings associated with resource efficiency improvements in the UK have been estimated to grow from EUR 21,000 to EUR 60,000 per company with payback periods between 0.06 and 3.45 years (BIS, 2010). At the national level, estimations hold that material savings through efficiency improvements in the German manufacturing sector can add up to EUR 48 billion of annual savings (Schroeter et al., 2011). At the global level, it is estimated that USD 3.7 trillion (EUR 2.65 trillion) can be saved by 2030 through the implementation of 130 resource productivity measures and the adaption of a new legislative framework (no subsidies or energy taxes and a USD 30 carbon price) (EIO, forthcoming, 2013), (Dobbs et al., 2011). The Annual EIO Report (forthcoming, 2013) presents further examples of efficiency potentials, but also warns that so far few of the estimates have been based on dynamic modelling, meaning that for instance, possible rebound effects from efficiency improvements have not been considered. The efficiency efforts discussed focus almost entirely on incremental changes.

Another opportunity for companies sharing the concern of creating a resource efficient society is the 'green market'. The German Ministry of Environment and the Federal Environmental Agency calculated the value of the world's 'green market' to be about EUR 1 trillion in 2005 (EIO, forthcoming, 2013). It included action areas such as energy efficiency, material efficiency, sustainable mobility and recycling/reuse. Particularly, the growth in energy efficiency and water management markets are expected to be significant in the future.

Western countries, such as the EU, currently are the global leaders in exploiting the technological and economic opportunities entailed in green markets (EIO, forthcoming, 2013). This places European businesses in a strong strategic position to



support the building of green markets abroad, especially in Asia, Latin America and Africa. The results of several publications, e.g. “The Fortune at the Bottom of the Pyramid” by Prahalad (2004), have shown that in recent times the world’s poor have untapped buying power and that serving these markets can generate profits for companies and help to eradicate poverty. Eco-innovation is one of the tangible contributions to this strategy. Since Europe is a leader in eco-innovation, the diffusion of eco-innovation to other parts of the world represents a significant economic opportunity for European companies. This opportunity does not only have the potential to boost economic and technological development, but also to contribute to the ecological modernisation process that has begun to take place in emerging economies (EIO, forthcoming, 2013).

**“ECO-INNOVATION IS THE INTRODUCTION OF ANY NEW OR SIGNIFICANTLY IMPROVED PRODUCT (GOOD OR SERVICE), PROCESS, ORGANIZATIONAL CHANGE OR MARKETING SOLUTION THAT REDUCES THE USE OF NATURAL RESOURCES (INCLUDING MATERIALS, ENERGY, WATER AND LAND) AND DECREASES THE RELEASE OF HARMFUL SUBSTANCES ACROSS THE WHOLE LIFE-CYCLE.” (EIO, 2010).**

“having concrete targets for resource efficiency and sustainable supply can be a first step to achieving scale through industry associations and partnerships” (WEF, 2012).

In summary, a resource-efficient economy links economic, social and environmental pillars of sustainability. It implies that an economic system operating with the carrying capacity of the earth considering intergenerational equity is resilient over the

Opportunities to increase competitiveness in a resource-efficient economy may be widespread and far-reaching. Evidence from a number of recent reports reveals that companies who act on that opportunity will have an advantage (UNEP, 2012a), (WEF, 2012), (Sommer, 2012), (FORA, 2010), (UNIDO, 2011a). However, at the same time, some change-resistant companies as well as industries might not survive the transition to a resource-efficient economy.

Nevertheless, as described in Chapter 2, business-as-usual is not an option. In their report on scaling sustainable consumption and resource efficiency, the World Economic Forum points out that, “business-as-usual approaches to supply, demand and rules of the game are likely to create a major gap between what is needed for growth and the ability of our resource base and governance and policy structures to sustain prosperity” (WEF, 2012). It also stresses that resource targets such as the ones generally discussed in Chapter 3 are needed as an orientation for business. Hence, the imperative for change is clear, but the question is, how?

The World Economic Forum suggests that,

long term. For developed countries this means no sacrifices in life quality, but a shift in how their needs are met (e.g. more services, more eco-innovative products). For developing countries this means to get better access to eco-innovative technologies and extend services to a larger share of their population.

#### **4.1 IMPROVED RESOURCE PRODUCTIVITY: A LOW-RISK INNOVATION STRATEGY FOR COMPANIES**

In particular in OECD countries, but also increasingly in emerging and developing economies there is strong evidence that process innovations reducing natural resource use in companies save material and energy costs and can be achieved with relatively small investments.

Eco-innovation, any innovation that reduces the use of natural resources and decreases the release of harmful substances across the whole life-cycle, plays an important role in this endeavor. According to the EIO (EIO, 2012a) 27% of innovating companies in the EU increased their material efficiency as a result of implemented changes. Up to 45% of companies in the manufacturing, construction, agriculture, water supply and food services sector reported implementing eco-innovation between 2009 and 2011, with the majority achieving incremental type improvements in resource efficiency.

A comprehensive study of the German manufacturing sector (see also Box 4) has shown that metal was the material with the highest savings potential, resulting in an average of EUR 72,000 saved per company every year. Putting the material savings in relation to total material spending reveals a cost saving ratio of 0.57% for Germany.

In developing countries the joint UNIDO-UNEP Resource Efficiency and Cleaner Production (RECP) programme applies integrated and preventive strategies to processes, products and services in order to increase production efficiency, minimize impacts on the environment and support human development (UNEP, 2012a) (see case studies 2 and 3). RECP programmes are implemented through a network of National Cleaner Production Centres (NCPCs). NCPCs have been established in 47 developing countries and economies in transition. Information sharing, technical assistance and capacity-building via a worldwide network supporting NCPCs promotes the implementation of resource efficient, cleaner production across a wide range of industrial processes.

Cleaner production, which focuses mainly on process innovation that helps to render production of goods more efficiently, plays a significant part in eco-innovation. Eco-innovation has a wider notion and includes the development of new products, new business models, new behaviour of consumers, and new policy instruments and frameworks. The UNEP led European

Commission funded project ‘Resource Efficiency and Eco-Innovation’ promotes eco-innovation based on resource efficient, cleaner and safer production methodologies in emerging and developing countries. This will also include design for sustainability and policy analysis for eco innovation.

### Material savings in Germany

Experiences from the German manufacturing sector support that material efficiency is among the low hanging fruit in achieving resource efficiency. An analysis of around 100 companies having received support between 2006 and 2010 from the German Material Efficiency Agency demea to dematerialize. Demea supports especially SMEs, to identify material efficiency potentials by way of a consultancy programme. This includes a quantitative material flow analysis, examining economic saving potentials and describing measures and investments that are needed to decrease the use of natural resources. On average, companies saved EUR 196,000 annually, comparable to 2.3% of company annual turnover or EUR 2,900 per employee. Especially for micro companies relative savings were generally found to be very high, comparable to 11% of annual turnover. For large companies, relative savings were less impressive but absolute savings of EUR 350,000 were found to be possible. The analysis showed that investments pay-off within 13 months. Saving potential was most often identified to optimize processes including for new machinery and software, and also for personnel training.

4\_SOURCE: (EIO, 2012)

### Resource savings in African paper manufacturing and conversion company

Chandaria Industries Ltd is a leading Nairobi based paper manufacturing and conversion company. The company’s core business is tissue paper manufacturing through waste paper recycling and virgin pulp blending into hygiene grades that include toilet tissues, tissue napkins, paper towels, facial tissues, and recycling of cotton fibres into absorbent cotton wool.

The Resource Efficient and Cleaner Production (RECP) audit started in 2005 and has led to cost reduction, efficient resource use and improved environmental performance. As of 2008 the following improvements could be recorded:

- \_ Electrical energy consumption, mainly utilized in the paper mill, conversion, and cotton milling plants, stood at an average of 416,000 kWh/year but was reduced by 15% after RECP implementation.
- \_ The high water consumption in the paper and cotton mill plants has been reduced by more than 60%, equivalent to 150,000 m<sup>3</sup> annually.
- \_ Previously, all water used was discharged as effluent directly into the sewer system but there has since been a reduction of up to 150,000 m<sup>3</sup> of wastewater annually.
- \_ A reduction of biological oxygen demand from 750 mg/l to 380 mg/l has been achieved through effluent treatment and wastewater recovery and recycling.
- \_ Solid waste generated after improvements consists mainly of sludge

ABSOLUTE INDICATOR	CHANGE (%)
Resource use	
Energy use	-25
Materials use	-29
Water use	-63
Pollution generated	
Air emissions (global warming, CO <sub>2</sub> eq.)	24
Waste:water	-63
Waste	-60

estimated at 600 tonnes per year.

The company achieved these resource savings through no and low cost investment options such as sub-metering of electricity and water consumption, process monitoring, preventive maintenance programme, wastewater treatment and recycling. For example, as a water conservation measure, the company practices rain water harvesting and steam condensate recovery. To reduce effluent, wastewater is treated through the dissolved air flotation system and clarified water is recycled for reuse in production dilutions and improved shop floor cleaning. The company’s practices in waste management include waste segregation at source, quantification of generation levels, recycling of sludge for production of egg trays.

5\_SOURCE: (UNIDO, N.Y., A)

### Cleaner production and material savings in Asian coconut mill

Rathkerewwa Desiccated Coconut Industry was built in 1966 as a one of the first desiccated coconut mills in the North Western Province Sri Lanka.

With help from the Resource Efficient and Cleaner Production (RECP) programme the company could improve its raw material utilization efficiency, reduce the discharge of waste water and could recover most of the oil previously discharged with waste water. Relatively small investments in resource productivity led to significant cost-savings. The process improvements and results included the following:

- \_ A considerable amount of nuts were rejected daily due to mishandling when loading to trucks at the collection points and when unloading at the mill premises. The damage due to unloading was reduced by re-laying rubber carpets on cemented floor. This measure saved the mill USD 11,750.
- \_ To reduce the wastage at paring stage the wastage was quantified first and the peelers were made aware of the value involved. Waste was reduced by 18 tonnes. This measure gave the highest financial benefit with savings in the range of USD 94,500.
- \_ The reduction of wash water drastically reduced the pollution load of the treatment system by 42% and saved USD 6,600.
- \_ The fuel switching in the boiler from furnace oil to coconut shell saved USD 165,000 and reduced CO<sub>2</sub> emissions by almost 900 tonnes.

PRINCIPAL OPTIONS IMPLEMENTED	INVESTMENT (USD)	COST-SAVING (USD/YR)
Reduction of coconut kernel during peeling.	< USD 100	< USD 94,500
Reduction of water consumption through improved processes and cleaning.	< USD 500	< USD 6,600
Recovery of oil from coconut water in wast pits.	< USD 2,200	< USD 49,500
Switching fuel from fossil fuel to coconut shells.	< USD 1,450	< USD 165,000

After implementation of all cleaner production options the company's savings were above USD 200,000 for an investment of less than USD 5,000.

6\_SOURCE: (UNIDO, N.Y, B)

While current examples of resource savings are positive developments, they also suggest that a greater push for material efficiency is required to go beyond incremental, process-oriented innovations in companies and bring about substantial change towards real dematerialization.

#### HIGH PRICES FOR OIL AND COMMODITIES PROVIDE INCENTIVES TO INCREASE RESOURCE EFFICIENCY

The EIO (2012a) found that there is important growth potential especially in the waste management, water supply, wastewater management and recycled material market segments. Ecorys (2009) estimated that approximately 3.4 million people were employed by these eco-industry sectors in the EU-27 and that this had steadily grown since 2000 by 72%. Yet the use of end-of-pipe technologies alone

will not be sufficient to dematerialize. Investment, market and job opportunities for a greener economy can be harnessed in all sectors:

— **Agriculture:** While global sales of organic food and drink approached USD 60 billion by 2010, with revenues having tripled since 2000 (Van der Lugt, 2012), it is estimated that this market will further grow by 50% until 2015 (Market Line, 2011).

— **Energy:** The waste to energy market is estimated at USD 20 billion in 2008 and is expected to grow by 30% by 2014 (Van der Lugt, 2012). Global revenues for companies involved in the renewable energy markets are projected to rise to more than USD 300 billion annually by 2020 (UNEP, 2012a).

— **Natural and organic beauty products:** The Organic Monitor reports that global sales of natural and organic beauty products reached about USD 9 billion in 2011, and predicts that its revenues would reach USD 14 billion by 2015 (Van der Lugt, 2012).

— **Eco-tourism:** This market is estimated to have reached USD 64 bn. in 2010 (Van der Lugt, 2012) and the number of international tourist arrivals worldwide is expected to increase by 3.3% a year on average from 2010 to 2030 (UNWTO, 2012).

Companies already begin to experience the effects of ecological scarcities. The declining stocks of non-renewables such as metals and minerals, but also those of renewable resources such as fresh water and others have led prices to experience high volatility. The oil prices especially have shown significant fluctuations during the past couple of years. During the first half of 2008, oil prices set records, jumping to a high of over USD 147 per barrel in July. Oil prices then fell sharply in the second half of 2008 at the outset of the global financial crisis, plunging to less than USD 40 a barrel by December 2008 (Johnson, 2011). Prices started rising again gradually over the next three years, and have averaged around USD 110 a barrel in 2012 (The Economist, 2012). Also lumber prices have been characterized by strong fluctuations during the last years. After collapsing during the financial crisis of 2008, lumber prices have risen and fallen constantly. In 2012 lumber prices have gone up by over 30% from the previous year and average at 2010 highs (WRI-ltd, 2012).

High prices of natural resources and expected further shortages can lead companies to take further action to use natural resources more efficiently. According to the World Resources Institute and AT Kearney (Callieri et al., 2008) natural resource constraints can lead to a decline in Earnings before Interest and Taxes by 19-47 per cent by 2018 for consumer goods companies, if no strategies are adopted to mitigate that risk. JPMorgan (2008) analyzed, for example, that water is a material cost in semiconductor manufacturing. Purified water is used for washing and cooling throughout the production process. In 2007, the two largest semiconductor companies Intel and Texas instruments used over 11 billion gallons of water in the production of chips. Both Texas Instruments and Intel have invested in water reuse systems to assure supply.

#### BUSINESS AND INDUSTRY'S VOLUNTARY ACTION CAN MAJORLY IMPROVE RESOURCE PRODUCTIVITY.

In addition to high prices other pressures have considerable effect on business and drive eco-innovation. Regulatory measures such as the successful implementation of the Montreal Protocol with accompanying measures have changed whole supply chains pushing companies to innovate and become more resource efficient. The implementation of the Montreal Protocol created a big market for products and equipment that replace ozone depleting substances, in addition to the related consulting services. For example, industry has developed a wide range of technologies to replace ozone depleting substances including those based on natural refrigerants, hydrofluorocarbons

and approaches that avoid unnecessary cooling requirements. The success of the Montreal Protocol is undeniable: 98 per cent of all chemicals it controls were phased out by the end of 2009 (UNEP, 2012a).

Other regulatory measures that have had considerable impact on business and their use of natural resources were the European Emission Trading Scheme enacted in 2005. While not all reductions might be attributable to the Trading Scheme, in 2010, emissions of the EU-15 Member States stood 11% below their level in Member States' chosen base years (1990 in most cases). In 2020 emissions are estimated to be 21% lower than in 2005 (European Commission, 2012).

#### REGULATORY MEASURES SUPPORT BUSINESSES' REDUCTION OF NATURAL RESOURCE USE

Even prior to the enacting of these international policy frameworks and instruments, businesses had adopted a number of tools to measure their environmental performance and set resource efficiency goals. Environmental management systems have been one of the most prominent ways to improve environmental performance, while often yielding cost-savings.

The number of organizations that participates in the EU Eco-Management and Audit Scheme (EMAS), a management tool for organizations to evaluate, report and improve their environmental performance, has increased constantly since its introduction in 1993. Today a total of 4,581 organizations participate in this programme. SMEs account for 59% of participating businesses (EMAS, 2012). This development highlights the important role of SMEs in driving environmental improvement in Europe.

On an international scale, European companies have been overtaken in their efforts to manage environmental performance by ISO 14001:2004, which gives the requirements for environmental management systems. At the end of December 2010, at least 250,972 ISO 14001:2004 certificates had been issued in 155 economies, a growth of 27 823 (+12%). China, Japan and Spain were the top three countries for the total number of certificates, while China, the United Kingdom and Spain were the top three for annual growth (ISO, 2011).

Voluntary action, including certification, has helped to decrease environmental impacts. In Africa one such example are the voluntary agreements between the Moroccan Ministry of Energy, Mines, Water and Environment and the cement industry, which helped to decrease environmental impacts, while contributing to the country's gross domestic product (see Box 7).

#### Moroccan Voluntary agreements to decrease environmental impacts

In the six-year voluntary agreement signed in 1997, the industry committed itself to integrating the environmental dimension in the choice of the location, equipment and industrial processes. In 1997 the costs of environmental damage and inefficiency were estimated at 15% of the sector's added value. Through the measures adopted to fulfill the voluntary agreements, such as ISO 14001 certifications, effective filtration systems, process optimizations, renewable energies, a reduced water and electricity consumption, and quarry reclamations, the costs fell to 3% by the year 2008. Between 1997 and 2008, the cement sector invested about EUR 230 million in environmental protection and thereby increased its contribution to Moroccan GDP from 0.61% to 0.74%. At the same time, environmental impacts fell from 1.41% to 0.19% of total environmental degradation. Thus, this voluntary agreement not only contributed to the return of the invested capital, but also for the well-being of the population of Morocco

7\_SOURCE: (UNEP, 2012A)

#### THE ZERO WASTE INTERNATIONAL ALLIANCE ENCOURAGES BUSINESSES TO REDESIGN THEIR RESOURCE LIFE CYCLES SO THAT ALL PRODUCTS ARE REUSED.

In Europe, there are several examples from the electronic industry where companies have signed voluntary agreements committing themselves to promote energy efficiency for washing machines, refrigerators, freezers and dishwashers. In 1999 the industry presented a unilateral commitment to energy saving for dishwashers to the European Commission. The overall target of the commitment was to reduce the specific energy consumption of household dishwashers by 20 per cent

by the end of 2002, related to the base case figures of 1996. Participants in this commitment represented more than 90 per cent of the European dishwasher market and close to 200 brands were affected (UNEP, 2012b). This is particularly relevant as the consumption phase of clothing and textiles accounts for much of the energy use over their life cycles.

