



SUSTAINABILITY AND BUSINESS: FRIENDS OR FOES?

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ABSTRACT

Sustainability and business: friends or foes?

Of the many challenges facing society, the need to undertake sustainable development – living and working in ways that have no negative impact on society, the environment or on future generations – is perhaps the biggest. This is especially so in the built environment, which is where the impact is most keenly felt.

A significant proportion of the world's energy – as much as 60% – is expended in the construction, operation and maintenance of the built environment. Organisations working within this area have a particular opportunity and obligation to promote sustainable development.

Key to fostering sustainable development is identifying the benefits that follow a sustainable approach, both in terms of profitability and risk management. Effective risk management for organisations involves adopting “the precautionary principle”, which means planning for the worst, not hoping for the best.

This paper explores global design and engineering firm Arup's approach to embedding sustainability through its research, processes, methodology and above all, its projects for clients. The examples of successful developments serve to illustrate that a sustainable approach can and does benefit both an organisation's risk profile and its bottom line.

Keywords

Sustainability, development, environmental, ethics, business, commercial.



Introduction

Is it possible to reconcile the concept of sustainability with continued economic and societal development? The UN thinks so. Indeed, the UN articulated environmental sustainability as one of its eight Millennium Development Goals. The often-quoted definition – from the UN's report, *Our Common Future* – has come to be widely accepted: “development which ensures that the needs of the present generation can be met, without compromising the needs of the future”¹.

The buildings and infrastructure which surround us have an impact – for better or for worse – on us all. The built environment outlasts us, becoming our legacy to those who follow. We treasure ‘successful’ structures such as the great cathedrals, Roman viaducts and iconic opera houses, and our expectations of modern development are increasingly uncompromising.

However, modern development consumes a significant portion of the earth's resources. Our estimate is that as much as 60% of the UK's energy each year is used to build, maintain or operate buildings. This figure is unsurprising when you consider that, on average, people in advanced economies spend up to 90% of their lives inside. Globally, we estimate that the building industry uses around 3 billion tons of raw materials each year, or 40% of all raw materials used, as well as 16% of the world's fresh water every year.

Arup is a firm that designs environments – from individual buildings to whole cities. We strive, as articulated by our founder Ove Arup in a speech he gave to the firm in 1970 – and which is still relevant today – to achieve excellence in all we do, and to promote the maintenance and widening of the principles of sustainability. As consultants to the built environment, we are aware of both our opportunity and our obligation to promote sustainability.

Sustainability is gaining credence in mainstream culture. It still, however, provokes suspicion in many commercial organisations, which take the traditional economist's view of sustainability – that it costs too much to implement and yields no competitive advantage. Indeed, David Vogel clearly underlined this view in the *Harvard Business Review* in 2005 – that the increase in costs associated with operating in a sustainable manner would drive customers away and harm a company's market position. If pursuing a sustainable approach to business actively harms the bottom line, few companies will adopt it unless forced to, and even then reluctantly.

For sustainability to become truly entrenched in business practice, at least four elements must be present:

- Customer pull: the customers or ultimate consumers have to care about sustainability and reward a sustainable approach, in order to encourage sustainable behaviour in business and its shareholders;

¹ See the Report of the World Commission on Environment and Development: *Our Common Future*.
<http://www.un-documents.net/wced-ocf.htm>



- Corporate governance: company officers must genuinely act in the long term interests of their companies (this is now enshrined in UK company law);
- Legislation and tax regime: the business environment must render such activities cost-neutral at the least, and preferably supportive;
- Governmental support: the political will must be present.

The key to incorporating the sustainability agenda into business is to go further than simply showing that it is the right thing to do – it is to demonstrate that it is sound business sense. We know it is a responsible thing to do – but can we show a consistent commercial advantage to doing it?

Why should commercial organisations embrace sustainability?

There are many reasons why sustainability should be at the top of everyone's business agenda, not least because the continued survival of future generations depends on finding solutions to the combined issues of climate change, finding an alternative to carbon-emitting fossil fuels for energy and transport needs, and ensuring widespread access to clean water.

Good infrastructure makes people's lives better in the here and now. Accessible highways better connect towns and cities, efficient railway lines and stations mean we can commute to work or escape to places we choose to spend our leisure time, and good design creates residential areas and houses that are comfortable, safe places to live. Sustainable development also ensures that this is not at the expense of future generations, nor of the environment.

