NETGREEN

Network for Green Economy Indicators

Report on definitions of the Green Economy and progress towards it

Deliverable 2.1

Funded by the European Union

SEVENTH FRAMEWORK PROGRAMME

AUTHORS

Karen Jeffrey, NEF

Charles Seaford, NEF

With contributions from:

Saamah Abdallah, NEF

Pedro Beça, Center for Environmental and Sustainability Research

Emily Benson, Green Economy Coalition

Floor Brouwer, LEI Wageningen UR

Inês Cosme, Center for Environmental and Sustainability Research

Lucas Porsch, Ecologic Institute

Vasileios Rizos, Centre for European Policy Studies

René Verburg, LEI Wageningen UR

Special thanks to:

The interviewees and workshop participants who gave their time to contribute to this research.

Project coordination and editing provided by Ecologic Institute.

Manuscript completed in May, 2014

Document title	Report on definitions of the Green Economy and progress towards it: Deliverable 2.1
Work Package	WP2
Document Type	Deliverable
Date	9 May 2014
Document Status	Final version

ACKNOWLEDGEMENT & DISCLAIMER

The research leading to these results has received funding from the European Union FP7 ENV.2013.6.5-1: Network for green growth indicators under the grant agreement n° 308680.

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of the following information. The views expressed in this publication are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

Table of Contents

Introduction

This paper has been written as a contribution to the FP7 project, Network for Green Growth Indicators (NETGREEN). The aim of the project is to accelerate the transition to a green economy by creating an open-access, searchable, web-based database that enables those working in the field to quickly identify and compare indicators that can be used to measure progress towards their vision of a green economy. The project will bring together and structure the existing fragmented body of work on indicators, creating indicator sets that are accessible via the database. These sets of indicators can then be used to measure progress towards the green economy according to different visions of the pathways that need to be taken.

The purpose of this paper is to provide a framework to help identify which indicators should be included in the NETGREEN database, and to help inform the structure of the database. It is based on a literature review of 92 reports on the green economy, [i] interviews with 55 experts from the field,[ii] and discussion of our early findings with 39[iii] experts at a seminar held in London in March 2014.

One difficulty of this task is that the definition of "green economy" and views on how it will be achieved are highly contested; as the European Environment Agency puts it "the term 'green economy' is not consistently defined, as it is still an emerging concept",[1] although UNEP's[2] definition[iv] is perhaps the best known and most widely accepted. However, during our research we have found that, according to all definitions, a green economy is one that is environmentally sustainable in the broadest sense; that is, an economy that operates without infringing environmental limits. Because our aim is to be inclusive, we are using this as *our* definition[v] and in Section 1 we report on the debate as to how to define environmental limits.

Beyond this, however, there is disagreement on what a green economy is and on how to achieve it, reflecting both different objectives and different perspectives on what is possible.

---

[i] See Annex 3 for a full list of the literature consulted

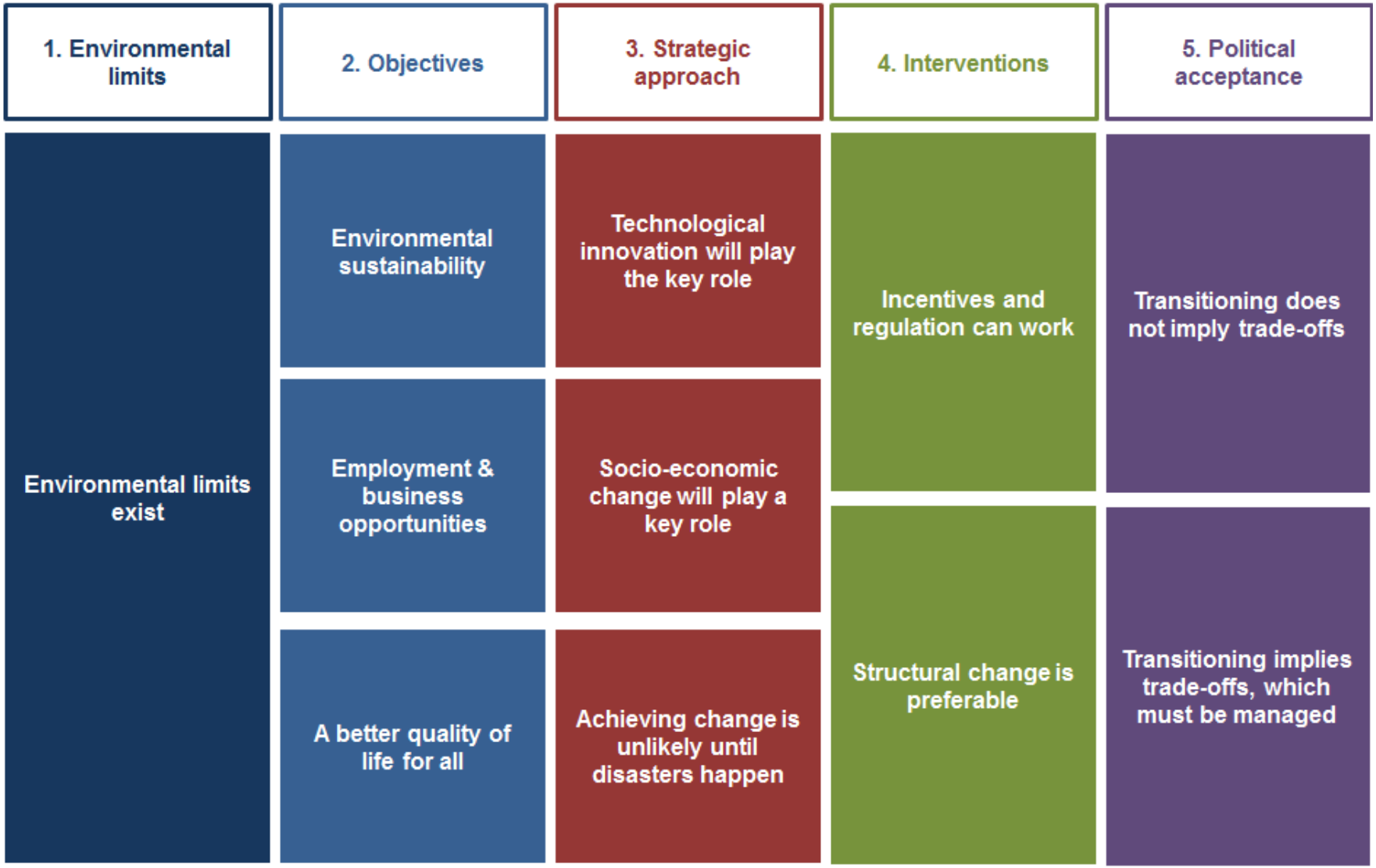
[ii] See Annex 4 for a full list of the experts interviewed

[iii] See Annex 5 for a full list of seminar participants

[iv] "[an economy] that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities"

[v] Note that in adopting this definition, we are **not** suggesting that improved social justice is not a necessary part of the transition to a green economy, or is not desirable in itself. We are simply adopting a definition that allows us to be inclusive of the wide range of work in this area. Nor are we ignoring the importance of resilience in the face of environmental shocks.

Figure 1: The key positions described in each section of this document



In Section 2 we describe the different objectives we have come across, and in Sections 3, 4 and 5 the different views on how to achieve a green economy. We describe briefly the debate about international relations in Annex 1. The key positions that we describe in Sections 1 to 5 are presented in Figure 1.

1 :: Environmental limits

During our interviews with experts, we found that the work on planetary boundaries led by Johan Rockström et al. in 2009[3] (see Box A) is generally accepted as a good starting point from which to conceptualise, communicate and measure what would constitute environmental sustainability. Having said this, a range of criticisms of using planetary boundaries as part of the process of measuring progress towards a green economy were made during the interviews we carried out, including–:-

- Using the planetary boundaries as a measure of environmental sustainability would fail to capture information about the depletion of natural resource stocks (see Box A)

- Setting limits at a global level is problematic because:
    - Policies tend to be set at national and sub-national levels, while the planetary boundaries provide global-level boundaries
    - Global limits tell us nothing about how the impacts of breaching those limits will be distributed throughout the planet
    - Global limits on environmental degradation cannot simply be apportioned based on a factor such as land area or population, as the variance in ecosystems across the globe would also have to be taken into account
    - There are important regional and local limits which are not detectable in discussion of global limits.

- There remains a great deal of uncertainty around precisely where the limits lie and thus about how seriously to take the limits, and we know too little about how reaching one environmental limit affects other environmental limits.

- Degradation may be damaging before the boundary is reached, and the concept could create the illusion that this is cost free. In other words, the idea of limits or boundaries should supplement, and not replace, externality pricing (Rockström et al. would no doubt agree).

- It may be impossible to construct adequate early warning indicators – tipping points are just too unpredictable and there are time delays in signals for certain limits – the use of boundaries may therefore create

false reassurance.

- According to Rockström's approach, breaching the planetary boundaries *risks* causing changes to the Earth system which threaten human survival. This introduces a normative dimension to the use of planetary boundaries, in so far as decision-makers must make an assessment of the amount of risk that they're prepared to accept (in terms of threatening human survival), against the social and economic implications of acting to avoid that risk.

These criticisms mean that indicators based on planetary boundaries will have to be supplemented in various ways, even as ultimate measures of environmental sustainability outcomes.[vi] However, the experts we interviewed tended to agree that the concept of environmental limits is a valuable tool to communicate the need to transition to a green economy, and that prolonged discussion on the exact values of limits should not be allowed to postpone action when the direction that should be taken is already clear. This has implications for the kind of indicators to be used: direction and speed of travel may be more important than precise distance to the limit.

Box A: Environmental limits and natural resource depletion

Rockström et al.'s work identified nine planetary boundaries which represent the limits of the safe space for human development. The boundaries are the lower end of the range of possible values for tipping points - points beyond which "irreversible and abrupt environmental change" may result. There are boundaries for climate change, biodiversity loss, nitrogen removal from the atmosphere, phosphorus in the ocean, ocean acidification, land use, water consumption, ozone depletion, atmospheric aerosols and chemical pollution. Of these, according to the authors, the first two have already been crossed, the next four have not yet been crossed and the last two have not yet been measured.

In addition to these planetary boundaries, environmental limits can also refer to more local boundaries, defined in the same way by reference to tipping points, but where the consequences may not be global environmental change, but levels of degradation to the local environment agreed to be unacceptable. In either case, the critical point is that such boundaries represent tipping points, because the consequences of breaching them are so potentially severe, irreversible, and uncertain that the associated costs are so extreme that the externality cannot be priced.

[vi] We acknowledge that such interventions are taking place – to some extent – at present, for example, through the implementation of national and regional emissions limits.

While the need to remain within environmental limits is recognised throughout the literature (either explicitly or implicitly) as a basis for which transition to a green economy is necessary, noticeably less emphasis is placed on the need to limit depletion of non-renewable natural resources. This seems likely to result from the uncertainty with which scientists are able to predict how much non-renewable natural capital remains available for extraction. This uncertainty, contrasted with current detailed understanding of safe limits for atmospheric concentrations of greenhouse gas emissions, may explain the greater emphasis on environmental limits (most notably, on the limit set for greenhouse gas emissions[vii]). In addition, the potential for environmental degradation to rapidly escalate as a result of the feedback loop effects associated with overshoot of environmental limits seems likely to increase the sense of urgency surrounding environmental limits, which depletion of non-renewable resources is not subject to (this is not to say that depletion of non-renewable resources doesn't represent significant challenges to humanity).

With the exception of Herman Daly,[4] who calls for depletion quotas to be auctioned by government, those authors who do acknowledge the need to limit depletion of non-renewable natural resources tend not to set explicit policies and targets for limiting natural resource depletion, which seems likely to be due to the previously stated uncertainty surrounding remaining stocks, and therefore the degree of action required. Instead, these authors tend to call for inclusion of changes in the stock of natural resources in national accounts.[5,6]

2 :: Entry points: different objectives for a green economy

Our research has identified three broad objectives held by individuals seeking a transition to a green economy:

1. **Environmental sustainability**
2. **Employment and business opportunities**
3. **A better quality of life for all**

These objectives are not mutually exclusive: it is possible, and in some cases likely, that an individual will hold more than one of these objectives.

The most likely combinations of objectives, and those likely to hold them are as follows:-

- **Environmental sustainability:**

[vii] For some non-renewable natural resources, it is possible to track the resulting emissions associated with their use in order to gain some understanding of the rate at which the resources are being used up (for example, the use of fossil fuels can be understood to an extent through tracking the concentration of carbon in the Earth's atmosphere); however, this only gives an indication of the rate of use, and not the stock of resources remaining.

    - Environmentalists who do not also have a social agenda

- **Employment and business opportunities:**
    - Businesses seeking to profit from markets which expand as a result of the transition to a green economy
    - Governments hoping to increase standards of living, which also recognise the opportunities created by the transition to a green economy

- **Employment and business opportunities, *and* environmental sustainability:**
    - Businesses seeking to profit from markets which expand as a result of the transition to a green economy, which also believe that failure to achieve sustainability will have a damaging long-term effect on profits
    - Governments who recognise the imperative of sustainability but are looking to minimise socio-economic change while increasing standards of living

- **A better quality of life for all *and* environmental sustainability:**
    - Environmentalists who also have a social agenda
    - Social campaigners/progressive politicians who believe in the importance of environmental sustainability for achieving social objectives

- **All three objectives**
    - Social campaigners/progressive politicians/governments who believe in the importance of the environment for social objectives, but who also believe in the importance of employment and business opportunities for those objectives

These objectives, which are influenced by individuals' motivations, experiences, and exposure to information and ideas, as well as other external factors, result in divergent views on how to achieve a green economy. In the following sections, we describe the key points of disagreement regarding:

- The strategic approach needed to achieve a green economy (Section 3)

- The types of interventions needed to operationalise the strategic approach (Section 4), and

- The action necessary to gain political acceptance for the changes needed (Section 5).

In the discussion below, we have framed the disagreements in terms of what participants believe will *work* to deliver a green economy. We believe this

stands up intellectually – you really can explain the differences in these terms – but we also believe it may help de-polarise the discussion and help create some convergence between different view points. This is in contrast to the framing in terms of attitudes to growth adopted elsewhere (i.e. the choice is presented as a choice between a "green-growth" strategy and a "steady state" or "de-growth" strategy)[viii] which we think can lead to unconstructive polarisation and caricature.

3 :: Strategic approach: technological versus socio-economic change

The first key area of disagreement about how to achieve a green economy is over the relative importance of technological and socio-economic change[ix] (the latter driving consumption and sometimes referred to misleadingly as "behaviour change"). At one end of this spectrum, technological innovation is predicted to be so successful that it allows a transition to a green economy, with consumers barely noticing, or at any rate tolerating, any increased cost of living or changes in relative prices. In other words 'absolute decoupling'[x] based on new technologies allows increases in living standards to take place without increases in environmental damage[xi].[7] Some more cautious proponents of this view, whilst recognising technological innovation as critical in order to progress towards a green economy, also acknowledge that the probability of such innovation producing decoupling to the extent needed is uncertain. Adherents of this perspective recommend that we have a 'Plan B', in case technological innovation is not successful. [8] Other variations on this view emphasise the importance of new business models and "the circular economy." We group these perspectives under "View 3.1: Technological innovation will play the key role". The view at the other end of the spectrum is that much of the technological change will be either expensive, or may simply not come about. The implication is that living within environmental limits will involve much higher prices for some goods, with the use of natural resources limited through changes to consumption patterns. This will involve either a reduction in aggregate consumption (in the developed world), or at least a change in

[ix] We use the term "socio-economic change" here, rather than the narrower "behaviour change" in order to capture the relation of economics to social values, as well as more direct behavioural change.

[x] It is useful to detail the difference between relative and absolute decoupling here. With relative decoupling, processes become more efficient, but emissions continue to grow as production grows; with absolute decoupling, processes become efficient enough that efficiency gains also negate increases in emissions associated with growth in production, and the absolute levels of environmental degradation fall.

[xi] What is described here is a slightly different form of decoupling than decoupling from GDP growth, which is a poor measure of living standards, and which could be sustained by, for example, increased expenditure on more expensive forms of energy.

what is consumed. We call this "View 3.2: Consumption patterns which limit natural resource-use will play a key role".

At first sight, the question appears to be simply about the scope for technological innovation, or more precisely two questions:-

1. To what extent will technological innovation eliminate the threat to the environment associated with the production of certain goods?

2. To the extent that it will, how expensive will this be, and thus how great will the impact on consumers (and voters) be?

However, our research (described below) leads us to believe that, whilst there is disagreement about what technological innovation can be used to achieve[xii] (with some taking it as axiomatic that it cannot achieve what is needed), the intrinsic uncertainty of technological development means that often what really divides opinion is as much about the extent to which socio-economic change will be possible and/or inherently desirable as about technology.

View 3.1: Technological innovation will play the key role

According to this view, the economy will continue to do what it does now, producing broadly similar goods but at much higher levels of environmental efficiency. Our review of the literature and interviews with experts suggests that proponents of this view may well accept that technological development is uncertain (i.e. not all advocates of this view have absolute faith in technological progress, although it is possible that some do[xiii]). However, the holders of this view believe that technological improvements are *more likely* to deliver a reduction in environmental degradation than significant changes in consumption patterns (the only alternative), whether changes in consumption patterns are the result of individual or collective (i.e. political) decisions, and whether the changes involve new forms of consumption which is less resource intensive than existing forms, or simply less consumption. In other words, advocates of this view believe that there won't be a significant shift to environmentally sustainable consumption in the future, any more than there has been in the past 20-40 years. Some proponents of this view also believe that consumption patterns reflect free choices and that therefore changes *should not* happen, but this is an extreme view and not essential to the

[xii] Constraints on technology include associated risks, i.e. in some cases technological developments (such as nuclear power generation, fracking and genetically modified food) have been rejected because their use is deemed to be too risky.

[xiii] We recognise that in some production sectors there are high levels of certainty regarding the feasibility of decoupling a specific form of production from environmental degradation, without implying restrictive increases in product prices; however, we are not aware of any proponents of the view that absolute decoupling is certain across all production sectors in the economy.

position. The broader view is that given the difficulty of achieving consumption changes, it is better to focus efforts on what might work than on what clearly won't work. Indeed attempting to change consumption creates the risk that voters and thus politicians will be alienated from environmental projects, and that as a result, even technological innovation will not get the support that it needs to optimise. It is also true that many of the commentators who adhere to this view are more sanguine about our ability to remain within environmental limits than adherents of View 3.2; as a result they may be willing to accept worse environmental outcomes in order to achieve higher economic or social outcomes.

A more cautious variant of this view reflects greater concern about the possibility of technological failure. It accepts that as things stand, we should concentrate on technological innovation and investment rather than the much more problematic socio-economic changes that are the only alternative. However, given the uncertainties, these more cautious proponents believe that we should at least prepare for socio-economic change of the kind suggested by proponents of View 3.2 (described below), so that if technology does not deliver, an alternative pathway will be open to us. In other words, it is possible, even likely, that the necessary technology will increase the cost of living or any rate the cost of certain highly valued goods – and in some cases fail to deal fully with the environmental problem. Proponents of this view may also draw attention to the likely impacts of raw material price increases (especially food and energy). It is therefore necessary, according to this point of view, to think seriously about what will make these extra costs and changes to consumption patterns politically acceptable, in the way that proponents of View 3.2 do.