In North America multi-stakeholder partnerships with industry and civil society, such as the multi-stakeholder process that led to the development of the LEED certification programme for buildings have had considerable impact (UNEP, 2012b). A study conducted by the New Buildings Institute (NBI) and funded by the U.S. Green Building Council with support from the U.S. Environmental Protection Agency analyzed measured energy performance for 121 LEED New Construction buildings. The results show that average LEED building energy use is 25–30% better than national average (Turner and Frankel, 2008).



While resource efficiency plays an important part in transitioning to a green economy, bigger steps are necessary. In some industries it has been proven possible to move towards closed loop systems. The European sugar industry is an example of an industry's success in using 100 per cent of its raw material, the sugar beet. While the industry processes 110 million tonnes of beets on a yearly basis, sugar constitutes only 16 per cent of this amount. Hence it uses the remaining components as follows: water, making up for 75% of the raw material is reused for beet washing, molasses making up for 3,5% is used as animal feed, beet pulp making up for 5% is used as animal feed and the remaining 0,5% of raw material is incorporated into sugar factory lime (UNEP, 2012b). Examples of individual companies that have set themselves zero waste targets can be found in the automotive and electronics industries (see Box 8).

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#### **Companies' zero waste targets and strategies**

The Subaru automaker company pledges that virtually none of the waste will wind up in a landfill. Copper-laden slag left over from welding is collected and shipped to Spain for recycling. Styrofoam forms encasing delicate engine parts are returned to Japan for the next round of deliveries. Even small protective plastic caps are collected in bins to be melted down to make something else. About 5% of its waste goes to a waste-to-energy plant that burns waste to make steam to heat Indianapolis' downtown (Subaru, 2005).

Another example of a company that turned waste into profit is Cisco. Its recycling unit has become a profit centre (Van der Lugt, 2012). Cisco, a producer of electronic products with global reach, provides end-of-life programmes that reduce the overall impact on the environment. These end-of-life programmes are designed to reuse or harvest the material commodities contained in the equipment collected and return those materials to the market where they are made into new products. Over 99% of the electronics sent for processing are recycled. This promotes efficient and sustainable production and consumption (Cisco, 2012).

8\_COMPANIES' ZERO WASTE TARGETS AND STRATEGIES

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#### **4.2\_NEW BUSINESS MODELS**

While companies have begun to increase their resource productivity, new business opportunities are opening up if sustainable development and resource efficiency represent the core of the business model. The joint UNIDO-UNEP RECP Programme emphasizes the importance of three dimensions within a green industry context: economic growth, environmental protection and human development. An innovative new business can be seen as a new rationale of value creation that an enterprise adopts in order to satisfy the changing needs of their customers. Innovative business models add new values to the old rationale in terms of growth, resource efficiency and social inclusion.

#### **FUNDING AND TECHNICAL ASSISTANCE ARE NECESSARY TO DRIVE ECO-INNOVATION**

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The EIO (EIO, 2012a) identified three opportunities of particular importance: (1) waste management, (2) green chemistry and (3) bio-based products. Waste management is a critical issue in developed as well as in developing countries. About 60% of the solid waste is going to landfill or incineration. If waste streams turned into resource stream, they could achieve environmental, economic and social benefits. E-waste is a good example for such a waste stream. It contains valuable and scarce materials, but also hazardous components that require special treatment – up to 60 elements from the periodic table can be found in complex electronics. Rudimentary methods like open burning, which are often used in the informal sector in developing countries to recover valuable materials, heavily affect workers' health and the environment. Sound policies, however, can lead to higher recovery rates of precious metals and business opportunities in developing countries. To this end, UNIDO assesses the opportunities and feasibility of establishment of local sustainable e-waste recycling in developing countries (see Box 9).

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#### **E-waste recycling creating economic and social benefits in Tanzania**

UNIDO's assessment of e-waste management in Tanzania found that in the last decade the number of mobile phone subscribers has risen 100fold. This indicates opportunities for income generation from recovering precious metals and recycling from this and other ICT equipment reaching their end-of life phase. Tangible opportunities can be reaped through:

- \_ the establishment of formal e-waste recycling activities;
- \_ accessing the countries' available market streams for valuable metals such as gold in mobile phones;
- \_ income generation through e- collection, refurbishment, dismantling activities, recovery of materials and final disposal.

9\_SOURCE: (MAGASHI AND SCHLUEP, 2011B)

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Green chemistry is another opportunity to establish new business models. This concept consists of environmentally friendly, sustainable chemicals and processes whose use results in reduced waste, safer outputs, and reduced or eliminated pollution and environmental damage (EPA, 2012). Companies investing in green chemistry innovations have enjoyed tremendous environmental and economic returns (ACS, 2012). A relevant example for Green Chemistry Innovative Models is Chemical Leasing. Chemical Leasing provides a more sustainable approach towards chemical management by shifting the focus from the product to the service delivered by chemical providers (see Box 10). Decoupling the payment from quantitative consumption of chemicals brings together environmental advantages with economic benefits. Chemical Leasing is also in line with Product Service Systems (see Box 11). (UNIDO, 2011)

*Mbeubeuss dump site  
in Malika, in Dakar,  
Senegal.*

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## Chemical Leasing

Chemical Leasing aims at providing practical solutions to reducing unnecessary hazardous of chemicals consumption and increasing resources efficiency of industry. It hence contributes to alleviate environmental pressures such fresh water scarcity, air and water pollution, and climate change, making a contributing also to protecting human health. In 2007, UNIDO developed in close cooperation with the International Working Group on Chemical Leasing the first detailed definition of Chemical Leasing:

- \_ Chemical leasing is a service-oriented business model that shifts the focus from increasing sales volume of chemicals, toward a value-added approach.
- \_ The producer mainly sells the functions performed by the chemical and functional units are the main basis for payment. Functions performed by a chemical might include: number of pieces cleaned, amount of area coated, etc.
- \_ Within chemical leasing business models, the responsibility of the producer and service provider is extended and may include the management of the entire life cycle.
- \_ Chemical leasing strives for a win-win situation. It aims to increase the efficient use of chemicals while reducing the risks of chemicals, and protecting human health. It improves the economic and environmental performance of participating companies, and enhances their access to new markets. While in a classical leasing model the user leases the product from a supplier, in a Chemical Leasing model, the user does not actually apply the product (chemical) himself but benefits from the service of the supplier. The UNIDO led Global Chemical Leasing Programme, which is supported by the Governments of Austria and Germany, is implemented at the national level in close cooperation National Cleaner Production Centres (NCPCs). Programmes are being implemented, for example, in Brazil, Colombia, Croatia, Egypt, Mexico, Russia, Serbia, Sri Lanka, Uganda and Ukraine.

10\_SOURCE: (IOMC, 2012)

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## Product Service Systems (PSS):

The basic idea of PSS is not to sell the product itself, but rather the service that is offered by the product. Eco-services are tenders which aim at an environmentally efficient use of a good by a secondary service. PSS are then eco-services resulting in less negative impacts on the environment through partial or full substitution of tangible material components (Jasch and Hrauda, 2000). Examples for PSS are car sharing or washing service for nappies. Consequently, an improvement of a company's environmental footprint is achieved by providing services rather than selling products (Omann, 2003).

11\_PRODUCT SERVICE SYSTEMS (PSS)

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## CRADLE TO CRADLE: COPYING WASTE-FREE CYCLES FROM NATURE

Another promising market carrying economic, social and environmental benefits are bio-based products. These are made from renewable resources and substituting fossil-based products. Such goods are used for example in Cradle to Cradle® designed products. Cradle to Cradle® design is an holistic approach that mimics nature's way of designing systems that are not only resource efficient but also essentially waste free. Rather than attempting to reduce the linear material flows and present-day methods of production, the Cradle to Cradle® design concept envisages their redesign into circular nutrient cycles, in which value, once created, remains of worth to both man and nature. In a production process this means that all inputs need to be either biodegradable materials posing no immediate or eventual hazard to humans and natural systems or materials that can again be transformed into resources for human activity (see also Box 12) (EPEA, 2012).

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## Cradle to Cradle® in print production

In Austria, the Gugler print company managed to develop a Cradle to Cradle® print product. The uptake of the Cradle to Cradle® principles in the design of their printing and core business entailed changes in the whole value chain as new colours, new paper versions and additional substances had to be developed

12\_SOURCE: <http://www.gugler.at>

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While opportunities for eco-innovative business models clearly exist, the EIO (2012a) found a combination of economic risk and information asymmetries to be the major barriers to eco-innovation (see Box 13) and impediments to their wider diffusion on markets.

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## Top 5 barriers and drivers to eco-innovation

### Barriers

- \_ Lack of funds within enterprise
- \_ Uncertain demand from the market
- \_ Uncertain return from investment/too long pay-back period
- \_ Lack of external financing
- \_ Insufficient access to existing subsidies and fiscal incentives

### Drivers

- \_ Expected future increases in energy price
- \_ Current high energy price
- \_ Current high material price
- \_ Good business partners
- \_ Secure or increase existing market share

13\_SOURCE: (EIO, 2012A)

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The EIO (2012a) stresses that policy has a key role in helping business to overcome these barriers. While companies are foremost driven to eco-innovate by the current and expected high prices of energy and material prices, companies lack funds to act and make use of this opportunity. Targeted financial support and technical capacity building are two elements to support business in this endeavor and to reap eco-innovation benefits. These can include: economic and social benefits such as increased competitiveness, reduced cost, job creation, improved knowledge and partnerships as well as reduced environmental impact. (UNIDO, 2012).

Yet limited environmental awareness can be a barrier for companies to eco-innovate. More awareness on the environmental impacts of materials and products can stimulate the demand for more sustainable solutions. Other factors that needs to be taken into account when assessing eco-innovation opportunities are skills and technology. The Emerging Markets Report of the EIO (EIO, 2012b) found that especially in many Asian and Latin American countries, the lack of highly skilled labour continues to be a challenge. Better access to environmental technologies including training and funding can be major source for new market opportunities.

LIMITED  
ENVIRONMENTAL  
AWARENESS AND  
LACK OF SKILLED  
LABOUR AS KEY  
CHALLENGES

A strong policy framework will however be needed to provide a level playing field for economic activity while safeguarding natural resources. This requires setting clear and binding environmental targets and limits of both resource use and emissions based on scientific evidence of planetary boundaries and wider societal trends. But decoupling economic development from environmental degradation also calls for a combination of supporting policies, technological innovations and important lifestyle changes. Lifestyle changes will be key to bring economies onto a less resource-intensive and competitive path. These will be explored in the following chapter.

*Ulsan shipyard,  
South Korea..*

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# 5\_QUALITY OF LIFE, THE CONSUMER AND THE ACTIVE "GREEN" CITIZEN

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## 5.1\_THE NEED FOR A TRANSITION TO SUSTAINABLE LIFESTYLES

The last chapter dealt with the supply side of the market and developed arguments why a strong policy framework is needed to set the boundaries for economic activities. On the other side, the demand side is addressed in this chapter. It deals with the role of lifestyles and behavioural patterns for resource-efficiency and the aim that is behind all activities, well-being.

KEY TO  
SUSTAINABLE  
LIFESTYLES ARE  
BOTTOM-UP  
INITIATIVES AND  
AN ADEQUATE  
POLICY  
FRAMEWORK

The key to sustainable lifestyles are policies, regulations and support which allow the economy and citizens to meet individual needs through resource-efficient strategies and bottom-up movements that experiment with and implement new lifestyle patterns. In order to foster these resource-efficient strategies, innovative forms of cooperation between governments and private actors are required as

well as changes of some of the norms that influence consumption which society and individuals currently value as reflected in their habits and preferences.

Social business initiatives, worker-owned enterprises, consumer-producer cooperatives, creative commons licenses, community supported agriculture, alternative currencies, or leasing of special equipment (e.g. tools, sport equipment, etc.) are examples of how new forms of cooperation can blur the conventional line between producers and consumers or developers and users which is needed to increase resource efficiency in a systemic

manner. Many are enabled or supported by technological innovations and are promoted by so-called pioneers of change. What these initiatives and experiments have in common is an innovative potential for the management of private and public goods, common pool resources and natural resources in general.

## 5.2\_THE CONSUMER, MATERIAL CONSUMPTION AND QUALITY OF LIFE

Consumption in the pre-war western society was largely based on meeting basic needs which has evolved into a landscape where hyper-consumption is the norm, using products that have increasingly limited shelf lives, or are simply perceived to be obsolete once the newer model comes onto the market and where conceptions of desirable lifestyles are crafted through sophisticated marketing strategies. All these tendencies drive industrialised economies towards more resource consumption and away from resource efficiency.

What factors encourage an individual or a society to consume are a complex web of cultural, historical, political, knowledge and socio-psychological factors. An underlying theme prevalent in our consumerist society is that consumption will make us happy. This then begs the question, what makes a person happy?

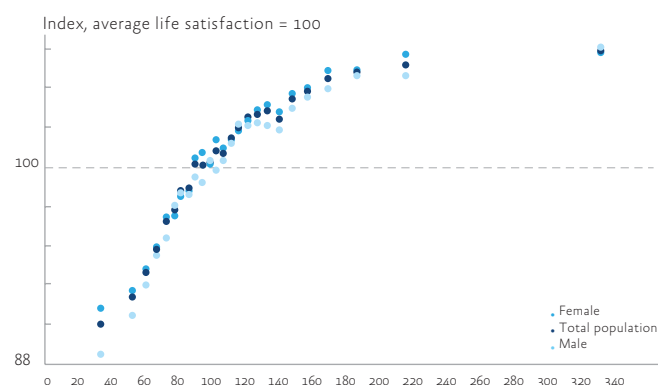
MATERIAL  
CONSUMPTION  
CONTRIBUTES  
ONLY TO A  
LIMITED EXTENT  
TO HUMAN  
WELLBEING.

Scientists who measure happiness and well-being have long argued that material consumption contributes very little to our happiness. Life satisfaction of individual people in a country is highest where social disparities among the population are minimal. Despite the many differences in populations around the world, what we do have in common is that once our

basic material needs are met, most of us strive for love and respect of others.

Studies have shown that income is positively correlated with well-being, as measured by indicators of human develop-

ment and quality of life. The Easterlin Paradox – named after Richard Easterlin who first documented it – states that over the long-term (10 years or more) happiness or life satisfaction does not increase as a country's average income rises (Easterlin, 2010). Easterlin observed that in a given country people with higher income are more likely to report a high quality of life (see Figure 8 below). However, when different countries are compared with the average reported level of life satisfaction, it does not vary much with national income per person for countries where the average income is sufficient to meet basic material needs (Easterlin, 1974).



**FIGURE 8**  
Example of data  
representing one fact  
of the Easterlin Paradox.  
Source: Statistik Austria  
(2012), based on the EU  
SILC Survey 2004-2010.

**QUALITY  
OF LIFE IS A  
COMBINATION  
OF OBJECTIVE  
LIVING  
CONDITIONS AND  
SUBJECTIVE  
WELLBEING.**

Quality of life consists of both objective and subjective elements and derives from the individual's potential to fulfil his or her needs. Objective conditions are referring to the political, social and economic system, which in turn determine the resources and capabilities that each individual person has at hand for the fulfilment of individual needs. The possibility to feel well once attaining these objective conditions is the subjective part within quality of life.

Max Neef (1991) and his colleagues have defined an ample list of needs that are shared by all persons. These needs can be divided into the categories of subsistence, protection, affection, understanding, participation, leisure, creation, identity, freedom and transcendence as outlined below.

EXISTENTIAL CATEGORIES/FUNDAMENTAL HUMAN NEEDS	BEING (QUALITIES)	HAVING (THINGS)	
SUBSISTENCE	physical and mental health	food, shelter, work	
PROTECTION	care, adaptability, autonomy	social security, health systems, work	
AFFECTION	respect, sense of humour, generosity, sensuality	friendships, family, relationships with nature	
UNDER-STANDING	critical capacity, curiosity, intuition	literature, teachers, policies, educational	
PARTICIPATION	receptiveness, dedication, sense of humour	responsibilities, duties, work, rights	
LEISURE	imagination, tranquillity, spontaneity	games, parties, peace of mind	
CREATION	imagination, boldness, inventiveness, curiosity	abilities, skills, work, techniques	
IDENTITY	sense of belonging, self-esteem, consistency	language, religions, work, customs, values, norms	
FREEDOM	autonomy, passion, self-esteem, open-mindedness	equal rights	
TRANSCENDENCE	inner centeredness, presence	religions, rites	

Needs and strategies according to Max-Neef

DOING (ACTIONS)	INTERACTING (SETTINGS)
feed, clothes, rest, work	living environment, social setting
co-operate, plan, take care of, help	social environment, dwelling
share, take care of, make love, express emotions	privacy, intimate spaces of togetherness
analyse, study, meditate, investigate,	schools, families, universities, communities,
cooperate, dissent, express opinions	associations, parties, churches, neighbourhood
day-dream, remember, relax, have fun	landscapes, intimate spaces, places to be alone
invent, build, design, work, compose, interpret	spaces for expression, workshops, audiences
get to know oneself, grow, commit oneself	places one belongs to, everyday settings
dissent, choose, run risks, develop awareness	anywhere
pray, meditate, develop awareness	places for worship

Divided into four existential categories – being, having, doing and interacting – the matrix lists examples of strategies to meet these needs. The ‘being’ column lists personal or collective attributes. The ‘having’ column lists institutions, norms, mechanisms, tools (not in a material sense), laws, etc. The ‘doing’ column lists personal or collective actions (expressed as verbs). The ‘interacting’ column lists locations and milieus. These categories show that ‘having’ is not the only way of meeting one’s need for IDLENESS, for example. Particularly for rich countries with a high degree of materialization, moving away from ‘having’ towards other ways of meeting one’s needs is certainly a significant ways to reduce resource consumption and protect natural resources. It is important to note that the needs are abstract; they are neither substitutes for one another, nor do they conflict with one other. Conflicts arise only at the level of specific negotiable strategies (Rauschmayer et al., 2011).