While corporate responsibility takes into account the economic, social and environmental impacts of how companies operate, engineers apply the same "precautionary principle" of planning buildings and infrastructure to cope with the worst outcome, rather than hoping for the best. Taking into account major forces such as climate change, water shortages and energy issues means we must constantly think about the overall sustainability of our designs. Our aim is to set a standard of sustainable design that benefits the environment in both the short and the long term.

As an organisation, Arup has promoted sustainability for decades. Our company's culture includes a commitment to shape a better world through our work. The ethical dimension of engineering is a subject of lively discussion within the firm, and there are many issues and questions under continuous debate. Should we be refusing work which could be characterised as unsustainable? Or should we take on such work and try to make them as sustainable as possible, educating our clients in the process? The answer is not straightforward. If we are to contemplate turning away unsustainable work, we must balance this with the need to educate our clients and to maintain our own business and provide employment for our staff.

Are we turning a corner?

The environment in which businesses operate is starting to reward sustainability in business, and a clearer definition is emerging. Sustainability represents a challenge to business, but embracing it is fundamental to managing a company's risk profile, and is essentially good business practice. Where the FTSE4Good Index measures the corporate responsibility performance of listed companies, the Dow Jones Global Sustainability Index tracks companies in the Dow Jones Global Index that are in the top 10% of sustainability



performance. Since the latter was created in 1999, it has consistently out-performed its parent.

While large-scale research still needs to be done on the benefits of a sustainable approach, there are several surveys which have looked at sustainability in different contexts. In 2003, the Australian government commissioned a report looking at corporate sustainability from the point of view of investment. *'Corporate Sustainability – an Investor Perspective: the Mays Report'* assessed the sustainability of businesses in the listed property trust, resource, energy, insurance, agriculture and commercial industrial services sectors. A brief summary of its findings is instructive.

It drew two general conclusions. First, it found that behaving in a sustainable way added value to commercial activities. Case studies showed companies using sustainability to create new business, to improve established business or to lower their overall risk profile. Secondly, it found sustainability was a useful device for managing a company's intangible assets, such as its brand and its reputation.

Looking at the property sector, where Arup has a wealth of experience, the report found three aspects of sustainability were particularly relevant: climate change; water and waste management; and community and consumer pressure. The last factor is particularly interesting, concluding that as more companies start gauging their own performance against sustainability factors, pressure to follow suit will increase, both from larger companies imposing such parameters on their own suppliers and from customer 'pull'.

Tellingly, Arup has observed that sustainability is now emerging as a driver of property value in many places around the world. As tenants increasingly decide they would prefer properties with sustainable features, rents for low-performing properties without these features drop, as do values of the underlying assets. Conversely, owners of properties with better sustainability features are increasingly able to benefit from higher rental yields and increased value. We have seen that developers in certain parts of Asia are prepared to pay up to 50% more on construction of residential housing that includes energy conservation systems. This reflects the growing market for such housing and the willingness of occupants to pay a premium, and is an indicator of 'consumer pull' that is crucial to promoting sustainability in business.

David and Goliath: how a sustainable approach can deliver benefits to the 'bottom line'

One of the companies studied in the Mays Report was Investa Property Group. Investa had positioned itself as a better manager of the resources that it used in its property portfolio. It identified the potential to incorporate this position into its strategy, and attract tenants with a particular interest in their own sustainability performance.

Arup helped Investa to develop a company-wide approach to sustainability. Arup reviewed all systems, policies and activities using a sustainability gap analysis. The results were analysed and linked with business goals, leading to the creation of a sustainability framework and strategy for each business unit. The final stage was to educate Investa's staff. Ultimately, Investa clearly differentiated itself from its competitors as a landlord of buildings with green credentials. In 2003 it was rated Australia's leading real estate investment trust by Sustainable Asset Management and included in the Dow Jones Sustainability Index, thereby gaining access to socially responsible investment. In 2004, it



won the Banksia Award for leadership in socially responsible investment and was named the Sustainable Company of the Year. The upward trajectory continues: in 2006, Investa was ranked 1st on the Dow Jones Sustainability Index in both the Financial Services Supersector and Real Estate Sector, showing an excellent return on its corporate strategy, and that a sustainable approach in the property sector can boost profits.

Another example of the bottom line benefits of sustainable development in property can be clearly seen in another of Arup's projects in the US. Supermarkets are not widely considered at the cutting-edge of environmentally-conscious construction. Yet Wal-Mart is now systematically evaluating the commercial benefits of sustainable development.

With Arup's help, Wal-Mart has developed two experimental stores in McKinney, Texas and Aurora, Colorado to serve as test grounds for technologies and products that save energy, conserve natural resources, reduce pollution and enhance their customers' shopping experience. These 'living laboratories' represent a new approach for the store, and could lead to a significant reduction in the company's global energy footprint and its greenhouse gas emissions.