A further variation within View 3.1 is the position that there is no realistic alternative to the growth-oriented capitalism that we have now – or at any rate, no high-wellbeing alternative – and as such, de-prioritising growth (a stance typically associated with those advocating radical changes to consumption patterns) is both unrealistic and undesirable. Some commentators believe that very significant improvements to environmental efficiency can be made, even given existing knowledge, and that while there will be costs to the consumer, growth will pay at least some of these costs and make them acceptable. So we might be able to rely on existing technology (which the Centre for Alternative Technology regards as being capable of allowing countries to reduce their greenhouse gas emissions to net zero), even if at substantial cost.

It should also be noted that proponents of View 3.1 generally accept that marginal changes to consumption patterns are possible and useful. Such changes might take the form of moral or socially-driven choices not to use environmentally damaging products, encouraged by increasing people's awareness of the environment and of how what they do affects it through the use of labels, or by 'nudging' through the use of modest differential taxes on

goods and services, and regulation and rationing of harmful products. It is also acknowledged that changes to technology can produce changes to consumption patterns. For example the technology which has allowed creation of websites such as eBay has also strengthened communication links between individuals, and this has presented the opportunity to greatly increase consumption of second-hand goods. However, it is generally accepted that these kinds of changes will not be sufficient on their own.

View 3.2: Socio-economic change which limits natural resource-use will play a key role

Proponents of this view do not deny that technological breakthroughs could make a huge difference; however, they believe that sufficient technological innovation at sufficiently low cost is at best highly uncertain. They also believe that simply rolling out existing technology will be expensive (i.e. will have to be paid for through reduced consumption) and/or it will be insufficient (i.e. will have to be supplemented by reduced or changed aggregate consumption). They also tend to be relatively sanguine about the likelihood of changes in consumption patterns, whether to less resource-intensive consumption, or simply to lower levels of consumption. Hence they place more, or at least as much, emphasis on achieving them as on technology.

The foundation for this optimism is the evidence from survey data that *beyond a certain point*, consumption is not a particularly important driver of wellbeing[9] [10] [11]. Other things then matter more, for example security, job satisfaction and social relationships[12]. If this is the case, it may be possible to change patterns of consumption, or restrict growth in consumption without too much damage to wellbeing. Indeed, it may even be possible to increase wellbeing.

Of course, attempting to restrict increases in consumption under current conditions would provoke quite strong resistance, and is highly unlikely to be suggested by any politician; however, it follows from the evidence on the connection between consumption and wellbeing that at least some of this resistance does not stem from the impact on wellbeing as such, but from something else[xiv]. Proponents of this view then suggest that this something else is not integral to human nature but is instead a function of socio-economic structures and culture, and can therefore be overcome. In other words, it should be possible to engineer our social and economic institutions (employing organisations, membership organisations, religious institutions etc.) and design government interventions (regulation, taxation etc.) in ways which would correct the bias to consumption engendered by modern capitalism, for example, by making shorter working hours more attractive.

[xiv] The proponents of reducing aggregate consumption or restricting its growth generally accept that consumption for the less well off (in least-developed and emerging economies) should increase.

Some proponents of this view also believe that, even if it was possible to achieve environmental sustainability using technology alone, it would still be desirable to change consumption patterns, at least amongst that part of the population with more than adequate incomes. The argument is that less consumerist lifestyles in the top half of the income distribution would remove some of the negative social effects produced by inequality and by conspicuous consumption, and might even lead to better lives for those currently "overconsuming" and overworking in order to achieve this.

It should also be noted that many commentators in this group compared to the other groups are more worried about the environmental limits, meaning they would accept lower economic or social outcomes to achieve a better environmental outcome.

Much technological innovation is designed to increase energy (or other material) efficiency, and as a result the debate about the potential of technology has sometimes been coloured and perhaps confused by this. It has been clearly established that the benefits of efficiency gains on their own can be neutralised or even reversed by the so-called "rebound effect",[xv] whereby the financial savings generated are spent on other environmentally damaging activities. Thus if efficiency gains were the only fruit of technological innovation, it would be game set and match to view 3.2, and on occasion proponents of this view seem to imply that this is the case. In reality of course, technological innovation is also designed to decarbonise the economy, much reducing the importance of the rebound effect in the debate.[xvi]

Consumption levels are also, of course, a function of population levels, which government can influence, for example through the empowerment of women by increasing education opportunities, especially in low-income, high-fertility countries. There are disagreements about how strong a role government should play in this, and it is an issue which tends to go largely unaddressed, due to the feeling that is it not politically acceptable to talk about controlling population levels.

[xv] The rebound effect reasons that, as methods of production become more efficient, goods can be produced at lower cost, therefore allowing higher levels of consumption (either more of the same good, or freeing up income for alternative forms of consumption).

[xvi] Once this understanding of technological innovation is accepted, two arguments come into play. First, renewables are currently more expensive than fossil fuels: the challenge is to allow the same amount of benefit from energy for a total cost to the consumer that is not too much higher than the current total cost. Until this is achieved there is no rebound effect. Second, once this is achieved there would only be a rebound effect if the energy system had not been decarbonised (or the other threats to sustainability in the production process not addressed).

View 3.3 Technological and socio-economic change is unlikely, until we experience significant shocks or disasters

There is a third view, which involves pessimism about the prospects of both technological and socio-economic change, reflected in the belief that the changes required to achieve a green economy will only take place after significant economic and/or social shocks, or even (in an extreme variant of this view) disasters. This does not mean that technological innovation and socio-economic change is pointless – clearly limiting the scale of shocks or likelihood of disasters, and developing technologies, infrastructure and attitudes that will be useful after the shocks, are valuable. However this view draws attention to the need to prepare for these shocks: to ensure that the economy is capable of adaptation, and that it exhibits a kind of positive resilience. Such considerations might include how easily a national economy will be able to adapt to important supply chain disruption due to major regional conflict, or how a country could insulate itself from such conflict. Clearly, national security and self-sufficiency in key raw materials start to become ever more critical objectives.

4 :: Interventions

Almost everyone agrees that whatever mix of technology and consumption change is needed to produce a green economy, government intervention will be needed at local, national and international levels (it is also acknowledged that, on occasion, changes can happen without government intervention, for example, where waste or energy efficiency improvements are profitable at existing prices, or where an organisation acts in order to attract green consumers, by "greening" its products or image). However, there are disagreements about the form that this government intervention should take.

According to standard economic theory, environmental damage is an externality, and externalities can be dealt with through some combination of pricing and regulation. Thus theoretically, the shift to a green economy can be achieved using these conventional tools, as correctly set prices will drive the market to respond appropriately, stimulating investment in new technologies, and new, environmentally friendly products. Perhaps the most perfect expression of this idea is the view that climate change could be dealt with by setting a global cap on carbon emissions, with tradable pollution permits allocated in a global market.

In reality, almost no-one believes that such a simple solution could work, largely because there would be some serious losers subjected to injustices (e.g. fuel poverty, inequality), or there would be insurmountable resistance from powerful groups. A good illustration of this is the difficulty of

establishing an effective European carbon price to drive change. Faced with this, the question becomes the extent to which externalities can be internalised through conventional mechanisms, and to the extent that they cannot, how change to investment in technology and consumption patterns can be achieved.

There appear to be two main points of view with regard to this. One is that a skilfully designed, and inevitably complex, array of incentives and regulations designed to influence behaviour and co-ordinated at an international level will be able to drive change without creating impossible opposition. We call this the "View 4.1: Incentives and regulations can work". Within this, there are nuances with regard to the extent to which "light" regulation, such as incentives and directives which set minimum standards about the "greenness" of certain products will be sufficient, or whether more intrusive regulation is needed. In addition, some of the proponents of this view draw attention to the need for 'strategic' regulation designed to influence long-term investment in green sectors, and to create policy certainty.

The alternative point of view is that while regulation and incentives can make a contribution, they cannot achieve the level of change needed for two reasons: first, they will provoke opposition and at best be watered down, certainly at the international level at which they need to operate; second they will become too complex and difficult to manage. Accordingly, changes to economic structures will be more effective. Some proponents of this kind of change also believe that such changes could produce other benefits, for example a radical power shift away from existing elites. Government therefore should show initiative, by leading the way in terms of investment, creating structural change, and pushing for a new international settlement. We call this "View 4.2 Structural change is preferable".

View 4.1: Incentives and regulation can work

According to this view, existing and new regulations and incentives of the kind already in place will be sufficient to effect the transition to a green economy. The key assumption is that while there will be losers, government will still be able to introduce these without a strong backlash - or fear of a strong backlash, whether from business or consumers/voters. This would imply a gradual transition with no structural changes to the economy.

Thus, proponents of this view judge firstly that a critical mass of *business* will welcome regulation and incentives that helps them to green their operations. This may be because their assessment is that the measures reduce the risks associated with resource scarcity or the risks associated with more stringent regulations being introduced in the future , or because they believe that regulation will create new markets and for some firms create a competitive advantage in those markets, or because corporate social responsibility plays an

important role. In general, this support will depend on any regulations or negative incentives (taxes etc.) being introduced at an international scale over a reasonably short period, i.e. preserving a level playing field and preventing 'carbon leakage' and similar distortions. This means that supporters of this view must assume that international agreement on a package of measures can be agreed (having said which, there are some relatively low-cost improvements in efficiency that could be introduced unilaterally, and which could drive improvements in other countries who want to export to the regulated markets.)

The assumption is also that *consumers and voters* will also support such policies for one of the following reasons:

- They take a long-sighted view and therefore perceive the necessity of action in order for the benefit of future generations.

- They can be convinced that an increased cost of living is not implied by such policies, or that the increased cost will have less of a negative impact on their wellbeing than damage done to the environment.

- They can be persuaded because of the prospect of green jobs, whether these are the results of investment in green infrastructure or processes (i.e. in the transition to a green economy) or the results of new competitive advantage.

We return to the assumptions about consumers and voters in the section on politics below.

It is easier to make these assumptions if you don't think tough regulation or high externality prices will be needed, either because the limits are not so close, or because they are not absolute (see section 1) and that therefore the normal political and economic bargaining processes for managing other trade-offs will be adequate to set the optimum level of taxation and regulation.

Some commentators, while agreeing that regulation and incentives are needed, draw attention to the lack of policy credibility: that is to the widespread belief amongst investors and in the business community that government policy will not develop sufficient teeth to deliver a green economy, and therefore that long term investment decisions should not be made on the assumption that it will. At the very least, businesses believe bets should be hedged. The resulting investments then create lock-in to unsustainable production, rather than the kind of technologies that will help to achieve government-set targets. This lock-in then drives business to lobby against regulations and incentives. What is needed, it is argued, are additional measures to stimulate long-term investment in the green economy, and thus create a different kind of lock-in. This will then incentivise business to lobby *for* the right regulations and incentives, making them far easier to achieve.

These measures are all commitment devices – ways of building the credibility of statements about future policies. They can include legally binding contracts (as in the case of energy prices), treaties (including the treaties underpinning the European Union), investments by government ('putting your money where your mouth is'), and cross-party agreement on core policies.

View 4.2: Structural change is preferable

Proponents of this view agree that incentives and taxation are part of the solution and that the existing system creates lock-in to an unsustainable economy and that this needs to be corrected. However they either believe that the kind of commitment devices proposed in View 4.1 will not be strong enough to achieve what is necessary, or that an alternative approach produces additional benefits, and is therefore more desirable. Thus proponents of View 4.2 tend to favour a more radical set of socio-economic changes.

The lack of faith in the kind of commitment devices proposed in View 4.1 may be due to a sense that such devices cannot signal effectively the very significant level of change needed (the more radical the change, the stronger the device needs to be). It may be because financial investors are particularly unresponsive to signals and incentives about the long-term. And it may be because such devices do not deal with political opposition from consumers/voters, but only from business. In addition, some proponents of this view believe that in the absence of structural change, regulation and incentives will become inefficient: too extensive and too complex to manage, as well as too unpopular.

Whether this view is adopted based on lack of faith in View 4.1, or belief that an alternative approach can produce a better outcome, the types of changes advocated are broadly the same. These may be designed to *create constituencies for change*, including businesses that can thrive in a sustainable world, or otherwise create the conditions in which regulation is acceptable (as in the smoking ban case), *create the conditions in which static aggregate consumption is acceptable* – for example more equality, *create new decision making structures* (including financial decision making structures) that side step the existing market system and all of its well-recognised failures, or *provide an alternative to (unacceptable) regulation,* for example through direct investment in sustainable infrastructure. They are also designed to *undermine the forces that block change*.

For the most part, these objectives as just described are not made explicit. The actual proposals include: ways of creating higher levels of wellbeing for any given level of output; higher levels of equality; encouraging fewer working hours; more of the economy serving local markets, perhaps encouraged by local currencies, and thus relatively less long distance trade; fewer very large

enterprises; a financial sector that is owned locally and serves local industries and small-medium enterprises; an active role for the state in planning and developing green industries and businesses that generate high wellbeing for both customers and staff; more mutual organisations and other changes to governance structures; new political narratives and headline measures of societal and economic progress; reducing the power of global financial markets – and so on.

5 :: Political acceptance

Several times in this paper, we have mentioned the role of optimism about the likelihood of change. Underlying much of this is a disagreement over what will be politically acceptable. This question is critical within both developed and developing countries, and at the international level. Box B sets out the four main types of policy proposed in the literature in order to build the necessary support for effective collective action.

In addition to these policy proposals (which are not mutually exclusive), we came across two broad strategies for building support, which can be framed in terms of their approach to trade-offs: "View 5.1: Transitioning to a green economy does not imply trade-offs", "View 5.2: Transitioning to the green economy implies trade-offs, which must be managed".

Box B: There are four main types of substantive policy advocated to build support or reduce opposition to change:

- **Job creation**, whether within existing economic structures, or within economic structures that have been reformed to better reconcile green and commercial objectives; to the extent that those advocating this admit there is a political problem, the idea is that the political gains from job creation potentially outweigh the political losses from reduced consumption. As noted in the section on interventions, there is disagreement on how active policy needs to be to deliver this.
- **Burden sharing**, i.e. increased equality and security, reinforced social solidarity, a focus on meeting essential needs and building human capability. This may be put forward as an end in itself, a moral imperative. However it can also be proposed as a political precondition for transition, both in domestic politics (since it means that the costs of the investment needed and of sustainable consumption are born by an electoral minority), and in international negotiations (potentially reinforcing political support for transition within developing countries). In the absence of the latter, the green economy can appear to be a rich country's objective. It can be achieved through a range of redistributive and 'predistributive' measures domestically, as well as through international transfers and investment. Most commentators will agree

that some burden sharing is needed – the disagreement is over the extent of redistribution required within and between countries and how to achieve it. For more on social justice measures proposed, see Box C.

- **Encouraging new conceptions of the good life** which politicians can deliver within environmental limits. This is as discussed in section 3.2. Those with these new conceptions then care less about a loss of income as compared with business as usual. As already noted, only some commentators think this is either realistic or desirable.
- **Stimulation of locally focussed economic activity**, which involves technological and institutional innovation that simultaneously delivers environmental performance and better lives. These innovations tend to encourage local economic activity – that is, production of goods and services that are consumed locally. The idea is that the reduced scale increases individuals' sense of control, and reduces the opportunities for an elite to appropriate value, and that these (more than) compensate for any reduced economies of scale. They also reduce the environmental damage associated with the global trading system. This can be delivered through local economic planning. To the extent that it is successful, it creates a group of people benefiting from the green economy and thus an electoral constituency.

View 5.1: Transitioning to the green economy does not imply trade-offs

Many commentators on the green economy stress that transitioning will produce benefits, particularly economic benefits. These may consist of new markets and green jobs (see Box B), greater resilience to shocks, or even an economy in which more satisfying lives can be achieved. Proponents of this view may state that these benefits will outweigh the costs of transitioning to a green economy, [13] [14] [15] and as such, there is no trade-off, and no political difficulty associated with transitioning. According to this perspective, the transition is underway already, and where blocks to progress exist, these are not political: for example, the technology required for pathway envisaged does not yet exist[xvii].

A related view is that it is not helpful to emphasise trade-offs. UNEP, for example implies that the *belief* that there is a problem itself creates the political problem for sustainability[xviii], and that there is no underlying problem. The importance of framing this as a 'win-win' situation ('green growth') has been emphasised by international organisations, where it is believed that a

[xvii] Shortage of investment is in fact a political difficulty because it reflects either inadequate policy or lack of belief in consistent government policy as discussed above

[xviii] This may well be true – GDP and other measures of economic progress may continue to rise, particularly in the developing world - but this does not mean that the consumption of certain powerful groups may not have to fall.

politically attractive pay-off has to be demonstrated in order to gain support for meaningful action.

The extent to which either variant of this view is plausible will depend on how large-scale the changes needed are perceived to be – the larger they are, the larger costs, and therefore the larger the compensating benefits needed.

View 5.2: Transitioning to the green economy implies trade-offs, which must be managed

Other commentators make the case that as things are now, the pay offs from green growth will be too weak to compensate for the associated costs – at least if 'green' means as green as is needed.[16] This is for a range of reasons, for example it may be that the pay-offs could be created in much more cost effective ways than transitioning to a green economy, or that they will only benefit certain groups, and will make things more difficult for other groups. Advocates of this view tend to think that acknowledging these difficulties is the first step to dealing with them.

Approaches to this latter stage include:

- Burden sharing so that an electoral coalition (or international coalition) for change can be constructed (see Box B with more detail on social justice measures in Box C).

- Development of new narratives, for example framing the issue as one of security, and active engagement with stakeholders and civil society organisations. Targets, indicators and data (including new ways of presenting national accounts) are part of the armoury of making change happen: they are political tools, forming the centre piece of a narrative, in the way that GDP forms the centre piece of the growth narrative.

- Increasing transparency and accountable decision-making as part of the process of challenging powerful interests. The assumption being made here is that the trade-offs are more difficult because of the power of these interests, and that transparency will reduce this power.

- As described by the World Bank[17]: "local strategies are needed because what works depends on local political economy"; this requires an "analysis of acceptability and urgency" and prioritising accordingly – acceptability is greatest where local benefits (e.g. jobs, increased safety) offset the transition costs; urgency is where there are lock-in effects in the absence of action (e.g. land use planning).

A more radical variant on this view is that structural change is needed to make the trade-offs less acute. This view is proposed for a range of reasons, but

partly because it is expected to facilitate a change in aspirations and thus the terms of the trade-off. So, for example it has been proposed that we will need an economy where shorter working weeks, accompanied by support for the lowest-earning members of society, become acceptable to citizens, and indeed, are viewed as a benefit rather than a cost associated with transitioning. This requires much greater economic equality. More generally, the economy can be managed explicitly to achieve the various drivers of wellbeing: economic security, social contacts, improvements to the physical environment, improved health, and so on.

Structural change could also involve making changes to the rules of the game in order to align social and private interest. The Dutch Sustainable Growth Coalition[18] of large businesses calls for aligning business incentives with social and environmental progress – with businesses actively pursuing long-term value for a range of stakeholders.

Box C: Measures advocated to increase social justice

A very wide range of measures are advocated, which are grouped below. An important observation is the lack of discussion of the trade-offs associated with the measures described below, which is largely omitted from discussions of social justice in the literature.