NEEDS ARE  
UNIVERSAL  
AND NEUTRAL.  
STRATEGIES TO  
MEET THOSE  
NEEDS ARE MORE  
OR LESS  
SUSTAINABLE,  
DEPENDING  
ON HOW MANY  
RESOURCES  
ARE USED.

The pursuit of economic growth and labour productivity in many industrialized countries has led to an increasing number of negative effects on humans reflected in increasing numbers of life-style related conditions such as obesity, work-related stress, depression and the increasing cases of “burn-out”. Today, many people satisfy their social needs such as participation or relationships through consumption which leads to increased resource use. However, quality of life research experience reveals that increasing material consumption does not meet all needs. On the contrary, the economic and social development of industrialized countries is a reason for a degradation in the quality of our social relations. It leads to loneliness and loss of social skills due to lack of time for real encounter.

STRIVING FOR  
GROWTH HAS LED  
TO NEGATIVE  
EFFECTS ON  
WELLBEING IN  
INDUSTRIALISED  
COUNTRIES, DUE  
TO AFFLUENCE.

### 5.3 PUBLIC PARTICIPATION AND GREEN LIFESTYLES

A shift to sustainable lifestyles will depend on systemic eco-social innovations (new rules, institutions, forms of living, mobility solutions etc.) that allow one to satisfy his or her needs through resource efficient strategies and activities. The development and implementation of policies supporting those innovations shall be participatory, so that citizens can directly influence the development of innovations, devices or buildings that correspond to their full range of needs.

FOR A CHANGE OF LIFESTYLES POLICIES ARE NEEDED THAT SUPPORT ECO-SOCIAL INNOVATIONS AND THAT ARE DEVELOPED TOGETHER WITH CIVIL SOCIETY.

In order to live resource-efficiently people need an enabling framework to realise such a lifestyle, for example access to safe, reliable and convenient public transportation systems. Many green lifestyles depend on community based actions in one way or another. This is only possible if various levels of society are connected tightly and cooperate smoothly. Thus, policies on multilateral as well as national, regional or local level should address frameworks for green consumption enabling individual and business involvement for new ideas (Coenen, 2002).

As the OECD points out, there are specific features for green development which can only be carried out by civil society, NGOs or individuals (OECD, 2002). If governmental engagement is turned down, the declaration of normative and idealistic motives for sustainable consumption would be rooted absolutely in personal interest. If changes in production processes and products were left upon the citizens themselves without governmental help, their options to act would be self-organized commitment, information provision and organizing consumer power (e.g. demand of better labelling, greater selection of greener product alternatives etc.). But these options are limited since facilitating integrating policies for desired changes in consumption and production patterns (such as taxation and passing legislation, banning of toxic products or the development of ecological industries) are absent.

On the other hand, a sustainable, resource-efficient consumption system only based on governmental commitment without stakeholder involvement might lack the legitimacy for certain decisions, since they might not represent the will and values of the people and might have less support and compliance. This could enhance the risk for conflicts between government and stakeholders and deprives the government of an additional source of ideas and information both about problems and their causes as well as alternative strategic options. If societal stakeholders are not involved, the reach of discussion about sustainable production and consumption is reduced, decreasing people's awareness of environmental problems (Coenen, 2002).

BOTTOM-UP CHANGES HAVE TO BE EMBEDDED IN GOVERNMENTAL TRANSFORMATION.

Bottom-up changes embedded in governmental transformation are needed. They are still rare. What have been emerged in the last years are many bottom-up activities. Important examples for sustainable lifestyles increasing well-being are discussed in the following. The last section of this chapter refers to the governance top-down level by giving examples for required policies.

A number of different activities in order to meet a sustainable lifestyle can be summarized under the term collaborative service (for further information see [www.sustainable-everyday.net](http://www.sustainable-everyday.net)). These are local small scale bottom-up solutions to problems focusing on the concept "using and sharing instead of possessing". Their variety ranges from neighbourhood initiatives such as private car sharing and home laundry to the weekly delivery of cooking ingredients for special diets. In the following section, a few approaches are presented to highlight the diversity of new solutions that are being implemented to address resource challenges in a sustainable and innovative way. To cluster these activities, the most resource-consuming activities in individual lifestyles have been identified and can be divided into the following categories: mobility, housing and food.

CHANGES ARE MOSTLY NEEDED IN THE AREAS OF MOBILITY, HOUSING AND FOOD.

#### 5.3.1 *MOBILITY AND TRAVEL*

There is no evidence for an increase of the share of mobility costs of households. Yet, over time, resource use and emissions from mobility are steadily increasing. An increase in the energy efficiency of cars has not caused a corresponding drop in GHG emissions from transportation. Furthermore, when buying a car a consumer hardly considers the energy and resources used in its production process. The shorter the life-cycle of a vehicle the larger its ecological impact. The aviation sector is also growing and is predicted to continue over the next years.

#### 5.3.2 *HOUSING*

About one quarter of an average household's consumption expenditure is spent on housing. General trends towards more space for fewer people or increased use of energy for heating and electricity contribute to an intensification of resource use. In addition, households' electronic equipment tends to become more resource intense both due to rising quantity and more complex devices. Studies have shown an overall increase of waste flows from housing activities but an accomplishment in water use reduction. On the other hand, the purchase of second homes is growing which has a negative effect on resource use and emissions but might reduce people's longing for long distance travel (EEA, 2005).

#### 5.3.3 *Food*

Approximately one third of household's total environmental impact is related to food (EEA, 2005). The problems the food systems create include emissions from livestock as well as from agriculture and industry, overuse of natural resources (like fish), waste from production process and packaging waste. Direct negative effects (e.g. travelling to shops, cooking, etc.) are considered low but constantly rising (EEA, 2005).

## 5.4 ALTERNATIVES AND OPTIONS FOR GREEN LIFESTYLES

Various examples of resource-efficient innovations already exist that may lead to an overall increase in well-being while minimizing the environmental impact. They can be called eco-social innovations, since they do not only aim at resource-efficiency but rather change people's relation to products and services and to other people.

A new lifestyle tackling all relevant categories of eco-social innovations and which is characterised by resource extensive needs fulfilment is the lifestyle of voluntary simplicity.

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### The lovos lifestyle

One example of such a shift in consumption patterns and new values would be lifestyles of voluntary simplicity (LOVOS). People who decide to live in voluntary simplicity try to integrate the reduction of luxury and consumption with the enhancement of personal well-being. The main objective is not abandoning one's needs but a change of strategies to satisfy them in a more sustainable way (e.g. preferring long-living products and repair them occasionally). In order to live sufficiently, a great awareness of one's own needs is necessary. These groups focus on a personal change of consciousness and values, reducing material consumption and tracing real life impacts back to altered ways of thinking and perception. On the internet, various examples for online forums and advices in order to turn down the credo of "the more the better" can be found. The self-description of this lifestyle is given as follows: "lovos.org offers continuative information about how we can alter and enhance our lifestyles to be more aware, caring, integral and so mentally as well as ecologically happy and sustainable. [Thus,] a high quality life of awareness with honesty and respect, love and joy may be reality – today and tomorrow, for everybody and everything." (www.lovos.org). Therefore, the lifestyles of voluntary simplicity cover the very core of what is meant by the term sustainability. Still, the description covers a wide range of possible starting points for changes, thus focusing on individual engagement and creativity for implementing concrete actions. Examples for LOVOS on the internet can be websites and blogs such as cited below. Thus, these people can be seen as a movement in order to provide the intellectual foundation for a future lifestyle, reinforcing individual needs for an individual, meaningful life with moral integrity. Hence, the trend of simplifying one's life has impacts on personal decisions regarding strategies for need satisfaction. One Swiss study (Giger, 2004) showed that people following the "philosophy of the essential" rank values such as truth, wisdom, happiness, recreation and relaxation, sense of life, freedom, right balance, clarity and beauty as most important.

14\_SOURCE: [www.lovos.org](http://www.lovos.org)

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For mobility, public transportation is currently experiencing system innovations in cities, which use public and innovative forms of private transportation in order to maximize sustainability and user-friendliness (Grazi and

van den Bergh, 2008). Today, in many cities the overall objective is to offer its inhabitants the possibility to live without owning a car. Especially in urban centres, it is possible to choose from an increasing range of different options for transport. These mobility solutions are expected to be quick, safe and secure, convenient, reliable, clean and affordable. Such solutions might combine different options for public transport as well as public bike rental with fixed stops, and (electronic) car sharing initiatives. In recent years, these systems have been implemented in different places with different mobility options.

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### Bicycle sharing systems

Bicycle sharing systems are a very cheap, sustainable and a fast way of mobility for short urban distances. Examples for countries with implemented bicycle sharing systems are Austria, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, Finland, France, Germany, India, Italy, Ireland Luxembourg, Mexico, Monaco, Netherlands, Norway, New Zealand, Poland, Romania, South Korea, Spain, Sweden, Switzerland, Taiwan, United Kingdom, and the United States. In these countries, the University of Berkeley has identified three generations of bicycle sharing systems (free bikes, coin deposit bicycles and IT based systems). (Shaheen S., 2011)

*The example of "Velib"*

One concrete example for such a system is the "velib" initiative in Paris which started 2007. It comprises of 1,200 fully automatic stops with more than 20,000 bikes for 24-hours-service. Users can buy a ticket for 1 day or one week online or at any station or sign up for a long-term subscription.

15\_SOURCE: <http://www.velib.paris.fr/>

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### Car sharing systems

Car sharing is a short-time car renting system offered by various companies throughout the world. It is especially useful for infrequent drivers who need on short notice a car for certain usages. Unlike private car sharing, users are not owner of the vehicles and therefore not responsible for service and repairation of the cars.

*The example of Zipcar*

Zipcar has more than 767,000 members and 10,000 vehicles in urban areas and college campuses in the USA, Canada, the UK, Spain and Austria. It offers different car models and makes. The use is described as easy: After a subscription, users get a zipcard and can reserve any car of zipcars' supply for a certain amount of time. To drive, the card simply has to be held to the windshield to unlock the car and the drive can start (gas and insurance included). In the end, the user just parks the car in a reserved parking lot at his destination.

16\_SOURCE: [www.zipcar.com](http://www.zipcar.com)

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*Oil residue landfill  
from the exploitation of  
oil sands, Fort McMurray,  
Alberta, Canada.*

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### Private Car sharing

Concerning private car sharing systems, there are a lot of options on the internet using the concept of a virtual notice board. Here, private people can offer or look for rides between specific cities on a specific date. Prices of these rides usually depend on negotiations. One of these platforms for examples can be found on <http://www.covoiturage.fr/>.

**17\_SOURCE:** <http://www.covoiturage.fr/>

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For housing, socially relevant and potentially resource-saving innovations are so called co-housing projects. Co-housing is a form of intentional community that unites private homes, which share certain facilities for collective use. In most cases co-housing projects are planned, owned and managed by the residents. The potential for resource-efficiency lies in two aspects. Firstly, future residents are involved in the selection of materials, technology and the optimization of the building according to their needs, and secondly, because a part of the building is reserved for common space that is used collectively.

Co-housing can influence daily consumption habits and affect them not only at an individual level but also a collective level due to participatory processes in the projects. However, since most co-housers already respect “green” values before joining such projects, behavioural changes are only amplified which enables the implementation of sharing systems and effective and equal organization of common spaces and duties. Still, co-housing does not automatically lead to more environmentally sustainable behaviour although newer communities focus on this dimension additional to social values.

The main gain of co-housing initiatives is first of all the building of a small community and thus the enhancement of individual well-being because the need for relationships and connections can be rather easily met. People are involved in creative processes determining their own housing facilities. Characteristics of former small communities such as neighbourly help, sharing systems for more expensive but rarely used goods or common leisure activities are translated to nowadays city life while freedom of individual choice and privacy are preserved. Thus, creating local supply for various individual needs on a very low level of resource use enhances co-housing’s potential for sustainable lifestyles.

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### Co-housing

Co-housing facilities are booming right now and exist in cities all around the world, sometimes organized in national co-housing associations which can be easily found on the internet. A few examples shown there are the Eco Village at Ithaca (New York: <http://ecovillageithaca.org/evi/>); East Lake Commons in the Metropolitan area of Atlanta (<http://www.eastlakecommons.org/pgHomeELC.aspx>) or Mosaic Commons in Berlin, Massachusetts (<http://www.mosaic-commons.org>).

**18\_SOURCE:** <http://www.cohousing.org/international>

For Europe, one concrete example out of thousands is Austria’s first co-housing project „Lebensraum“ nearby Vienna, founded in summer 2005. It tries to link ecological living in low-energy buildings to an increased social life for different ages. Special characteristics of co-housing projects are met such as a common development of housing facilities with privacy and common rooms, an intergenerational living concept and a democratic and self-responsible administration and organization.

**18\_SOURCE:** <http://www.cohousing.org/international>. **SOURCE:** <http://www.der-lebensraum.com/cohousing.html>. **OTHER EUROPEAN EXAMPLES ARE THE LANCASTER (UK) CO-HOUSING PROJECT** (<http://www.lancastercohousing.org.uk/>), **COPENHAGEN (DEN, <http://www.langeeng.dk/>) OR ECO CHATEAU IN CAUTINE (FRA, <http://www.eco-chateau.com/>).**

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With regards to the food sector, today economic growth and profit making often result in a more intensive exploitation of natural resources on the supply side and, it could be argued that it will lead to an overconsumption and obesity on the demand side. Innovative concepts such as Slow Food or food cooperatives try to re-connect producers and consumers in order to minimize the negative effects of anonymity in food systems.

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### Slow food

Slow food is an international non-profit association with a worldwide network to improve agricultural production and distribution. They have more than 100,000 members in 153 countries. Their local convivial tries to protect local culinary cultures and to support a more sustainable food culture. Slow Food activities are coordinated and organized by seven national branches while the association’s Board of Directors is elected every four years and supported by an International Council which consists of representatives of countries with at least 500 members. Slow Food develops projects both on the regional (convivial) and global level and tries to defend food biodiversity (by practising new economic models for example), develop networks (through the Terra Madre network to give a voice to small food producer and integrating them with cooks, academics and youth for discussion), food and taste education (in schools, hospitals, canteens etc. to create “awareness, new markets and positive social change”) and connects producers and consumers.

**19\_SOURCE:** <http://www.slowfood.com/>

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### Community supported agriculture (CSA)

Community supported agriculture is a concept that links consumers and producers of organic food by promoting local exchange. The idea is to buy seasonal food directly from a regional farmer. The consumer pays a subscription fee to the farmer and in return regularly receives a box of vegetables, dairy products, meat or other farmer's products throughout the farming season. Advantages for farmers, apart from closer linking to their consumers, are financial security early in the season and in some cases, a share of risks (e.g. drought, rain etc.) and thus higher independence from external factors. The advantage for consumers apart from enjoying fresh food is the closer link to their producer and agriculture in general. Consumers might also get to know new varieties of vegetables and learn about new ways of preparing seasonal vegetables. They also become more aware about the seasonality of farming and the availability of regionally produced vegetables during the year.

20\_SOURCE: <http://www.localharvest.org/csa/>

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### Food cooperatives

Food Cooperatives (FoodCoops) consist of people and households, who organize as a group the purchase of organic products directly from local farmers. FoodCoops exist in different forms: From small storages (for approximately 50 members) to bigger FoodCoops based on order systems (without storage) and big FoodCoops shops (e.g. in the U.S.). The concept of FoodCoops is not only based on organic food, but is also a movement against the prevailing common agricultural systems driven by the dominance of supermarkets and industrial agriculture which often rely on long distance transportation and inequalities along the production chain. The cooperatives seek to address these issues by abandoning the anonymity between producers and consumers, offering seasonal, regional and ecological sustainable, fair produced food and self-organization of the cooperative life including decisions based on democratic rules.

21\_SOURCE: [www.foodcoops.at](http://www.foodcoops.at)

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In both these approaches (like in many other), individual's focus shift from food quantity to higher quality, both in a literally and figuratively way: Members of such initiatives tend to pay more attention to what they eat and how food is produced but also focus on strengthening consumer-producer-relationships and alternative currency or exchange systems.

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### Alternative financial systems

Complementary to the examples mentioned above are alternative financial systems. Complementary currencies and so-called Local Exchange Trading Systems (LETS) focus on a local supply of people's demands either by using an alternative currency to the national one or by implementing systems of exchange with no money at all. Every person in a community

can contribute in an individual way to its functioning. Basic assumption is that most needs (see Max-Neef above) met by material consumptions are substitutes for underlying social deprivation and thus can be better met through social interaction. Additionally, the appreciation of individual efforts by the community of people often marginalized by society (e.g. unemployed persons) enhances personal well-being. In addition, local consumption and sharing systems use fewer resources than usual consumption patterns. Hence, complementary currencies and LETS may enhance personal well-being and social capital of a community while cutting-down resource use due to lifestyle changes. (Mock, 2012)

22\_ALTERNATIVE FINANCIAL SYSTEMS

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Urban gardening can be seen as a new option for housing facilities as well as a new way of food generation. It comprises mostly of small scaled areas for agricultural use within urban housing estates focusing mostly on organic and environmental friendly production and a conscious consumption of the food. Some benefits from urban gardening are the reduction of local GHG emissions because of green areas in cities and a better microclimate, collaborative work, the option of slowing down in the middle of a stressful environment and new social contact with neighbours.

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### Urban Gardening

Evolving from such local initiatives, a whole "urban gardening trend" has been created. One example for such coordination is the American Community Gardening Association which tries to build community by increasing and enhancing community gardening and greening across the United States and Canada. Urban gardening initiatives can be found all over the world. A few examples are the "Prinzessinnengarten" in Berlin (<http://prinzessinnengarten.net/blog/>), "Community Gardens" in Amsterdam ([http://kkvb-cfwn.blogspot.co.at/p/cook-farmer-his-wife-and-their-neighbor\\_04.html](http://kkvb-cfwn.blogspot.co.at/p/cook-farmer-his-wife-and-their-neighbor_04.html)) or "Tenth acre farms" in New York (<http://www.tenthacrefarms.com>).