The projects allowed Arup to move away from the existing green building process, which tests technologies on one building at a time, and instead to assess impact on a far larger scale. It was mechanical and electrical services, rather than aesthetics and architectural constraints, which drove the design.

Simple changes, such as lower energy LED lighting in all food cabinets – which produced less heat, thereby increasing the efficiency of refrigeration – will undoubtedly be adopted industry-wide. A displacement ventilation system that moves air out at low velocity so that only air in the immediate surroundings is chilled replaces the traditional high-level system that conditions the entire space, which is just over 6m high. One proposal for sliding doors on mid-temperature refrigerated products such as bacon and cheese has resulted in significant energy savings.

Sustainable practices that benefit the company's bottom line are assured of a warm reception from Wal-Mart, which builds around 300 new stores each year in the US alone. The wider benefit of these activities will become tangible, as part of Wal-Mart's mission statement for these two stores is to share the process, as well as the results of the experiments with the wider industry, the public and government agencies in order to promote good sustainable practice.

How can engineers promote sustainable development in practice?

Design engineers, architects and other professionals are essential contributors to the sustainability challenge. They provide practical solutions to sustainability problems, and are required to approach problems in a systemic way.

As a firm, Arup was an early champion of sustainability and responsible design, an agenda it has been following for decades. Owned in trust on behalf of its staff and founded by a forward-thinking Danish philosopher and engineer, Ove Arup in 1946, the firm pursues a sustainability agenda in a number of ways: through researching sustainability issues; identifying opportunities to operate in a more sustainable way; evaluating our own work on its sustainability performance; creating methodologies to embed sustainability considerations in all our work; and promoting sustainability to clients, educating all those



we deal with on sustainability. We also promote sustainability in the training and education of design professionals in the built environment.

Given the impact of the property industry on the environment, even incremental changes in a design firm like Arup – in its approach to building design, the raw materials we work with and the development of ways of measuring, and therefore evaluating, sustainability factors – are significant for the long term ‘greening’ of the building design process.

In a wider commercial context, measuring sustainability performance is a prerequisite for using it to inform wider decision-making, and as part of a broader set of financial management information. An example of our impact in this area is the Global Reporting Initiative (GRI), which is a non-profit organisation whose aim is to develop a business strategy to increase the quality and quantity of sustainability reporting worldwide. It also facilitates the reporting process for organisations. Our consultants applied our expertise on GRI’s behalf to develop a range of sustainability indicators, ensuring that they are relevant, measurable and therefore useful as a basis for financial analysis, decision making and communication of results.

The key drivers of change

Designing in a sustainable way requires us to investigate those trends which are most likely to have an impact upon the world in the future. In order to anticipate future change, Arup conducted a series of scientific reviews and surveys – which we call the ‘Drivers of Change’ – exploring the major drivers that most affect society’s future. The three most important factors identified by our clients are climate change, energy resources and water, with urbanisation, demographics and waste not far behind. The Drivers of Change tapped into the perceptions of more than 10,000 people and our current focus is to embed them into Arup’s design, methodologies and evaluation processes.

Climate change

Having examined in detail the arguments on both sides of the climate change debate, we can find no fault in the assessment that climate change is predominantly man-made through the emission of huge quantities of greenhouse gases, notably carbon dioxide. Scientific consensus is that climate change is inevitable. The question is no longer ‘will it happen’, but ‘when’.

The Intergovernmental Panel on Climate Change estimated in February 2007 that the world warmed by 0.6°C in the last century, and pointed out that the 1990s was the hottest decade since records began. We are used to temperatures fluctuating within a band of 1.0°C, but the IPCC’s prediction that temperatures may rise by between 1.4°C and as much as 5.8°C over the next century is a different proposition entirely.

The hundreds of forecast effects of such changes include unpredictable weather, changes to agriculture and rising sea levels. The appeal of a warmer Mediterranean climate to those more used to cooler northern European temperatures, diminishes when scanning some of the worst-case scenarios: one predicts rising sea levels in the Thames estuary, the effect of which would be a four metre rise in the river by 2100, submerging large parts of the UK’s capital. In the US, Hurricane Katrina left hundreds dead and billions of dollars worth of damage, and was a timely reminder of the potential chaos which rises in sea level could wreak on low-lying communities.



Designing for Climate Change

Designing building solutions to overcome such problems is a significant challenge from a technical perspective. It is also a challenge to convince governments and developers to invest in the necessary research and to accept the need to act now to deal with future climate change. One of the problems is that although climate change is a generally accepted phenomenon, the specific and localised effects are unknown and difficult – if not impossible – to foresee.