- ***Delivering good jobs***. This involves both creating and supporting jobs and ensuring that as many jobs as possible are 'good', in terms of opportunities for training, adequate wages, safe working conditions, job security, reasonable career prospects and workers' rights (all this an obligation that government needs to encourage *business* to bear, and so represents a trade-off in terms of winning support from business in terms of transitioning to a green economy). It also involves ensuring access to the labour market - provision of information, and education and training for all, including all ages. This call for higher levels of employment implies greater levels of production and consumption levels, unless the new jobs created are carefully formulated to address such.
- ***Ensuring fair access to resources and services***. In addition to education and training, this includes ensuring access to clean water and basic sanitation, clean energy, knowledge, health and care services, housing, and all other basic goods and services that are essential for life and health. A difficulty associated with this will be determining at what level such resources and services cease to become essential.
- ***Ensuring decent local environments and communities***. This includes local economic development, particularly to increase local resilience, support for culture and sports, safety, solidarity – and more broadly promoting cross-cultural sensitivity and education and anti-discrimination measures. *Business strategies* should also include strengthening communities particularly in the least-developed and emerging economies, for example by developing products that help vulnerable people, or that are widely

affordable. They can also partner with communities to preserve natural resources.

- ***Creating income and wealth equality***. In addition to what is delivered through good jobs and fair access to resource and services, this can involve maximum and minimum wage or income limits, progressive taxes (including a financial transactions tax and anti-avoidance measures), income support and social protection measures (including to help limit damage to workers most likely to be affected by the shift to a green economy), universal child-care benefits, work sharing, addressing gender inequality, emergency poverty relief and many other mechanisms. Such measures would seem to be designed to comply more directly with the social components of definitions of a green economy, and the environmental aspects more indirectly. ***Management of property rights and rights over common resources***. This includes reviewing intellectual property rights; better definition and enforcement of common resource use rights, for example in the high seas, mangroves, coral reefs, flood plains and forests; payments for ecosystems services; and strengthening of the land and natural resource ownership and access rights of the poor. Most developing countries face enormous economic pressures to overexploit their environmental resources, especially where tenure or use rights are insufficiently defined or enforced. There could be international interest in creating conditions that reduce these pressures.
- ***Fair allocation of the costs of sustainability*** through international agreement to internalize environmental and social costs on their products; with costs shared by the government, business and individuals, and equal per capita resource and emission caps.
- ***Sustainable food security***: through sustainable systems of production and distribution, including more effective incentive systems which will allow global access to sufficient nutrition.
- ***Democratic governance structures*** such as a 'Green Economy Council' to engage both business and civil society; steps to ensure that tribal and indigenous people have power over resource extraction; access to media; strengthened democracy. *Businesses* will need a broader understanding of value creation than they have now (ie not just profit) which implies stronger engagement with stakeholders, and perhaps reformed ownership and governance structures (e.g. co-operatives).
- ***Targeted development aid designed to increase sustainability and capabilities***. This may involve increased aid overall, including debt restructuring, but there should be a focus on: technology and knowledge transfer, strengthening technical and scientific cooperation, fighting corruption, incubators, dedicated funds to de-risk entrepreneurial investments and stimulate intellectual property sharing and innovation, special funding mechanisms (such as financial transfer and transaction taxes) for renewables, energy and resource efficiency, infrastructure and the protection of 'carbon sinks' and biodiversity.

- ***An improved international trade regime*** that involves: fewer discriminatory provisions, non-tariff barriers and less protectionism - but conversely could involve a carbon levy on imports from developing countries; increased negotiating capacity of developing countries with transnational companies; improved international co-operation, governance and agreements on access to vital resources; and consistency between aid, trade, technology and other policies so as to support inclusive green economy transitions. Such measures may imply green trade rules being used, or perceived, as trade barriers against developing countries.
- ***Encourage new models of development*** that are more sustainable instead of following the path of most rich countries.

Annex 1 :: The developed world and the rest of the world

Our literature review and interviews were weighted towards developed world opinion and this section is something of an overview as a result.

There are concerns from the least-developed and emerging economies that the aim of transitioning to a green economy is not relevant to developing-world needs. Specifically, policy instruments (such as sustainable public procurement, green subsidies and taxes, certification and standardisation tools and green industrial policy) are expected to marginalise vulnerable communities further, rather than reducing poverty. For example, small-scale farmers may not be able to afford 'green' certification systems and many poor people rely on subsidised fossil fuel prices in order to afford energy or transport. Least developed and emerging economies' governments also fear that the green economy approach will lead to trade protectionism in international markets. As such, it is important that the transition takes account of the needs of the least developed and emerging economies. Hence the definition of the green economy coming out of Rio +20.

There appear to be two main issues:-

- To what extent should the least developed and emerging economies follow a development path similar to that of the developed world?

- How much does the developed world need to 'give' to the least developed and emerging economies in order to achieve a global green economy?

The view adopted on these is likely to determine the view adopted on a third issue:-

- How much reform of international institutions (WTO, IMF, World Bank, UN etc) is necessary to achieve a global green economy?

To what extent should the least developed and emerging economies follow a development path similar to that of the developed world?

The question is whether attempting to become like existing developed countries is desirable and feasible for developing countries.

Broadly there are two types of position:-

1. The least developed and emerging economies should attempt to become like existing developed countries in key respects (although of course preserving their distinctive cultures). After all, why should their citizens not aspire to or be entitled to the standard of living achieved in the developed world? Having said this, of course they should be more

environmentally efficient than the developed world is now – but this can be achieved using existing and emerging technologies.

2. Developing countries should create their own visions of progress, which are not simply imitations of developed countries. This is for three reasons: levels of wellbeing in the developed world are not all they might be, and citizens of developing countries can aspire to more than this; if the developed world is seen as the model, the development process will produce very high levels of disruption, damaging wellbeing, and very high levels of inequality (or at least fail to address existing very high levels of inequality); a world of 9bn people with life styles similar to those in the developed world now is simply unsustainable – and citizens of the least developed and emerging economies will be the first to suffer the effects of environmental catastrophe. Of course the last point does not mean that citizens of the least developed and emerging economies should have a lower standard of living than citizens of the developed world – change is needed everywhere.

Within the second position, there are a whole range of views as to the direction to be followed.

How much does the developed world need to 'give' to the least developed and emerging economies in order to achieve a global green economy?

This is not an argument about morals but about what the developed world's bottom line should be in the global negotiations – although of course ethical appeals can and sometimes should be used in those negotiations. (We do not think anyone really thinks there will be a major shift in developed world positions motivated simply by altruism and we are concerned in this paper about alternative views as to how we really will achieve the green economy, not what would be ideal).

Again we can polarise the debate, although there are in reality a range of positions. At one extreme, there is the view that the least developed and emerging economies will suffer most from environmental catastrophe and as a result needs developed world technology. The developed world, meanwhile, needs to incentivise its businesses to innovate and win the support of its citizens for change. Therefore it should take a hard line and give relatively little. Hence measures such as TRIPS (Trade Related Aspects of Intellectual Property Rights) are justified.

At the other extreme is the view that powerful interests in the least developed and emerging economies (whether democratic or elite) cannot or will not make the adjustments to their development paths needed for global sustainability unless transfers (of technology or other resources) from the developed world increase very substantially. What is more the cost to the developed world of these transfers is much less than the cost of the catastrophe that is otherwise

likely to follow. Therefore it should take a much more generous line and give much more. Measures such as TRIPS are not justified.

As in all negotiations, the choice of view depends at least in part on one's reading of what the other side's position is and is likely to be in the future.

How much reform of international institutions is necessary to achieve a global green economy?

We have not come across any serious study of this question (as opposed to expressions of opinion) and it is possible to say 'none', 'incremental only', 'major'. We include this here only to flag the issue – and to suggest answers may be at least influenced by answers to the previous two questions.

Annex 2 :: Detailed reports from the NETGREEN partners

This paper, although written up NEF, draws on research carried out by all of the NETGREEN partners. In addition to all partners reviewing literature, conducting interviews and participating in the NETGREEN seminar (see Annex 3, 4 and 5 for further details), several partners contributed detailed reports, based on the work carried out during the literature review, which the final paper drew heavily upon. These detailed reports are included, in full, in this annex and the literature referenced is detailed in Annex 3.

Report 1: The environmental limits within which a green economy must exist, written by LEI Wageningen UR

1. Understanding environmental limits in a green economy

Understanding environmental limits is a key phenomenon to clarify:

a. The main challenges in society related to the environment (e.g. natural resources, energy, water, biodiversity). Such challenges could be the main motivation towards greening the economy.
b. The main sectors in the economy at stake. Linkages are made between economic activities, use of natural resources and outputs;
c. The need for green technologies, policy intervention and changing consumption and production patterns. The International Trade Union Confederation in their report on growing green and decent jobs (ITUC, 2012) conclude that annual investments amounting to 2% of GDP generate millions of jobs in Europe, among others in energy, construction, transport and manufacturing.

Examples of environmental targets and limits from the literature are presented, with a view to understand the main challenges addressed, the key sectors in the economy at stake and the links with production and consumption patterns. UNCSD (2012) in their report Rio+20 identify targets to commit to the Millennium Development Goals by 2015, and fully implement commitment under the United Nations Framework Convention on Climate Change (UNFCC), the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD).

2. Understanding the environmental limits in the context of the main challenges in society

Several environmental concerns are linked to the debate on greening economies. WWF (2012) express concerns and propose targets in the following areas:

- Climate: atmospheric greenhouse gas concentrations less than 350 parts per million; warming kept below 1.5°C above pre-industrial average; 100% renewable energy by 2050.
- Biodiversity: halt and then reverse biodiversity loss (Living Planet Index or equivalent measure).
- Forests: Zero Net Deforestation and Forest Degradation (ZNDD) by 2020 and maintained thereafter.
- Freshwater: restore and maintain environmental flows in rivers, lakes and aquifers.
- Marine: restore and maintain depleted fish stocks to sustainable levels; marine protected areas in at least 10% of national waters and the high seas; improve ocean health.
- Nitrogen and phosphorus: dramatically reduce inputs to the biosphere and oceans.
- Ecological footprint: stay within the Earth's capacity to renew resources and absorb pollution and waste.
- Waste: zero waste economy.

The recognition of critical environmental and resource thresholds brings to the fore how the 'safe operating space' for humanity is to be shared, especially given that around a billion people currently don't have access to the food, water and energy they need to live a decent life.

Environmental limits relate to emission reduction targets and important EU and/or international targets related to the green economy include (DEFRA, 2011):

- Reduce greenhouse gas emissions by 20% (against 1990 levels)
- 20% of energy from renewable sources (against 1990 levels)
- 20% reduction in primary energy use compared with projected levels (against 1990 levels)
- Recycle 50% of household waste and at least 70% of construction and demolition waste (against 1995 levels)
- Reduce amount of biodegradable municipal waste going to landfill by 65% (against 1995 levels)
- Halve the loss of natural habitats and increase size of protected areas to cover 17% of world's landmass and 10% of oceans
- Halt loss of biodiversity and degradation of ecosystem services in EU

The EU has met its 2020 climate and energy targets and is working towards reducing greenhouse gas emissions by 80-95% by 2050 compared to 1990, as part of a global effort to limit the average temperature below 2° C (European Commission, 2012).

3. Environmental limits are not made explicit in pathways for a green economy

Environmental limits are not made explicit in several pathways for a green economy. However, environmental limits tend to be translated into environmental targets and ambitions. Ellen Macarthur Foundation (2013) investigate the rationale for a transition towards a circular economy, and clarify that economies could potentially benefit from a substantial saving in net material use, focus on the mitigation of price volatility and supply risks, target at sectoral shifts and possible employment benefits, reduced externalities and lasting benefits for a more resilient economy. Such targets enhance the understanding of pathways for an economy, without further explicit elaboration of the environmental limits. Similarly, ILO (2012) mention the actions that are deemed necessary for a green economy. The report clarifies that ambitions on the use of natural resources should focus on energy consumption, water and pollution control, extraction of natural resources, recycling rates, renewable energy production and resource use efficiency.

GIZ (2012) and DEFRA (2010) indicate that absolute decoupling of economic growth from greenhouse gas emissions is an important feature of a green economy. Targets on resource and energy efficiency relate performance over time of economic indicators relative to usage of natural resources. Contrary to this, absolute decoupling occurs in a growing economy occurs when the emissions decline in absolute terms, while the economic indicator increases over time.

Reductions in greenhouse gas emissions are often part of the pathway for a green economy. Jaeger et al. (2011) are motivated from a new growth path for Europe, especially where they indicate a green economy path enhances the European climate target with emission reductions to be increased from 20% to 30%. Such a pathway would benefit the main economic sectors (agriculture, energy, industry, construction and services) and largest benefits are foreseen to be achieved in the construction industry. OECD (2011) offers a broad consideration of environmental limits, focussing on environmental and resource productivity. This report distinguishes between carbon, energy and resource productivity, reducing waste and energy consumption and targeted towards optimizing productivity per unit of resources available.

Hatfield-Dodds et al. (2008) identified major reductions of net greenhouse gas emissions to be key components of the green economy, with emission reductions targets to be 60-100% by 2050. In addition, this report also highlights the importance of improvements in resource efficiency with factor 4.

Increasing energy efficiency is also often mentioned to be strategic areas for environmental policy targets. PIK & GRI LSE (2009) for example, identify the capability for G20 countries improving their energy efficiency through private investments to be in the order of 1% of GDP. Efficiency of energy consumption

is the ratio of economic output (e.g. production) to the physical inputs (e.g. energy). This report also concludes that at least 20% of such investments should come from public support, and measures should be applied for boosting energy efficiency in buildings and introducing fuel efficiency standards. Similarly, Netzwerk Ressourceneffizienz (2008) do not set quantifiable targets nor limits, but refer to public sector targets from the sustainability strategy in Germany, doubling resource productivity and energy productivity by 2020. Here resource productivity is the unit of GDP out of every kg of resources used.

4. Environmental targets can be linked with economic growth paths

Clear resource and environmental targets are considered vital by Jackson (2009), and this report highlights the need to integrate them into both economic and social functioning. Also, limits on energy intensity are part of Sekulova et al. (2013) where abolishment of objectives on economic growth require the reduction of energy intensity and reduction of consumption. Ecological modernization is a pathway towards a green economy with a focus on efficiency gains and innovation, and Lorek and Spangenberg (2013) argue in favour of a decline in resource use. In addition, the authors also highlight the need to balance living for most in accordance with the ecological and social necessity (increase human well-being of most) and a redistribution of wealth. Fortschriftsforum (2013) made an effort to strengthen the debate on the definition of societal progress and instruments are proposed to enhance an ecological sustainable economy, including improvements in resource and energy efficiency and higher prices for resource use.

Economic growth targets and related pathways are often considered as part of a green economy. Jackson and Victor (2011) indicate a green economy is a low-growth or slow-growth economy, which is service-based and therefore less materials-intensive and intrinsically more labour intensive. Environmental targets are therefore formulated to reduce carbon emissions. Quantifiable targets and environmental limits are considered important to enhance the understanding of the extent of action that is envisaged as being necessary for a green economy.

The literature offers some attempts to define strict constraints on resource use. Environmental targets and limits focus on the notion of an optimal scale of resource use (see also Daly, 1991). This analysis builds on the consideration of the size of the economy needs to be sustainable relative to the ecosystems that contain it. This concept on sustainable scale and degrowth, as well as fair distribution of income and wealth and an efficient allocation of resources. Similarly, no explicit environmental targets are provided in Bartelmus (1992). His analysis, offering options what could realistically be sustained, builds on the carrying capacity of mainly local ecosystems. Dietz and O'Neill (2013)

focus on a green economy that aims towards maximizing long-term well-being instead of short-term profits. Several environmental targets are defined, including limits towards the use of materials and energy to sustainable levels, more durable and repairable products, stabilize population and create a culture of sustainability. In order to achieve this, the exploitation of renewable resources should not exceed the rate of regeneration, and the depletion of non-renewable resources should not exceed the rate at which renewable substitutes can be developed.

5. Environmental limits and greening the business sector

The business sector is not very explicit in identifying environmental limits. However, several investigations clarify long-term environmental ambitions and pathways. This is essential to understand what are the key sectors in the economy at stake and the need for new technologies.

Raingold (2011) for example, indicates a green growth strategy must address critical resource challenges beyond carbon as resource efficiency and related innovations. Increasingly, they become primary benchmarks of a successful economy and key considerations in the business cycle. According to the Confederation of British Industry (2012), without effective policy, the full potential of business energy efficiency will not be realised. One of the key components for the success of the economic agenda is that greater priority must be given to the triple challenge of decarbonisation, energy security and energy affordability.

6. Targets need to consider environmental risks and scarcity of natural resources

Several investigations address the risks related to environmental impacts. UNEP and WRI (2011) recommend the integration of climate risks into government decision making, including mainstreaming climate risks and measures to mitigate such risks across sectoral policies.

Environmental limits are aimed to better manage risks to the environment and society. Recent investigations on The Economics of Ecosystems and Biodiversity (TEEB) draw attention to the economic benefits of biodiversity and highlight the costs of biodiversity loss and ecosystem degradation. TEEB (2010) highlight the limits to reduce environmental risk and prioritise (a) response to climate change, (b) ocean acidification, (c) release of hazardous chemicals and pollutants and (d) quantity and management of waste. The key components of suggested pathways towards the green economy for highly developed nations include reducing the per-capita ecological footprint and pro-actively improve quality of life.

7. Moving environmental limits to maintaining natural capital

According to the OECD Glossary of Statistical Terms, natural capital are natural assets in their role of providing natural resource inputs and environmental services for economic production. WAVES (Wealth Accounting and the Valuation of Ecosystem Services) is an initiative of the World Bank involving several UN agencies, national governments, NGOs, and academic and other institutions. The 2012 WAVES report to factor natural capital into economic decision making, advocates the use of accounting methods, especially the SEEA approach (System of Environmental-Economic Accounting), and to develop ecosystem and natural capital accounts. These accounts then allow the further specification of indicators for monitoring and benchmarking of natural capital status and health. The World Bank (2012) report on inclusive green growth emphasise that comprehensive wealth measures including natural capital are needed to maintain the provision of ecosystem goods and services. However, the report does emphasise that a clear measurement framework is implicit in the framework for action.

The Roadmap to a resource efficient Europe (EC, 2011) set out the targets to be met by 2020, with targets on resource efficiency (e.g. economic growth and well-being is decoupled from resource inputs and come primarily from increases in the value of products and associated services) and natural capital. Among others, targets apply to the good status (in terms of quality, quantity and use) of waters in all EU river basins in 2015. Also, natural capital and ecosystem services will be properly valued and accounted for by public authorities and businesses. IHDP (2012) suggest the four kinds of capital (natural, human, produced and social) should be measures since it provides evidence on whether a country can increase well-being in a sustainable manner – not eroding one of its assets. In doing so, the key components of the capital approach, is based on the notion that decoupling is insufficient component of a pathway towards the green economy.

8. Conclusions

Economic activities (e.g. production, consumption and international trade) operate within the environmental limits and targets formulated in a green economy. Limits and targets are formulated with focus on:

a. Emission reduction – percentage reduction of emissions (mainly greenhouse gases) relative to a base year.
b. Energy efficiency, the ratio of amount of energy consumed to economic output (e.g. production) generated.
c. Ecological footprint, which is defined by OECD as the amount of resources (e.g. land and water) required for the support of a particular population. It is the inverse of the carrying capacity of a territory.
d. Resource productivity, optimizing productivity per unit of resources available.

e. Natural capital, which are the renewable and non-renewable resources that enter the production process and satisfy consumption needs, as well as environmental assets that have amenity and productive use, and natural features.