23\_SOURCE: [www.communitygarden.org](http://www.communitygarden.org)

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#### *The example of Abbey Gardens (London)*

Abbey Gardens is situated in Bakers Row in East London (Newham). It is a farming area growing flowers, fruit and vegetables organized in regular gardening sessions led by an experienced gardener. The harvest is shared among volunteers and also available to the local community. The area of a 12-century monk garden became an open-access park and the harvest garden in 2006 due to the initiative of "Friends of Abbeys gardens", a group of local residents. The gardening sessions and organized free events function as meeting point for people of all ages, giving them opportunity to enjoy nature and learn new skills. Organization and planning is also done by the residents, currently they comprise of around 60 members.

23\_SOURCE: <http://www.abbeygardens.org>

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## 5.5 CHALLENGES FOR SUSTAINABLE CONSUMPTION

All these eco-social innovations have implications to people's lifestyles and the way they are used to organize themselves. They require a conscious and aware choice of strategies and shall be embedded in policies that provide the adequate frame conditions for the individual transition.

### THE REBOUND EFFECT IS IMPEDING RESOURCE EFFICIENT LIFESTYLES.

Under current conditions even the most environmentally aware persons do not succeed in reducing their overall environmental impact through individual action. For example, a comprehensive survey of the energy consumption of persons from different social milieus in Austria has shown that although people

from different milieus may have very distinct patterns of behaviour, there is no significant difference in the overall consumption of energy. Any saving in energy or material input through resource-efficiency must be expected to lead to an increase in other aspects of our lifestyles (cpf. rebound effect). Researchers of ETH Zurich (Griod, 2009) found out, that households apply a kind of mental bookkeeping for the environmental impacts caused. Thus, use of high efficient technology is compensated by an increase of consumption. Therefore it does not seem promising to focus on resource-efficient technology alone, without more fundamental structural changes of the economy and society.

### RESOURCE EXTENSIVE PRODUCTS ARE NOT ALWAYS ACCEPTED BY THE SOCIETY.

Today, environmentally sustainable products and solutions often imply an increase in costs and time for citizens. Conventional products and technologies mostly have co-evolved in form and function with citizens' use of strategies. For example, in most rural regions conventional cars are the only option that allows citizens to get

to work, shops, family and friends. One main barrier for eco-social innovation, therefore, is the general acceptance of unsustainable and resource inefficient products and the lack of affordable alternatives.

Consumption patterns are not static over time. On the level of national economies, the growth of the GDP has led to an increase of household consumption of almost one third between 1990 and 2002. With an increase in income patterns, consumption change and more income is spent for luxury products and leisure. Additionally, long-term trends in society like single households or an ageing population also lead to considerably different consumption patterns. These changing patterns have to be taken into consideration when talking about resource efficient lifestyles.

### THE BELIEF-BEHAVIOUR GAP BETWEEN KNOWING SOMETHING AND ACTING ACCORDINGLY IS A STRONG FACT.

Even people with good intentions have difficulties to maintain sustainable lifestyles and frequently experience what is called "cognitive dissonances" which describes the emotional conflict of an individual between two or more attitudes, beliefs or actions. For example a concern for the environment may be expressed in being vegetarian and having no car, but flying frequently for holidays.

We argue that our economy and economic policy shapes our values, feelings and actions. Therefore a society's preoccupation with economic growth will result in the individual need for constant individual advancement. When personal advancement is based on the idea of material wealth and progress, resource-efficient lifestyles are difficult to promote.

### SUSTAINABLE LIFESTYLES HAVE TO BE LINKED WITH WELLBEING, NOT WITH SACRIFICES.

Sustainable living needs to be reframed so that it is not related with personal sacrifices but with increasing quality of life. In this context it might be helpful to address sustainability values indirectly. For example, durable goods can be appealing to consumers because of their quality and not because a longer durability might relieve pressure on overall resource consumption.

Neither resource-efficiency in specific products, nor individual awareness, has proven to lead to an overall decrease in resource consumption as absolute resource use in Europe has generally remained steady over the past two decades (see Figure 1 in Section 1). Moreover, due to the 'rebound effect', it is unlikely that resource use can be reduced by technological improvements alone. For fundamental changes in lifestyles of citizens in industrialized countries and emerging economies, policy measures on a structural level are a necessary pre-requisite. As long as unsustainable options in the fields of mobility, food, housing and heating are the less expensive and easier ones, the majority of citizens in wealthy countries will not likely avoid them.

## 5.6 POLICIES TO SUPPORT THE TRANSITION TOWARDS SUSTAINABLE LIFESTYLES:

As said before, a shift to green lifestyles and reduced consumption will depend on policy measures that allow people to satisfy their needs through immaterial and resource-efficient strategies and activities. An overall decrease in resource consumption and environmental impact requires structural changes inspired and promoted by long-term strategies and policies.

*Household appliance  
dump, Aspropyrgos,  
Attica, Greece.*

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Addressing over-consumption needs a better understanding of what drives consumption and what measures will inspire sustainable lifestyles and consumption without posing burdensome requirements on people, particularly as this would be viewed as an obstruction on individual liberty in some countries, therefore a range of sustainable options need to be presented so that a choice remains and these choices are made as easy and desirable as possible.

**THE MOST IMPORTANT AIM OF RESOURCE EFFICIENT STRATEGIES IS INCREASE QUALITY OF LIFE.**

The most important criterion for the promotion of resource-efficient strategies should be whether they raise the individual quality of life and the quality of relationships between people. Nevertheless, since no transformation affects all the people in the same way, different groups and sectors of the population will experience and perceive them differently. For example, policies that

allow for more flexibility in work relations blur the division of work time and leisure time, which then affects people's relationships with family members, relatives and friends.

**UNSUSTAINABLE PRODUCTS AND SERVICES SHALL BE BANNED FROM THE MARKET.**

Policy makers urgently need to aim at eliminating unsustainable products and services from the market in order to allow the consumer to choose between sustainable products and services only. However, there will be no "one size fits all" policy response, particularly in light of the dif-

fering levels of development between countries, and levels of awareness and interest in addressing environmental and social issues between and within countries. Strategies need to be innovative and cross-sectoral, engaging a mixture of public and private stakeholders. Some of the immaterial and resource-efficient strategies for individuals may be inspired by the initiatives that environmentally aware people and groups already implement today.

This might not be sufficient. As said before these bottom-up initiatives need to be combined or better integrated into governance consumption and production programmes. They need to link long term goals to short- and mid-term steps and be based on reliable analyses of different contexts (global, local and social and economic as well as environmental impacts). Furthermore, clear definition of objectives need to be developed as well as indicators which should be integrated within existing national development strategies

When it comes to governmental approaches, flexibility is paramount. Governments have a wide array of policy options at their disposal; some of which are outlined below.

**GOVERNMENTS SHALL PUT IN PLACE THE FRAMEWORKS FOR COMMUNITY PARTICIPATION**

**5.6.1\_CIVIL SOCIETY PARTICIPATION AND EMPOWERMENT**

As mentioned earlier, communities and civil society often develop innovative measures to address societal problems. Therefore, it is essential that governments put in place the frameworks for community participation through developing and

implementing policies that encourage government openness and accountability such as "right to know" legislation where information is publicly available, if it is deemed in the public's best interests. Such practices encourage debate and leaves the government policies open for public scrutiny and hopefully adding to their level of rigour. Governments should also operate within a collaborative framework with civil society and industry and can build trust by carrying out transparent and independent reviews of progress.

**5.6.2\_REGULATORY OR "COMMAND AND CONTROL" MEASURES**

Cheap resources that do not reflect the true environmental costs of developing a product stimulate excessive and wasteful consumption and inefficiency. Governments are both the source of this inefficiency through the introduction of subsidies on resources, however they also have the ability to develop regulations which in themselves can force or encourage more sustainable consumption or which

reflect the true environmental cost of a product. Pricing is an effective demand management tool as pricing plays a very significant role in influencing which product and how much of a certain product a consumer purchases. For example, if the government regulates for products to reflect their true environmental costs, this will encourage manufacturers to reconsider and mitigate their environmental impacts.

Environmental taxes and fiscal reforms offer an opportunity to encourage sustainable consumption in all types of economies by influencing consumer behaviour, however they should be implemented with great care in a phased manner to ensure that the poor do not suffer any adverse effects of the pricing policies. If designed well, fiscal reforms could contribute to a fair and equitable transition to a green economy by addressing the distributional effects on the poor.

**PRICES OF PRODUCTS AND SERVICES SHOULD REFLECT THE TRUE COSTS (INCLUDING THE EXTERNAL COSTS).**

### 5.6.3 FINANCIAL INCENTIVES

Financial incentives such as tax reductions or grants can be applied to encourage the adoption of green technologies. For example, in the Australian state of New South Wales, purchasers received a rebate for water efficient household appliances to encourage the uptake of more efficient appliances in the at times, drought prone state.

### 5.6.4 THE MESSAGE: INFORMATION-BASED INSTRUMENTS

Information-based instruments can include a range of instruments such as eco-labelling or certification schemes, education or training and public disclosure of a companies' environmental performance. Labelling is a particularly well known example of this. Environmental labelling or certification can play a role building awareness amongst consumers of the environmental impacts of their purchase such as energy and water efficiency and waste, thereby encouraging consumers to make more sustainable choices. For example, the Australian Capital Territory introduced a mandatory energy efficiency disclosure rating where sellers are required by law to disclose the energy efficiency of their houses. Follow up studies on the scheme have found that the rating influenced people's purchasing decision.

#### Energy labelling system in Thailand

Thailand introduced a voluntary energy labelling scheme which was supported by high profile publicity campaigns to increase public awareness of energy labels and the energy efficiency of products. The scheme was voluntary in nature but still managed to attract a large number of manufacturers, with energy savings made exceeding targets for refrigerators and air-conditioners.

24\_SOURCE: <http://www.climateparl.net/cp/101>

### Pro Planet: an eco-label based on a comprehensive set of indicators

In 2010, the large retailer REWE International launched a new label in Austria, "Pro Planet", which assesses the sustainability of selected conventionally produced food products. The label marks those products that cause least harm to the environment along their supply chain and that are produced under conditions that meet internationally recognised social standards.



REWE developed the label in a collaborative process involving an environmental NGO (Friends of the Earth Austria), a social and human rights organization (Caritas) as well as a scientific research institute (Sustainable Europe Research Institute). The label is based on an assessment using the FOE/SERI set of resource use indicators (biotic, abiotic, water, carbon footprint and land), specific indicators for measuring the sustainability of agricultural products (e.g. nitrogen balance, pesticide use intensity) and strict controls of social standards at the producer.

So far, the label has been given to a variety of fruits and vegetables (apples, grapes, strawberries, cabbage, Chinese cabbage, iceberg lettuce, onions, and radish). Future assessments may include other groceries as well as non-food products.

25\_SOURCE: <http://www.proplanet-label.at>

### 5.6.5 EDUCATION

The education of young people is an effective tool to encourage environmental and social awareness regarding the impacts of consumption on the use of natural resources. Education is also a long-term investment in sustainability. For example, the Republic of Korea introduced green growth content into the national elementary and secondary curricula as well as establishing training for teachers on green growth. However, information and media campaigns also need to be a part of a wider policy mix employed by governments.



*Deforestation  
in Amazonia, Mato  
Grosso, Brazil.*

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# 6\_ GREEN GROWTH POLICIES AND STRATEGIES AT THE MACRO LEVEL

## SUCCESSFUL POLICIES ALREADY EXIST

A number of green economy strategies and policies already exist that can be applied to deliver on key economic priorities such as employment creation or stabilising the economy as well as to improve environmental targets. These strategies provide evidence of the role of resource productivity policy both in providing a short term economic stimulus and in building a sustainable and resilient economy in the long term. For example, adequate resource productivity policies can stimulate innovation and investment in innovation. These innovations can deliver reduced costs for companies, and thus reinforce the competitiveness of key industries that partake in the green growth.

This chapter highlights many areas where resource productivity policy is essential for sustainable economic progress – on national, regional and global levels. While policies can cause shifts in the composition of employment, evidence suggests that any negative effects on polluting products and processes are at least balanced by growth in less pollution-intensive ones. Nevertheless, the fear of diminished competitiveness and job losses remains one of the main barriers to following a green development. Therefore, in order to ensure a fair and sustainable shift to a green economy, it is essential to address problems such as potential skills shortages, income security and social exclusion. Overall, the right policy mix has the potential to directly and indirectly stimulate economic growth, competitiveness, employment and environmental improvements.

The chapter is divided into two parts, a discussion of different approaches to augment resource productivity in developed countries as well as in the developing and emerging economies. For developed regions and countries, such as Europe, North America and Japan, some successful policies and initiatives not only in the context of increasing resource productivity but also in the context of overcoming problems on the labour market will be presented. The developing and emerging economies perspective concentrates on significant institutional, environmental, political and social challenges.

## THE RIGHT POLICY MIX CAN IMPROVE ECONOMIC PERFORMANCE, EMPLOYMENT AND ENVIRONMENT

### 6.1\_ GREEN GROWTH POLICIES IN DEVELOPED ECONOMIES

A high capital stock is the basic source of quality of life. In the context of sustainability, capital is defined broadly as the resource (or capital) stock that provides current and future flows of goods and services. Old economics textbooks only

## PRESERVING NATURAL CAPITAL IS IMPORTANT FOR A SUSTAINABLE ECONOMY

refer to two kinds of capital, financial and manufactured capital. The concept of sustainability has also moved natural, human and social capital in the focus of interest. For a description of the different capital forms see the glossary.

Natural capital and ecosystem services provide an integral starting point for the transformation to a new, greener, more resource efficient economy (EEA, 2010). Preserving natural capital is therefore at the heart of this chapter. In Section 6.1.1, promising strategies, policies and instruments are presented that would lead to higher resource productivity and are especially targeted to manage and maintain natural capital, but at the same time support economic and social challenges.

#### INCREASING HUMAN CAPITAL SUPPORTS AN INCLUSIVE ECONOMY

Nevertheless a sustainable management of the other capital forms is also crucial to master the current challenges. **The increase of human capital** is closely related to the provision of employment, which is important for high quality of life (as it provides income and social participation) as well as for a competitive and inclusive economy (as it enables high qualified employees and the possibilities of innovations, etc.). Human capital refers not only to the number of employees but also to their skills. For example, if there are too many engineers and marketing experts although the economy demands skilled workers, as it is currently the case in Spain, a mismatch-problem occurs, as the supply and demand side do not meet. The educational system providing skills training is an important engine of economic growth. If it fails, qualified workers are short in supply and/or the number of unqualified job-seekers rises. Therefore, suitable investments in human capital may reduce mismatches and support the labour supply. This, in turn, helps to better redistribute labour. In Section 6.1.2 measures that support high levels and high quality of employment are at the heart of the discussion.

##### 6.1.1 *HOW TO IMPROVE RESOURCE PRODUCTIVITY?*

There is widespread agreement that increasing resource productivity will benefit the economy and the environment alike, thus being a true winning strategy. Resource productivity is becoming gradually critical for economic development in a world where many resources (including oil, raw materials and food) are becoming increasingly scarce and expensive. There is much evidence that many resource productivity gains can be achieved relatively easily and cost effectively (see Chapter 4 above). However, *the world is not greening by itself*.

Thus, a sustainable economy requires dedicated policy approaches embedded in a coherent, integrated strategy covering demand and supply aspects. The key message of various studies is that no single instrument alone can effectively promote a sustainable economy. Governments have to find the optimal mix of instruments, which are supported by national strategies and integrated policy frameworks (UNIDO, 2011b).

There is evidence that existing policies present a strong basis on which to build new approaches that balance economic, social and environmental considerations (EEA, 2010). In particular, *market-based instruments* (such as environmental taxes and charges, tradable permits, environmental subsidies and incentives) must be a core pillar of a policy mix. Furthermore, *regulatory policies* (such as standard setting) and *non-economic measures* (such as voluntary approaches and information provision) should be part of a coherent strategy. Alongside these policy instruments and measures, additional public and private action is needed to accelerate the transformation.

#### THE “GREEN” POLICY MIX MUST INCLUDE MARKET-BASED INSTRUMENTS, REGULATORY POLICIES AND NON-ECONOMIC MEASURES

**Market-based instruments** internalize external costs, making the polluter pay. They take into account the “hidden” costs of production and consumption in a cost-effective way. *Environmental taxes*, for example, help to ensure that prices reflect the negative environmental impacts and costs of various products and processes not included in the market price. In the short run taxes and charges provide incentives for polluters and resource users to change their behaviour. In the longer run they encourage innovation and the development of new and more efficient production methods (OECD, 2008a).

Environmental taxes can target consumption and (inputs to) production. The following Box provides an example of a promising resource tax that is targeted at the input side of production.

##### **Material input taxes**

Material input taxes are a means to stimulate a more efficient use of resources and foster eco-innovations for resource efficient production technologies and less material intensive products.

While most taxes address the output side of production (e.g. taxes or charges on emissions or waste), a material input tax applies to each (physical) unit of virgin extraction. The tax could charge all categories of materials – biomass, abiotic materials, soil displacements, water and air (at combustion and chemical transformations) – at their first point of extraction. Thus, the tax could cover all resources required for production processes and thus also the indirect resource use (“ecological rucksacks”) of products (Behrens et al., 2005).

The explicit aims of the tax are to induce environmental benefits by better reflecting the environmental costs associated with quarrying and to encourage the use of alternative materials such as recycled materials and certain waste products. A material input tax could either be uniformly applied to all kinds of materials as a quantity tax (e.g. in EUR/tonne) or be differentiated according to the toxicity of the different materials. Ideally, it would be harmonized at the international level in order to avoid tax evasion through the relocation of industries to non-taxed countries (UNIDO, 2010).

