Future Development

a sustainable development briefing

Prepared for
the Nesta Trustees

2 November, 1998

How many people is the earth able to sustain?

The question is incomplete as it stands.

One must modify the question by asking further:

at what level of technology?

And modify it still further by asking:

at what level of human dignity?

Isaac Asimov
cited in *Exploring Sustainable Development*
World Business Council for Sustainable Development

1

‘Sustainable development’ is a political phrase that tries to reconcile two competing philosophies (see box).

On the one hand, it questions the optimists who define human progress in terms of economic growth. On the other, it doubts the pessimists waiting for the inevitable global environmental disaster.

Linking the two is a third dimension – the human.

The result: a different way to think about human organisation. (Or, alternatively, another mantra to be parroted as things carry on pretty much the same.)

The greatest evils that stalk our Earth are ignorance and oppression, not technology and industry.

The Heidelberg Appeal
signed by 2600 scientists including 72 Nobel Prize winners

PESSIMISTS

1989

Areas of the Prince William Sound are "irrevocably destroyed" by the 11 million gallon spill of crude oil from the Exxon Valdez.

OPTIMISTS

1992

It is "impossible to tell without resort to navigational charts where the spill occurred."

1962

Rachel Carson predicts extinction for 40 species of birds.

1996

19 species have stable populations
14 have increasing populations
7 are in decline

1992

Greenpeace issue full page ads on ozone depletion, declaring: "Normal life could be interrupted for generations. In some places it could be dangerous to go outside". Greenpeace Ozone Director Karen Lohr declares "it wouldn't be surprising, if polar bears began going blind".

1993

Researchers at the US National Oceanographic and Atmospheric Administration show that the rate of CFC build-up peaked in 1988 and predict ratios will reach a maximum before 2000 and then decline.

1968

'The battle…is over. In the 1970s hundreds of millions of people are going to starve to death.'

Paul R. Ehrlich, opening words, The Population Bomb

1968

The rate of population growth peaks at 2%. Today, the average woman in the third world bears 4 live children. In the 1960s it was 6.

The changing **agenda**

It's all happened very quickly.

In 1987, the Brundtland Report, *Our Common Future*, introduced sustainable development into the policy-making lexicon:

> Humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs.

Two years on, the Berlin Wall fell and socialism seemed bankrupt as an ideology. Fukuyama declared 'the end of history' and, as markets opened and governments shrunk (though without seeming to get smaller), the market ruled supreme. So the greens squared up to business.

"Growth for the sake of growth is the ideology of the cancer cell," wrote Edward Abbey. While, for the International Chamber of Commerce, "the withering away of the Marxist challenge leaves the environmental challenge as the most fundamental one that business [people] all over the world are going to face in the foreseeable future".

A central tension lay in our ambivalence towards the modern world. In 1962, biologist Rachel Carson played heavily on the Frankenstein myth in *A Silent Spring*, writing of "the synthetic creations of man's inventive mind, brewed in his laboratories, and having no counterparts in nature". Meanwhile, Rudolf Bahro, co-founder of the German Green Party (now in power), was saying that "people should live in socialist communities of no more than three thousand, consuming what they produce and not trading outside the community".

The green/business argument, however, proved less stable than the ideological Cold War – it was always much harder to tell whose side someone was on. Rachel Carson was herself a scientist. Another green scientist, James Lovelock, invented the *technology* that pushed Carson towards her conclusions – the electron capture detector, which he calls "the most sensitive, easily portable and inexpensive analytical device in existence… if a few litres of a rare perfluorocarbon were evaporated somewhere in Japan we could with little effort detect it in a 100 cubic foot sample of the air here in Brussels a few weeks later". The suggestion was: the clock cannot be turned back. To save the world, *more* science and *better* technology will be needed.

Business, meanwhile, reacted in unexpected ways. Some companies, with their Brent Spars, *did* miss the depth and force of public concern. Others, however, experienced private epiphanies. 3M's Vice President for Environmental Engineering, Dr Joseph Ling, for example, was asked to work out what increasing environmental legislation was likely to cost the business.

He concluded, predictably enough, that *existing* controls were an uneconomic drag on the company. Future controls, inevitably stricter, promised diminishing profit margins. At this stage, he should have recommended a greater lobbying spend and imminent job losses – the ultimate sanction on an unruly electorate. Instead, he suggested the company accelerate *beyond* regulatory demands. The '3P' campaign was born: pollution prevention pays. It works to the following formula:

> Pollution (waste materials) + Knowledge (technology) = Potential Resources

3M have used it to decrease their use of resources – and to save money.

This kind of approach – often called eco-efficiency (see box) – has clear appeal. The initial wave of dramatic cost-savings (often through energy efficiency) helped it emerge as a coherent management philosophy, linking competitiveness and environmental responsibility, with 'continuous improvement' the watchword. The World Business Council for Sustainable Development (WBCSD) lends heavyweight support, with recent work proposing Factor-4 ('twice the productivity from half the resources') and even Factor-10 targets.

A related idea, sustainable production and consumption (SP&C), was a key issue at Rio. It is an evolutionary process, embracing strategy development, innovation, consumer education and re-design. WBCSD argue SP&C should be a 'common goal' for business, consumers and governments. Edgar S Woolard Jr, Chairman of US giant DuPont, suggests the momentum is unstoppable:

> Those that aren't trying [to achieve integrated environmental performance] won't be a problem simply because they won't be around long term.

ECO-EFFICIENCY

7 elements

1. Reduce the **material** intensity of goods and services
2. Reduce the **energy intensity** of goods and services
3. Reduce **toxic** dispersion
4. Enhance material **recyclability**
5. Maximise sustainable use of **renewable** resources
6. Extend product **durability**
7. Increase the **service intensity** of goods and services

4 success factors

1. **An emphasis on customer service**

   By focusing on what services to provide, not just what products to supply, companies open up opportunities to deliver less eco-intensive, higher-value applications.