They enable to define limits and targets, focussing on the use of natural resources (e.g. energy efficiency and ecological footprint), emissions (e.g. reduction targets), productivity of natural resources and management of natural capital. Several of the limits focus on the use of resources, although some of them focus on efficiency and productivity of using resources in the economy. Such limits link resource use with the economic activities, and are flows in the economy. Contrary to this, natural capital is a stock indicator which is enables to understand the long-term availability of natural resources to support economic activities.

Report 2: The production needed for a green economy, written by NEF

Below, we consider the convergence and divergence of views regarding three key aspects of production: the infrastructure needed for a shift to a green economy, the financing that will enable a transition, and employment and skills.

1.Infrastructure

1.1 Operational efficiency

The majority of the literature states that in order to transition to a green economy, it will be necessary to improve existing infrastructure to make industrial processes, waste and recycling, building, and transport and mobility more resource efficient.

1.1.1 Uncertainty over operational efficiency

The World Bank (2012) agrees that technological development is critical to advancement towards a green economy, but is a lone voice in its caution that relying upon technology to solve the problems of environmental sustainability implies risk, as we cannot yet be certain of the future capabilities of technology. This highlights an implicit assumption made throughout the literature that technology will evolve sufficiently to allow the necessary gains in operational efficiency, or that today's technology is capable of meeting our efficiency needs. The repeated emphasis by authors on the need for research and development into technology suggests that the former viewpoint is predominant; however, the Centre for Alternative Technology (2013) states that the technologies in existence now are capable of allowing countries to reduce their greenhouse gas emissions to net zero. This argument may reflect the Centre's expertise in the area of low-carbon technology, or it may simply be stated as a point around which to encourage discussion, in order to meet the Centre's aim of providing a "positive and technically feasible future scenario for a zero carbon Britain that aims to stimulate debate and catalyse action".

Despite advocating action to increase operational efficiency in some detail, the European Commission (2011) also identifies a difficulty in relying upon efficiency gains in order to achieve environmental sustainability, whereby as the efficiency of production increases, consumption becomes less expensive and environmental gains from the efficiency of production are therefore offset by higher levels of consumption; a phenomenon termed the "rebound effect". This highlights another implicit assumption within the literature, that increasing consumption will not undo any advances gained in terms of environmental sustainability through operational efficiency. Such a belief is

likely to be influenced by authors' visions of the extent to which production can be decoupled from environmental degradation.

1.1.2 The rationale for operational efficiency

Differences in views regarding the rationale for improving operational performance are also evident. Some authors advocate increasing operational efficiency as a means by which to gain early, national advantage in a competitive global market (DEFRA, 2010, DEFRA, 2011; Confederation of British Industry, 2012; Aldersgate Group, 2011), whilst others argue that reducing developed world emissions is a necessary vehicle by which to enable higher emissions, and therefore development in the developing world, whilst not exceeding environmental limits (United Nations, 1987). These differences in approach suggest some incongruence between national and global perspectives, with the latter implying the belief that creating a green economy is matter to be addressed at the global level, for which international issues such as trade and climate change require eradication of global poverty. This position assumes that it will be possible to achieve high levels of cooperation between countries, and that the developed world will be prepared to act in the interests of the developing world. The former view seems to assume that either a green economy can be achieved at a national level, without the need to consider global implications, and suggests a view that the best approach to achieving a global green economy involves countries working independently, and in competition with one another. The views are undoubtedly influenced by the remits of the organisations expressing them, whether based at the national or international level.

1.1.3 Quantifiable targets for operational efficiency

Despite these differences in visions, there is general agreement that operational efficiency will be a key aspect of the transition to a green economy. However, a significant proportion of the authors who advocate increasing operational efficiency fail to suggest quantifiable targets in this area. This suggests that there remains uncertainty over the extent of action required and seems to reflect the inertia that currently pervades the transition towards a green economy.

1.2 Renewable energy and a circular economy

Increased operational efficiency tends to be advocated as part of a strategy which also includes investment in renewable energy technologies and emphasis on recycling and reuse of natural capital, a so-called "circular economy" (Ellen MacArthur Foundation, 2013). However, the extent to which different authors envision renewable energy, recycling and re-use of natural resources varies. Some authors call for 100% of energy generated to come from renewable sources (Centre for Alternative Technology, 2013; International

Trade Union Confederation, 2012; Ellen MacArthur Foundation, 2013; Deutscher Nachhaltigkeisrat, 2013) as well as completely eradicating waste (International Trade Union Confederation, 2012; Ellen MacArthur Foundation, 2013), whilst others explicitly call for renewable energy technologies as part of an energy mix, alongside fossil fuel technologies (Climate Works Foundation, 2011; Jackson, 2009; DECC, 2011), or implicitly suggest such a mix by covering energy efficiency in great detail, with very limited discussion of renewable energy generation (European Commission, 2011). The discrepancy in the extent to which renewable energy and recycling of wastes is advocated suggests a difference in optimism over the technological or financial viability of achieving such, or a difference of approach in terms of taking short-term and a long-term views, as made clear by the United Nations' (1987) explicit statement that "energy efficiency is not the ultimate solution; it can only buy time for the world to develop low energy paths based on renewable sources". These differences seem to reflect different authors' intentions: i.e. whether they are presenting a document that calls for realistic and immediate action with quantified targets and deadlines, such as the European Commission's (2011) document, or whether the authors are presenting a far-reaching vision of a desired end-state. These differences seem likely to represent the different remits of the organisations, i.e. whether they are policy makers or theorists.

1.3 Nuclear energy

Of all the sources consulted for this review, the most thorough discussion of the use of nuclear energy comes from the United Nations' 1987 report, which takes a risk-averse, but not condemning stance on its use. The United Nations (1987) calls for on-going research into increasing the safety of nuclear energy generation, arguing that its use is only justifiable if solid solutions to unsolved problems regarding its costs, risks and benefits can be found, and that the highest priority should be accorded to research and development on environmentally sound and ecologically viable alternatives, as well as means of increasing the safety of nuclear energy. The Centre for Alternative Technology (2013) and Deutscher Nachaltigkeisrat (2013) also make reference to the subject of nuclear energy, which they both explicitly exclude from their visions of a green economy due to fears over its safety. Of the literature consulted for this review, the only source to advocate the use of nuclear energy is the UK's Department for Energy and Climate Change (DECC) (2011).

The divergent views over the role of nuclear energy as part of a green economy seem likely to be influenced by the different authors' obligations in terms of decreasing carbon emissions, or perhaps the authors' interests in promoting renewable energy technologies. However, the lack of discussion of whether or not nuclear should be included in the strategy for achieving a green economy is marked, which seems likely to be reflect the controversy which surrounds the subject of nuclear energy following the Fukushima disaster of 2011.

1.4 Infrastructure to reverse unavoidable environmental degradation

Throughout the literature, there is a notable absence of discussion on the subject of infrastructure to reverse unavoidable environmental degradation. Some authors make general reference to the need to restore natural capital, but only a small minority make concrete suggestions of action to be taken in order to achieve this in terms of infrastructure, such as using carbon capture and storage technology (Food and Agriculture Organisation, 2010; PIK and GRI LSE, 2009; Forum for the Future, 2010). The lack of attention given to infrastructure to reverse unavoidable environmental degradation seems an implicit suggestion of the uncertainty held by authors regarding the extent of action required, and may also be indicative of the uncertainties and high costs associated with such technologies. In terms of motivations, it is unsurprising that one of the strongest advocates in favour of such infrastructure is the Food and Agriculture Organisation (2010), which works to preserve industries that are particularly vulnerable to climate change.

2. Financing

The question of how to finance the shift to a green economy is addressed in varying degrees of depth throughout the literature. A portion of the literature presents a vision of what a green economy might look like, and how we might get there in terms of regulation, but fails to address the critical point of how the required investment will be raised. The reason for this omission is not explicitly stated, and in some cases, seems to represent an impassioned enthusiasm for change, unconstrained by the practicalities of implementation. Where similarly unqualified suggestions come from more serious authors, the approach seems to reflect the view that action is required, but that uncertainty remains over what form that action might take. This is a clear demonstration of the political inertia and lack of financing instruments identified by the World Bank (2012) as an obstacle to transitioning to a green economy.

Many authors do, however, present strategies on how the transition to a green economy might be financed. The most widely accepted strategy is that of financing the transition via green growth. A second strategy, promoted by a smaller proportion of authors, calls for some aspects of green growth alongside more significant economic reform. The following section explores the differences of view held by advocates of each strategy in turn, before considering the disagreements and differences between views.

2.1 Green growth and economic reform

2.1.1 Green growth

WWF UK (2012) outlines a quandary of financing the transition to a green economy, in that there is a need for substantial capital investment, which will

be difficult to achieve whilst avoiding growth; but, the kind of economic growth that we depend on now is environmentally unsustainable. A solution to this, presented in much of the literature, involves pursuing a "greened-economy model" (United Nations et. al, 2003) or "green growth" (World Bank, 2012; UNEP, 2011; Confederation of British Industry, 2012; PIK and GRI LSE, 2009; DEFRA, 2010), which calls for producing growth via environmentally sound projects and policies, and wider and longer term development objectives around growth, social goals and environmental impacts.

In terms of how environmentally sustainable such green growth should be, The UK Parliament Environmental Audit Committee (2012) calls for progress towards decoupling growth from environmental degradation, whilst Hatfield-Dodds et. al (2008) call for "significant decoupling". Meanwhile, other authors call for absolute decoupling (GIZ, 2012; DEFRA, 2010; United Nations, 1987; United Nations, 2012; UNEP, 2012; Green Economy Coalition, 2012; Confederation of British Industry, 2012; European Commission, 2011). Again, these differences seem to reflect different authors' optimism and certainty regarding the possibility of achieving such, and the intentions of their reports, i.e. whether they are presenting a document that calls for realistic and immediate action with quantified targets and deadlines, or a far-reaching vision of a desired end-state.

As with the discussion of operation efficiency, there is disparity in the rationale for seeking green growth, with some advocating it in terms of national competition and a vehicle by which to gain competitive advantage (Confederation of British Industry, 2012; DEFRA, 2011), whilst others view inclusive green growth as an essential vehicle by which to lift the developing world from poverty (World Bank, 2012; United Nations, 1987; United Nations, 2012). These differences in views represent the incongruences and assumptions as noted in section of this report which discusses the rationale for operational efficiency. In terms of reducing poverty via green growth, the World Bank (2012) points out that the extent to which this is possible depends upon the degree of inequality. This reveals an implicit assumption by the advocates of green growth as a vehicle by which to eradicate poverty: that it will be possible to overcome the governance failures, market failures, and entrenched interests and behaviours under a green growth approach, which has not been achieved in the history of pursuing economic growth.

Within the literature that advocates green growth, a key requirement over which there is some disagreement, centres on raising the necessary investment to facilitate that growth. Several authors argue in favour of public investment in the form of funding research and innovation, green financing, or incentives as a sensible act which will produce returns for tax payers (United Nations, 1987; Jackson, 2009; Green Party, 2010; IHDP, 2012) in the form of direct financial returns from energy savings, indirect returns to the economy from reduced emissions, greater energy security and improved quality of life

and social returns (Sustainable Development Commission, 2009; PIK and GRI LSE, 2009; UNEP, 2011). The dominant view is that such public investment is a useful mechanism by which to stimulate further investment from the private sector (European Commission, 2011; UNEP, 2011; PIK and GRI LSE, 2009; OECD, 2011; DECC, 2011; McKinsey and Company, 2013; GIZ, 2013) by reducing the risks associated with private investment and entrepreneurship (Green Growth Institute, 2012). These authors tend to call for such investment alongside regulation designed to stimulate private sector investment and ensure the sustainability of growth, such as emissions trading schemes and green taxes (OECD, 2011; UNEP, 2010; DEFRA, 2010; European Commission, 2011), as well as using the classic economic mechanism of removing environmentally perverse subsidies to improve economic decision making (UNEP, 2011; OECD, 2011; GIZ, 2012; Jackson, 2009; United Nations, 1987; Griggs et al., 2013).

Unsurprisingly, the authors with business interests tend to agree with the view that public investment should be used to trigger further investment from the private sector, warning that there is a risk that the potential of growth from shifting to a low-carbon economy might not be realised without improved conditions to drive low-carbon markets and stimulate investment (Confederation of British Industry, 2012; Aldersgate Group, 2011). However, it is also acknowledged by forward-looking business players that pursuing green growth is essential for businesses, in order to ensure that profitability is sustained by moving away from growth based on the use of finite resources, which will become increasingly expensive as their scarcity increases (Dutch Sustainable Growth Coalition, 2012; Aldersgate Group, 2011).

Some authors are more sceptical of the role of public investment. For example, the UK's Green Party (2010) argues that public investment should only take place if the private sector acts too slowly or on an insufficient scale, while others advocate greater emphasis on use of regulation to incentivise investment by the private sector (Climate Works Foundation, 2011), or policy designed to boost investor confidence, by offering longer-term predictability and stability around how governments will deal with major environmental issues (Deutscher Nachaltigkeisrat, 2013; Climate Works Foundation, 2011; OECD, 2011), and less emphasis on public investment. Without explicitly stating it, these authors are essentially calling for action to correct failures of the current economic system in order to encourage private investment. Other authors explicitly acknowledge that it is such failures which necessitate reform. The problems described by these authors include financiers' unfamiliarity with the sector, and the often unfavourable nature of longer-term investments for financial markets, which are viewed as favouring short-term returns (World Bank, 2012; Green Economy Coalition, 2012).

This spectrum of views implies a range of assumptions. The view that public sector investment is necessary in order to stimulate private sector investment

seems to be based on the assumption that the private sector will not act sufficiently or quickly enough. This view also seems to suggest that driving investment via regulation alone may be undesirable – perhaps over concerns that businesses will favour unregulated markets (which also implies an assumption that all markets will not be regulated in the same way), or the assumption that businesses will tend to take a short-sighted view in terms of the profitability of investments. The Dutch Sustainable Growth Coalition (2012) (a coalition of large enterprises, including Akzo Nobel, Heineken and Shell) states that this short-sighted depiction of private organisations isn't always accurate, as business investors are likely to take a short term perspective geared towards profit maximisation, but stakeholders prefer longer-term value creation.

Meanwhile, those who advocate limited public investment in infrastructure seem to assume that the benefits of private investment in infrastructure will be sufficiently high to compensate private investors, or else that not investing will be sufficiently punitive to drive investment (i.e. as resource scarcity drives up the cost of resource use). Finally, those authors calling for reform of the existing economic system must assume that it will be possible to gain support for, and acceptance of, their proposed changes.

Despite these differences of views amongst green growth advocates, there is one big assumption being made by this group overall. Green growth advocates must assume that by focussing on economic growth in environmentally sound projects and policies, it will be possible to achieve sufficient decoupling of growth from environmental degradation to allow growth to continue accelerating in the developed world, and that a new green growth trajectory will be sufficient to enable developing countries to make their way out of poverty, without the need for significant economic reform.

2.1.2 Economic reform

Although there are several differences amongst the authors who advocate green growth, overall, the view that green growth is a necessary mechanism to facilitate the transition to a green economy is held widely. There are, however, some opponents of this view, who are critical of the generally accepted economic growth paradigm. These authors cite the existing economic system, centred on growth, as being responsible for the climate and financial crises (Miller and Hopkins, 2013; Jenkins and Simms, 2012; Daly, 1991; Daly, 1992; Sekulova et. al, 2013; Victor, 2008; Jackson, 2009; Jackson and Victor, 2011). Rather than calling for green growth, they argue that some sectors must grow, such as clean energy and small enterprises, but that overall, long-term growth is not possible, and is insufficient to avoid further crises and as such, any type of growth should not be the main focus of the economic system. Instead, these authors favour significant economic reform or, as Miller and Hopkins (2013) describe it, a "post-growth economy", with a focus on recapturing the

financial sector for the public good and measuring economic success in terms of secure, well-paid jobs, well-being, poverty levels and proximity to environmental limits and inequality, in addition to some growth in environmentally sound and local-economy based sectors (Jenkins and Simms, 2012; Daly, 1991; Daly, 1992; Sekulova et. al, 2013; Victor, 2008; Jackson, 2009; Jackson and Victor, 2011).

The authors who call for economic reform argue that there is a need for various instruments and interventions in order to correct failures of the existing economic system that go beyond what is called for by the green growth advocates. Their vision includes the use of classic economic instruments such as green taxes, emissions trading schemes and caps, and removal of subsidies (Daly, 1991; Daly, 1992; Ditz and O'Neill, 2013; Sekulva et. al, 2013; Jackson, 2009; Victor, 2008; Jackson and Victor, 2011; Jenkins and Simms, 2012), as well as significant reform of institutional structures, accounting frameworks and macro-economic relationships (Jackson and Victor, 2011; Transnational Institute, 2011; nef and Green New Deal Group, 2008) with particular emphasis on reform of the banking sector.

The authors call for much tighter regulation of banks (Dietz and O'Neill, 2013; Enquete Commission, 2013), geared towards creating a more stable financial system, which is diverse and decentralised (WWF UK, 2012; Jackson, 2009; Smart CSOs, 2011), which channels investment to foster ecological and social sustainability, including via implementation of a Tobin Tax (Forum for the Future, 2010; Forschrittsforum, 2013; Dietz and O'Neill, 2013), green investment banks to mobilise private investment for clean technologies and infrastructure (Green Party, 2010; WWF UK, 2012), ending fractional reserve banking, lower salaries in financial markets (Forum for the Future, 2010), capital controls, clamping down on tax avoidance and tighter regulation of derivatives, more national autonomy on monetary and fiscal policy (nef and Green New Deal Group, 2008), and separating retail from investment banking (Green Party, 2010).

There is also a strong emphasis on the creating a financial system that is designed to help stimulate small-medium enterprises and community initiatives in order to grow the green economy from the ground up, including more mutual (Forum for the Future) and small, value-based banks (Green Economy Coalition, 2012; Green Party, 2010; nef and Green New Deal Group, 2008), alongside the establishment of local currencies, to encourage the purchase and production of local goods and services and to increase community trust and reduce their dependence on imports (Dietz and O'Neill, 2013).

These authors also call for revitalising local economies (i.e. institutions and businesses controlled locally, serving locals markets) and strong local government to achieve resilience and stability without growth, from which a

new economy can be built (Forum for the Future, 2010; Miller and Hopkins, 2013; IHDP, 2012). Such a view calls for investment by government in grassroots projects, local production, and small micro and medium enterprises, which are viewed as being well suited to innovate with a view to increasing environmental sustainability (SEED/IISD, 2012; Smart CSOs, 2011; Green Party, 2010; Sekulova et. al, 2013). The rationale for this is that communities, cities and towns are more flexible at the local level, resilience is grounded in communities, and this offers enormous potential for flourishing local economies, in terms of jobs, finance streams and a skilled workforce (Miller and Hopkins, 2013). There is also the benefit that operating at the local level reduces global trade (Dietz and O'Neill, 2013). IHDP (2012) and Smart CSOs (2011) acknowledge some difficulties with this in that the resulting benefits will require government support to scale up.

Overall, the advocates of economic reform as a vehicle by which to achieve a green economy must assume that it will be possible to gain the political will to achieve this radical reform.