A modelling study for Germany on behalf of Aachen Foundation (2005) analysed the macro-economic impacts of the implementation of consistent policy measures to increase resource productivity by a given amount in the manufacturing sector, construction sector and public service. The results show that the combination of a support program (information, consulting and innovation programmes) and a material input tax (incl. ecological rucksack, excl. water and fossil fuels; combined with a reduction of income tax equivalent to the MIT revenues) positively influence



macro-economic indicators: GDP and employment slightly increase. Since the price level decreases, available income increases. Resource productivity largely improves. The total resource use decreases by 20% in 2020, i.e. an absolute decoupling from the positive economic growth. While theoretically effective, an extraction tax for all materials is technically and politically not yet feasible, as many questions regarding the actual implementation remain open. For example, it would require environmental management systems and solid material flow accounts in companies around the world. Introducing material input taxes in a single region or country would require rules for imported materials in order to avoid market distortions and a shifting of the environmental burden abroad. Again, this may act as a trade barrier and economic disadvantage for countries dependent on material exports (UNIDO, 2011a).

In some countries (Belgium, Bulgaria, Canada, Denmark, France, Russia, Sweden, the Ukraine and the UK) material input taxes are already being levied on a limited range of resources (usually on selected minerals) (UNIDO, 2011a).

#### 26 MATERIAL INPUT TAXES

Environmental taxes can be implemented as a single step or within a comprehensive environmental tax reform (or fiscal reform, which in addition removes environmentally harmful subsidies).

#### ETRS OFFER STRATEGIC FINANCIAL BENEFITS AS THEY CAN DOUBLE DIVIDENDS

A fiscal reform through tax recycling or restructuring could shift the tax burden from labour to environmentally damaging activities, such as unsustainable resource use or pollution. Evidence of the benefits of environmental fiscal reforms has grown in recent years. Positive effects include environmental improvements,

employment gains, a stimulus to eco-innovation and more efficient tax systems (EEA, 2010, 2011). Such environmental tax reform (ETR) deserves serious consideration particularly in the current context of public deficits (Ekins and Speck, 2011). Overall, environmental fiscal reform is a promising tool for the transition towards a green economy by creating a *double dividend*, i.e. reductions of resource use on the one side, and employment gains on the other side.

Examples of European countries which have already implemented different forms of ETR are described in the following Box.

#### Implementation of environmental tax reforms in European countries

The implementation of ETRs in Europe started in the early 1990s in the Scandinavian countries Sweden, Denmark, Norway, Finland, and the Netherlands. The UK and Germany followed in the late 1990s, as well as some new EU member states more recently. In the years since 2001 the introduction of ETRs in Europe became politically less important,

only Estonia, and to a lesser degree the Czech Republic followed the example of the early ETR countries. Reasons for this are due to higher international energy prices in the first decade of the 2000s and the emergence of the EU Emission Trading System (Ekins and Speck, 2011). Recently, European countries have been rediscovering an interest in ETR. In Denmark and Sweden, the governments implemented further ETRs during 2009. In Ireland, a carbon tax was introduced at EUR 15 per tonne CO<sub>2</sub> at the end of 2009. This was part of a new taxation package to cut Ireland's budget deficit. In France, an ETR centred on a carbon tax was planned to be announced in January 2010, but the tax was prevented by the constitutional court due to many exemptions (Ekins and Speck, 2011). The following table provides some examples of ETRs implemented in EU member states.

Currently, most ETRs in developed countries focus on achieving a reduction of the private consumption of energy, and on private transportation. In the EU for instance, about three-quarters of environmental tax revenue arises from energy taxation. The remaining 25% are taxes on transport, pollution and resources. In terms of redistribution of revenues, most countries chose to reduce income taxes or social security taxes (ILO, 2012).

#### 27 IMPLEMENTATION OF ENVIRONMENTAL TAX REFORMS IN EUROPE

*Eroded iceberg  
in Unartoq Fjord,  
Kitaa, Greenland.*







COUNTRY	TYPE OF TAXES	UTILIZATION OF ETR REVENUE
DENMARK	<ul style="list-style-type: none"> <li>_CO<sub>2</sub> tax on energy products consumed by households (1992) and businesses (1993).</li> <li>_Special tax provisions for industry with possibility of refunds.</li> <li>_Provision of investment grants for energy-saving measure.</li> </ul>	<ul style="list-style-type: none"> <li>_Reduction of marginal tax rates on personal income.</li> <li>_Reduction of employers' contribution to social security contributions.</li> <li>_Establishment of special fund for SMEs that would only marginally benefit from reduction of social security.</li> </ul>
FINLAND	<ul style="list-style-type: none"> <li>_CO<sub>2</sub> tax on energy products except for transport fuels.</li> <li>_Landfill tax.</li> </ul>	<ul style="list-style-type: none"> <li>_Reduction in state and local personal income taxation.</li> <li>_Reduction in employers' social security contributions.</li> </ul>
GERMANY	<ul style="list-style-type: none"> <li>_Increase of mineral oil taxes in transport fuels.</li> <li>_Taxes on: gas, heavy fuel oil, light heating fuels, electricity.</li> <li>_Special tax provisions for certain industries (manufacturing, agriculture, forestry and fishery sectors).</li> </ul>	<ul style="list-style-type: none"> <li>_Intended to be revenue neutral but temporarily also used for budget consolidation.</li> <li>_Reduction of employers' and employees' social security contributions.</li> </ul>
NETHERLANDS	<ul style="list-style-type: none"> <li>_Taxes on energy and CO<sub>2</sub>.</li> <li>_Tax-free allowance (natural gas and electricity).</li> </ul>	<ul style="list-style-type: none"> <li>_Reduction of personal and corporate income taxation.</li> <li>_Special tax provisions for industry.</li> </ul>
SLOVENIA	<ul style="list-style-type: none"> <li>_Until 1997: VAT on energy products.</li> <li>_After 1997: all ad valorem taxes abandoned (except for transport fuels that were abolished in 1999).</li> <li>_Introduced a CO<sub>2</sub> tax in 1997.</li> <li>_Increase in the number of taxable energy products.</li> </ul>	<ul style="list-style-type: none"> <li>_Tax revenue not recycled, although plans were created in 2004 for one-third of revenue to co-finance investments in energy efficiency and emissions reduction. Revenue from other environmental taxes are generally earmarked for specific environmental investments.</li> <li>_Businesses may be eligible for tax reductions up to 100 per cent, decreasing by 8 per cent per annum until 2009.</li> </ul>
SWEDEN	<ul style="list-style-type: none"> <li>_CO<sub>2</sub> tax, SO<sub>2</sub> tax, N<sub>2</sub>O charge, value-added tax (VAT) on energy purchases.</li> <li>_Energy taxes are indexed to inflation and linked to Consumer Price Index (CPI).</li> <li>_Until 1992: no special tax provisions for companies but tax ceiling of 1.7 per cent of sales values for energy taxes.</li> <li>_After 1992: special tax provisions for certain industries.</li> </ul>	<ul style="list-style-type: none"> <li>_Intended to be budget neutral in the long run but deficits accepted in the short run.</li> <li>_Reduction of personal income tax rates for all income earners.</li> </ul>
UNITED KINGDOM	<ul style="list-style-type: none"> <li>_Heavy taxation of transport fuels; landfill tax.</li> <li>_Introduction of Climate Change Levy (CCL).</li> <li>_Special tax provisions for industry.</li> </ul>	<ul style="list-style-type: none"> <li>_Revenue from Fossil Fuel Levy: from subsidization of nuclear power to renewables.</li> <li>_Reduction of employers' national insurance contributions.</li> <li>_Subsidies of investment in energy and research activities.</li> </ul>

SOURCE: ILO (2012)

Preliminary lessons of existing ETRs show a number of deficiencies in the current approaches. For instance, most developed countries have granted special tax provisions for certain energy-intensive industries. While they were implemented to protect the competitiveness of these industries, they have weakened the original purposes of many ETRs, since the largest potential for CO<sub>2</sub> emissions savings is in those industries that have been granted special tax provisions (ILO, 2012).

There is high potential for wider use of environmental taxes, although they need to be well-designed and their potential impacts on international competitiveness and income distribution

identified and addressed (OECD, 2008a). If the tax rates are too low they may not be effective in reducing CO<sub>2</sub> emissions or resource use, as they would not change the behaviour of economic agents but “only” generate revenue (see e.g. Baumol and Oates, (1988)). Generally, large price increases are necessary to bring about behavioural change. Higher tax rates also provide more leeway for substituting other taxes and charges (e.g. on labour). However, high tax rates may cause *negative social effects*. In fact, a gradual increase of taxes has the potential of reducing pollution or resource use as well as generates an incentive for technological innovation and thereby increases competitiveness.

#### POTENTIAL NEGATIVE DISTRIBUTIONAL EFFECTS OF ETRS SHOULD BE AVOIDED

In order to avoid negative impacts on distribution, policymakers can intervene on the taxation side or at the redistribution of revenues. Options on the taxation side are, e.g. tax exemptions, progressive tax rates (higher rates for high-income households) or tax-free basic amounts of consumption. Measures concerning the redistribution of revenues and complementary measures include eco-bonus' refunds to offset eco taxes, income tax reductions/income tax reforms, general or specific support measures for vulnerable households (increase in transfer payments), etc. (EEA, 2011).

#### SUBSIDIES WITH NEGATIVE ECONOMIC AND ENVIRONMENTAL CONSEQUENCES NEED TO BE PHASED OUT

*Reducing environmentally harmful subsidies* should also be an important part of an environmental fiscal reform. These subsidies encourage unsustainable economic activity, are fiscally expensive, and often provide limited benefits for poor households. Removing them is a particularly contentious issue and complex process, and while progress has been slow, recent environmental and economic challenges are providing renewed motivation to address the issue. Reform programmes should be based on better information on the magnitude and distributional consequences of such harmful subsidies (UNEP, 2010). In this context, it is crucial that policy makers have improved access to tools to identify and assess environmentally counterproductive subsidies.

*Emission trading systems* are also powerful tools for reducing emissions and their use will likely grow substantially over the next years. In contrast to taxes that increase the price, a cap is set on the environmental burden. Covered by the cap, allowances are provided, either through purchase or free allocation, to emitters, which can be traded.

The European Union Emissions Trading System (see Box 28) provides the most comprehensive existent trading system to regulate greenhouse gases. It has inspired other countries and regions (e.g. Australia) to announce their own cap and trade schemes. It would be desirable to link up compatible systems around the world to introduce a global carbon market. Modelling suggests that, under the right settings, global carbon trading could reduce global emissions by 40-50% without additional cost and provide substantial money to the developing world to support the shift to a low carbon economy with sustainable growth (Lazarowicz, 2009).

#### GLOBAL CARBON TRADING WILL BE A COST-EFFECTIVE TOOL TO SIGNIFICANTLY CUT GREENHOUSE GASES

Hence, a global price on carbon could help in discouraging the use of fossil fuels and encourage alternative energy solutions with positive environmental benefits. In addition, prices of other resources need to rise in order to achieve substantial dematerialisation.

#### The EU Emissions Trading System (EU ETS)

Launched in 2005, the EU ETS is the largest emission trading scheme in the world. It is a binding cap-and-trade system for all EU member states that aims to reduce greenhouse gas emissions. It currently includes more than 40% of all Europe's greenhouse gas emissions (EU website<sup>2</sup>).

The EU ETS has operated in phases:

In **phase I (2005-2007)**, the 'learning by doing' phase, only CO<sub>2</sub> emissions were enclosed. The sectors covered are electricity generation (power stations) and other large stationary emission sources (industry) – for example, iron, steel, cement, lime, pulp, paper and board. In National Allocation Plans (NAP) the member states granted the emission allowances to businesses. The allowances were allocated for free. The collective total of these allocations constituted the EU level cap, the maximum amount of emissions possible under the EU ETS. However, over-allocation led to a collapse of the price of the allowances.

**Phase II (2008-2012)** aimed to improve the efficiency of the system. The cap was tightened, with the auctioning of around 3% of allowances. The aviation sector was added to the system at the beginning of 2012. In addition, three non-EU countries – Norway, Iceland and Liechtenstein – were included in the EU ETS. Also in this phase, surplus of allowances appeared because of the economic crisis which has decreased emissions more than anticipated. In the short run influences the orderly functioning of the carbon market; in the longer term it reduces the ability of the EU ETS to meet more demanding emission reduction targets cost-effectively. In **phase III (2013 onwards)** there will no longer be any NAPs. Instead, a centralised EU cap will be set. The cap will decline linearly, aiming for a total reduction of around 21% of emissions below 2005 levels by 2020.<sup>3</sup> The EU ETS will be further expanded to the petrochemicals, ammonia and aluminium industries and to additional gases<sup>4</sup>.

Auctioning of allowances will be the default method for allocating allowances, progressively replacing free allocation. Auctioning is an effective means of reducing windfall profits by passing through to consumers the price of allowances that they received for free.

While unlimited banking (saving credits/allowances to future periods) was not allowed between the trading periods I and II, it will be allowed between Phases II and III.

<sup>28</sup> SOURCE: EUROPEAN COMMISSION, 2008; EU WEBSITE ON ETS<sup>4</sup>; LAZAROWICZ, 2009

<sup>2</sup> [http://ec.europa.eu/clima/policies/ets/index\\_en.htm](http://ec.europa.eu/clima/policies/ets/index_en.htm)

<sup>3</sup> If an international agreement is decided and the EU agrees on an overall reduction target greater than 20%, the cap will be strengthened to deliver emissions reductions within the ETS that are consistent with the overall EU target.

<sup>4</sup> [http://ec.europa.eu/clima/policies/ets/index\\_en.htm](http://ec.europa.eu/clima/policies/ets/index_en.htm)



**PUBLIC FINANCE  
IS IMPORTANT IN  
FOSTERING  
INNOVATION AND  
INVESTMENTS IN  
GREEN  
TECHNOLOGIES**

A green economy is likely to depend crucially on *innovation* (in particular eco-innovation) and *investments* in green technologies. In this respect, **public finance** has a crucial role to play. Direct public expenditure, e.g. through support for research and development in environmental technologies or cleaner infrastructure provision, as well as indirect support (e.g. through different forms of public guarantees) can force green investment by households and firms (UNEP, 2010).

*Financing infrastructures* especially remains a considerable challenge for policy makers. A key issue will be how to mobilize investments from the private sector, foreign direct investment, cooperation between countries and alternative approaches to infrastructure development and planning. Clear energy policies, good governance, and a strong regulatory and institutional structure are among the basic requirements to attract investment for infrastructure development (UNIDO, 2011a)

Governments, however, cannot rely on private funds alone and will have to find new income sources. This means diversifying by making more and better use of user fees, creating mechanisms for securing long-term financing for infrastructures, e.g. as Canada has done (see Box below).

**Canada's Green Infrastructure Fund**

Through Canada's Economic Action Plan, the Federal Government provides almost CAD 1 billion over five years for a Green Infrastructure Fund (GIF). This fund supports sustainable energy generation and transmission, along with municipal wastewater and solid waste management infrastructure. Targeted investments in green infrastructure can improve the quality of the environment and will lead to a more sustainable economy over the longer term.

Eligible projects are those that promote cleaner air, reduced greenhouse gas emissions, and cleaner water and fall within any of the following categories: wastewater infrastructure, green energy generation infrastructure, green energy transmission infrastructure and solid waste infrastructure, and carbon transmission and storage infrastructure.

The new Green Infrastructure Fund is allocated based on merit to support green infrastructure projects on a cost-shared basis. The fund focuses on a few large-scale and strategic infrastructure projects. The merits of the projects are based on assessment criteria such as eligibility, leveraging financial investments and project benefits.

<sup>29</sup>\_SOURCE: UNIDO, 2010; INFRASTRUCTURE CANADA<sup>5</sup>

5. See [www.infrastructure.gc.ca/prog/gif-fiv-eng.html](http://www.infrastructure.gc.ca/prog/gif-fiv-eng.html)

Beside these rather long-term oriented investments, *fiscal stimulus packages* that should help to overcome shocks or crises can also include environmental measures. The objective is to create a multiplier effect which generates further income and employment growth. However, during the last economic crises much stimulus support (e.g. in China) has been gone to traditional forms of infrastructure provision, particularly road building projects that augment the demand for road transport (UNEP, 2010). The effects of green stimuli on employment are discussed in Section 6.1.2 (Box 36).

**REGULATION  
MUST MAINTAIN  
ITS IMPORTANT  
ROLE IN A GREEN  
ECONOMY**

*Regulatory or "command and control" instruments* usually form the basis of environmental policy frameworks in both developed and developing countries. Regulations address a broad range of environmental problems, especially those that have severe health effects. They are useful in tackling point sources of pollution; particularly when easily identified, monitored and enforced. They also provide certainty and clarity for administrators and businesses. Flexible, well designed standards and regulations can also stimulate short term innovation and technology diffusion by generating a demand for products and services. However, at the same time poorly designed regulations can suppress technological innovation, particularly over the long-run (UNIDO, 2011a).

An interesting example of how regulations can stimulate technological innovation is Japan's Top Runner programme (see Box). With regard to energy-efficient new buildings, regulations in the form of new building standards have been proven to be successful.

**Japan's Top Runner programme  
for energy efficiency**

In 1998 the Top Runner Programme was launched by Japan's Ministry of Economy, Trade and Industry. At the core of this programme stands the setting of performance targets for companies based on the value of the most energy-efficient products on the market at the time, rather than fixed targets. Target achievement is periodically monitored and benchmarking criteria are developed by aligning individual targets on the performance of the "best in the class". Through the flexible and dynamic methodology a standard setting has been developed and creates positive incentives and boosts competition among manufacturers. They are becoming eager to improve their product performance without the need for additional financial means or a bias towards existing or outdated technologies. In order to help consumer choices at the point of sale, the programme is complemented by the e-Mark voluntary labelling scheme.

Japan's Top Runner programme for energy efficiency currently targets 21 product groups in the residential, commercial and transport sectors.

<sup>30</sup>\_SOURCE OECD, 2010; UNIDO, 2010

**VOLUNTARY  
AGREEMENTS ARE  
MOST EFFECTIVE  
WHEN USED  
TOGETHER WITH  
OTHER MEASURES**

Voluntary agreements can encourage companies, industries or sectors to improve their performance related to resource efficiency and environmental protection beyond regulatory measures. There is a great variety of voluntary agreements. They range from rather informal initiatives, where participating

parties set their own target and conduct their own monitoring and reporting, to formal contracts between a private party and a public institution or non-government organization (UNIDO, 2011a).