2. **An emphasis on quality of life**

   Companies' performance and success will be judged increasingly on how their products or services meet real needs, not perceived wants.

3. **A life cycle view**

   Companies will add value from their activities by monitoring and assessing their impact at every stage. A life cycle approach can lead to decisions to redesign processes and products to minimise impact, maximise efficiency and measure the value added.

4. **The eco-capacity imperative**

   Eco-efficiency's 'bottom line' is to enable business to add ever more value within the realities of the earth's carrying capacity (for example, its ability to absorb more wastes), through a continuous process of improvement, reflecting the philosophy 'we can continually do more with less'.

Two **tribes**

It was not just business that came under attack. Environmentalists were also criticised as evidence mounted that humans – particularly the poor – tend to suffer if 'nature people' get too much of their own way.

Policy in protected areas has been especially catastrophic, with entire communities forced off their land (sometimes at gunpoint) to protect the charismatic species Western charities rely on for fund-raising.

Not only morally wrong, this approach fails to even deliver conservation goals. In Kissidougou, for instance (see box), careful research contradicted the assumption that people were destroying their environment.

In fact, negative environmental impacts often *follow* environmental regulation. In South East Zimbabwe the Mahenye people were excluded from the National Park and forbidden to hunt elephant, a traditionally important resource. So they started farming – but the elephants trampled their crops. They concluded that, if the elephant could all be destroyed, the authorities would lose interest in the area and they would get their land back. 'Shadrak' became a local folk hero – heading a team of poachers and killing 20-30 large bull elephants every year for fifteen years.

In the developing world, therefore, the term 'sustainable development' reflected growing consensus between 'nature people' and 'people people'. This new harmony was given institutional approval at the Earth Summit, where Principal 1 of the Rio Declaration states: "human beings are at the centre of [our] concerns… they're entitled to a healthy and productive life in harmony with nature."

A parallel process can be seen in the developed world, where concentrating solely on the better use of resources has been dismissed as 'eco-efficiency for the rich'. In fact, this *technical* goal is some way from the *roots* of business interest which included concern about consumer pressure, both direct (consumers stop buying products) and through governments (increased regulation).

It was therefore the *marketing* functions of major corporations that promoted and instituted the first changes. Indeed, much early business work on environmental matters was dismissed as 'greenwash' or PR gloss by environmentalists.

Marketing, however, was simultaneously changing. A 1993 book from the Economist Intelligence Unit talked of 'strategic communications marketing', suggesting that marketing and communication goals would increasingly drive the modern company. Good communication helps "organisations to understand their environments, to establish objectives in relation to groups important to the achievement of strategic goals". The new-found sense of direction can then be transmitted to "their members – employees – and to external groups".

Marketing and communication professionals began appearing on boards. Businesses who had previously re-engineered their processes (basically using computers to sack people), began to re-organise to maximise human capital. The talk was of a new 'turning outwards' and becoming 'people-focused'. In other words, 'people people' were beginning to exert as much influence on business as 'nature people'.

One well-known prophet was Francis Fukuyama. Where greens had complained that market forces did not account for the value of the environment, he used *Trust: the social virtues and the creation of prosperity*, to make a similar argument for people's motivations, aspirations and

expectations. The plea is for socio-efficiency, couched in similar language to that of eco-efficiency:

> If people who have to work together in an enterprise, trust one another because they are all operating according to a common set of ethical norms, doing business costs less. Such a society will be better able to innovate organisationally, since the high degree of trust will permit a wide variety of social relationships to emerge.

With recent formulations of sustainable development, these ideas begin to coalesce. John Elkington, in his book *Cannibals with Forks*[1], uses the term Triple Bottom Line (TBL) to describe the synthesis:

> The sustainability agenda, long understood as an attempt to harmonise the traditional financial bottom line with emergent thinking about the environmental bottom line, is turning out to be much more complicated than some early business enthusiasts imagined. Increasingly, we think in terms of a 'triple bottom line', focusing on economic prosperity, environmental quality and – the element which business has tended to overlook – social justice.

Elkington sees the TBL as evidence of moves towards "sustainable capitalism, with its emphasis on the triple bottom line performance of companies, industries, and economies", arguing that:

> To refuse the challenge implied by the triple bottom line is to risk extinction. Nor are these simply issues for major transnational corporations: they will increasingly be forced to pass the pressure on down their supply chains, to smaller suppliers and contractors. These changes flow from a profound reshaping of society's expectations and, as a result, of the local and global markets business serves.

Elkington believes that the sustainability agenda will change the way organisations are run, and overlap with renewed interest in corporate governance to provide a focus for the work of high performance boards. He thinks organisations will become more open, inclusive and transparent. Boards, in his opinion, will work to different time-scales – both wider (i.e. with a clear idea of what is going on now) and longer (making decisions with an eye on the future). The result: "The creation of organisations that genuinely learn and evolve at a competitive pace."

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[1] The title derives from a question put by the Polish poet Stanislaw Lec: "Is it progress if a cannibal uses a fork?"

Getting it wrong

Since our ancestors' time we have worked this land, and here you see trees. There the land has not been worked. No trees.

Layebe Mansare, Toly village elder, Guinea, West Africa, *Forest Islands of Kissidougou*

For a hundred years, colonial administrators, local governments and others thought they had a handle on the front line between scrubby grasslands – savanna – in West Africa and the remaining forest. "It's an ecologically fragile area," they said. "There's a deforestation crisis," they agreed. Scenes of burning trees were described as "wanton destruction".

DFID funded two British researchers, Melissa Leach and James Fairhead, to look at local views on 'the problem'. First they talked to elderly villagers about their memories of the local area. Then they dug out aerial photos from the 1950s and colonial records from the last century.