A key lesson from Arup's experience is that tackling climate change in the built environment must embrace every aspect of design and planning. This cannot be separated from other key considerations such as transport or energy. To successfully plan in this area requires a holistic and sustainable approach across all the different facets of a new development.

Energy

Intimately linked with climate change is the second factor that we have identified as a driver for business this century: energy. The world is using more and more of it. The vast majority comes from burning fossil fuel, which in turn creates greenhouse gases which contribute to global warming. The three main sources of energy are oil, gas and coal, all of which are finite resources and which one day must run out.

While estimates vary as to when they will run out, the world's growing hunger for energy is hastening its arrival. The International Energy Agency estimates that the world will need at least 50% more energy in 2030 than it does now². Most of that demand will be met by burning more fossil fuel, thereby accelerating global warming. Caught in a vicious circle, global demand for energy is likely both to cause an increase in global warming and to increase because of it. When the UK experienced record temperatures in mid July 2006, for example, the leap in energy demand to accommodate the increase in use of air conditioning units strained the national power grid.

Oil is a particular concern. It accounts for about 90% of our energy needs in the transport, food, and chemicals sectors. The price and supply of this precious resource are vulnerable to volatile international events, something set to become more of a problem as access to easily-available oil slows down and additional supplies become harder to find.

Precisely when demand outstrips the supply of oil is unknown. But it is clear that, with no new major oilfield discoveries in the last few decades and with uncertainty over the extent of the world's oil reserves – particularly in the oil-rich Middle East – that the point at which demand outstrips readily-available supply is only a few decades away. This situation – known as 'peak oil', after the point at which oil production peaks and no longer meets demand – has the potential to lead to a global economic depression, which would challenge the widely held assumption of continued economic growth.

The energy debate is going to rage for quite a while. The only certainty is that if we are to make a peaceful transition from fossil fuels to renewable energies, we – companies, governments and individuals – need to act now.

² See International Energy Agency's World Energy Outlook 2006. The Executive Summary is available here: <http://www.worldenergyoutlook.org/summaries2006/English.pdf>



Designing for efficient energy use and alternative energy sources

Rather than a distinct discipline in itself, planning or designing for energy efficiency or conservation must be approached in tandem with other areas such as transport or energy. A holistic approach is a necessity, not a luxury.

Arup took a holistic approach to masterminding China's first 'eco-city', Dongtan, which is being designed from the beginning to be as close to zero-carbon as possible. Arup is integrating every aspect of planning into a sustainable overall plan. Transport, building design, social structure, energy, water, waste and economics all overlap and feed into each other to achieve sustainable goals.



Fig 1: Dongtan, an eco-city Arup is designing near Shanghai, in China, will be a zero carbon development.

Dongtan will produce its own energy from wind and its own waste. Clean technologies such as solar energy will power public transport. With a network of cycle and footpaths and rechargeable private vehicles, the eco-city will achieve near-zero vehicle emissions. Previously cultivated land will become managed wetland, providing a buffer for city and wildlife habitat and preventing light, sound, emissions or water pollution from escaping.

With only 40% of the site used for the city buildings and infrastructure, Dongtan's own organic farmland will feed the eco-city, while the use of traditional Chinese design features and policy incentives will help to create a social, economic and cultural centre.

Water

The earth does not lack for water. Essential for sustaining life, the distinguishing feature of water resources is that water availability is a local and not a global issue. Europe, for example, relies on a relatively plentiful supply of clean and usable water. In Africa, however, someone dies every 15 seconds through a lack of access to clean water. A billion people in the world struggle every day to find enough clean water with which to live.

Water requires a fundamentally different design and engineering approach. Complex technological solutions will not provide a long-term sustainable answer in communities, unless the technical experience exists to service such solutions. Arup has entered a partnership with the charity WaterAid to provide practical assistance throughout the



developed and developing world. Our engineers are learning first-hand of the particularly local issues generated by water.

Designing to conserve water

When Arup designed the UK's Eden Project, a contemporary tropical plant house in Cornwall, rainwater harvesting was an integral part of the design, with a series of channels, tanks and treatment facilities which allow rainwater to be collected and reused to humidify the plant houses. Arup developed a web-based rainwater harvesting tool on the project, to cross-reference physical details such as the proposed use of buildings, the roof area and estimated water requirements with regional rainfall data.