It is generally accepted that voluntary agreements are most effective when used in combination with other measures such as economic instruments and regulations, or during a phase-in period for the use of another instrument (OECD, 2008a). The following Box provides an example of a voluntary scheme on energy efficiency in Denmark's industry that was launched in 1996 as part of the Green Tax Package.

**Danish Agreements on Industrial Energy Efficiency**

The main objective of the Danish Green Tax Package was to decrease the carbon dioxide (CO<sub>2</sub>) and sulphur dioxide (SO<sub>2</sub>) emissions from trade and industry. In doing so, it introduced negotiated agreements combined with CO<sub>2</sub> taxes and investment subsidies. The voluntary agreements are targeted to enterprises with energy intensive production processes. These enterprises can enter into a three-year arrangement with the Danish Energy Agency qualifying them for a rebate on their CO<sub>2</sub> payment.

The agreements can be individual (covering a single firm) or collective (covering several enterprises within a sub-sector with similar production processes). In both cases the contract is signed by the individual enterprises. As the agreement is legally binding and the tax rebate is firm-specific, the problem of free-riding is not present. If enterprises do not comply with the terms of the agreement, their tax rebate is cancelled. Thus there exists a strong incentive for fulfilling the terms of the agreement. Companies entering into the voluntary scheme must implement an energy management system (EMS). The purpose of the EMS is to ensure that energy savings are achieved in daily operations, to identify inefficient operations, and to continuously evaluate new possibilities for energy efficiency. The Danish experience shows that the administrative costs for the implementing authority can be significantly reduced over time as a result of learning-by-doing, continuous adjustments (revisions), and increased systematization of the administration.

31\_SOURCE: ERICSSON, 2006; UNIDO, 2010

**Green Public Procurement (GPP)** is a voluntary instrument which can significantly support public authorities to reduce their costs and the environmental impact of their purchase decision. The following Box describes the efforts of the European Union to support GPP.

**Green Public Procurement in the EU**

Public authorities are major consumers in Europe, spending approximately 2 trillion Euros annually, equivalent to approximately 19% of the EU's gross domestic product. By using their purchasing power to choose goods and services with lower impacts on the environment, they can make an important contribution to sustainable consumption and production. GPP may also provide financial savings for public authorities – especially if you consider the full life-cycle costs of a contract and not just the purchase price. Purchasing low-energy or water saving products for example, can help to significantly reduce utility bills. Reducing hazardous substances in products can cut disposal costs.

In 2008, the European Commission set an indicative target that, by 2010, 50% of all public tendering procedures in the EU should be green. In 2011, the European Commission commissioned a study with the aim of measuring if this target has been met. Although the uptake of Green Procurement in the EU is significant, it appears that the 50% target has not been met. Only 26% of the contracts signed by public authorities in the EU in the 2009-2010 period included all surveyed EU core GPP criteria. However, 55% of these contracts included at least one EU core GPP criterion, showing that criteria of green procurement are being taken into account at a large scale. There are four top performing countries (Belgium, Denmark, Netherlands and Sweden), in which all EU core GPP criteria were applied in 40-60% of the cases. On the other hand, there are as many as twelve countries where this occurred in less than 20% of the last contracts.

The study shows that purchasing costs are still the predominant criterion for awarding contracts. 64% of the respondents mainly used the lowest price as the decisive criterion, while only a minority uses predominantly Life Cycle Costing evaluation methods. Furthermore, the level of awareness on GPP initiatives and tools is highly significant in determining both the choice to adopt GPP and the number of tenders that are adopted with the inclusion of environmental criteria.

32\_SOURCE: (EUROPEAN COMMISSION, 2011)

**INFORMATION-  
BASED  
INSTRUMENTS  
ARE IMPORTANT  
TO ENCOURAGE  
BEHAVIOURAL  
CHANGES**

**Information-based instruments** can comprise a range of activities and services such as environmental data collection, development of indicators, environmental valuation, energy audits, education and training, eco-labelling or certification schemes, public disclosure of enterprises' environmental performance, etc. If designed properly these can complement

and strengthen the effectiveness of other policy instruments (UNIDO, 2010). Product labels, for example, can reinforce behavioural responses to fiscal incentives by enabling consumers to recognise environmentally friendly goods (UNEP, 2010). Successful examples are already presented in Section 5.6.4.

In summary, a resource-efficient economy can only be achieved with a *policy mix* that optimises synergies and addresses trade-offs between different areas and policies. The EU Roadmap to a Resource Efficient Europe (see following Box) provides an example of a policy framework for the design and implementation of future actions. The objective is to provide a stable perspective for transforming the current economy.

### Roadmap to a Resource Efficient Europe

The vision of the Roadmap to a Resource Efficient Europe shows a European sustainable economy: *By 2050 the EU's economy has grown in a way that respects resource constraints and planetary boundaries, thus contributing to global economic transformation. Our economy is competitive, inclusive and provides a high standard of living with much lower environmental impacts. All resources are sustainably managed, from raw materials to energy, water, air, land and soil. Climate change milestones have been reached, while biodiversity and the ecosystem services it underpins have been protected, valued and substantially restored.*

To tackle the challenges on the way to 2050 and to fulfill the vision, a fundamental transformation in the sectors energy, industry, agriculture, fisheries, transport systems and in consumer behaviour is necessary.

The objective of the roadmap is to provide a stable perspective for transforming the current economy, it sets recommendations to increase the productivity of resources and shows ways for the decoupling of economic growth from resource use and its environmental impacts. A good overview how policies interrelate and are built up on each other is also provided.

It is important, that all policies are going in the same direction and that problem issues like inconsistencies in policy and market failures are tackled. Another focus is on areas, where policy actions can make a real difference and the need for more long-term innovative thinking is also highlighted. Specific and cross-cutting themes – such as addressing prices that do not reflect the real costs of resource use – will be discussed too.

The roadmap analyses the key resources from a life-cycle and a value-chain perspective. Especially for the sectors nutrition, housing and mobility – since these sectors are responsible for most of the environmental impacts – actions are proposed to complement existing policies and measures. It provides milestones which have to be reached until 2020. These milestones show what is needed for a path for a resource efficient and sustainable growth in Europe.

Of course this roadmap is not the ultimate response to all challenges, but it is a first step to design an action framework that meets different policy areas and sectors. To achieve the objectives, the roadmap sets milestones for each sector that should be reached until 2020. In the field of sustain-

able consumption and production, the *EU's Lead Market Initiatives* and the *Ecodesign Directive* should be considered and include more resource relevant criteria, but also voluntary measures may be taken into account. Boosting an efficient production is also important and avoiding the use of dangerous chemicals and promoting green chemistry can protect key resources like soil and water. A sustainable management of chemicals can be achieved by implementing REACH. The Commission also will strengthen the requirements on Green Public Procurement (GPP) for products with significant environmental impacts. An improvement of the waste management is aspired to create a full recycling economy and can be achieved with a combination of policies, for example a product design integrating life-cycle approach, better cooperation along the market actors along the value chain, better collection processes, appropriate regulatory framework, incentives for waste prevention and recycling and public investments. The efficient use of natural resources is addressed in the *Raw Material Initiative* and the climate and energy policies under the Resource Efficiency Flagship. The *Water framework Directive* (WFD) aims at a sustainable management of water resources.

To implement the roadmap, the Commission is preparing policy and legislative proposals. The engagement of other public and private actors is necessary to achieve the resource efficiency objectives, as well as incentives are an important part of the implementation.

33\_SOURCE: (EUROPEAN COMMISSION, 2011)

Promoting more flexible labour markets is also likely to support the transition to a green, inclusive and competitive economy, including retraining workers in industries expected to decline in size. However, there are also broader changes needed to strengthen an inclusive economy, as is evident from the next section.

### 6.1.2\_HOW TO ENSURE AN INCLUSIVE AND SUSTAINABLE ECONOMY?

It is important to ensure that a transition to a sustainable economy is characterized by gains in job quantity and quality, reductions in poverty and improvements in social inclusion. As was already explained in Section 3.3, fostering labour productivity is not the key strategy to support these aims, since this requires economic growth rates that are not compatible with an environmentally sustainable development.

### REDUCING WORKING HOURS SUPPORTS CREATION AND FAIR DISTRIBUTION OF EMPLOYMENT

One alternative way to reach these targets is to distribute employment more equally within the society. A **reduction of working hours**, while maintaining same levels of productivity, has the potential to stabilize or even increase the number of jobs (Stocker and Hinterberger, 2010). This would be an essential step towards the fair distribution of employment within a society, paving the way for an inclusive economy.

Less working hours allows a higher time sovereignty which is an important factor of well-being given the increasing number of health problems (depressions burn-out) due to too many working hours under too much pressure. However, it is important to allow the employees to choose voluntarily whether they want to work less and earn less or the contrary. Surveys in Austria and Germany (micro census) indicate that more than 50% of the working force would prefer a working time reduction to wage income.

Since productivity is high anyway, a general extension of working hours, as has been discussed for competitive reasons over and over during the last couple of years, would be socially counterproductive. This is because welfare has two currencies: money and time. It is the task of politics, collective bargaining parties and companies to respect the widely spread wishes – depending on individual life targets and biographic phases – to temporarily or permanently work less. Shorter working hours should no longer be punished financially und welfare-politically; they should be supported sustainably (Spitzley, 2007).

The following Box provides insights in the evolution of working hours over the 20<sup>th</sup> century.

### The evolution of working hours

In the 1930 essay “Economic Possibilities for Our Grandchildren,” John Maynard Keynes imagined that a rise in productivity would result in a large increase in leisure during the next 100 years. He predicted a 15-hour working week by 2030, based on the expectation that growing incomes would lead to both higher levels of consumption and shorter hours of work. But working time has proven to be less sensitive to income, especially in more developed countries. Despite a long-term trend towards a reduction of average working hours over the last 80 years in most countries of the world, Keynes’ vision is out of reach. Rather it has been shown that 22% of the world’s workers were working more than 48 hours per week at the turn of the 21st century (ILO, 2010a).

Nevertheless, over the 20th century, work hours declined by almost half, mainly due to rising wages caused by increased economic growth, with a supporting role from trade unions, collective bargaining, and progressive legislation. But also international standards of the International Labour Organization (ILO) had an influence: By the mid-twentieth century two primary standards were available for limiting weekly working hours, the 48-hour limit of the earliest international instruments and the more recent objective of the 40-hour week. They have not been viewed solely as stimulating employment, however, but have been recognized as contributing to a broader range of objectives, including health issues or, in recent years, towards advancing work–life balance (Lee et al., 2007)

In most industrialized countries, the worked hours a week dropped steadily, to about forty hours after World War II. The decline continued faster in Europe: for example, France adopted a 35-hour workweek in 2000 in

order to create additional jobs. A few years later, the Netherlands was the first country to achieve an overall average working week of less than 30 hours. However, in the 1990s, long-term reduction of weekly working time was over in Europe (only holiday entitlement has extended). Today, we need again a reduction of working time in order to solve the problems mentioned (unemployment on the one hand, overloading the other).

Working hours in industrializing economies, though still much higher than the leading industrial countries, are also declining steadily, as it is the case in South Korea.

A closer look at some of the EU member states reveals that low levels of unemployment are not the result of extensive working hours. Empirically, rather the opposite seems to be true. Those countries whose average working week hours are relatively low are the most successful in terms of employment policies. De facto the working week hours (including part time) amount to 33.8 in 2011 in Denmark and in the Netherlands even only to 30.5, while EU-Average was 37.4 in 2011 (Office for National Statistics<sup>6</sup>). At the same time, the unemployment rates are very low in these countries. While unemployment amounts to 7.6% in 2011 in Denmark, only 4.4% of the Dutch population is affected in 2011 (Eurostat<sup>7</sup>).

34\_THE EVOLUTION OF WORKING HOURS

Discussions about a reduction in working hours are associated with the question **whether and how wages should be adjusted**. The decrease of working hours *without wage compensation* (in other words, wages stay the same) have the highest effect on employment rates. In this case the costs per hour of work would stay the same as long as there is no increase in labour productivity and shrink respectively if labour productivity rises. This method of reducing working hours represents, especially for those who are highly qualified and belong to the upper salary range, a suitable alternative. However, those who belong to the lower-income groups are also in need of reduced working hours, in order to be able to better balance their job and family life. To reach this target, the reduction of working hours would have to be coupled to a corresponding minimum wage. *Complete or partial wage compensations* are also possible. If they are granted, the costs per hour of work rise; but only if (at a constant level of employment) increases in productivity do not cover the rising costs. However, if the *wage compensation is implemented proportional to the increases in productivity*, additional work force can be employed. Since the unit labour costs stay the same, when implementing this measure, it is referred to as a cost-neutral reduction of working hours.

6. [www.ons.gov.uk/ons/re/1/mac/hours-worked-in-the-labour-market/2011/rpt-hours-worked-in-the-labour-market.html](http://www.ons.gov.uk/ons/re/1/mac/hours-worked-in-the-labour-market/2011/rpt-hours-worked-in-the-labour-market.html)

7. [epp.eurostat.ec.europa.eu/portal/page/portal/employment\\_unemployment\\_ifs/data/main\\_tables#](http://epp.eurostat.ec.europa.eu/portal/page/portal/employment_unemployment_ifs/data/main_tables#)











The topic surrounding the reduction of working hours is part of the increasing criticism of economic growth. The 40-hours-and-more-week dogma is outdated, it is argued, because it originates from the industrial age. Work and life should be brought back into balance. The new economics foundation (nef) has recommended moving to a 21 hour standard work week<sup>8</sup> to address problems such as unemployment, environmental degradation, low well-being, entrenched inequalities, family care, overworking, and the general lack of free time (Coote et al., 2010). And, if we are confronted with persistent low economic growth rates in the future – whether through commodity price shocks, a decline in consumer confidence, or a managed attempt to reduce consumption – then the trend towards improved labour productivity causes unemployment (see Chapter 3.3). This in turn leads to reduced spending power, a loss of consumer confidence and diminished demand for consumer goods (Jackson and Victor, 2011).

IN SPECIFIC  
SECTORS LABOUR  
PRODUCTIVITY  
GAINS ARE  
COUNTER-  
PRODUCTIVE

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ening of other labour intensive sectors, such as education and care, through measures like a reduction of the number of students per class or of care patients per caregiver, is also a promising option (Daly, 2008). The trend to a service economy is generally considered to be resource saving and job creating.

THE STATUS OF  
UNPAID WORK  
HAS TO BE  
ENHANCED

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unpaid work: While all persons living in Austria need 186.5 million hours a week for unpaid work, the time needed for paid work is 182.4 million hours. 66% of the unpaid work is done by women, 61% of paid work is done by man. Given the importance of informal (unpaid) work, an extended definition of labour is essential for a sustainable society, which brings forth the concept of “mixed work” (see the following Box).

**Lower labour productivity** gains in some sectors can also contribute to a high participation rate on the labour market. This option, however, is more difficult to influence politically, but still can be pushed by the support of a shift from production to maintenance and repair, which are more labour intensive. Strengthening

In addition to the redistribution in gainful employment, another possibility is to **redistribute between gainful (paid) employment and informal (or unpaid) forms of work**. Data for Austria (Statistik Austria, 2009) underscore the importance of

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### The concept of mixed work

The concept of mixed work comprises additionally to the usual gainful employment the already mentioned types of labour: the caring work, voluntary work in the community and parts of work as self-provider. This concept was developed at the Science Centre (Wissenschaftszentrum) Berlin, Germany. It pulls together gainful employment and other relevant forms of labour in an economy such as active work (i.e. housework), care work (i.e. child care, nursing for the sick and old) and work for the community (e.g. unpaid work for self-help groups, non-profit associations, informal organizations) for all population groups.

These informal forms of labour are seen as necessary in existing economies without having a market value. In the concept of mixed work these valuable activities are considered explicitly and with this, get a higher significance.

The concept of mixed work connects the dynamic of development of employment with the requirements and potentials of social sustainability. It presupposes the revaluation of so called informal work by focusing more on the equality of rights and participation through the reallocation of work to ensure that useful forms of employment are accessible to all people regardless of gender, race, and age. An emphasis on the quality of work is also an important feature of mixed work.

This aside, the reduction of the unemployment rate can be regarded as an adequate indicator for social sustainable development, because formal work (traditional jobs) plays the most important role in the concept of mixed work. In this sense, people should be encouraged to gain useful employment in the formal economy, but work fewer hours per year, if possible, and engage in work in the informal sectors of society.

In addition, more flexibility at work could support mixed work. Besides the positive effects on labour productivity, reduced gainful employment hours result in an increase of active work and nursery work hours. Overload and work related diseases can be lessened and a better balance of work and family can be achieved. Unpaid work could be better distributed to women and men improving gender equality. Mixed work can also bring positive effects for relieving public finances: a stronger focus on nursery work can substitute professional nursery for example and this reduces burdens on the national budget.

<sup>35</sup> SOURCES: (HANS-BÖCKLER-STIFTUNG, 2000), (STOCKER ET AL., 2006), (HINTERBERGER ET AL., 2009)

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A number of measures could enhance a redistribution of labour and an enlargement of the term, such as an environmental tax reform, reduced working hours or the introduction of minimum wages. The following Box lists many suggestions that were developed within an Austrian research project on behalf of Eco-social Forum. The reorganization of labour is also supported by measures, which are assigned to other policy areas (such as distribution policy). A further reflection concerns equipping people with the skills to support the transformation to a sustainable economy through education, research or industrial policy (EEA, 2012).