Piece by piece they built up a jigsaw of new information. Forests grow in 'islands' around the local villages of North Guinea *because of people*. Clearing savanna land for agriculture and homes *encouraged* tree growth.

Up to ten years the trees come…so new land has become old. Water has entered, the hoe has softened it. It has softened and become like old land.

Layebe Mansare

When people create new villages, forests follow. When villages are abandoned, Nature ensures the savanna quickly creeps back. The farmers in the Kissidougou region use techniques which date back centuries – and include burning trees to clear and enrich farmland. Forests *increase* as a result of these activities.

For thousands of years, people and the environment have found ways to work together. In this part of West Africa humans can be seen nurturing the environment – and *improving* it.

Source: *uk@earth.people: poverty & the environment,*(1997) Department for International Development (DFID)

Reality **check**

Many greens are currently quite excited about sustainable development (see box), proclaiming (in Victor Hugo's words) that "you can resist an invading army; you cannot resist an idea whose time is come".

They point to high-profile successes like Shell, traumatised by Brent Spar, who has now adopted significant parts of the sustainable development agenda. In *Profits and Principles - does there have to be a choice?*, the company uses 'triple bottom line' thinking to produce a 'road map' identifying stages at which reporting, standards and engagement will be achieved in the next few years. Many believe that if a conglomerate of Shell's size – Royal Dutch Shell alone accounts for 40% of Dutch market capitalisation – has realised the need for change, others will follow.

A more realistic assessment is that progress is likely to be patchy and inconsistent. For a start, interest in green ideas seems to peak and trough. So despite BSE and heightened concern about genetic engineering, we appear to be heading into a green 'recession'. Progress towards recycling targets, for example, has flattened out and, post-Kyoto, there is little sense of environmental urgency – yet.

As well as interest in green ideas, sustainable development also relies on a degree of social optimism. This, for the moment, *is* present in the UK. The Blair government, semi-articulated notions of a third-way and a (still) buoyant economy provide fertile ground for a 'things can (only) get better' philosophy.

The world economy looms currently seems to be deteriorating, however. Global and then local economic pain could quickly expose as quaint innocence Richard Koch's idea, in *The Third Revolution*, that such new forms of development "can unite and give moral purpose to developed societies and, within the next century, banish war, hunger and oppression from the face of the earth".

A further danger is that sustainable development will prove to be a nice *idea*, but one which in *practice* means little. Organisations may simply be acquiring more jargon for staff to learn – leaving them, as John Micklethwait and Adrian Wooldridge note in *The Witch Doctors (what the management gurus are saying, why it matters and how to make sense of it)*, "rather like Soviet bureaucrats, living in a dual world – the real world and the world of the officially sanctioned ideology".

A common response to such concerns has been to search for more *rigour*. Civil servants spend years defining sustainability. They start with something like this, from Herman Daly of the World Bank:

> A sustainable society needs to meet three conditions: its rates of use of renewable resources should not exceed their rates of regeneration; its rates of use of non-renewable resources should not exceed the rate at which sustainable renewable substitutes are developed; and its rates of pollution emission should not exceed the assimilative capacity of the environment.

and work towards something more complex (accurate, scientific defensible etc.).

Applying this kind of 'rigour' can make things worse. John Elkington puts Recombinant BST (a genetically-engineered hormone used to increase a cow's milk production) through what he grandly describes as a "beta version of the need test", as developed by SustainAbility (his consultancy) and Dow Europe. The conclusion, for all the method, is staggeringly banal:

> In a world where cows and other farm animals are increasingly turned into machines, BST would be a sure-fire winner. In a sustainable world, hopefully based on the humane treatment of animals, the prospects seem less certain.

The coda descends into bathos, noting that "things might be somewhat different if the biotech industry came up with a version which could be ingested rather than injected". In other words, according to the 'needs test', BST may or may not be sustainable – but the juxtaposition of needles and large mammals should be avoided.

It is interesting to compare the fate of sustainable development indicators, which many, such as the current government, hope will "keep track of progress, and [report it] in a way that is clear, comprehensive and useful to a wide audience". Unfortunately, the process of devising these indicators is almost always expert-driven. There is, note Michael Jacobs (now of Fabian Society) and Phil MacNaghten (of the Centre for the Study of Environmental Change) a battle between:

> 'Cold' indicators, which serve the managerial purposes of technical accuracy, and 'hot' ones, which (though in some cases barely 'measuring' anything specific at all) are resonant with the public, striking an emotive chord of recognition and concern.

"The ideal indicator," they conclude, "is 'warm', being both accurate and resonant."

CERES (aka Valdez) principles (1989)

protection of the biosphere · sustainable use of natural resources · reduction & disposal of wastes · energy conservation · risk reduction · safe products & services · environmental restoration · informing the public · management commitment · audits and reports

Agenda 21 priority actions (1992)

revitalising growth with sustainability · sustainable living · human settlements · efficient resource use · global & regional resources · managing chemicals & wastes · people's participation & responsibility

Bellagio principles (1996)

guiding vision & goals · holistic perspective · essential elements · adequate scope · practical focus · openness · effective communication · broad participation · ongoing assessment · institutional capacity

Core **values**

So what might a 'warm' outline of sustainable development look like?

Firstly, as with indicators, it is essential to realise there is no 'right' answer. Expert efforts to discover a set of indicators that precisely measure the world's environment have been, and will continue to be, failures. As A.J. McMichael points out in *Planetary Overload*: "Scientists and policy-makers are going to have to learn to live with more uncertainty than in the past. This point about uncertainty needs emphasis. Since it is not yet possible to make specific predictions and to forecast actual outcomes, scientists must deal with a range of plausible scenarios."