3. Employment and skills

3.1 Employment

The majority of authors expect that the transition to a green economy will create higher levels of employment than those achieved in the current "brown economy", in-line with the green growth perspective on the transition to a green economy with the exception of a very small minority, who expect that increased investment in technology will result in fewer jobs (Green Alliance, 2011; Worldwatch Institute, 2008; International Trade Union Confederation, 2008). This difference in view seems likely to have come from consultation of different sources. The World Bank (2012) explicitly states that the evidence suggests that fears about massive job losses are misplaced.

Of the authors who do envisage higher employment in a green economy, the majority expect this to be achieved as a result of the green growth, described earlier in this paper. An exception to this is the authors who envisage a green economy that is consistent with a steady state, or post-growth vision. These authors expect limited growth, and therefore limited job creation, but higher employment as a result of greater sharing of jobs (Dietz and O'Neill, 2013; Victor, 2008; Jackson, 2009) with the benefit that this will produce a more equitable society, and as a result, strengthen social capital (Jackson, 2009), and fight poverty and social exclusion (Victor, 2008). The authors propose that this will be made possible via implementation of job sharing schemes, job subsidy measures, and support for self-employed individuals (Victor, 2008). This is based on a strong assumption that the proposal of reducing working, and a concurrent reduction in income, will be acceptable to those currently in

full-time employment, as well as to employers. This contrasts somewhat with the World Bank's (2012) view that the promise of jobs under the green growth scenario will be an important tool by which to foster acceptability of the transition to a green economy amongst citizens. This argument also implies an assumption that those who are currently unemployed are both willing and able to work, or will be furnished with the skills required to do so.

The authors who envisage jobs being created under a green growth scenario cite several benefits of such, including that higher rates of employment will create greater equality (Worldwatch Institute, 2008); elimination of persistent poverty and greater social equity (UNEP, 2011); promote equitable ownership and workers' rights (Green Economy Coalition, 2012); economic recovery and social returns (Sustainable Development Commission, 2009); and as a result, facilitate decent lives for citizens (International Trade Union Confederation, 2012; Green Party, 2010).

Many of the authors do not explicitly define how this job creation will be achieved, which suggests an assumption that job creation is likely to follow naturally from investment in green infrastructure, an assumption which would imply that specific investment in job creation will not be necessary. Other authors argue that there will have to be a concerted effort and investment in this area in order to protect the workers who are most likely to lose jobs as a result of the shift towards a green economy (International Trade Union Confederation, 2012; International Labour Organization, 2012; WWF UK, 2012; Food and Agriculture Organisation, 2010; Green Economy Coalition, 2012; Dietz and O'Neill, 2013; World Resources Institute, 2011; Aldersgate Group, 2011; World Bank, 2012; Worldwatch Institute, 2008) in terms of training, income support, job search assistance, education and social protection measures. The International Trade Union Confederation (2008) argues that 2% of global GDP per year will have to be invested in order to ensure high levels of employment in a green economy.

Many of the authors argue that quantity of jobs alone is not singularly important, but that the quality of jobs created must also be decent, i.e. considerations such as wages, working conditions and workers' rights must be considered (Worldwatch Institute, 2008; Sustainable Development Commission, 2009). SEED Symposim (2011) cautions that this may be problematic, as the technological progress expected with the transition to a green economy is likely to reduce the demand for highly educated workers, creating fewer decent jobs (SEED Symposium, 2011).

3.2 Skills

Human capital is recognised by several authors as a vital enabling feature of facilitating the transition to a green economy (World Bank, 2012; Aldersgate Group, 2011; WWF UK, 2012; International Labour Organization, 2012; CSIRO,

2008; Jackson, 2009; UK Parliament Environmental Audit Committee, 2012; SEED Initiative; Sustainable Development Commission, 2009).

Where job creation is envisioned as part of a green economy, authors note that there will be a need for re-training and increased green literacy (Worldwatch Institute, 2008; Aldersgate Group, 2011; International Labour Organisation, 2012) in order to limit "skills bottlenecks" (OECD, 2011). Several authors argue that this will require concerted action by government, businesses, labour, and educational and training institutions to develop and implement new approaches to green education and training (Worldwatch Institute, 2008; Aldersgate Group, 2011; DEFRA, 2011; UK Parliament Environmental Audit Committee, 2012; GIZ, 2012).

These authors don't all propose how this literacy and skill creation will be achieved, but CSIRO (2008) cautions that current knowledge of what is needed in terms of skills is poor, and that incentives and concerted action by government, businesses, labour and educational and training institutions will be required to develop and implement new approaches to green education, training and jobs. Meanwhile, SEED Symposium (2011) argues that governments have an important role in creating programs for training and development, but also acknowledges that there is a lack of access to funds for training, and overcoming this will be challenging.

Report 3: The consumption patterns and lifestyles needed for a green economy, written by The Centre for Environmental and Sustainability Research (CENSE)

Introduction

A common theme in the green economy literature reviewed is the need to change society's unsustainable consumption patterns. This can be achieved by several ways: the reduction in total consumption, the reduction in the consumption of some particular goods or a shift to a more sustainable consumption. These approaches have different degrees of change associated with them, ranging from light changes in our consumption habits to major social and economic changes. In spite of the divergences between authors, we can say that it is desirable and necessary to fight current consumerism.

In the next sections the main drivers for change are presented and discussed. In section 1 we discuss what can be done to change consumer behaviour, mainly by focusing on education, directly or by setting a positive example. In section 2 we explore the possibility of promoting a more frugal, nonmaterialistic lifestyle, focused on well-being and interpersonal relations rather than on material consumption and accumulation. Section 3 unravels the more light view of sustainable consumption in a green economy, which is the change in the type of consumption. In section 4 we present the major desirable changes for reducing water and energy use. Section 5 reveals indirect ways to act on consumption, such as reducing wages or controlling population. Section 6 concludes this theme, by presenting some major disagreements found on the literature and some general research pathways for advancing knowledge on the theme.

Promote the behaviour change by educating people

Educating consumers can change consumption patterns, by promoting an increase in their environmental awareness and by raising the information about the products characteristics (Creech, 2011; DEFRA, 2011; ILO, 2012; PEP, 2012). In terms of education, more young people should be trained, and those already in the work force should be retrained, to be far more cognizant of the environmental consequences of what they do (Victor, 2008; WI, 2008). As for the transparency on the product labels, some authors go further and claim that instead of using labels to bring attention to the most sustainable products, we should label the most harmful ones (Lorek and Spangenberg, 2013).

Advertising is a powerful tool to influence consumers' behaviour. A better regulation of advertising would be beneficial to turn it into a more informative and less deceptive tool (Jackson, 2009; GEC, 2012; Sekulova et al., 2012; Dietz and O'Neill, 2013; Lorek and Spangenberg, 2013). Apart from regulation, a good strategy might be using the marketing techniques to "sell" sound cultural values instead of consumer goods (Dietz and O'Neill, 2013).

We should also promote the benefits of a nonmaterialistic good life, encouraging lower consumption and a greater satisfaction of fundamental needs (GP, 2010; Dietz and O'Neill, 2013). Initiatives such as Transition Towns demonstrate how a nonmaterialistic, sustainable lifestyle can be dynamic and refreshing. Additionally, other nonconsumerist institutions, such as cooperatives, land trusts and community workshops, should be created and empowered to de-emphasize consumerism (Dietz and O'Neill, 2013).

More unconventional pathways should be taken in terms of education for sustainability, which can also change consumption patterns. For instance, promoting the participation in creative and collaborative processes that produce art, or recruiting influential individuals to be well informed as they could potentiate the change (Dietz and O'Neill, 2013).

Promote a more frugal and conscientious lifestyle

The environment in which we live influences our consumption patterns, and that environment has to be changed in order to impact a greater number of people. A green economy society should have a different structure for the economy, which should aim to be "more about the good life and less about how much stuff you have" (EAC, 2012). However, the individual acts are also crucial to the change and to set as an example for others. Therefore, the 'voluntary simplicity' and more locally based economies and communities should be encouraged (Victor, 2008; Jackson, 2009; GEC, 2012).

By promoting the "downshifted" lifestyle, one can focus less on consumer products and more on time, relationships and community (Sekulova et al., 2012; Dietz and O'Neill, 2013). This will also be beneficial to avoid buying status goods and for rejecting other unnecessary consumer items, as well as to set positive examples for demoting consumerism (participation in local initiatives, develop alternatives to mass consumption by buying less, producing locally, rejecting mass consumer outlets) (Jackson, 2009; Sekulova et al., 2012; Dietz and O'Neill, 2013). For Victor (2008), status goods should be demoted recurring to taxation schemes. Sharing and leasing products is another way to reduce the volume of products we own (EC, 2011; Sekulova et al., 2012). Co-

housing can be a useful approach to reduce the amount of household appliances that we have (Sekulova et al., 2012), as well as reducing energy and water use. A culture of repair and reuse should also be implemented to encourage a more circular economy and thus avoid over-consumption (OPN, 2011).

Greening consumption

A change in the production methods is crucial to create more sustainable products. However, governments can also potentiate the shift to a more sustainable consumption by encouraging the consumers to choose wisely the products they buy. This can be done by introducing differential taxes on goods and services that will favour the more durable, more useful and less harmful products for the environment and health in the market (Victor, 2008). Additionally, the creation of environmental standards can be an effective tool for this purpose (UNEP, 2011). But a more radical approach is to phase out consumer products and services with the highest environmental impact (OPN, 2011; GEC, 2012), so they will not be available in the market. A more positive approach is to reward greener products in the market, through directives like EcoDesign (EC, 2011). A State has also the power to improve the type of consumption of its citizens by applying legal and structural reforms to ensure that land is made available for small-scale agriculture and public housing programs (SWR, 2011). Individuals can also be actors in this change by, for instance, refusing to buy short-lived products in order to influence companies to stop planned obsolescence (EC, 2011; Dietz and O'Neill, 2013; EMF, 2013).

Greening the public spending is another strategy pointed out by many authors (FAO, 2010; Raingold, 2011; UNEP, 2011; GIZ, 2012; EAC, 2012; McKinsey, 2013). Apart from the benefits for the environment, sustainable public procurement can also help to create and strengthen markets in sustainable goods and services (UNEP, 2010; 2011). Examples of public spending within a green economy are to replace government fleet vehicles with ultra low-carbon vehicles and to invest in renewables and energy efficiency in the public sector (UK SDC, 2009).

Ensure a reduction on resource consumption

Reducing consumption is not only about cutting down on material accumulation but also reducing water and energy use. For this, it is important to build strategies that potentiate efficient water usage, as well as the reduction, reuse and recycling of wastewater (EC, 2011; GEC, 2012; GIZ, 2012). It is also necessary to invest in energy efficiency to reduce energy consumption

(DECC, 2011; EC, 2011; GEC, 2012; GIZ, 2012) and on renewable sources of energy to reduce the use of fossil fuels. For the WCED (1987), energy efficiency is a way to buy time for a low energy development path based on renewable sources. A programme of coordinated research should potentiate this path, as well as the development and demonstration projects commanding funding to speed up the shift in the energy system (WCED, 1987). The WCED (1987) recommends that Governments intervene in energy pricing to encourage the adoption of energy-saving measures. Other government measures can be the implementation of personal resource use allowances or caps (OPN, 2011; Jenkins and Simms, 2012)

Indirect ways to influence consumers' behaviour

The previous sections explored direct ways to influence consumption behaviours to be more sustainable or to reduce consumption levels. However, there are also some indirect ways of influence changes.

a) ***Through population control:*** A growing population is a pressure factor on Earth's natural resources. Some authors recognise this problem, but do not tackle the need to control it (UN et al., 2003; TEEB, 2012). In contrast, some authors suggest that we should take some measures to control the increasing population. A direct measure would be to create transferable birth licenses for stabilizing the population (Daly, 1991), or to encourage nations to retain their most capable workers in order to stabilize immigration (Victor, 2008; Dietz and O'Neill, 2013). A more indirect measure would be to promote the empowerment of women through increasing education opportunities, especially important in low-income, high-fertility countries (Dietz and O'Neill, 2013).

b) ***Through labour measures:*** Material accumulation is a necessity of our current economic system, but to pursue a green economy, some believe that this paradigm must change. By promoting an increase non-formal, unpaid, low-productive working time (Sekulova et al., 2012; Jackson, 2009), we will be fostering not only the valuation of work without money involved, but also promoting a more frugal lifestyle. In this context, other measures such as shortening the workweek and the legal facilitation of work sharing can be beneficial, as they might lower wages but also add free time to our lives (Jackson, 2009; Porritt, 2009; Jackson and Victor, 2011; OPN, 2011; Sekulova et al., 2012; Dietz and O'Neill, 2013). Additionally, reducing geographical labour mobility (Jackson, 2009) can have a positive influence on well-being and also help us to reduce resource use.

c) ***Through income control:*** This category has the same rational as the previous one, but instead of presenting a trade-off (time and/or value for money), it presents a direct regulation of high wages. This is based on the assumption that earning a lower income will lead to a reduction in the person's consumption, essentially on unnecessary products. Measures to

achieve this would be reducing excessive executive remuneration packages (or making them performance related), or by limiting the maximum wage, in a similar approach to a standard minimum wage that many countries have (Jackson, 2009; Porritt, 2009).

d) ***Through the creation of local currencies****:* The establishment of local currencies encourages the purchase and production of local goods and services, an increase of community trust, and it reduces their dependence on imports (Narberhaus et al., 2011; Dietz and O'Neill, 2013).

e) ***Through the increase of sustainable options:*** If public transport infrastructures are efficient and sustainable mobility is promoted, people are incentivised to trade individual transportation for collective one or for a bicycle (UK SDC, 2009; DECC, 2011; EC, 2011; GEC, 2012).

Conclusions

There are some very different views on what consumption should look like in a green economy, which range from more radical to more light changes on our consumption patterns. For instance, the EC (2011) suggests that if citizens and public authorities have the right incentives (e.g. price signals, environmental information), they will purchase accordingly and with that stimulate companies to innovate and create more resource efficient goods and services. For Sekulova et al. (2012), this viewpoint is not enough in the transition to a more sustainable economy, because there is the need for less harmful alternatives to common products, and the manufacturing of better products is insufficient for attaining sustainability. Lorek and Spangenberg (2013) present a different viewpoint, pointing out that governments play a crucial role in the transition to a more sustainable consumption, and also, that consumers do not have all the information they need to make the better choice. These authors also comment that non-governmental organizations have a very important role in stimulating the civil society, by demonstrating the feasibility of some sustainable options and stimulating behaviour changes. The process of learning and sharing the knowledge on measures that are effective is also very important for countries to help each other (GEC, 2012; Miller and Hopkins, 2013).

In spite of the disagreement of the level in which environmental awareness is an effective tool to pursue sustainable consumption patterns, this is one of the measures most referred by the authors, as it contributes to empower consumers to do better choices. Other measures that are commonly agreed by the majority of authors are:

- the regulation of advertising to increase information and reduce deceptiveness;

- the importance of greening public spending to promote the more sustainable markets and reduce the negative environmental impact of public services;
- the reduction and efficiency on resources use;
- and the indirect measures of shortening the work hours to increase low impact leisure time, and investing in more options to promote sustainable mobility.

Another important aspect mentioned by some authors is the need to invest in research, so that there is a better understanding of the relationships between the following dimensions: education, training, jobs, employment, environmental footprint and consumer behaviour (Hatfield-Dodds et al., 2008; EC, 2011). New research can also be used to understand how values can be shifted, using the knowledge from cognitive science and psychology and sociology (Narberhaus et al., 2011).

Report 4: Politics and institutions, written by NEF

These are two separate issues and therefore this paper covers each separately.

Note that quotes are from the summary sheets not the documents themselves.

1. **Is there a political problem?**

Many of the papers ignore the political barriers to achieving a green economy, however defined. This may be because the paper has other more specialised concerns, or is concerned with aspects of the transformation that are not politically controversial, but in some cases it represents, implicitly or explicitly, the view that there is no point in a political analysis. This in turn tends to stem from one of two very different points of view. These tend to be assumed rather than articulated, so the following is our interpretation:-

1. Conventional politics cannot deliver a green economy. Perhaps there needs to be a completely new politics as well as a new economics, but whether or not this is the case, it is impossible to predict how this would play out; therefore there is no point in a political analysis. Instead the first step is the development of a grass roots movement that is variously political and practical. The task is to articulate what this movement should do in practice and should demand from governments.

2. The investment needed for the shift to a green economy will, like all investment and especially innovative investment, generate growth and jobs. What is more the investment required is not so great that the opportunity cost in terms of lost consumption represents a political problem. This is either because the returns to technological innovation will be high – or because the scale of change required is not so great. (For an example see Hatfield-Dodds et al 2008).

In each case the point of view rests on an optimistic assumption: that a grass roots movement can create a new politics; and that the investment required is not so great.

However those that accept that there is a political problem will adopt a third point of view, which we can summarise as follows:-

3. The level of investment required for the transition to a green economy does create an opportunity cost in terms of lost consumption, potentially for certain powerful groups and potentially for those least able to afford it. This is true both in the developed world and in the developing world, where, on the face of it, green policies could hamper the drive to reduce poverty. This cost is large enough to create a political problem, and while a grass roots movement may be part of the solution, it is also necessary to consider the dynamics of conventional electoral politics, established power structures, and international negotiations between the developing and developed world. Between them, these create both active and passive barriers: that is forces

pushing in the opposite direction; and an absence of forces pushing in the desired direction.

2. What kinds of solution are proposed to the political problem?

Very broadly, the solutions to these problems proposed in the papers fall into two groups: substantive policies which can help build support for a green economy; and political strategies and structures which can use or facilitate these substantial policies. The various solutions are not mutually exclusive – however we identify the disagreements in the next section.

Substantive policies

There are four main types of policy advocated: job creation, burden sharing, encouraging new conceptions of the good life, and stimulation of locally focussed economic activity.

- *Job creation*, whether within existing economic structures, or within economic structures that have been reformed to better reconcile green and commercial objectives

  In some cases this is a half-way house to viewpoint 2 above: there is no real trade-off, just a mistaken impression that there is one. The task is then to correct this. However it can also represent the view that the political gains from job creation potentially outweigh the political losses from reduced consumption.

  Papers that identify this solution, implicitly or explicitly, include: Jaeger et al (2011); FAO (2010); the Poverty-Environment Partnership (2012); Raingold (2011) – which emphasises the opportunity for competitive advantage for countries adopting effective policies; Schwarzer (2013) which calls for active industrial policy; OECD (2011) which discusses removing skills bottlenecks and new job opportunities; nef and Green New Deal Group (2008); and UNEP (2011); ITUC (2012) which identifies impacts on "decent jobs" as a key indicator; the CBI (2012) which argues green business can drive mainstream growth based on creating a comparative advantage for the UK.

  UNEP also points out that "making agriculture, forestry, fisheries and energy sectors sustainable…[makes] livelihoods in those sectors sustainable", in other words the value lies not just in jobs but in sustainable jobs.

  The UNEP paper is an example of the halfway house point of view. It goes on to question the existence of a trade-off between environmental sustainability and economic progress – but implies the *belief* that there is one creates a political problem for sustainability. It also points out that there are many examples of sustainable development in the developing world. Others reject this view: Lander (2011) specifically

rejects the assertion that there is no trade-off between sustainability and economic growth. Seaford (2013) points out there can be a trade off between consumption and sustainability even if there is none between growth and sustainability.