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## Measures that could enhance the redistribution and reorganization of labour

### *Measures that affect work time and flexibility:*

- \_ Stronger implementation of flexible work hour models (flex time, part time, partial retirement, work hour accounts, sabbaticals, relay model, etc.), via legal regulations (working hours, part-time law) and voluntary work agreements
- \_ Abolition of tax breaks for overtime
- \_ Gradually increase of effective retirement age, linked to increase in life expectancy
- \_ Incentives for companies to create long-term employment (bonus for full-year employment offer, e.g. in construction and tourism in the unemployment and health insurance)
- \_ Promotion of the possibility of teleworking

### *Measures that affect income and labour costs:*

- \_ Environmental tax reform
- \_ Decrease of ancillary labour costs especially for low and medium income
- \_ Introduction of minimum wage to ensure subsistence
- \_ Flattening of age profiles (older/younger) regarding gross wages through changing wage schemes

### *Measures that support mixed work and gender equity:*

- \_ Encouragement of greater labour participation of women through the development of qualified and affordable child care with flexible opening times
- \_ Promotion of balanced allocation of gainful employment and informal work – increase of proportion of women in higher income and fields of activity (e.g. through quotas, women's promotion plans or gender budgeting in the public sector)
- \_ Favouring social recognition of informal work (e.g. by encouraging paternity leave, awareness raising)
- \_ Tax privileges for companies that provide child care
- \_ Tax incentives for certified assistance and care services
- \_ Tax incentives for domestic services (with upper limit, time-limited, subject to mandatory qualification offer)

### *Measures that integrate specific target groups in the labour market:*

- \_ Financial and advisory assistance for companies in the employment of low-skilled employees
- \_ Establishment of an promoted extended labour market for people with special needs, where these are insured and are enabled to participate in long-term employment and with this, to provide valuable, paid contributions to the overall social wealth creation
- \_ Raise awareness of employers, government agencies and offices for the problems and potentials of particular target groups (people with disabilities, migrants, older workers)

36\_SOURCE: (OESF, 2010)

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## DECENT JOBS AUGMENT THE QUALITY OF LIFE

Based on inputs of the International Labour Organization (ILO) concepts of **decent work** that respect human rights standards are being developed. These concepts do not focus on paid labour per se, but on the quality of labour. Topics like job security, occupational safety, income, social benefits, working-hours as well as work-life-balance, gender equality, qualifications and job satisfaction are also being taken into consideration, with regards to this “new” focus (Ax, 2009). Since our society is in transition, it seems especially important to strengthen concepts that increase and secure the quality of work.

The concept of decent work is also at the heart of the creation of so called **green jobs**. The definition of green jobs is provided in the glossary.

## GREEN JOBS MUST BE SUPPORTED BY SOCIAL AND EDUCATION POLICY

An important step for the creation of green jobs is the implementation of an environmental tax reform (already introduced in Section 6.1.1). Shifting towards a green economy will significantly affect workers, employers and communities. Thus, policies are required that share the costs and spread the benefits. Programmes such as job-search assistance, job counselling, training and improved labour market information should be introduced, because the structural transformation into a green economy entails changes in employment patterns and skills requirements. Certain sectors and enterprises that are incompatible with long term sustainable development may be shrinking. Income support and social protection measures will be required to bound the downside adjustment process for workers most likely to be affected by the shift towards a greener economy (i.e. low-skilled workers), notably in resource-intensive sectors. Furthermore, income support measures, when accompanied by other measures such as training, can improve employability by keeping workers tied to the labour market and prevent skills erosion. Close cooperation between governments and social partners will also be essential that the transition to a greener economy goes along with decent jobs. In fact, well-informed and coherent policies that result from broad support and active commitment among stakeholders will be central to confirming that the transformation is sustainable (ILO, (2011)and (ILO, 2012)).

8. The 21 hours week accords to the average that British people of working age spend in paid work and just a little more than the average spent in unpaid work.



During the recent economic crisis **green stimulus programmes** were a common used approach to stimulate employment and simultaneously provide environmental benefits. Green stimulus measures can be separated into support for the clean energy sector, comprising energy efficiency and renewable energy as well as support for water, waste and pollution control (Pew Charitable Trusts, 2009). However, there may be large differences in the quantity and quality of jobs created across different green stimulus programmes (see the following Box).

### **Employment effects of green stimulus programmes**

Currently, empirical evidence on the employment effects of specific environmental stimulus programmes is limited. Economic theory seems to prefer supporting energy efficiency measures that reduce energy costs, over renewable energy investments that are likely to raise energy prices (UNEP, 2010). As argued by the IEA (2009), “improvements in energy efficiency can deliver some of the largest and cheapest CO<sub>2</sub> reductions. Importantly in a time of financial crisis, they can also often be implemented quickly and bring more benefits for employment than any other category of energy technology”.

Investments in clean energy can generate twice as many jobs per dollar invested compared with traditional fossil fuel-based energy. In addition, studies suggest that improvements in energy efficiency and investments in green power have longer lasting employment gains than tax cuts or traditional infrastructure investments that generate jobs only as long as projects’ funds last (UNEP/ILO/IOE/ITUC, 2008). Specific labour intensive environmental clean-up operations, which give productivity benefits that are not only but also based on improvements of human health, are also favoured by theory. Support of renewables generates less employment than building insulation and other energy efficiency programmes. (Strand and Toman, 2010). But there are also large variations on the impact of different renewable technologies on labour. Employment in photovoltaics requires a higher level of education, while employment in biomass production will most likely generate jobs in low skilled agriculture (UNEP, 2010).

Various green stimulus programmes have been endorsed by higher-income countries as well as some middle-income countries. Although the amounts of funds and outlays vary from country to country, nearly two thirds of all green spending globally supports energy efficiency (EC-IILS, 2011). Germany has announced two successive stimulus packages, the first in November 2008 and the other in January 2009. These two make up the biggest fiscal recovery programme in Europe, contributing at least 37% of the overall EU-27 stimulus. The spending combines tax cuts with infrastructure investments, with a focus on energy efficiency and climate protection. The planned investments are expected to further increase job growth in renewable energy (including 30,000 in the construction of offshore wind parks). In addition, construction and manufacturing for retrofitting buildings for energy efficiency will create about 25,000 jobs (EC,IILS, 2011). In the UK, the green stimulus is expected to create

350,000 jobs in the low-carbon sector. Similarly, in France, the green stimulus package is estimated to generate 80,000-110,000 new jobs. It is also projected that by expanding investments in clean energy in Canada, 407,000 jobs could be created (EC, IILS, 2011). In the United States, total green spending under the American Recovery and Reinvestment Act (ARRA) amounts to 0.7% of US GDP, and aims to create or save around 2 million jobs (Barbier, 2011). These numbers are in line with a study from Houser et al. (2009), which argues that USD 1 billion spent on green fiscal measures has the potential to create about 30,000 jobs.

There seems to be evidence that programmes resulting in larger employment effects tend to create jobs for largely lower-skilled workers, and vice versa. These results reinforce the argument that different instruments are needed for addressing different problems (Strand and Toman, 2010).

Ultimately, it has to be noticed that a green stimulus is no replacement for comprehensive climate and energy policy. Even very successful short-term spending will have only a modest impact on greenhouse gas emissions and dependence on foreign sources of energy (Houser et al., 2009).

#### **37\_EMPLOYMENT EFFECTS OF GREEN STIMULUS PROGRAMMES**

In sum, green growth/green economy policies may create jobs, but are no substitute for sound labour markets. Shortcomings in labour markets will not disappear with the adoption of environmental policies. On the other hand, fears that environmental regulations will lead to massive job losses or loss of competitiveness are unfounded as well (World Bank, 2012).

### **6.2\_GREEN GROWTH POLICIES IN DEVELOPING AND EMERGING ECONOMIES**

Global resource use and emissions were, until recently, largely driven by wealthy industrialized countries. However developing and emerging economies are increasingly exploiting their natural resources to attain unprecedented levels of wealth, and have, in recent decades, been characterised by unprecedented resource consumption. In some regions inequalities have been exacerbated as development has further eroded the basis of poor people’s livelihoods.

The world stands at a dangerous juncture of escalating global temperatures, sea level rises and food insecurity and again, it is the world’s poor who are most susceptible to extreme events associated with climate change, over-population and resource degradation, with East Asia and the Pacific accounting for 40% and Sub-Saharan Africa 35% of climatological disasters between 2005–2010 (UNDP, 2012) and it is the world’s poorest who are being left behind with rapid economic growth, with the expected „trickle down“ effect in many African countries making no progress in lifting the majority of populations out of poverty, in contrast, poverty levels are rising in some regions.

**EXPERIENCE  
SHARING AND  
COOPERATION AT  
THE REGIONAL  
AND  
INTERNATIONAL  
LEVEL IS  
IMPORTANT FOR  
SUSTAINABLE  
ECONOMIC  
DEVELOPMENT**

Many emerging and some developing economies are in the transition or have transitioned from a largely agrarian-based economy to resource intensive industries in the context of dwindling domestic resources and which is compounding existing pressures on a diminishing global resource base, largely set in motion by industrialized countries. Many Asian and Pacific developing economies are already approaching their limits in terms of domestically available resources and have become net importers of raw materials, especially metals and fossil fuels (Dittrich et al., 2012). Therefore, economic development in the close future will rely increasingly on their capacity to purchase these strategic resources on the world market, and prices for many strategic resources may increase. With many global problems an effective way in which to share experience is by cooperation at the regional or international level. The Asia-Pacific region which has a range of developing, emerging and industrialized economies is a good example of how experience sharing and working together could look at the regional level (see the following Box).

**Low Carbon Green Growth Roadmap  
for Asia and the Pacific**

The Asia Pacific region has been one of the forerunners of the green economy and green growth concept. For example, the Republic of Korea first declared low carbon green growth as the new national vision for the country to follow in August 2008. In 2009, Korea announced the National Strategy for Green Growth to guide development during the next 50 years and in order to implement this vision (UNESCAP, 2012). In 2012 the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) developed a Roadmap for the region, which outlines policy options to lead countries, and in particular developing countries-towards a greener economy. The Roadmap draws upon approaches and experiences that promote low carbon green growth in the Asia-Pacific region, outlining the region-specific challenges, and how to pursue green growth in several critical sectors such as fiscal reform, urban planning, transport, green buildings, water infrastructure and trade. The Roadmap presents a range of policy options and detailed analysis of these options including their respective strengths, challenges and implementing strategies.

*38\_Low Carbon Green Growth Roadmap for Asia and the Pacific*

**6.2.1\_SHIFTING POWER STRUCTURES  
AND THE WORLD'S POOR**

The dynamics of resource use - including the power dynamics - have shifted dramatically in favour of the large emerging BRICS economies. As a negotiating block in the climate change,

environmental and sustainable development negotiations, they are also demanding that they have the right to follow the economic, resource intensive paradigm as undertaken by the industrialized countries before them if that is what is needed to be done to lift their countries out of poverty.

**GREEN GROWTH  
STRATEGIES MUST  
LEAD AWAY FROM  
UNSUSTAINABLE  
RESOURCE  
CONSUMPTION**

The world's 1.3 billion poorest people need to consume more resources in order to be raised out of extreme poverty, yet 100 countries with the lowest absolute material consumption together consume only around 1.5% of all globally consumed materials (Dittrich et al., 2012).

In parallel, many developing and emerging economies are facing severe environmental degradation, with resource depletion, climate change and food insecurity posing a very real threat to any gains that may have been made towards sustainable development. Therefore, it is increasingly clear that being green is not just an environmental issue - it is wide-ranging - it is an issue of equity, for today's and future generations, it is about social stability and the delicate ecosystems upon which the poor rely. In order to achieve this, there is a realisation that developing countries will need to follow patterns of economic growth that are significantly more resource efficient than those already undertaken by today's industrialized countries. Such green growth strategies must lead away from the wasteful use of resources, the destruction of ecosystems, and from air and water pollution towards clean, renewable, and sustainable forms of resource use.

Many developing and emerging economies face significant institutional, environmental, political and social and capacity challenges that do not exist to the same level in industrialized countries.

**GREEN GROWTH  
MUST CONTINUE  
TO BE COUCHED  
IN POSITIVE  
TERMS**

**6.2.2\_GREEN GROWTH APPROACHES  
IN A RANGE OF EMERGING  
AND DEVELOPING COUNTRIES**

Economic growth and green growth as understood in the industrialized economies where governance and environmental and economic regulations are stronger - are different in the spectrum of emerging to least-developed economies. Similar to industrialized countries, green growth is an opportunity to decouple resource use and related environmental impacts from economic growth and "leapfrog" over the well-worn development paradigm of resource over-exploitation and environmental degradation as set by industrialized countries. For developing countries, green growth is about cleaner production to mitigate air, water and land pollution, providing basic services such as energy, clean water, education and shelter and lifting their populations out

*Fishermen returning  
to Saint-Louis, Senegal.*

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of poverty. Green growth is a development opportunity for developing and emerging economies and as such, must continue to be couched in positive terms to avoid the debate over semantics as faced sustainable development.

#### SHORT-TERM COSTS MIGHT HINDER THE TRANSFORMATION

As noted above, developing and emerging economies that intend or are already are pursuing a form of green growth or low carbon development strategy, are beginning their work in a completely different, more challenging and complex economic, industrial and often social context than many industrialized countries. With this should come an expectation, which may, or may not be realized, that the short-term costs which are associated with the re-structuring towards green growth, might decrease the willingness of developing and emerging countries to change to that path.

Such costs could stem from necessary structural change, i.e. changing from a model and economic structure, which is in many countries still very much oriented towards resource extraction and exports or heavy-industry (metal, chemical, etc.), towards a model, which is more industry- and service-oriented. There will be losing sectors in the Southern economies (mining, agriculture, high resource-intensive manufacturing, etc.), while the new sectors have not yet been set up fast enough to counterbalance the loss of the “old sectors”. However, this can also be seen as an advantage. It is correct that a large degree of infrastructure still needs to be developed to facilitate green industry and green growth, however this is also an opportunity to “leap frog” the pollution and resource intensive growth paradigm as followed by the industrialized countries, which has created a “path dependency” for them. In contrast, such a situation can spur innovation in emerging and developing countries to bypass the inherited pollution intensive technologies, or even benefit from a system that evolved largely without the resource intensive paths of industrialized countries, as seen in many developing countries still possessing a large swathe of the world’s remaining tropical forests and thus being able to benefit from ecotourism, PES schemes (Payment for Ecosystem Services) and, as outlined below in the case of Uganda, the ability to benefit from their organic farming practices brought about in part by a scarcity of inputs.

#### Organic agriculture in Uganda

Uganda is a largely agrarian-based economy with 85 per cent of the population engaged in agriculture production, contributing to 42 per cent of the national GDP and 80 per cent of the exports earnings in 2005/06. Fertilizer use was not widely used, due to the historically limited availability of inputs. Recognizing the opportunities from this, a small number of commercial companies began to engage in organic agriculture

as early as 1994. In parallel, there was a general movement in the agricultural sector towards developing sustainable agriculture as a means of improving people’s livelihoods.

Uganda has now built on its comparative advantage in organic agriculture and has expanded the size of the land dedicated to organic farming from 185,000 ha of land under organic farming covering more than 2 per cent of agricultural land in 2004 to 296,203 hectares of land were under organic agricultural production with 206,803 certified farmers with its certified organic exports increasing from Certified organic exports increased from USD 3.7 million in 2003/4, to USD 6.2 million in 2004/5, before jumping to USD 22.8 million in 2007/8.

The growth of organic agriculture in Uganda has been supported through government policies such as the adoption of firstly the Uganda Organic Standard and then the East African Organic Products Standards (EAOPS) developed under a joint UNEP-UNCTAD initiative. The government also introduced a Draft Uganda Organic Agriculture Policy, the implementation of which aims to support the development of organic agriculture as “one of the avenues for delivering self-sustaining growth as it provides mechanisms for individual farmers to improve productivity, add value and access markets which are keys to achievement of the Poverty Eradication Action Plan objectives”. The policy strategy is based on the following objectives:

- \_ the promotion of organic agriculture as a complementary agricultural production system;
- \_ the development of a system of standards, certification and accreditation;
- \_ the promotion of research, to enable technology development and dissemination;
- \_ support to the development of local, regional and international markets for organic products;
- \_ the generation of information, knowledge and skills through education and training;
- \_ the improvement of post-harvest handling practices, preservation, storage and value addition;
- \_ the sustainable use of natural resources; and participation of the special interest groups such as women, youth, and the poor and vulnerable.

39\_SOURCE: UNEP, 2010A

The example from South Africa below highlights the kind of support that can be provided by developing country governments to support fledgling green growth/ green economy strategies within their countries.

#### National Cleaner Production Centre South Africa

The Nation Cleaner Production of South Africa (NCPC-SA) was launched during the 2002 Johannesburg World Summit for Sustainable Development (WSSD) as a co-operation programme between South Africa and the United Nations Industrial Development Organization (UNIDO) with financial assistance from the South African Department of Trade and Industry (the DTI) and the Governments of Austria and Switzerland. The Centre is active in the following sectors: chemicals; agro-processing, automotive and transport equipment; metals and allied processes; pulp

and paper; clothing and textile; leather and footwear; tourism and hospitality, commercial buildings. Its service model is based on applications of tools and methodology from the UNIDO CP Toolkit. Additional extended Resource Efficiency and Cleaner Production (RECP) services including energy efficiency, industrial symbiosis and waste recycling, life cycle assessments, eco-labelling and environmental laws and policies.

The NCPC-SA primarily focuses on Small and Medium Enterprises (SMEs) in offering CP advocacy and techniques. The objectives of the NCPC are as follows:

1. grow CP awareness in South Africa;
2. provide CP assessments and advice to enterprises in all industry sectors;
3. facilitate value added outcomes through investments in Cleaner Technologies;
4. grow CP capacity among the industrial workforce, management, government, service providers and students;
5. contribute to national priorities for example energy saving, water quality and waste minimisation through efficiency; and
6. contribute to the creation of green jobs through CP capacity building and recycling.

40\_SOURCE: (UNIDO/UNEP, NY)

The magnitude of climate change, environmental and food security issues facing the developing world in particular cannot be understated. Green growth needs to both socially and environmentally appropriate to the context in which it is applied. The oft-expressed adage of “threat as an opportunity” most certainly rings true for developing and emerging economies. However, there is a large swathe of inter-connected issues that must be able to be addressed at a minimum in order to provide a strong framework to pursue these programmes and policies.