A similar fate will befall architects of the ultimate theory of sustainable development. What is needed is for organisations (whether company, public sector body, town or city, or even society) to develop an individual scenario of the future – one that:

→ is bespoke, answering *its* needs and solving *its* problems

→ provides difficult, but exciting, *challenges*

→ has agreed, and immediate, *practical* implications

→ *synthesises* economic, environmental and social goals

→ can be *explained* in a way that motivates both insiders and outsiders

The first two points cover what sustainable development should mean to each organisation. It involves, by its nature, changing *core values* – and these can never be found on a shelf. As James Collins and Jeremy Porras note in *Built To Last,* the world's most resilient companies all seem to have strong value systems. It doesn't seem so important what these values are, they argue: "It is not the content of the company's ideology, but how deeply it believes its ideology and how consistently it lives, breathes and expresses it in all it does."

Bob Shapiro, CEO of Monsanto, gives a real sense of this challenge: "The focus around sustainable development became obvious. I should have been able to come up with that in about 15 minutes. But it took a group of very good people quite a while to think it through, to determine what was real and what was just puff, and to convince themselves that this wasn't a fluffy issue – and that we ought to be engaged with it."

Sometimes, however, the spark is more individual and quirky. B&Q's environmental journey is said to have begun when a director was unable to provide a 'satisfactory' answer to his ten-year old daughter's query: "What are *you* doing about the environment?"

The dangers of adopting someone else's vision are particularly acute for the public sector. Almost all the vigorous thinking about sustainable development has either been done by business or far away in the developing world. And as the authors of *The Witch Doctors* note, the public sector has wasted vast sums of money in failed attempts to get good management ideas across the private/public divide.[2]

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[2] They cite the report that led to the sacking of Derek Lewis (ex-M&S and Granada) from the Prison Service: "any organisation which boasts one Statement of Purpose, one Vision, five Values, six Goals, seven Strategic Priorities and eight Key Performance Indicators, without any clear correlation between them, is producing a recipe for confusion."

The importance of 'producing difficult but exciting challenges' can be seen by returning to the work of Joseph Ling at 3M. By suggesting the company might not survive in its present form, he threw down a gauntlet to a company convinced it can invent its way round *any* problem. Indeed, it could be suggested that the success of the whole eco-efficiency movement lay in providing managers – convinced that no obstacle can beat them – with a new mountain to climb.

The Triple Bottom Line, Elkington's call for a dynamic synthesis of the economic, environmental and social, has already been discussed. One further point is worth developing, however. While many have concentrated on the difficulties private sector organisations face meeting *social* and *environmental* challenges, few have noted that the public sector has equal (and perhaps greater) difficulties meeting the *economic* challenge.

Government, after all, consumes over 40% of wealth in most societies. There are few people arguing it makes good 'returns' on this money. Some suggest that sustainability, in avoiding waste and demanding lean systems, is *the* management philosophy for the 21st century. Yet Government systems – many designed in the 19th century – appear to be in wilful *opposition* to the idea, acting more like a 'value destroyer' than a business 'adding value'.

Any serious sustainable vision must, by definition, be a long-term project – but this should not stop practical results being immediately demonstrable. B&Q, for instance, launched into an extraordinary – and totally unpredicted – revolution of its timber retail business. Such was the speed of its action that it had to employ consultants to explain the new world to its suppliers – and quickly found itself far in advance of most NGO work in the field.

Core values, once adopted, need explaining. And while we British can explain with great inventiveness why a yoghurt will change your life, when serious topics are breached we descend into what Aldous Huxley called "alchemy in reverse…the verbal equivalents of tripe and hogwash". Take, for example, the reaction of a River Path panel to the recent DETR sustainable development consultation leaflet. Although one member found it "easy to read", the others were all negative, calling it "patronising at times", comparing it to the "script for a very condescending video advert" or succinctly dismissing it as "creepy".

It is not just the language that is at fault, however. Phil Macnaghten and Michael Jacobs ran focus groups on sustainable development. Only two people (from eight groups) had even *heard* of the term sustainability and most dismissed it as a piece of abstract jargon when it was introduced by the moderator. However:

> Many of the participants guessed accurately the broad meaning of the term (about keeping things going for the future) and its significance for contemporary society. While the younger and better off groups were more likely to discuss sustainability in global terms, the majority of groups understood and identified with the principle of a 'shared world' and the need to respect environmental 'limits'.

The more serious problem lies with high levels of public cynicism about politics and a declining faith in their institutions. To *convincingly* adopt a sustainable agenda, therefore, a public sector body needs to go to some lengths to show that it is *different*, that it is creating a new type of institutional model. It will need to bring to all parts of its operation a level of efficiency, integrity and creativity well beyond what the disillusioned public currently expects.

2

The sustainable development agenda offers NESTA a number of challenges.

If accepted, these must be met head-on, otherwise ethical policies will again be seen as an easy way out. As a public sector organisation, NESTA will need to pay particular attention to *economic* sustainability.

A simple but powerful interpretation of sustainability should be developed. From this, practical effects on the organisation, its funding policy, “supply chain” and communication policy must begin to flow.

As a bonus, a partial solution to the problem of the lone inventor may present itself.

Four **square**

Before considering what sustainability *means*, NESTA needs to consider its *ends*: just who is NESTA going to be sustainable for?

NESTA clearly has a whole range of stakeholders. Four groups are particularly important.

The original investors – who will have bought about a billion lottery tickets to make the endowment. To date, no lottery beneficiary group has displayed enough interest in ticket buyers – and plenty of bad publicity has resulted. A sustainable development agenda needs to be instituted *and explained* in ways that appeal to the broad range of people who buy lottery tickets.

Creating wide appeal is likely to result in problems with the second group, its clients – people who succeed in getting grants and (the majority) people who don't. Lots of people with scores to settle. Any approach that is too demotic will undoubtedly result in artists (with access to the letters page of The Times) denouncing NESTA as philistine, and scientists (similarly well-connected) describing the organisation as stupid.

The sustainable development agenda must therefore have operational meaning, in professional terms, to these people. It should promise them that (a) it helps NESTA operate more effectively and (b) is an approach that will improve the overall health of science, technology and the arts – regardless of whether they get grants or not.