(Lander (2011) also rejects the view that the problem can be dealt with by adjusting incentives and calls for structural change. UNEP (2011) agrees that command and control is sometimes the most cost effective way of achieving change.)

- *Burden sharing*, ie increased equality and security, reinforced social solidarity, a focus on meeting essential needs and building human capability.

  This may be put forward as an end in itself, a moral imperative. However it can also be proposed as a political precondition for transition, both in domestic politics (since it means that the costs of transition are born by an electoral minority), and in international negotiations (potentially reinforcing political support for transition within developing countries). In the absence of the latter, the green economy can appear to be a rich country's objective. It can be achieved through a range of redistributive and 'predistributive' measures domestically, as well as through international transfers and investment.

  Papers that identify this include: Jaeger et al (2011) which identifies regional inequality as a problem with business as usual; IHDP (2012) which refers to a "passion for equity" and the need for an economy that "focuses on enabling people around the world to pursue and achieve lives that are meaningful to them" (a concept based on Sen's theories of capabilities); Share the World's Resources (2011) which similarly calls for essential goods and services to be universally accessible; IISD (2011) which says the green economy must be "pro-poor"; ILO (2012) which calls for decent work, gender equality, an inclusive economy and changes in employment patterns and income distribution; The World Bank (2012), which sees the challenge as reconciling the need for growth to alleviate poverty and environmental constraints - it also refers to the way Iran spent 50% of saving from ending energy subsidies on cash transfers benefitting 80% of the population; Jackson (2009) which calls for equal per capita resource/emission allowances and for incorporating welfare losses from an unequal distribution of income into national accounts; the Green Economy Coalition (2012) which calls for inclusive economic growth through a range of measures; Share the World's Resources (2011); the Poverty-Environment Partnership (2012) which identifies reduced inequality; Porritt (2009) which calls for redistributive tax, a living and maximum wage, and investment in

housing; the Enquete Commission (2013) which argues social inclusion is integral to the green economy; the UK Sustainable Development Commission (2009) which identifies fuel poverty, inadequate access to transport and poor housing as key targets; Dietz and O'Neill (2013); ITUC which calls for "equity within and between countries", for "the rights of workers and trade unions" to be respected, and for the "satisfaction of human needs"; Worldwatch Institute (2008) which points out that green jobs are not necessarily decent jobs and calls for advocates of one to support the other. Seaford (2013) attempts to quantify the kind of redistribution that would be necessary in the UK to create a majority of winners at the same time as investment in a low carbon economy is taking place.

GIZ (2012) calls explicitly for "efforts [to] ensure that the burden of low-carbon development is spread fairly between poorer and richer countries" and concentration on enabling "a pro-poor, ecologically sound and low-emission path to development". Something similar is called for in many papers, and while it is clear that this burden sharing is needed to solve the developing world political problem, it is itself of course part of the developed world political problem which domestic burden sharing (and other measures) are designed to solve.

- *Encouraging new conceptions of the good life* which politicians can deliver within environmental limits.

  There are two variations of this idea. One is that what people choose to consume will change and thus while productivity growth may lead to more consumption, this will be decoupled absolutely from environmentally damaging production. The other is that people will choose to work and consume less – productivity growth will lead to more leisure and not to more consumption. In both cases individuals can be 'nudged' or incentivised to change their choices – or simply persuaded. They then care less about a loss of income as compared with business as usual.

  Papers referring to this include: WWF (2012) which calls for policies to promote sustainable lifestyles; IHDP (2012) which identifies the "need to replace outdated ideas about makes life valuable – about what defines well-being", and relates this closely to everyone having the resources to live a meaningful life (see above on burden sharing); Fortschrittsforum (2013) which emphasises raising opportunities for everyone; Jackson (2009) which calls for changes to the dynamic of status consumption while improving quality of life; the Green Economy Coalition (2012) which identifies the need to improve wellbeing; Share the World's Resources (2011) which refers to fulfilling lives and "a more holistic vision of humanity's relationship to the natural environment"; Dietz and

O'Neill (2013) who argue for promotion of the 'downshifted' lifestyle, harnessing the power of art, limiting advertising and planned obsolescence and cultivation of non-consumerist institutions; and Seaford (2013) who also argues for limits to advertising and the strengthening of non-consumerist institutions, as well as changes to corporate governance to make these changes compatible with capitalism. Jackson and Victor (2011) link more jobs to work-time reduction policies. Victor (2008) links full employment with shorter hours and shorter working life. Dietz and O'Neill (2013) echo this.

- *Stimulation of locally focussed economic activity* – in other words technological and institutional innovation which simultaneously delivers environmental performance and better lives.

  These innovations tend to encourage local economic activity – that is production of goods and services that are consumed locally. The idea is that the reduced scale increases individuals' sense of control and reduces the opportunities for an elite to appropriate value, and that these (more than) compensate for any reduced economies of scale. They also reduce the environmental damage associated with the global trading system. This can be delivered through local economic planning. To the extent that it is successful it creates a group of people benefiting from the green economy and thus an electoral constituency.

  The Green Economy Coalition (2012) emphasise the importance of community actions and locally owned solutions which deliver "synergies between environmental and economic growth aspirations". Share the World's Resources (2011) refer to flourishing local communities. The Poverty-Environment Partnership (2012) refers to "green technologies that can benefit the poor" and resilient local economies. IISD (2011) argues "the green economy should have its roots at the local level, in small, micro and medium sized socio-economic enterprise". Porritt calls for "revitalisation of local economies". Miller and Hopkins (2013) call for "resilient communities – that 'meet a growing proportion of the local economy's needs for food, energy, building materials and employment opportunities from as near as possible'" – involving "democratic participation" and "the community invests in itself". This involves building a critical mass of people who support the programme as well as their capacities. Ellen McArthur Foundation (2013) also calls for activating local communities, including small businesses in local clusters.

  UNEP (2011) points out that investment in natural assets that are used by the poor enhances livelihoods in low income areas. One of the biggest opportunities to speed transition to a green economy is to invest in the provision of clean water and sanitation.

Availability of appropriate financing instruments is critical to this. For example loans to save energy (Potsdam Institute 2009).

Process

There are four kinds of process solution proposed: pragmatic coalition building, political leadership, engagement and narrative development, transparency and accountable decision making, and targets, indicators and data.

- *Pragmatic coalition building*: initial steps have to be (a) where there is no sharp trade-off between current and future wellbeing – for example where addressing environmental externalities will increase wellbeing now (b) creating the conditions so that as time passes further steps can be taken without sharp trade-offs.

  This is the political strategy that makes use of the other potential solutions. It is set of tools for politicians who wish to encourage the transition, either out of conviction or to appeal to a particular electoral constituency.

  The paper from the World Bank (2012) develops this idea: "local strategies are needed because what works depends on local political economy"; this requires an "analysis of acceptability and urgency" and prioritising accordingly – acceptability is greatest where local benefits (jobs, increased safety) offset the transition costs; urgency is where there are lock in effects in the absence of action, eg land use planning.

  The Dutch Sustainable Development Coalition (2012) call for aligning business incentives with social and environmental progress – with businesses actively pursuing long term value for a range of stakeholders. IISD (2011) also calls for fostering socio-environmental enterprises.

- *Political leadership and engagement* which persuades the electorate and other powerful groups to accept sustainability measures; this includes the development of new narratives, for example framing the issue as one of security, and active engagement with stakeholders.

  Papers which refer to this include: WWF (2012), FAO (2010),IISD (2011), World Bank (2012) which calls for framing, nudging and informing and social marketing. The World Resources Institute (2012) calls for increased public awareness of environmental costs and the economic benefits of the green economy. UNWCED (1987) recommends that the "notion of security as traditionally understood in terms of political and military threats…must be expanded to include the impacts of environmental stress." DEFRA (2011) calls for government provision of

information for businesses and consumers to improve decision making. Dietz and O'Neill argue for a more accessible message about "steady state" and an active debate and academic research on this.

This also involves working with social partners. The ILO (2012) refers to the need for "a social dialogue to help the transition" and "policies that result from broad support and active commitment among stakeholders". GIZ (2012) calls for "dialogue between government, private sector and civil society stakeholders" to create problem solving strategies and the European Commission (2011) wants to see "policy makers…in active discussion with business and civil society about the policy conditions necessary to overcome the barriers to resource efficiency" as part of an effort to mobilise stakeholders to ensure effective co-ordination of "policy, financing, investment, research and innovation."

Civil society organisations (CSOs) have a role to play too (Narberhaus et al 2011) and need to attempt to change values; they need to adopt a systems rather than single issue focus and form alliances.

- *Transparency and accountable decision making* as part of the process of challenging vested interests.

  The assumption being made here is that much of the problem is the power of vested interests and that transparency will reduce this power, in the interests of "poor and marginalised people, future generations, and the natural world", in the words of WWF (2012).

  Other papers referring to this include: Poverty-Environment Partnership (2012) which calls for "empowered citizens through access to information and justice and participation in decision-making" and "improved transparency and accountability in the public and private sectors." This is linked to improved land and natural resource property rights for the poor. UNEP (2011) also refers to the creation of rights which can drive green economic activity (alongside incentives). The World Resources Institute (2012) calls for "opening up government decision making processes to the public and civil society to ensure policies are accountable to the public and not steered by vested interests". Lander (2011) rejects the idea that governments operate as rational welfare maximisers for their citizens, ie in reality they are influenced by vested interests.

- *Targets, indicators and data* are part of the armoury of making change happen. They are both political tools – forming the centre piece of a narrative, in the way that GDP forms the centre piece of the growth narrative, and part of the institutional armoury.

  The European Commission (2011) calls for "ambitious resource efficiency targets" and indicators and "a shared objective of the international community". Similarly there are calls for "global political

commitment, goals and indicators for sustainable development" (WWF 2012) and a "goal setting approach" with measurable targets (Griggs et al 2013). The UK Parliament Environmental Audit Committee (EAC) (2012) also calls for a basket of indicators and a clear trajectory. This requires reliable data (WWF 2012) (UNWCED 1987).

3. Disagreements about political problems and solutions

The disagreements are for the most part manifest in difference of emphasis rather than direct argument. Thus the following is our interpretation of these disagreements, subject to revision during the interviews (for all there can be different answers for different countries). They are not all explicitly stated in the papers. There is (naturally) heavy overlap with the social equity and consumption themes.

1. Is there a political problem?
    a. No – the trade off between rising living standards and sustainability is small enough to manage
    b. Yes –but the solution just requires people to realise that the trade-off between rising living standards and sustainability is small enough to manage
    c. Yes – and a mixture of substantive and process solutions are needed
2. Is creating jobs an adequate solution?
    a. Yes – the consumption losses needed are small enough for this to be enough
    b. No – the consumption losses are too great for this to be enough on its own
3. Is increased equality within countries a necessary part of the political solution?
    a. No – the consumption losses needed are small enough for this to be unnecessary
    b. Yes – the consumption losses are too great to be voted for by the majority without this kind of redistribution
4. What does the developed world need to do to burden share and so make the politics of sustainability in the developing world easier? (This is not covered in any great depth by the paper summaries I have read, but is obviously a source of major controversy; we might want to identify more and better sources)
    a. Encourage free trade and capital investment *or*
    b. Develop a strong environmental tariff/import regulation system, potentially spending the proceeds on aid
    c. Subsidise technology transfer through large scale investment *or*
    d. Support investment in locally controlled business and technology
    e. Etc
5. Does encouraging new conceptions of the good life and other ways of encouraging more sustainable consumption have a role to play, not just

in itself decoupling or reducing production but in making the measures government needs to take more acceptable?

   a. No – government does not need to take measures which reduce or change consumption as compared with business as usual
   b. Yes – but with one or more qualifications
      i. It is for civil society not government to do this and/or
      ii. All that is needed is encouraging sustainable consumption, not some broader change to people's ideas about the good life
   c. Yes – both government and civil society have a role to play, both to encourage sustainable consumption and more broadly to change aspirations

6. More generally, what kind of government communication will be important?
   a. Information
   b. Information and more active social marketing
   c. The above plus a strong narrative about the advantages of action and the risks associated with inaction
7. How important is stimulating locally focussed economic activity to build support?
   a. Not important – conventional business models will maximise welfare within environmental constraints
   b. A useful part of the armoury – but most people will be unaffected so it will have relatively little impact on politics
   c. This is potentially a key change and we should look for as many opportunities to do this as possible
8. How should we adopt the World Bank's prioritisation framework?
   a. Do what is acceptable
   b. Do what is acceptable or urgent and do what it takes to make the urgent acceptable
9. How should the support of business be won for the transition to a green economy?
   a. By a combination of dialogue, policy certainty, stable externality pricing and regulation and public investment in the research and skills needed for the green growth industries of the future
   b. As above but the dialogue needs to be with other social partners as well
   c. As above and changes to the rules of the game which mean businesses maximise their returns to all stakeholders (and therefore support a different set of policies)
   d. The support cannot and should not be won; instead the power of business should be made clear and reduced
10. How important are transparency and accountability to counter vested interests
   a. Quite – but winning public support is equally or more important

b. Fundamental – if we can deal with vested interests, public support will be relatively easy to win

11. How important are indicators for political purposes?

a. A red herring

b. Very important

4. Institutional issues and solutions

Whereas the political solutions are designed to create the desire for change, institutional solutions are designed to translate that desire into action. Change is needed at the national and international level. The indicator development already referred to will support this.

- *Policy integration and policy certainty at the national level*: policy for the green economy needs to be integrated into mainstream economic policy and thus policy coherence achieved – however there are also calls for separate units separated from day to day government designed to create policy certainty.

  Environmental issues should not be considered in separate departments in national governments: according to UNWCED (1987)[xix] "The central economic and sectoral ministries should be given responsibility for the quality of those parts of the human environment affected by their decisions". "Ecological dimensions of policy should be considered at the same time as the economic, trade, energy, agricultural and other dimensions." IISD (2011) emphasises the need for policy coherence. The report by Brainpool (2013) also calls for more integrated policy making as essential to sustainability. The Poverty-Environment Partnership (2012) also calls for integrating green economy objectives into planning and broader economic policy making as does OECD (2011).

  The EAC (2012) calls by contrast for dedicated units to examine the relationship between growth, prosperity and quality of life, to engage with business and civil society, to monitor progress and to set tariffs and charges (and so create certainty for investors). The latter requires a non-partisan approach. The importance of policy certainty for investment is emphasised by Deutscher Nachhaltigkeisrat (2013). A similar emphasis on clarity and predictability in infrastructure planning is made by DEFRA (2011): rapid, predictable, accountable, transparent planning system is needed for infrastructure.

  All this requires capacity building within government so that rational decisions can be made (UNEP 2010).

- *Reformed international institutions*: these need to be reformed to a greater or lesser extent to facilitate the transition to a green economy

[xix] The Brundtland Report

UNWCED (1987) calls for "International agencies concerned with development lending, trade regulation, agricultural development... to take the environmental effects of their work into account", and international law needs developing. FAO (2010) also refers to international frameworks, international law and national law harmonisation eg over the commons. Other papers calling for similar reform of institutions include Griggs et al (2013). UNEP (2011) echoes this emphasis on international agreements and processes, and calls for WTO Doha round to promote a green economy. Pardee Centre (2011) argues for "reform of macro-economic policy instruments and structures as they bear on international trade and finance" – although not for any fundamental reform of institutions which is a distraction – incremental reform is best.

There is also a call for a "stronger voice for poor and marginalised in international institutions" (WWF 2012), for "the negotiating capacity of developing countries vis a vis transnational companies [to be] strengthened" (UNWCED - 1987). Similar calls are made by Share the World's Resources (2011).

In parallel with such changes, there needs to be policy coherence towards aid to developing countries across OECD countries, supported by leading NGOs (Poverty-Environment Partnership 2012).

5. Disagreements about institutional solutions

12. What is the right balance between integrating green economy policy making into economic policy making generally and having dedicated, powerful units with a remit to create permanent change and policy certainty?
    - **a.** If you do the former you don't need the latter
    - **b.** The specialist units should take over the key levers of economic policy
    - **c.** Integration is not as important as having dedicated units.
13. What reform of international institutions is needed?
    - **a.** None worth speaking about
    - **b.** Incremental reforms which integrate green economy objectives into existing processes
    - **c.** Only significant change will make a difference, and should be part of a new international settlement between developing and developed countries.

Report 5: The national and international improvements to social justice that will underpin this politics, written by written by The Centre for Environmental and Sustainability Research (CENSE)

1. Introduction

A green economy can be defined as one that is inclusive and focuses on enabling people to pursue and achieve meaningful lives while minimising the negative impacts that their activities have on the environment (EC, 2012; UNU-IHDP, 2012;). This economy needs to safeguard human health and well-being, provide jobs, reduce inequalities and invest and preserve natural capital. The transition to a green economy should also be socially just to ensure a fair distribution of the costs and benefits (Raingold, 2011; EC, 2012).

What does it mean to have a socially just transition? Two main aspects of social justice are intra and intergenerational equity. The principle of intergenerational equity is based on the responsibility of preserving a legacy of resources and environmental quality to future generations. Norton (2002), groups the issues associated with intergenerational equity into four categories:

1. The intergenerational trade-offs: how should the needs of future generations be balanced against the needs of present generations - this is more significant in the face of uncertainty and subjectivity about future needs;

2. The distance issue: how far we should consider the needs of future generations – this is highly dependent on individual perceptions and concerns;

3. The knowledge issue: how much do we know about future generation's needs – this can be viewed in terms of wants, desires, needs, as well as rights or entitlements;

4. The typology of effects: how do we account for some of the characteristics of the natural systems, such as irreversibility and the inherent value of natural capital – this is related to the extent and type of precautions taken for the conservation of natural capital.

It is crucial to ensure a sustainable future for the generations to come and manage the economy in a long-term perspective (WCED, 1987; UK SDC, 2009; GEC, 2012). This has to be a global concern and effort, so it is important to invest in social dialogue on society's collective future and responsibility to the planet (OPN, 2011).

Intragenerational equity translates the spatial and social dimensions of equity. Fundamental aspects are the distribution of benefits and costs of

environmental goods and services, as well as the access to resources. This means that the responsibilities of sustainable development should be spread fairly between poorer and richer countries, as well as the social and economic co-benefits (GIZ, 2012). These co-benefits can be multiple: security of natural resources; freedom and ability to pursue meaningful lives; building trust in the governments and businesses; inclusiveness and participation in decision-making; guarantees of health care and education system; decent job guarantees; and a fair distribution of income and wealth, among others (GEC, 2012; UNU-IHDP, 2012; Dietz and O'Neill, 2013).

Poverty is a central issue when talking about social justice. Poverty is at the same time a major cause of global environmental problems and also a consequence of them (WCED, 1987). Fighting poverty in a green economy means not only to invest in job creation but also on preserving natural capital, in which people depend on, and investing in the clean development of low-income countries (UNEP, 2011). Therefore, the transition to a green economy entails the eradication of extreme poverty, and to that it is crucial to share financial, technical and natural resources between rich and poor nations (SWR, 2012).

In the next sections the main drivers for social justice are presented and discussed. In section 2 we discuss what can be done in the private sector to ensure that the employees and the rest of the society are being considered on companies' strategies to the green economy. In section 3 we explore what can be done in the public sector, namely if the actions carried are aimed at: distributing benefits and costs more fairly between people and nations, fighting poverty, aiding the development of countries in need, promoting social inclusion and enhancing global and national governance. In section 4 we discuss an indirect way of promoting social justice, by creating new ways of measuring progress. Section 5 concludes this report, presenting the major challenges for enhancing social justice.