#### GOVERNMENTS MUST BE THE DRIVERS OF GREEN POLICIES AND PROGRAMMES

Developing country governments can-not rely on the free market alone to drive green growth; governments must be the driver of green policies and programmes and show sustained commitment to seeing these programmes succeed in both the short and long term. Governments need to address capacity constraints and

policies and programmes must target specific groups such as women and youth in all of their green growth and sustainable development policies and programmes which in turn, must be based on sound evidence, derived from robust modelling and the integration of stakeholder input.

**Regional cooperation**, as demonstrated by the work undertaken in the Asia-Pacific region that produced the “Low Carbon Green Growth Roadmap for Asia and the Pacific”-(UNESCAP, 2012) can build on synergies and promote cooperation.

#### 6.2.3 THE APPLICATION OF THE TERM “GREEN GROWTH” IN VARYING CONTEXTS

The text below is based on a paper developed by Jacobs (2013) which outlines the different theories/ forms that the “opportunity of green growth” has taken. This also broadly reflects the range of green growth/green economy approaches as applied to date around the globe.

##### Environmental stimulus in recession

One expression of green growth has been a short-term “green stimulus” in times of recession or financial crisis as evidenced in the recent global financial crisis, many countries devoted billions of dollars in order to boost their economies. The objective of this is to create a multiplier effect which generates further income and employment growth. However this is more of a short-term focus than longer term change as the investments would typically have been made at some time in the future and this is merely bringing this forward (Jacobs, 2013).

##### Stimulus package in China

As a response to the Global Financial Crisis, China was reputed to have invested a total of USD 586 billion in stimulus packages. It is estimated that around USD 221 billion was spent on “green” projects, with over 51 billion allocated for renewable energy projects, including energy efficient building and low carbon vehicles with around 73 billion spent on rail projects.

41\_SOURCE: (REVELLE AND CHIANG, 2009)

##### Green growth as a response to market failure

Another application of green growth seeks to address market failures, revising the traditional growth theory and acknowledges and integrates the contribution made to growth in investment in natural capital. Green growth offers the opportunity of a global and coordinated response to such market failures, correcting those through a variety of tailored policy responses which seek to address the prevailing economic paradigm of resource exploitation without the integration of the cost of the environmental damage and formalising a framework for payment of these services. This approach has been adopted in both developed and developing countries from the international to the sub-national level. In the developed country context, this approach was most famously espoused by the 2006 Stern Review on the Economics of Climate Change which argued that climate change is the greatest and widest-ranging market failure ever seen, presenting a unique challenge to address this.

Another well-known example of the addressing market failure approach is Payment for Ecosystem Services (PES) whereby a landowner or traditional user is remunerated for their role in conserving a particular natural resource. REDD+ outlined below, is a well-known form of PES.

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### **The REDD+ programme**

A prominent form of PES (Payment for Environmental Services) is REDD+ (Reducing Emissions from Deforestation and Forest Degradation, and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks) is an international initiative that is seeking to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development.

REDD+ is an opportunity for developing (including least developed countries) and emerging economies to benefit from their comparative advantage in forests. No formal agreement exists at the international level, however countries ranging from the Democratic Republic of Congo to Brazil have entered into agreements with a range of stakeholders such as other countries or corporations also through voluntary markets to compensate for this conservation. REDD+ activities are also focussing on areas such as strengthening forest governance, forest monitoring and social and environmental safeguards (that is, policies that seek to mitigate social and environmental harms from development programmes or policies), forest monitoring, including on the ground monitoring by local communities and funding mechanisms to ensure that compensation is directed towards the resource owner or custodian. Though REDD+ is not without controversy, with critics arguing that REDD+ promotes monocultures, could further disenfranchise traditional forest owners from their lands and encourage monocultures.

*42\_SOURCE: UN-REDD PROGRAMME (SEE [www.un-redd.org/aboutredd/tabid/582/default.aspx](http://www.un-redd.org/aboutredd/tabid/582/default.aspx))*

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### **PES in Mexico**

Mexico has the world's largest program of Payment for Environmental Services, which rewards and supports mechanisms for hydrological, carbon and biodiversity services. Clear land tenure is a prerequisite under the PES programme and is prescribed in law. CONAFOR (the National Forestry Commission) enters into 5 year contracts with landholders who apply to participate in the program with contracts being awarded to applicants who score highest under a points system. Contracting parties agree to make no land use changes and protect the land from illegal logging and forest fires so as to protect and enhance the water services provided by the forest on their land. The Government monitors performance remotely and by sending inspectors.

*43\_PES IN MEXICO*

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The focus in some emerging and developed economies has been to address both environmental and non-environmental market failures through measures such as improving energy efficiency or taxing emissions. For example Australia introduced commercial building energy disclosure legislation as well as recently putting a price on carbon. The objectives of such measures are multiple: consumers and firms respond by becoming more efficient and there are also spill-over effects in the areas of innovation where firms respond to these demands through developing more efficient technologies and processes amongst others.

### **Technological revolution in generating green growth and a new "green revolution"**

The third concept emphasizes the importance of the implementation of green policies to create new jobs in green industries. It is said that more stringent environmental policies will drive technological innovation and create comparative advantage with both elements thought to create a new jobs and eventually a new industrial revolution (Stern and Rydger, 2012).

China is a good example of an emerging economy that is now focusing on the quality of its growth having implemented a number of green growth measures since 2005 with the inclusion of energy and resource efficiency in its Eleventh and Twelfth Five-Year National Social and Economic Development Plans as well as setting quantifiable targets for energy and resources efficiency.



*Delmas open-air  
coal mine, Republic  
of South Africa.*

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## 7\_RECOMMENDATIONS

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### FOCUS ON RESOURCE AND CAPITAL PRODUCTIVITY AS THE NEW STRATEGY

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In this publication it has been argued that many attempts have already been successfully undertaken around the world to fight the multiple crises of economies, societies and the environment from a new perspective. This new perspective puts its focus on improving the productivity in the use of natural resources as well as

capital rather than further increasing labour productivity, the main strategy of the past decades.

Companies in many countries have already started applying eco-innovative processes and developing new products that provide services with significantly less material input than comparable processes and products in the past. At the same time, a rapidly increasing number of people is changing their consumption behavior and asks for resource-efficient products which sometimes are even cheaper than conventional ones.

### COMPANIES, INDIVIDUALS AND GOVERNMENTS ARE ALREADY CONTRIBUTING TO A SHIFTING PARADIGM

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Governments around the world start to support such behaviour of companies and households with innovative tax or subsidy schemes as well as with special programs that advise companies and households to innovate in a resource-efficient direction. Setting ambitious targets and monitoring progress towards their achievement are key success factors of such policies.

A promising new strategy towards “green growth” should actively apply the successful policies around the globe summarized in this publication and combine the advantages of voluntary action by individual actors with a strong policy framework on the national, regional and global levels of governance.

As the forerunners and perpetrators of industrial development and exploitation of natural resources, it is contingent upon the Global North to take the lead on developing sustainable solutions to consumption and production challenges. Governments need to lay the framework for enhancing the integration of new actors from the private sector and civil society, develop new societal norms and sustainable economic models that integrate well-being and are not solely based on GDP (Reilly, 2012)

### THE GLOBAL NORTH IS RESPONSIBLE TO TAKE THE LEAD TOWARDS SUSTAINABLE CONSUMPTION AND PRODUCTION

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At the same time, individuals need to get aware of the impacts of their lifestyles on themselves and others and get together to start a change. Only if changing patterns of consumption match with the afore-mentioned shifts in governance and companies a broad transition towards “green lifestyles” will be achievable.

Decoupling economic development from environmental degradation calls for a combination of supporting policies, technological innovations and important lifestyle changes with respect to the three key targets for overcoming the current crises laid out in this publication:

#### Target 1:

##### An inclusive and competitive economy

In order to reverse all negative impacts of our current economic system and promote a sustainable future governments and international organizations should:

- \_ Promote regional development to minimize the adverse effects of global dependencies
- \_ Expand human and social capital to promote communication-, team building- and conflict resolution skills
- \_ Conduct institutional reforms, such as new rules for the monetary system, company law and property rights

#### Target 2:

##### A high quality of life for everybody

In order to increase the quality of life for all and reduce our consumption of natural resources at the same time governments and international organizations should:

- \_ Promote the individual's awareness and duty to take responsibility (for oneself, family, neighbourhood, region, nation, planet...)
- \_ Create a political framework and transparency to be able to live this responsibility
- \_ Support the supply of eco-efficient goods and services, which mirror this responsibility on the supplier- as well as the consumer-side
- \_ Increase the coverage of sustainability issues in the media raising awareness in the public debate
- \_ Promote strategies to assist, motivate and inspire behavioural change (e.g. in education)
- \_ Emphasise the role of infrastructure and enabling sustainable living environments
- \_ Promote localised social innovation experiments

#### Target 3:

##### Sustainable use of natural resources

In order to reduce the use of natural resources in absolute terms by a factor of 5 to 10 in early industrialized countries leaving further room for developing countries to expand their resource consumption governments and international organizations should:

- \_ Implement Environmental Tax Reforms (ETR) in a broad sense (including a shift of tax burden from labour to environmental concerns, most notably material use, water use and greenhouse gas emissions)
- \_ Phase out environmentally harmful subsidies
- \_ Develop a global carbon market
- \_ Use public finance to foster innovation and green investment (in the short and long term)
- \_ But also use regulations, voluntary agreements and information-based measures aiming at resource-efficient production and consumption

However, fostering resource efficiency is not enough, as improvements in resource efficiency are often offset by the rebound effect, whereby reductions in the costs of products due to enhanced resource efficiency lead to increased purchases of those or other products. Therefore more needs to change in the core business of companies. Especially **SMEs need more support** to eco-innovate and adopt resource efficiency measures. Specific investment is needed especially the domain of science, innovation and entrepreneurship. **Strong policy framework conditions are needed** to provide a level playing field for economic activity while safeguarding common goods. This requires setting clear and binding environmental targets and limits of both resource use and emissions based on scientific evidence of planetary boundaries and wider societal trends. From this follows that not only environmental but also wider macro-economic policies need to be targeted towards more radical and systemic eco-innovation.

A sustainable economy requires dedicated policy approaches embedded in a coherent, integrated strategy covering demand and supply aspects. No single instrument alone can effectively promote a sustainable economy. Governments have to find the optimal mix of instruments, which are supported by national strategies and integrated policy frameworks.

As shown by numerous examples, there is evidence that existing green strategies and policies present a strong basis on which to build new approaches that balance economic, social and environmental considerations.

These strategies have proven to be more successful than other forms of economic policy interventions and provide evidence of the role of resource productivity policy both in providing a short term economic stimulus and in building a sustainable and resilient economy in the long term.





*Agricultural landscape  
near Cognac,  
Charente, France.*

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## 8\_GLOSSARY

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### **CAPITAL**

*The whole capital stock of a country consists of:*

#### **NATURAL CAPITAL**

Natural capital is defined as any stock or flow of energy and matter that yields valuable goods and services. This includes resources, some of which are renewable (e.g. timber, grain) and others that are not (e.g. fossil fuels). Natural capital also includes sinks that absorb, neutralize or recycle waste (Porritt, 2006).

#### **MANUFACTURED CAPITAL (OR PHYSICAL CAPITAL)**

Manufactured capital consists of material goods – tools, machines, buildings and other forms of infrastructure – that contribute to the production process but do not become embodied in its output (Porritt, 2006).

#### **HUMAN CAPITAL**

Human capital refers to the education, job experience, acquired skills, and the health of individuals. Most economists focus on the learning aspects of human capital and use the assumption that learning capacities are comparable to other natural resources involved in production processes as basis for this approach (see e.g. Beckley et al. 2002). Learning happens either formally or informally and can be expressed in various dimensions (e.g. leadership skills, life experience, and tacit knowledge).

#### **SOCIAL CAPITAL**

The most controversial and the hardest to measure kind of

capital, consists of the structures, institutions, networks and relationships that enable individuals to maintain and develop their human capital in partnership with others, and to be more productive when working together than in isolation. It includes families, communities, businesses, trade unions, voluntary organizations, legal/political systems and educational and health institutions (Porritt, 2006).

#### **FINANCIAL CAPITAL**

Financial capital is an instrument of exchange between all other forms of capital and for the assertion of claims of ownership. It reflects the productive power of the other kinds of capital and enables them to be owned and traded. Financial capital is the money used by businesses to buy what they need to produce their products or provide their services. The value of financial capital is created the moment it is spent: it does not have an intrinsic value and it is lost if it is given away (Hargreaves 2001).

### **PRODUCTIVITIES**

#### **CAPITAL PRODUCTIVITY**

Capital productivity is defined as output per unit of value of manufactured capital. Capital productivity is the measure how well this capital type is used in providing goods and services. An increase of capital productivity means that for a given level of production less capital is needed.

#### **LABOUR PRODUCTIVITY**

Labour productivity is the average per capita production. It is measured in terms of the quantity of output produced by a worker per unit of labour-time (an hour, a shift, a month, or a year) or in terms of the time spent in producing a unit of output. Labour productivity is the product of working hour productivity and average working hours per capita. It rises with increasing labour productivity per hour and decreases with reduced working hours.



#### RESOURCE PRODUCTIVITY

Resource productivity illustrates the amount of economic value generated by unit of resource used. In most cases, the term

#### GREEN JOBS

UNEP et al. (2008) broadly define a green job as any decent job that contributes to preserving or restoring the quality of the environment. This broad definition includes green occupations across the economy and employment in green sectors as well as employment in parts of non-green sectors, which operate in an environmentally friendly manner (such as agriculture, forestry, construction, manufacture or transport). All three dimensions of sustainable development are part of this definition: green jobs have to be decent, i.e. productive, provide adequate incomes and social protection, respect the rights of workers, etc. They also should have the potential to significantly reduce negative environmental impacts of economic activity, ultimately leading to sustainable enterprises and economies (ILO, 2012).

Until now, however, there is no single definition of green jobs. Many countries are developing their own definitions to serve as a basis for collecting statistics and making policy choices. A harmonization of concepts would make it easier to compare developments in different countries. Accordingly, the ILO is just working on a standardized definition for green jobs that could be applied by countries in all regions (ILO, 2012).

#### NEEDS

Needs are the most fundamental dimensions of human flourishing. We call needs those reasons for action that require no further explanation or justification.

#### STRATEGIES

Strategies are instrumental means to fulfil needs. Typically, strategies relate positively and/or negatively to more than one need.

#### WELL-BEING

This term refers to emotional states and reflections of meaning in life based on the subjective experience of one's fulfilment of needs. Its hedonic part reflects the pleasure experienced and is linked to emotional well-being, its eudaimonic part reflects the striving to realise one's personal and social potential.

#### QUALITY OF LIFE

Quality of life is related to individuals and has two components: capabilities and well-being.

## 9\_ WEBLINKS

- Abbey Gardens: <http://www.abbeygardens.org>
- Co-Housing Copenhagen: <http://www.langeeng.dk/>
- Community Supported Agriculture: <http://www.localharvest.org/csa/>
- Covoiture: <http://www.covoiturage.fr/>
- Climate Parliament: <http://www.climateparl.net/cp/101>
- East Lake Commons: <http://www.eastlakecommons.org/pgHomeELC.aspx>
- Eco Chateau: <http://www.eco-chateau.com/>
- Eco-village Ithaca: <http://ecovillageithaca.org/evi>
- EPEA: <http://epea-hamburg.org/index.php?id=199>
- Foodcoop Austria: [www.foodcoops.at](http://www.foodcoops.at)
- Gugler: <http://www.gugler.at/unternehmen/zertifikate/cradle-to-cradler.html>
- Lancaster Housing: <http://www.lancastercohousing.org.uk/>
- Lebensraum Gänserndorf: <http://www.derlebensraum.com/cohousing.html>
- LOVOS: <http://en.lovos.org>
- Make Wealth History: <http://makewealthhistory.org/2012/12/07/four-forces-of-consumerism/>
- Mosaic Commons: <http://www.mosaic-commons.org>
- Prinzessinnengarten Berlin: <http://prinzessinnengarten.net/blog/>
- Pro Planet: <http://www.proplanet-label.at>
- Simple Living: <http://www.simpleliving.de>
- Slowfood: <http://www.slowfood.com/>
- Statistik Austria: <http://www.statistik.at/>
- Tenth Acre Farms New York: <http://www.tenthacrefarms.com/>
- Urban Gardening: [http://www.lebensministerium.at/lebensmittel/city-faming/urban\\_gardening.html](http://www.lebensministerium.at/lebensmittel/city-faming/urban_gardening.html)
- Urban Gardening Amsterdam: [http://kkvb-cfwn.blogspot.co.at/p/cook-farmer-his-wife-and-their-neighbor\\_04.html](http://kkvb-cfwn.blogspot.co.at/p/cook-farmer-his-wife-and-their-neighbor_04.html)
- Velib': <http://www.velib.paris.fr/>
- Zipcar: [www.zipcar.com](http://www.zipcar.com)

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## GOODPLANET FOUNDATION

The photographs of this book have been done by Yann Arthus-Bertrand, chair of the GoodPlanet Foundation.

The GoodPlanet Foundation's mission is to raise awareness and to educate about environmental issues. It operates solidarity projects of conservation and invites citizens, communities and corporations to take action for the planet, using a series of programs in order to "bring ecology to the forefront of awareness".

Many of those projects have been supported by the AFD, which is a privileged partner of the foundation for years. *For more information:* **[www.goodplanet.org](http://www.goodplanet.org)**

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Our economic growth has been largely driven by the availability of cheap natural resources and less than decent jobs. The challenge now – in light of rapidly increasing populations and prosperity, especially in developing countries, and at the same time, increasing unemployment and demand for more resources – is to devise a new model that connects the economy and the environment and promotes a more balanced, equitable society.

“Now more than ever, we must secure resource-efficient, low-carbon growth to ensure a healthy planet for future generations. By greening existing industrial activities and creating new sustainable modes of production, we can protect the environment while creating new jobs, which in turn helps reduce poverty and raise living standards.”

*Kandeh K. Yumkella*  
Director-General, UNIDO

“We must learn how to value our natural resources and the ecosystem services they provide. Such natural capital should be conserved and valued for the contributions they make to society and particularly to the poor.”

*Dov Zerah*  
General Director French Development Agency



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