A third group are the Patrons, who may make "gifts of assistance, money, intellectual and other property". Such investments are made when a return is offered. If NESTA is to grow its fund in this way, it will need to develop a sense of momentum. It will also need to convey, as the National Trust does, that patronage will help make a long-term difference. Sustainability can help underpin this promise – doing something now for the future. (Or as Bertrand Russell put it: "the purpose of life is to plant trees under whose shade you will not sit.")

Partner organisations are the fourth group to be factored in – and can significantly affect progress with the other three. NESTA emphasises a partnership approach: "we will also work in close partnership with other bodies (with objectives complementary to our own) on projects aimed at identifying and nurturing the careers of talented individuals."

Itself a partnership of both words and concepts, 'sustainable development' is inevitably big on partnerships. A major problem is that it always seems easier to link up with the like-minded. However, NESTA should try to follow Elkington's prescription – seek out and work with organisations with quite different ways of working – rather than simply find partners who duplicate your own areas of weakness. Such diversity led to Shell's links with NGOs – hailed as a significant breakthrough.

Public sector organisations have historically been more attuned to social concerns. With a broadly environmental agenda as a bridge, the clear implication is that genuinely diverse partnerships will be with business. NESTA is hoping to "increase its earnings through equity deals, royalties, share options, contractual payments and so on, whenever possible". NESTA's sustainable agenda therefore needs to be sufficiently hard-edged to do business with.

With so many different interests to satisfy, NESTA might consider developing a small number of core principles. These would emerge from, and be consistent with, the sustainable development agenda – rather than using the whole term as an umbrella. Their aim would be to help define the character of NESTA's purpose, actions and relationships.

Any such principles need to be developed over time. They should also emerge from *within* the organisation, rather than being imposed from outside: a bespoke set, answering NESTA's needs and solving NESTA's problems. To justify the name, principles should robustly reflect general truths that are fundamentally satisfying.

The following four principles, which emerge from the (vast) sustainable development literature, are offered as a starting point. (Each principle also opposes one element of classic media criticism of grant-givers.)

Useful. NESTA is fundamentally a social fund, "helping persons to turn inventions or ideas in the fields of science, technology and the arts into products and services which can be properly exploited". A citizenship ideal and the concept of investing for social goods should be at the forefront.

Avoiding waste. As noted earlier, government organisations have a reputation for inefficiently using resources. NESTA is intended to be a lean machine. Successfully developing this theme could be very important in helping to 'brand' the organisation. This principle provides a space for uniting economic and environmental principles.

Built to last. NESTA should stress that it is investing money (i.e. for the long term), rather than giving it away (i.e. activities that stop once the grant is used up). It will often be spending in areas where lack of viable structures mean that activity is currently not sustainable – i.e. British film, so long bedevilled by lack of proper distribution mechanisms, or science, where public suspicion acts a continual drag. Again, economic sustainability will come to the forefront.

Forward looking. The core of NESTA's work is the support of the individual – specifically helping individuals "demonstrate their exceptional talent or promise". Sustainability *can* seem a flattening agenda – with its emphasis on equity, saving resources, avoiding harm and so on. A focus on the future is about positive choices. As Jean-Marie Dru puts it in his book *Disruption*:

> After we have restructured, reengineered and rediscovered the importance of the client, what's left? What enables something to happen? What's left is what makes a real difference: creativity. Creativity is a tool for change.

Pro **forma**

A philosophy based on sustainability means working to develop the "agreed, and immediate, *practical* implications" discussed earlier. We therefore discuss four *general* areas, each of which in part informs the others, and concentrate on the *structures* that NESTA is creating, rather than the *actions* it will take once operational.

1. Funding policy: problems are character-building

   NESTA's main function is grant-making – an area with great potential for inefficiency and wasted resources. Grants inevitably distort the market. They create enterprises where there were none previously and encourage applicants to switch endeavours to whichever area is currently attractive to funders. They also involve people in huge amounts of work preparing applications. Because most people don't receive funding, much of this work is unproductive.

   NESTA therefore needs application procedures that are innovative and demonstrably efficient (or, at least, less inefficient than the norm). The consistent theme should be: lean.

   Some ideas include:

   → Screening techniques: such as the use of nominations or initial, quick applications – with only the successful being required to do further work.

   → Using existing work if possible: funding systems can create 'application form artists'. Basing decisions on real-world work cuts down on applicant's work – i.e. accepting slides of artwork rather than long screeds about the artworks' value; taking an existing business plan, rather than requiring the completion of a NESTA-specific document.

   → Engaging applicants in work that will have some residual use – even if the application falls down. Requiring the submission of business plans is a clear example.

   → Setting clear boundaries and defending them rigorously. Fielding endless enquiries diverts money from funding – a policy of not discussing applications (and especially refusals), clearly stated *and* explained, will gain respect.

2. Organisational efficiency: indicators that make sense

   Setting challenging goals for organisational efficiency is a path that NESTA has already embarked upon: projecting a staffing of no more than 30.

   Indicators are an effective and well-attested way to demonstrate how efficiency goals are being met. These might cover:

   → Internal performance (e.g. applications handled per person)

   → Responsiveness of grant process (e.g. time to turn around)

   → Efficient use of money (e.g. percentage going in grants)

   → Effectiveness of money (e.g. return on investments, likely multipliers etc.)

   Good indicators are clear, easy to understand and easy to measure. They should also be *representative*: organisations don't measure how quickly they answer phones because that's

the most important thing in its operation, but because it indicates a general attitude towards the outside world. Time and creativity will be needed to identify and design indicators.

3. Supply chain: extending influence

   NESTA has the opportunity to make a difference down its supply chain.