2. Private sector contributions

The business sector plays a major role in supporting a socially fair transition to a green economy. It should guarantee that employees are valued and that the company's economic activities are a positive contribute to society in general. The value that is created with stakeholder engagement, whether playing the role of costumers, a local community or the government, is essential to assure that companies' performance is sustainable (DSGC, 2012). The following groups of measures are meant to summarize what can be done by the private sector to enhance social justice.

a) ***Ensure decent labour conditions:*** The employees should have opportunities to do training and to gain work experience in a diverse workforce and under good working conditions (DSGC, 2012). Furthermore,

the green job creation that is implicit to the transition to a green economy has to be accompanied by adequate wages, safe working conditions, job security, reasonable career prospects and workers' rights (FAO, 2010; GEC, 2012).

b) Changing the structure of companies: Some authors propose that business should encompass a more inclusive understanding of 'value' in their value chains?, although in different degrees. On a general basis, businesses operate with a shareholder structure, and one perspective is inserting the company in a wider network of stakeholders, learning with their engagement and making better-informed decisions (UNEP, 2012). A more radical viewpoint is to abandon the corporate structure as a form of productive organization and establish more employee-owned companies, while transforming others into cooperatives (Sekulova et al., 2012; Dietz and O'Neill, 2013).

c) Build competitiveness and resilience in community: Business should not only consider stakeholder engagement to make decisions, but also promote the resilience of their communities. In this context, businesses should be more concerned with creating wealth in communities, by promoting the development and deployment of new and innovative products and services, particularly to help vulnerable people in developing countries and also ensure that these technologies are appropriate and affordable (UNGC et al., 2011). Additionally, companies can partner with local communities to preserve natural resources on which they both are dependent to exist (UNGC et al., 2011).

d) **Equitable development for business:** to build a green economy there should be a special focus on small and medium enterprises (SMEs) which are more numerous than the large ones, particularly considering that SMEs might lose competitive advantage more easily than large companies in the process of transition. For this, financial markets should be reformed to take a longer-term view in financial accounting and investment decisions and enable smaller, value-based banks to become more numerous so they can help stimulate the SMEs and community initiatives that will help the transition (GEC, 2012). It is also important to explore how the financial sustainability of SMEs can be strengthened and establish information- and experience-sharing mechanisms that can support their growth (Creech et al., 2012).

3. Public sector contributions

3.1 Fair distribution of benefits and costs

The objective is to achieve a fair distribution of benefits and costs of environmental goods and services, as well as ensure the access of all members of society to resources. There are several issues associated such as: sustainable food security, the way public goods are managed to ensure a fair distribution of rights, the way environmental and social costs are distributed, the equality in resource and emissions caps, the way wealth and income is distributed, the way international trade is conducted, among many others. A few measures that can be taken to achieve this are:

a) **Fair access to resources**: Guarantee access to natural resources and their services, e.g. freshwater, soil fertility; Achieve universal access to clean water and basic sanitation, and ensure efficient allocation through integrated water-resource management; promote the access to clean energy; universal and affordable access to clean energy that minimizes local pollution, health impacts and mitigates global warming; Sharing knowledge globally will assure greater mutual understanding and create greater willingness to share global resources equitably; assure universal access to basic goods and services that are essential for life and health, through effective public services which replace private sector alternatives that the poor often cannot afford; Global interdependence of resources requires nations to co-operate more effectively, share their natural and economic resources, and ensure that global governance mechanisms reflect and directly support our common needs and rights. Agreements should be promoted to assure national and international access to natural resources so that resources can be shared equitably and sustainably managed; Local rights and capacities: there should be a strengthening of land and natural resource ownership and access rights of poor and marginalized groups. (WCED, 1987; SWR, 2011; PEP, 2012; TEEB, 2012; Griggs et al., 2013).

b) **Sustainable food security**: Fight hunger and achieve long-term food security — including better nutrition — through sustainable systems of production, distribution and consumption; Most developing nations need more effective incentive systems to encourage food production; Food security requires attention to questions of distribution, since hunger often arises from lack of purchasing power rather than lack of available food; Food security is also associated to nutrition and sustainable agriculture (WCED, 1897; UN, 2012; Griggs et al., 2013).

c) **Managing public goods:** Some common resources' use rights are insufficiently defined, and others are difficult to be enforced, for example in the high seas, some mangroves, coral reefs, flood plains and forests without clear ownership; The international community should seek to create, and enhance existing regimes (including ratification of these) to ensure that the oceans, outer space and Antarctica are shared fairly and peacefully; Establish payments for environmental services – this will promote a fair sharing of benefits and costs of ecosystems services; The equality on global rights to the global commons can be promoted by a reduction in wealth inequality within and between countries. (WCED, 1987; FAO, 2010; Jenkins and Simms, 2012; WB, 2012).

d) **Sharing environmental and social costs**: International agreement to internalize environmental and social costs on their products; the costs of transition towards a low-carbon economy, in the effort to tackle climate change, should be shared fairly by the government, business and individuals (DECC, 2011; Dietz and O'Neill, 2013;).

e) **Equality in resource and emission caps**: Identifying clear resource caps and emission caps for all sector of the economy and establishing reduction targets under those caps: establish equal per capita allowances on resource and emission caps (Jackson, 2009).

f) **Wealth and income distribution**: Limiting the degree of inequality in the distribution of income, for example establishing maximum and minimum limits to personal income, the promotion of a smaller difference between the wages of high and low earners, as well as a maximum limit to personal

wealth; Increase gender equality; Redistribution of wealth and income through the use of taxes and social transfers (e.g. welfare payments); Wealth redistribution from North to South to alleviate poverty and to ensure that every nation can provide access to essential services such as education, healthcare and utilities for all their citizens; the rolling back of privatisation and the intellectual property rights regime; Sharing the available work so that more people can have an income (Daly, 1992; Jackson, 2009; OPN, 2011; SWR, 2011; Dietz and O'Neill, 2013; Fortschrittsforum, 2013).

g) **Value informal work**: Explore the potential and the value of informal and voluntary work at the levels of household and community, as well as amateur and social-enterprise-based (Sekulova et al., 2012)

h) **Tax legislation and application**: Revise income tax structures to allow a better distribution of benefits and costs; Introduce a more progressive tax system; Reduce tax avoidance; Establish taxes for financial transactions; Avoid tax havens to promote social equality and fairness (Jackson, 2009; Porritt, 2009; GP, 2010; OPN, 2011; EAC, 2012; Fortschrittsforum, 2013).

i) **International trade**: G20 members should develop co-ordinated efforts to their commitment to an open trading system and refrain from discriminatory provisions in national stimulus packages; Reverse the trends towards depressed commodity prices and protectionism; Increase the negotiating capacity of developing countries regarding transnational companies, so these countries can secure property tights and environmental concerns; Develop trade rules that promote liberalization, as well as non-discriminatory and equitable multilateral trading systems; There are some concerns that industrialised countries could establish new non-tariff trade barriers in a green economy context, e.g. by dictating stricter environmental standards (WCED, 1987; PIK and GRI-LSE, 2009; GIZ, 2012; UN, 2012).

3.2 Development aid to developing countries

International cooperation for development is still an area that needs plenty of attention. In a green economy context, development aid should be focused on helping low-income countries to achieve better living conditions for their populations in a sustainable way, and also for them to build resilience to face future environmental challenges. Additionally, it is crucial to have in mind that a different development model should be promoted for developing countries, one that is built by local people with the financial help and knowledge from more developed nations. A few measures that can be taken to achieve this are:

a) **Increase finance aid:** assistance for small island developing states; support for least developed countries and landlocked least developed countries; enhance financial support from developed to some developing countries, to meet their commitments under agreements regarding Official Development Assistance; efforts to improve the quality of aid; In the area of debt financing efforts should be made to relief unsustainable debt levels, and, where appropriate, debt restructuring for developing countries; fighting corruption (Jackson, 2009; DEFRA, 2010; GP, 2010; SWR, 2012; UN, 2012).

b) **Increase technology transfer:** ensuring wide diffusion and international transfer agreements of green technologies and practices, as well as the corresponding know-how and assistance, by reducing barriers to trade and foreign direct investment protection of property rights; cooperative action on technology innovation, research and development (WCED, 1987; PIK and GRI-LSE, 2009; OECD, 2011; UN, 2012;).

c) **Support the ecological transition in developing countries:** funding mechanisms that promote investment in renewable energy, energy efficiency, resource efficiency, low-carbon infrastructures and the protection of 'carbon sinks' and biodiversity; payment of a carbon levy by richer nations on imports from developing countries; promote fair trade; promote the rights for developing countries; taxes on financial institution transfers to pay for sustainable development measures; assistance to change energy use patterns (WCED, 1987; Jackson, 2009; GP, 2010).

d) **Catalyse innovation in least developed countries:** internationally sponsored networks of business incubators; significantly scaled-up innovation activity via competitive grant; dedicated funds to de-risk entrepreneurial investments and stimulate intellectual property sharing (GGGI, 2012).

e) **Promote capacity building:** strengthening technical and scientific cooperation including North-South, South-South and triangular cooperation; globally representative participation in sustainable development assessment and monitoring, to enhance national capabilities and the quality of research for decision- and policy-making processes; developed countries to share knowledge with developing countries on how to develop resource-efficient, inclusive economies (UN, 2012).

f) **New development paradigms:** Implement a different development model for developing countries, to adopt a more sustainable path instead of following the same unsustainable path of most rich countries; rethink of Western notions of 'development' to move beyond the obsession with purely market-based economies; Develop a more holistic vision of humanity's relationship to the natural environment (SWR, 2011; UNU-IHDP, 2012).

g) **Promote the harmonization of international policies and support:** ensure coherence of aid, trade, technology and other policies to support inclusive green economy transitions in developing countries; development agencies can provide harmonized support for country-led efforts to define and implement a national strategy for transitioning to an inclusive green economy (PEP, 2012).

3.3 Fight poverty

One of the main objectives of a green economy is tackling poverty and ensuring the basic needs of populations. For some authors, a green economy must be a 'pro poor' approach (Creech, 2011; GIZ, 2012; PEP, 2012;). A few measures that can be taken to achieve this are:

a) **Job creation and support:** increase the value given by society to non-formal, unpaid, low-productive working time; facilitation of work-sharing;

guaranteed jobs provided by the state, to help people that are unable to find employment; employer job subsidy measures; support for self-employment (Victor, 2008; Jackson, 2009; Porritt, 2009; Jackson and Victor, 2011; OPN, 2011; Sekulova et al., 2012; Dietz and O'Neill, 2013;).

b) **Ensure decent jobs and labour guarantees:** promote decent wages, career prospects, job security, occupational health and safety, and worker rights; income support and social protection measures, to help limit the downside adjustment process for workers most likely to be affected by the shift towards a greener economy; ensure a stable and relatively equal earning distribution; stricter regulation of exemptions to the labour code; development of a more general work insurance that copes better with the more flexible and more disrupted working life situations (Victor, 2008; WI, 2008; ILO, 2012; WB, 2012; ECGB, 2013; Fortschrittsforum, 2013;)

c) **Ensure personal financial help:** creation of a citizen's minimum income level; promote universal child-care benefits; create protective measures aimed at maintaining a minimum safety net, such as targeted transfers, social assistance, social housing, in-kind support, means-tested income supplements; payments for environmental services to benefit the poor (Victor, 2008; Jackson and Victor, 2011; OPN, 2011; WB, 2012; Dietz and O'Neill, 2013)

d) **Improve local economics and neighbourhood quality:** promote community social and economic development, community development corporations, rural sustainability, safe communities, etc.; local support for culture, sports and recreation; improvement of social capital (Victor, 2008).

e) **Promote community resilience:** greening agriculture, forestry, freshwater, fisheries and energy sectors will make livelihoods in those sectors sustainable (UNEP, 2011).

f) **Emergency poverty relief:** Implement an international program of emergency relief to rapidly eliminate hunger and unnecessary deprivation, led by the UN; create a new definition of what constitutes a humanitarian crisis to include any person who exists in a life-threatening condition of poverty (SWR, 2011).

3.4 Social inclusion

A green economy must be inclusive and ensure that there is universal access to basic services. A few measures that can be taken to achieve this are:

a) **Access to education:** optimising vocational training systems whilst considering new, environment related employment opportunities; educational outcomes for disadvantaged groups; Training courses for older employees; opportunities for lifelong learning skills (; Victor, 2008; Jackson, 2009; GIZ, 2012; TEEB, 2012; Dietz and O'Neill, 2013; Fortschrittsforum, 2013; Griggs et al., 2013).

b) **Access to the labour market:** provision of information and active counselling; development of education, skills training, literacy and numeracy training, language training, orientation and settlement, information technology training (ECGB, 2013)

c) **Access to health and care services:** assure universal access to basic health and care services; measures to address drug issues, teen pregnancy, and mental health; provision of universal child care; better provision of care for the elders (Victor, 2008; Fortschrittsforum, 2013; Griggs et al., 2013;).

d) **Access to housing:** assure universal access to housing; investments in quality of housing (Victor, 2008; Griggs et al., 2013).

e) **Promoting social cohesion and solidarity:** promoting solidarity, including citizenship education, cross-cultural sensitivity and education; framework legislation establishing rights and freedoms; promote anti-discrimination measures and celebrate diversity (Victor, 2008; GP, 2010).

3.4 Governance

The construction of a green economy can benefit significantly from a collective process rather then be concentrated in the hands of decisions-makers. The participation of diverse stakeholders in a democratic and transparent process can have multiple advantages such as the increase of: information exchange, acceptance, and the speed of the transition towards a green economy. A few measures that can be taken to achieve this are:

1. **Stakeholders inclusion:** ensure that different voices are heard in the processes of decision-making, for example by the creation of a 'Green Economy Council' to engage both business and civil society; creation of institutional and legal means to involve civil society, non-governmental organizations, scientists and industry in decisions about sustainable development; promote active partnerships between governments, public institutions and the private sector; ensure that tribal and indigenous people have a decisive voice in formulating policies about resource extraction and use in their regions; greater representation for poor and marginalised people; promote inter-institutional cooperation, as well as appropriate decision-making and implementation mechanisms (WCED, 1987; EAC, 2012; GIZ, 2012; WWF, 2012;).
2. **Promote a global commitment on green economy:** global political commitment towards goals and indicators for sustainable development; better integration of the concerns of poor and marginalised nations in international institutions, ensuring that the global economy can serve the interests and securing basic needs of all people; ensure that global governance mechanisms reflect and directly support humanity's common needs and rights, for instance through agreements over national and international access to natural resources (SWR, 2011; WWF, 2012).
3. **Promote democracy and public information transparency:** promote democracy, good governance and the rule of law, at the national and international levels; introduce proportional representation for all elections; promote high standards and information for all goods and services; access to broadcast media (GP, 2010; UN, 2012).

4. Promote new valuation techniques

The pathway to a green economy can be better assessed if new metrics and indicators are developed. Some of the existing and commonly used indicators are not enough to a proper evaluation of sustainable development, namely improvements are needed in the assessment of the quality and availability of natural resources, as well as the evaluation of social conditions. A few measures that can be taken to achieve this are:

a) **Develop new metrics:** Adopting alternative valuation techniques (different from the traditional, monetary valuation techniques) that are able to capture more adequately value human, social and natural capital; Alternatives to financial measures like GDP and income per capita as the main yardsticks for national and social progress; Develop new measures of economic growth and metrics of saving and inclusive wealth; Develop measures of social fairness (SWR, 2011; EAC, 2012; UNEP, 2012; NCC, 2013;)

b) **Revise national accounts:** Incorporate the real welfare losses from having an unequal distribution of income; Account for non-market services (e.g. domestic labour, voluntary care); Develop a national well-being accounts and integrate them systematically into the existing national accounting framework (Jackson, 2009).

c) **Measuring capabilities and flourishing:** Define an appropriate measurement framework for a lasting prosperity, which includes a systematic assessment of people's capabilities for flourishing across the nation (healthy life expectancy, educational participation, trust, community resilience, participation in the life of society); Creating maps for economic development that properly account for the environmental, social and economic challenges of modern times, both in high-income and low-income nations (Dietz and O'Neill, 2013; Jackson, 2009).

5. Conclusions

For ensuring social justice in a green economy, there are a few major challenges that need to be addressed::

Internal and external pressures to exploit natural resources (WCED, 1987; FAO, 2010; SWR, 2011)**:** most developing countries face enormous economic pressures from powerful groups to overexploit their environmental resources, since competing destructive resource usages are highly lucrative. This problem is particularly significant in the situation where resources tenure or use rights are insufficiently defined or enforced, such as in the high seas, some mangroves, coral reefs, flood plains and forests without clear ownership. One possible solution for this problem is to foster international cooperation in creating conditions that allow an equitable sharing of the world's resources.

Lack of global governance (FAO, 2010; WWF, 2012)**:** traditional processes of decision-making are insufficiently accountable and transparent; this enables powerful groups interested in maintaining the status quo to have a disproportionate influence, at the expense of poor and marginalised people,

future generations and the natural world. There is a strong need to enhance governance at many levels from local to national and global, that is able to promote a more sustainable and integrated development.

Economic challenges (SWR, 2011; PEP, 2012)**:** transaction costs to a green economy can be very high; although longer-term impacts of achieving an inclusive green economy will be generally beneficial, particularly to the less fortunate members of society, the shorter-term impacts may be negative, such as: fossil fuel and energy price rises, increase in use of biofuels, decarbonising urban space and settlements; unwillingness of governments to regulate the power and influence of big business in terms of production, what has great impacts on the poor (e.g. in the form of climate change) and widens inequality further.

Development aid challenges (SWR, 2011)**:** generally governments favour a pro free-market ideology over prioritising poverty alleviation, so aid is often tied to political, ideological and commercial interests that benefit the richer countries. Comprehensive solutions that address the structural causes of poverty and inequality are often dismissed by policymakers in the North as 'unrealistic' given the political and economic realities they face. The outcome is that multilateral institutions continue to promote policies that increase global inequality, with the justification that more economic growth will solve the poverty problem, and in some cases not enough 'real aid' is given to those how need the most.

Annex 3 :: Literature consulted

Acosta, A. (2010). El Buen Vivir en el camino del post-desarrollo: Una lectura desde la Constitución de Montecristi. *Policy Paper*, 9.

Allen, C., & Clouth, S. (2012). *A Guidebook to the Green Economy Issue 1: Green Economy, Green Growth, and Low-Carbon Development–History, Definitions and a Guide to Recent Publications*. United Nations Department of Economic and Social Affairs.

Bapna, M. & Talberth, J. (2011). *What is a green economy?* Retrieved from http://www.wri.org/blog/qa-what-green-economy-0

Bartelmus, P. (2010). Use and usefulness of sustainability economics. *Ecological Economics*, *69(11), pp. 2053-2055.*

Brundtland, G. (1987). Our common future: Report of the 1987 World Commission on Environment and Development. United Nations.

Bundeskoordination Internationalismus (2012). After the failure of the green economy: 10 these of a critique of the green economy.

CBS (2011). *Environmental accounts of the Netherlands 2011.* The Hague: Statistics Netherlands.