   Ensuring the *economic sustainability* of any work it funds should be a particular focus. NESTA also needs to look at the bigger picture, rather than become too preoccupied with the product. Peter Drucker made this leap in his seminal work on General Motors which influenced the Japanese to overturn the rules of car-making. He was more interested in the *structures* that GM had created, than the internal combustion engine. Similarly, in his more recent work on the public sector, he concentrates on the hospitals in which people are cured (or not), rather than the arrival of the latest wonder medicine.

4. Communications policy: new ways to talk

   On its website, NESTA has already shown some willingness to develop a new kind of tone in its communications – engaging ("please bear with us"), straightforward ("it will be some while") and open ("we have to wait for the money to come through"). As the patchy progress of sustainable development has shown, *consistent* commitment to effective, honest and genuine communication (without descending into skin-deep creepiness about "customers") is an organisational action, not an add-on.

   The consistent theme here should be *transparency* – providing information, not its appearance – which talks to, rather than talks down. Such an approach will also go some way towards untangling the nest of problems attached to the consistently poor way sustainable development is communicated outside an enclave of professional activists, policymakers and managers.

   One key theme is the growing convergence between the Information Society and Sustainable Development. Information technology encourages a certain amount of *dematerialisation*[3]. Or in straightforward language, activities previously carried out in the real world – from law and medicine to form-filling and commerce – are being transferred into cyberspace. The economist Danny Quah has called this "the growing weightlessness of GNP".

   NESTA – lying at the nexus of science, technology and arts – clearly has the potential to lead with its web site. It can act as a repository for large amounts of information – which does not have to be expensively printed – as well as a directory of further resources accessible at the click of a button. Style is always pleasing, but resources will need to be concentrated on (regularly enriched and updated) content if the site is to become a 'first port of call'.

   The electronic age also offers the possibility to develop imaginative, sophisticated and resource-efficient processes. For example, the courier firm DHL gained great efficiencies – and customer buy-in – when it developed electronic systems to track parcels. Something similar, instituted for grant applications, would immediately convey all four of the principles outlined above: usefulness, avoiding waste, built to last (the investment required indicates this) and forward-looking.

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[3] A term suggesting that "the main axis of economic value is shifting towards the increased valorisation of weightless configurations of bits as distinct from, and contrasted to, configurations of material atoms".

Inventing **the future**

One part of NESTA's remit that needs special attention is helping people turn inventions into products and services. NESTA will need to work hard to make this fit a sustainable agenda.

There are dangers. The Prince of Wales Business Leaders' Forum was left defending its affiliate, the Czech Business Leaders' Forum, for giving an award to the manufacturers of… Semtex:

> The reason for the prize is purely environmental. The company has demonstrated it has made excellent environmental progress. They have completely cleaned up their act. What its products are used for and where they go does not form part of the Forum's remit.

There are also great opportunities. For a start, there is the glamorous character of the entrepreneur. ("Such people are not content to let the status quo be the way forward. They itch to make a difference. We should encourage them.") Then there is the sheer number of inventions that start in Britain – more than 50% of successful inventions since the war, according to *Inventors World*. Finally, there is the real – and genuinely exciting – possibility that innovation can help 'ride to the rescue' by actually delivering on sustainable development goals.

That being so, there is currently surprisingly little evidence of consistent attempts to tie 'green' and 'innovation' issues together. According to Peter Knight, writing in *Tomorrow* magazine, "the market is ill-defined, driven almost entirely by regulation".

Britain's Centre for Alternative Technology, for instance, seldom sees ideas that have a chance of making it to the market – and instead invests its energies in reviving traditional techniques and giving them a new relevance for the modern world. When it does hear of viable ideas, it usually passes them on to innovation counsellors with "no real interest" in sustainable ideas.

There are *some* relevant awards. Two of the most interesting come from the UN's Environment Program (UNEP). The Global 500 Awards, originally a five-year programme (starting in 1987) to honour 100 laureates a year for "services to the globe" – but extended due to its success. UNEP's Sasakawa Environmental Prize has been running even longer, since 1976, and is described as "one of the most prestigious environmental awards in the world". It is aimed at "individuals who have made an outstanding global contribution to the management and protection of the environment".

An especially interesting approach, the US Federal Department of Energy's 'Inventions and Innovations Program', has its origins in the oil crisis. It offers money on two levels: up to $40k and up to $100k. Out of the inventions given assistance to date, 25% reached the market place. Greenpeace also had remarkable success with its drive to get an eco-friendly fridge to the marketplace (see Greenfreeze box).

But these are relatively isolated cases – suggesting a new approach is needed. In *Driving Eco-Innovation*, Claude Fussler is scathing about the stone-age efficiency of most modern products – cars which lose 20% of their energy cooling water, 35% in exhaust – and are left with only 2% for their main purpose: 'person mobility'. "This is an example of technology lethargy," he writes. "Average fuel efficiency is stuck, and stuck on very low."

Fussler predicts we are about to enter an era of startling advances – which will come from a new approach to the *design* stage – where at least 80% of a product's economic *and*

environmental costs are thought to be decided.[4] Already, the world market in pollution control technologies and other environmental goods and services is 2% of global gross domestic product. While in Germany, a recent study suggested close to 1 million jobs are supported by environmental spending. Meanwhile, the production of highly efficient compact fluorescent light bulbs has increased eightfold in the last nine years – a reduction in electricity demand equivalent to 43 nuclear power stations.

William McDonagh, based at the University of Virginia and described as "the mastermind of sustainable design" by Al Gore, emphasises that usefulness must come first – and sustainability follow. We need better packaging, certainly, but not necessarily smaller packaging:

> Have you ever noticed how medical supplies are packaged? The packages are 10 times the size of what's inside. But if you're in the emergency room, do you want a nurse fumbling around with a tiny package that is efficiently designed? No! You want her to rip it open, grab what's inside and help you. Fine. But let's design the package without heavy metals and PVCs.

MacDonough has developed (and trademarked) a number of concepts such as Cradle-to-Cradle: "a lifecycle assessment process used… in designing all products. At the end of a product's useful life, its materials become food for other systems." Fussler, a Vice President at Dow Jones, also advocates a lifecycle approach. This is described as "an environmental improvement process that takes us outside our factory fence, our home and our business to look at the driving forces behind the products and services that society uses." It suggests asking six questions:

1. What upstream operations (extraction, culture, separation etc.) are necessary to provide raw materials to the first major manufacturing unit?

2. What manufacturing steps are needed before the product is ready for shipment?

3. Which downstream operations lie between the company's operation and the end-user?

4. Which function does the final product perform while it lasts with the consumer?

5. What are the revalorization (re-manufacturing, reuse, recycling etc.) options that can be considered at the end of the product's service life?

6. What are the disposal options of the ultimate waste streams?

NESTA's intervention will start early in the invention process. To be successful, it will need to ask 'lifecycle' questions at the beginning of the process – and continue to follow them through the long process of development. It will need to become adept at using its original investment to influence later market development.

Such long-term commitment is vital according to the US National Science and Technology Council. They conclude that the sustainable development landscape "cannot be understood, navigated, or managed effectively with short-sighted polices. The long view is absolutely necessary because technologies can take years or decades to travel from the initial idea to commercially viable products."

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[4] Yet UK design culture – from higher education to specialist magazines – shows almost no engagement with sustainability issues, instead concentrating on function and image. As another area straddling science, technology and art, it would seem ripe territory for a sustainable NESTA to influence.

Greenfreeze timeline

That's ridiculous. If that worked everyone would have already done it years ago.

Colleagues reaction to Dr Harry Rosin,
inventor of the first greenfreeze fridge in Germany

According to Greenpeace, greenfreeze "offers the hope that environmental groups will be able to unlock the scientific, technical and human potential for environmental solutions.. saving the environment requires practical action: solution not compromises". It's a rare – but striking – example of sustainability and invention reaching the market.

1990: 2 German scientists at the Dortmund Institute of Hygiene experiment with alternative refrigerants based on butane and propane mixing – a process used widely before CFCs came along in the 1930s. Dortmund city fathers stop the research on the grounds that the institute is "for public health" not fridge design.

1992: Greenpeace Germany undertake a joint test project with the Dortmund 2 and begin a collaborative project with an East German manufacturer. (Meanwhile Greenpeace UK launch a hydrocarbon fridge.) 50,000 advance orders are received by the end of the year. This helps privatisation and contributes to saving 540 jobs.

1993: UK government interest, initially cool, becomes warmer. The greenfreeze is awarded Germany's coveted Blue Angel eco-label. Annual production is set at 300,000. Greenpeace play a key role linking Japanese, Chinese, Swiss, Indian and Australian industrialists and policymakers to German manufacturers. By now, 5 brands of greenfreeze are on offer to Dutch consumers. As manufacturers wake up to the potential Greenpeace finds it has moved, in less than 18 months, from campaigning *against* some of the world's largest manufacturers – to campaigning *with* them. UK industry remains wary, resenting being "rushed through". However, claims that greenfreeze is energy inefficient are dramatically undermined by new Electricity Association research: 2 German models show 39% and 55% more energy efficiency than 2 Hotpoint Models.

1994: Bosch announce conversion of 90% of their manufacturing to greenfreeze within 12 months. Other German manufacturers follow. Hotpoint in the UK is still "only beginning to evaluate hydrocarbon technology" – and Greenpeace reveal that Electrolux are manufacturing and selling greenfreeze fridges (by mail order under the name *Priveleg* in Australia) but have "kept it a secret". Roll-out of Greenpeace fridge promotions at exhibitions in Mexico, Brazil and Argentina. Electrolux finally go public on their conversion to greenfreeze. Danish and Swiss manufacturers soon follow. Greenpeace help broker relationships between Indian and European officials and industrialists.

More than 50% of European, and 15% of global, fridge production is now using the new technology.

1995: First Chinese greenfreeze due to roll off the production line.

2000: Greenfreeze fridges slated to be used at the Sydney Olympics.

Eco **filter**

In concentrating funding on sustainable inventions, NESTA can engineer economic 'virtuous circles' – but it will also be keen to use sustainable criteria to stop its systems being overwhelmed by an avalanche of applicants.

There are believed to be around 50,000 lone inventors active in the UK at any one time – with many of them fixated on a single product (the serial inventor is, it seems, a very rare figure). Many – perhaps most – of these are likely to consider applying to NESTA once it begins to release money. As the director of one of the UK's Innovation Centres commented "support for the lone inventor can become more like social work than anything else".

Sustainable criteria could be limiting on three levels:

1. *Ruling out unsustainable inventions*

   Most broadly, a brief lifecycle analysis could be used to exclude clearly unsustainable products. Inventors could be asked to provide evidence that they had thought carefully about sustainable goals in the design of their product. A more detailed lifecycle analysis could be commissioned for those inventions thought likely to get funding – and a sustainability index used as one factor in making the final funding decision.

2. *Funding certain types of sustainable development*

   In order to be more prescriptive, NESTA could decide to fund only certain types of invention. These would fall within the sustainable criteria, but would not need to cover the whole area. The choice of criteria would clearly be subjective – covering areas, which the trustees had decided, offered especially fertile possibilities. The US Department of Energy offers a model for this type of approach (see box), though NESTA would be expected to shift its criteria over the years as circumstances changed.

   This approach would have the advantage of actually discouraging replies – the inventor of a new type of bottle opener might try to make a case that his invention was sustainable, but would be less likely to try to argue that it made a significant contribution to the UK's water efficiency.

   Clearly ineligible applications could be quickly weeded out without assessment.