Centre for Alternative Technology (2010). *Zero Carbon Britain: Rethinking the Future.* Centre for Alternative Technology.

Centre for the Advancement of the Steady State Economy (n.d.). *Definition*. Retrieved from http://steadystate.org/discover/definition/ [accessed on 10th November 2013].

Confederation of British Industry (2012). *The Colour of Growth: Maximising the potential of green business.* Confederation of British Industry.

Confederation of Resources for Global Democracy (2012). *Commons: A model for managing natural resources.* Confederation of Resources for Global Democracy.

Creech, H. (2011). *SEED Symposium: The Green Economy – Accelerating the transition*. International Institute for Sustainable Development.

Creech, H., Huppé, G.A., Paas, L., Voora, V. (2012). *Social and Environmental Enterprises in the Green Economy: Supporting sustainable development and poverty eradication on the ground—Analysis of a 3-year study for policy-makers*. SEED initiative and International Institute for Sustainable Development.

Dalal-Clayton, B. (2013). *Turning green the strategic way: the role and potential of strategic environmental assessment in securing a green economy.* International Institute for Environment and Development.

Daly, H. E. (1991). *Steady-state economics: with new essays*. California: Island Press.

Daly, H. E. (1992). Allocation, distribution, and scale: towards an economics that is efficient, just, and sustainable. *Ecological Economics*, *6*(3), *pp.185-193*.

Daly, H. E. (1996). *Beyond growth: the economics of sustainable development*. Boston: Beacon Press.

DECC (2011). *The Carbon Plan 2011*. Department for Energy and Climate Change, UK Government.

DEFRA (2010). *Economic Growth and the Environment*. Department for Environment, Food and Rural Affairs, UK Government.

DEFRA (2011). *Enabling the Transition to a Green Economy: Government and business working together*. Department for Environment, Food and Rural Affairs, UK Government.

DEFRA (2010). *Government economic service review of the economics of sustainable development.* Department for Environment, Food and Rural Affairs, UK Government.

DEFRA (2011). *The natural choice: securing the value of nature*. Department for Environment, Food and Rural Affairs, UK Government.

Deutsche Nachhaltigkeitsrat (2013). *Sustainability: Made in Germany, the second review by a group of international peers.* Deutsche Nachhaltigkeitsrat.

Diefenbacher, H., Held, B., Rodenhäuser, D., & Zieschank, R. (2013). *NWI 2.0–Weiterentwicklung und Aktualisierung des Nationalen Wohlfahrtsindex.* Bundesministerium fur Umwelt, Naturschutz und Reaktorsicherheit.

Dietz, R., & O'Neill, D. W. (2013). *Enough is enough: Building a sustainable economy in a world of finite resources*. London: Routledge.

Dittrich, M., Giljum, S., Lutter, S., & Polzin, C. (2012). *Green economies around the world. Implications of resource use for development and the environment*. Sustainable Europe Research Institute.

Edenhofer, O., & Stern, N. (2009). *Towards a global green recovery: Recommendations for immediate G20 action*. Potsdam Institute for Climate Impact Research.

Elliott, L., Murphy, R., Juniper, T., Legget, J., Hines, C., Secrett, C., Lucas, C., Simms, A. & Pettifor, A. (2008). *A green new deal.* New economics foundation.

ESCAP (2010). *Financing an inclusive and green future: A supportive financial system and green growth.* United Nations Economic and Social Commission for Asia and the Pacific.

European Climate Foundation (2010). *Roadmap 2050: A practical guide to a prosperous, low-carbon Europe.* European Climate Foundation.

European Commission (2007). *Measuring progress, the true wealth, and the well-being of nations.* European Commission.

Eurpean Commission (2011). *Roadmap to a Resource Efficient Europe.* European Commission.

European Environment Agency (2013). *Towards a green economy in Europe: EU environmental policy targets and objectives 2010-2050.* European Environment Agency.

European Environmental Bureau (2012). *Work programme and budget 2012.* European Environmental Bureau.

EXIOPOL (2011) *A new environmental accounting framework using externality data and input-output for policy analysis.* EXIOPOL.

FAO (2010). *Payments for environmental services within the context of the green economy.* Food and Agriculture Organization of the United Nations.

Fay, M. (2012). *Inclusive Green Growth: The Pathway to Sustainable Development*. World Bank.

Frederick S. (2011). *Beyond Rio+ 20: governance for a green economy.* Pardee Center for the Study of the Longer-Range Future. Boston: Boston University.

Friedrich Ebert Stiftung (n.d.). *Nachhaltigkeit gestalten.* Retrieved from http://www.fes-sustainability.org/de [accessed 10th November 2013].

Fulai, S., Flomenhoft, G., Downs, T. J., Grande- Ortiz, M., Graef, D., Scholtens, B. & Hermann, S. (2011). Is the concept of a green economy a useful way of framing policy discussions and policymaking to promote sustainable development? *Natural Resources Forum, 35(1), pp. 63-72.*

GIZ (2012). *Green economy – the economy of the future.* Deutsche Gesellschaft für Internationale Zusammenarbeit.

Green for All (2011). *Amplifying the green economy.* Green for All.

Green Economy Coalition (2012). *The green economy pocketbook: the case for action.* Green Economy Coalition.

Griggs, D., Stafford-Smith, M., Gaffney, O., Rockström, J., Öhman, M. C., Shyamsundar, P. & Noble, I. (2013). Policy: Sustainable development goals for people and planet. *Nature*, *495*(7441), *pp. 305-307.*

Harvey, H. & Segafredo, L. (2011). *Policies that work: How to build a low emissions economy.* Climate Works Foundation.

Hines, C., and Lucas, C. (2008). A green new deal. *Policy Matters, 16, pp.214-218.*

Hultman, N., Eis, J. & Sierra, K. (2012). *International Actions to Support Green Growth Innovation Goals.* Global Green Growth Institute.

ILO (2012). *Working Towards Sustainable Development*. International Labour Organization.

IN-STREAM (2011). *Results and conclusion for policy makers*. Linking Sustainability Indicators with Policy Making.

International Trade Union Confederation (2012). *Growing green and decent jobs.* International Trade Union Confederation.

Jackson, A. & Dyson, B. (2012). *Modernising Money: Why Our Monetary System Is Broken and How It Can Be Fixed.* London: Positive Money.

Jackson, T. (2009). *Prosperity without growth: Economics for a finite planet*. London: Routledge.

Jackson, T., & Victor, P. (2011). Productivity and work in the 'green economy': Some theoretical reflections and empirical tests. *Environmental Innovation and Societal Transitions*, *1(1), pp.101-108.*

Jaeger, C., Paroussos, L., Mangalagiu, D., Kupers, R., Mandel, A., & Tabara, J. D. (2012). *A new growth path for Europe: Generating prosperity and jobs in the low-carbon economy.* European Climate Forum.

Kamp-Roelands, N., Balkenende, J. P. & van Ommen, P. (2012). *Towards sustainable growth business models*. Dutch Sustainable Growth Coalition.

Karbassi, L., Park, J., Kasten, T., Munang, R., Coleman, H., Putt del Pino, S., Metzger, E., Powitt, S. & Hopkins, N. (2011). *Adapting for a green economy*. United Nations Global Compact, United Nations Environment Program, Oxfam and World Resources Institute.

Lander, E. (2011). *The green economy: the wolf in sheep's clothing.* Transnational Institute.

Lawn, P., & Clarke, M. (2010). The end of economic growth? A contracting threshold hypothesis. *Ecological Economics, 69(11), pp.2213-2223.*

Lorek, S., & Spangenberg, J. H. (2014). Sustainable consumption within a sustainable economy–beyond green growth and green economies. *Journal of Cleaner Production*, *63, pp.33-44.*

Makower, J. (2013). *State of Green Business 2013*. GreenBiz Group.

Narberhaus, M., Ashford, C., Buhr, M., Hanisch, F., Sengun, K., Tunçer, B. (2011). *Effective change strategies for the Great Transition.* Smart CSOs.

Natural Capital Committee (2013). *The State of Natural Capital: Towards a framework for measurement and valuation.* Natural Capital Committee.

One Planet Network (2011). *Scenarios for a One Planet Europe*. One Planet Network.

OECD (2011). *Towards green growth*. Organisation for Economic Co-operation and Development.

Party, G. (2010). *Fair is worth fighting for: Green Party Manifesto, General Election*. Green Party, UK.

PIK & GRI-LSE (2009). *Towards a global green recovery: recommendations for immediate G20 action*. Potsdam Institute for Climate Impact Research and Grantham Research Institute on Climate Change and the Environment.

Porritt, J. (2009). *Living within our means: avoiding the ultimate recession*. London: Forum for the future.

Poverty-Environment Partnership (2012). *Building an inclusive green economy for all.* Poverty-Environment Partnership.

Raingold, A. (2011). *Greening the economy: a strategy for growth, jobs and success.* Aldersgate Group.

Schepelmann, P., Goossens, Y., & Makipaa, A. (2009). *Towards sustainable development: Alternatives to GDP for measuring progress* (No. 42). Wuppertal Spezial, Wuppertal Institut für Klima, Umwelt und Energie.

Schwarzer, J. (2013). *Industrial policy for a green economy*. International Institute for Sustainable Development.

Sekulova, F., Kallis, G., Rodríguez-Labajos, B., & Schneider, F. (2013). Degrowth: from theory to practice. *Journal of cleaner Production*, *38*, *pp. 1-6*.

Share the World's Resources (2011). *International sharing: envisioning a new economy*. Share the World's Resources.

Share the World's Resources (2012). *Financing the global sharing economy*. Share the World's Resources.

Stiglitz, J. E., Sen, A., & Fitoussi, J. P. (2010). *Report by the commission on the measurement of economic performance and social progress.* Paris: Commission on the Measurement of Economic Performance and Social Progress.

ten Brink, P., Badura, T., Bassi, S., Gantioler, S. and Kettunen, M. (2011). *Estimating the overall economic value of the benefits provided by the Natural 2000 Network.* Institute for European Environmental Policy.

Turner, G., Schandl, H., & Doss, T. (2008). *Growing the green collar economy: Skills and labour challenges in reducing our greenhouse emissions and national environmental footprint*. Dusseldrop Skills Forum.

Urhammer, E., & Røpke, I. (2013). Macroeconomic narratives in a world of crises: An analysis of stories about solving the system crisis. *Ecological Economics, 96, pp.62-70.*

UK PEAC (2012). *A Green Economy.* UK Parliament Environmental Audit Committee.

UN (2012). *The Future We Want: Outcome document adopted at the United Nations Conference on Sustainable Development (Rio +20)*. United Nations.

UN, EC, IMF, OECD & World Bank (2003). *Integrated environmental and economic accounting 2003: Handbook of national accounting.* United Nations, European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, World Bank.

UNEP (2010). *Enabling conditions: supporting the transition to a global green economy.* United Nations Environment Programme.

UNEP (2011). *Towards a green economy*. United Nations Environment Programme.

UNEP (2012). *The Business Case for the Green Economy: Sustainable Return on Investment.* United Nations Environment Programme.

UNEP-WCMC (2011). *The UK national ecosystem assessment technical report.* UNEP-WCMC.

UNU-IHDP (2012). *Green economy and sustainability: A societal transformation process. Summary for decision-makers.* UNU-IHDP.

Van den Bergh, J. C. (2009). The GDP paradox. *Journal of Economic Psychology, 30(2), pp.117-135.*

Victor, P. A., & Rosenbluth, G. (2007). Managing without growth. *Ecological Economics*, *61(2), pp.492-504.*

Vogelsang, S., Arndt-Brauer, I. & Bernschneider, F. (2012). Arbeitsbericht Projektgruppe 2: Entwicklung eines ganzheitlichen Wohlstands- bzw. Fortschrittsindikators. Enquete-Kommission Wachstum, Wohlstand, Lebensqualität des Deutschen Bundestages. Berlin: Kommissionsdrucksache.

WAVES (2012). *Moving beyond GDP: How to factor natural capital into economic decision making.* Wealth Accounting and Valuing Ecosystem Services.

Worldbank (2011). *The changing wealth of nations: Measuring sustainable development in the new millennium.* The International Bank for Reconstruction and Development / The World Bank.

WWF UK (2012). *Building green economies: Creating prosperity for people and planet.* World Wildlife Fund UK.

Yap, N. T. (2005). Towards a Circular Economy. *Greener Management International*, *2005*(50), pp.*10-24.*

Annex 4 :: Experts interviewed

Alexander Girvan: Cropper Foundation

Andreas Versmann: European Economic and Social Committee

Andrew Simms: Global Witness, NEF

António Alvarenga: Portuguese Environment Agency

Bedrich Moldan: Charles University

Blake Alcott: Independent academic

Bram Edens: Statistics Netherlands (CBS)

Carlos Carvalho - Portuguese Institute of Statistics (INE)

Claúdia Sousa: Banco Espirito Santo

Cliff Cobb: Redefining Progress

Cristina Ramos: Portuguese Institute of Statistics (INE)

Dan O'Neill: University of Leeds

David Reiner: Judge Business School, University of Cambridge

Dorothee Braun: Council for Sustainable Development, Germany

Eric Gerritsen: Ministry of Economic Affairs, Netherlands

Farooq Ullah: Stakeholder Forum

Frank Hönerbach: Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Germany

Garret Tankosic-Kelly: SEE Change Network

Gaylor Montmasson-Clair: Trade and Industrial Policy Strategies (TIPS)

Gitanjali Kumar: Development Alternatives

Gus Speth: Vermont Law School

Helmut Haberl: The Institute of Social Ecology, Klagenfurt University

Jacques Bonnin: European Commission

Jayati Ghosh: Centre for Economic Studies and Planning, School of Social Sciences, Jawaharlal Nehru University

Jörg Mayer-Ries: Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Germany

Jyrki Laitinen: Syke, Finnish Environment Institute

Klaus Jakob: Freie Universität Berlin

Lew Daly: Demos

Lili Fuhr: Heinrich Böll Stiftung

Luis Gamez: Public Utilities Company of Heredia (ESPH)

Luísa Serra: Energias de Portugal

Molly Scott Cato: University of Roehampton

Nuno Oliveira: Instituto Superior Técnico

Oliver Dudok van Heel: Aldersgate Group

Paola Migliorini: European Commission

Paul Allen: Centre for Alternative Technology

Paul Ekins: University College London

Pedro Paes: Energias de Portugal

Peter Czaga: European Commission

Peter May: Federal University of Rio de Janeiro

Peter Victor: York University

Philipp Schepelmann: Wuppertal Institute

Raimundo Soares: Instituto ORIOR

Rajesh Makwana: Share the World's Resources

Remko ter Weijden: Ministry of Infrastructure and the Environment, Netherlands

Riccarda Retsch: Council for Sustainable Development, Germany

Rob Dietz: Centre for Advancement of the Steady State Economy

Ross Gurdin: Confederation of British Industry

Ruth Potts: Bread, Print & Roses/The Green New Deal

Sjoerd Schenau: Statistics Netherlands (CBS)

Stefan Giljum: Vienna University of Economics and Business

Susana Fonseca : Quercus (National Association of Nature Conservation)

Tiago Domingos : Instituto Superior Técnico

Tim Kasser: Knox College

Tomás Ramos: Universidade Nova de Lisboa

Annex 5 :: Seminar participants

Angel Hsu: Environmental Performance Measurement Program, Yale University
António Alvarenga: Agencia Portuguesa do Ambiente
Arno Behrens: Centre for European Policy Studies
Beata Maciewska: Green Institute Foundation/Zielony Instytut
Beth Stratford: University of Roehampton
Charles Seaford: NEF
Claire Hardgrave: Department for Business, Innovation and Skills
Dan O'Neill: University of Leeds
Danielle Paffard: Centre for Alternative Technology
Emily Benson: Green Economy Coalition
Floor Brouwer: LEI Wageningen UR
Inês Cosme: CENSE: The Centre for Environmental and Sustainability Research
James Evans: Office for National Statistics
Jan Bakkes: PBL Netherlands Environmental Assessment Agency
Karen Jeffrey: NEF
Katharina Stepping: Deutsches Institut für Entwicklungspolitik
Laura Aylett: Department for Energy and Climate Change
Lucas Porsch: Ecologic Institute
Lucien Georgeson: University College London
Marco Morosini: ETH Zürich
Markku Lehtonen: University of Sussex
Martin O'Connor: Université de Versailles
Maya Göpel: Wuppertal Institut
Oliver Greenfield: Green Economy Coalition
Oliver Dudock van Heel: Aldersgate Group
Paul Allin: Imperial College
Paul Schreyer: OECD
Pedro Beca: CENSE, The Centre for Environmental and Sustainability Research
René Verburg: LEI Wageningen UR
Saamah Abdallah: NEF
Sara Davies: Department for Environment, Food and Rural Affairs
Stephen Devlin: NEF
Terri Kafyeke: Ecologic Institute
Tomasz Kozluk: OECD
Vasileios Rizos: Centre for European Policy Studies
Will McDowall: Green Economy Policy Commission

End notes

[1] European Environment Agency (2011) Europe's environment – An assessment of assessments. Copenhagen: European Environment Agency.

[2] UNEP. (n.d.) *What is GEI?* Retrieved from http://www.unep.org/greeneconomy/aboutgei/whatisgei/tabid/29784/default.aspx [accessed 18/03/2014].

[3] Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S., Lambin, E. F., & Foley, J. A. (2009). A safe operating space for humanity. *Nature, 461(7263), pp.472-475.*

[4] Daly, H. E. (1991). *Steady-state economics: with new essays*. California: Island Press.

[5] Jackson, T. (2009). *Prosperity without growth: Economics for a finite planet*. London: Routledge.

[6] Creech, H. (2011). *SEED Symposium: The Green Economy – Accelerating the transition*. International Institute for Sustainable Development.

[7] Turner, G., Schandl, H., & Doss, T. (2008). *Growing the green collar economy: Skills and labour challenges in reducing our greenhouse emissions and national environmental footprint*. Dusseldrop Skills Forum.

[8] Fay, M. (2012). *Inclusive Green Growth: The Pathway to Sustainable Development*. World Bank.

[9] Jackson, T. (2009). *Prosperity without growth: Economics for a finite planet*. London: Routledge.

[10] Easterlin, R. A., McVey, L. A., Switek, M., Sawangfa, O., & Zweig, J. S. (2010). The happiness–income paradox revisited. Proceedings of the National Academy of Sciences, 107(52), 22463-22468.

[11] Abdallah, S., Thompson, S., Michaelson, J., Marks, N. & Steuer, N. (2009) The (un)Happy Planet Index 2.0. London: The new economics foundation.

[12] Sachs, J. D., Layard, R., & Helliwell, J. F. (2012). World happiness report. The Earth Insitute-Columbia University.

[13] International Trade Union Confederation (2012). *Growing green and decent jobs.* International Trade Union Confederation.

[14] ILO (2012). *Working Towards Sustainable Development*. International Labour Organization.

[15] FAO (2010). *Payments for environmental services within the context of the green economy.* Food and Agriculture Organization of the United Nations.

[16] Creech, H. (2011). *SEED Symposium: The Green Economy – Accelerating the transition*. International Institute for Sustainable Development.

[17] Fay, M. (2012). *Inclusive Green Growth: The Pathway to Sustainable Development*. World Bank.

[18] Kamp-Roelands, N., Balkenende, J. P. & van Ommen, P. (2012). *Towards sustainable growth business models*. Dutch Sustainable Growth Coalition.