3. *<u>Only</u> funding the development of an invention that meets one clearly-defined need*

   Perhaps the best-known example of this approach is the prize (of over a million pounds in today's currency) offered by the British Parliament for anyone who could offer a "practical and useful" means of determining longitude. The prize was offered in response to a constant series of shipping accidents caused by captains' inability to accurately compute their position.[5]

[5] Perhaps the most dramatic such failure, recounted in Dava Sobel's *Longitude*, occurred when Admiral Sir Clowdisley Shovell lost a thousand men foundering four ships off the Isle of Scilly. Shovell, who had just had a man hanged for suggesting disaster was imminent, was one of only two survivors. While lying on the beach, he was murdered by a local woman for his emerald ring.

If NESTA's trustees could agree on *one* potential invention that would dramatically change the sustainable development agenda, it would cut administration costs *and* attract enormous public interest and excitement.

Lunatic suggestions would certainly arrive (one to the longitude problem was to measure the yelps of a wounded dog), but clear criteria could be issued to rule them out. The Longitude Act offered £20,000 for a method to determine longitude to an accuracy of half a degree of a great circle; £15,000 for a method accurate to within two-thirds of a degree and £10,000 for a method accurate to within one degree. It also made development grants for inventors with promising ideas, but insufficient resources.

The English clockmaker John Harrison ultimately took the prize after "his followers shepherded [his] intricate, exquisite invention through the design modifications that enabled it to be mass produced and enjoy wide use". Not that the money was given up easily. The Astronomer Royal seems to have sabotaged testing of his clock and it was "an aged, exhausted Harrison, taken under the wing of King George III, [who] ultimately claimed his rightful monetary reward in 1773 – after forty struggling years of political intrigue, international warfare, academic backbiting, scientific revolution, and economic upheaval".

NESTA, with a forward-looking ethic based in ideas of sustainability, could presumably be counted upon to behave somewhat better.

The US Department of Energy's Inventions and Innovations Program

Established in 1972 after the oil crisis, and enacted into law by a Congress concerned to "bring to the fore ideas that might help solve the ensuing energy crisis," the program offers awards of $40,000 for conceptual development and $100,000 for more material propositions. The process is staged, with technical examinations undertaken by the Department of Commerce *National Institute of Standards and Technology*. Applications currently run at about 500 annually.

All ideas are first vetted against practicality to exclude perpetual motion (or similar) schemes. This reduces the field by an average 50%. The remainder go on to two consultants – at $8,000 per application – who make separate and independent reports. If *both* consultants like the proposal (around 2% of the total) a third consultant carries out a more thorough examination – an expensive option considered only when DoE is "close to certain" it wants to make the grant.

At first, the process was very open, with ideas submitted for consideration at any time. According to David Crouch, the current program manager, "We'd get 25 recommendations every year. If they were rejected they were told why and they could come back with an appeal". This soon created backlogs, with good applications not getting serious consideration for several years.

On the positive side, even when an applicant did not get money directly from the DoE, the consultants' reports on their invention was often used to establish the credibility of the idea for *other* potential investors (or in court during patent litigation). So several projects may have come to fruition outside the program structure – however, this has not been consistently tracked.

David Crouch shares the views of several UK consultants in the field that inventors "are not always as commercially bright as their ideas". To respond to these needs, the DoE brought in the Mohawk consultancy from Maryland to run 'commercialisation workshops' for successful applicants. Workshops offer a training program and the chance to meet people with experience in the same (or similar) specific field as the inventors. The hope is that, in discussing their insights, inexperienced inventors acquire a more realistic grasp of what lies ahead of them. It may also convince some that commercial collaboration is the most practical way forward.

This year saw a major change in the structure and format of the awards. Now there is a definite deadline once a year – with Award announcements made by the end of October.

Results to date are impressive. 25% of award winners make it into commercial production. it is estimated that the scheme has saved the United States some 6 -8 quadrillion (10^{15}) btus, and led to an estimated $6-700 million in sales. The costs though are hefty: the DoE pays out between $1.8 and $2 million to carry out the screening process, and a series of tests as applications advance that cost $8,000 a report.

Sources: Program website and personal interview with David Crouch

Some **resources**

A Moment on Earth – The Coming Age of Environmental Optimism, Gregg Easterbrook, Penguin, 1996

Cannibals With Forks – The triple bottom line of 21st century business, John Elkington, Capstone, 1997

Corporate Citizenship – Successful strategies for responsible companies, Malcolm McIntosh, Deborah Leipziger, Keith Jones, Gill Coleman, Financial Times Professional Ltd., 1998

Driving Eco Innovation – A breakthrough discipline for innovation and sustainability, Claude Fussler with Peter James, Pitman, 1996

Exploring Sustainable Development – WBCSD Global Scenarios 2000-2050, WBCSD 1998

Longitude – The true story of a lone genius who solved the greatest scientific problem of his time, Dava Sobel, Foruth Estate, 1996

Planetary Overload – Global Environmental Change and the Health of the Human Species, A.J. McMichael, Cambridge University Press, 1993

Public identification with sustainable development – Investigating cultural barriers to participation, Global Environment Change, vol 7, No 1, pp 5-24, 1997

Strategic Communications Management, Jon White, Laura Mazur, The Economist Intelligence Unit, 1995

The Death of Distance – How the communications revolution will change our lives, Frances Cairncross, Orion Business Books, 1997

The Third Revolution, Richard Koch, Capstone, 1998

The Witch Doctors – What the management gurus are saying, why it matters and how to make sense of it, John Micklethwait, Adrian Wooldrige, William Heinemmann, 1996

Trust – The social virtues and the creation of prosperity, Hamish Hamilton, 1995

Vital Signs 1998 1999 – The environmental trends that are shaping our future, Lester R. Brown et al, Earthscan, 1998

Trustees may borrow any of these books from the River Path offices. A hotlinked list of electronic resources and documents is also available. Email David Steven on david@riverpath.com or phone 01202 843910

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