The tool allowed the designers to calculate the potential savings both as a percentage of water costs and in terms of cubic metres of water saved. The experience gained on the Eden Project informed the development of the tool, which is used frequently in projects around the world. It takes into account the capital outlay on tanks and other equipment, and calculates the point at which the equipment will pay for itself.

Focusing effort where it will make the biggest difference

The findings from our Drivers of Change research inform our own approach, both long and short term, and help us to identify areas where we can make the most difference, whether through early interventions, influencing development in key developing countries, "greening" the procurement process in the construction industry or educating the engineers of the future to put sustainability at the heart of their approach.

For example, over 30% of Arup's business is in China, which is the fastest developing country in the world. Dr Fatih Birol, chief economist of the Paris-based International Energy Agency, was quoted in April³ as saying that in 25 years' time, "CO2 emissions which come from China alone will be double the CO2 emissions which will come from all the OECD countries put together".

Arup's strategic partnership with several Chinese developers on the design and master-planning of a number of "eco-cities" offers the potential to influence the development of a country which in 2006 built an average of five 300 megawatt coal-powered electricity plants a week, and burned more than 1.2bn tonnes of coal⁴. Though the new eco-cities may be firing the imagination of the media, there are many other areas in China in which Arup is pioneering a more sustainable approach to development.

One such example is Beijing's Green Plaza, which marked the start of a new approach to sustainable building in China, and is one of the country's biggest sustainable architecture projects. Essentially an environmental shield, it encases two nine-storey and two 18-storey buildings in a transparent glass and ETFE (ethylene tetrafluoroethylene) 'envelope'. Inside, a 'buffer zone' between each of the four buildings and the envelope keeps the development's temperature constant.

The structure is the first building in Beijing designed to be environmentally sustainable and the first to create and make use of a microclimate. The structure reduces energy

³ Guardian, 25 April 2007: <http://business.guardian.co.uk/story/0,,2064726,00.html>

⁴ *ibid*



consumption by limiting the need for air conditioning in Beijing's scorching summers and stemming heat loss in its freezing winters.

In the US, Arup advised on the sustainability planning of the Treasure Island Community Development in San Francisco's Bay area. This 180 hectare brownfield site, a decommissioned naval station, is set to become a thriving sustainable community, with over half of its energy coming from renewable sources by 2018.

The model created by Arup reduces each resident's carbon footprint by 60%. The strikingly simple idea of rotating the entire master-plan grid by 35 degrees, for example, reduces energy demands at a stroke, by maximising solar exposure, use of natural light and wind protection. The development will be a net exporter of renewable energy during peak solar hours.



Fig 2: Treasure Island, San Francisco, USA. It will meet 100% of its own water needs

Water is a valuable asset on the island, so Arup devised a method to allow the development to meet 100% of its own water demand by recycling water and capturing storm water on site. Overall, Arup's analysis identified the potential to reduce the average eco-footprint of Treasure Island residents to 3.69 hectares – less than half of the typical Bay Area resident's figure of 8.56.



Building sustainability considerations into the design process

It is essential to look at the approach we take as designers to identify opportunities to ensure a sustainable aspect of every aspect of our processes, from procurement of raw materials to post-occupancy evaluation of buildings' sustainability performance.

Arup has sponsored various initiatives, some research-based and others which pose questions of and challenge accepted industry practice, where there is an opportunity to improve sustainability. These are some examples of ways in which we are improving the sustainability of our approach, from design through planning to procurement and beyond:

- *Integrated Resource Modeling (IRM)*: At the planning stage, this involves a methodology which informs decision-making by helping us quantify and therefore evaluate a potential improvement in sustainability performance. We developed IRM in our work on Chinese eco-cities, using it in master-planning to assess the effect on carbon footprints of policies, strategies and applications originally aimed at building design improvements.
- *'Greening' structural specifications*: Arup examined each stage of the construction process, and concentrated on reviewing the main construction material specifications in the light of sustainability considerations. The result, currently under investigation at the School of Chemical Engineering's laboratories at the University of New South Wales in Australia, is a chemical binding process that will produce a more clever, environmentally-friendly kind of concrete, using a process which consumes, rather than generates, CO₂, and takes place at room temperature
- *'Building performance feedback'*: Sustainability considerations are not only present during planning and construction phases, but continue afterwards. Arup has embraced post-occupancy evaluation of buildings that we design against planned energy savings, thermal performance and air quality, among other considerations. While in principle such feedback is straightforward - even obvious - it remains far from common practice. Feedback informs Arup's brief development and design process. Our approach has the additional benefit of anticipating legal requirements for energy certification in Europe.

Where is the world now?

Taking stock of the current status of sustainable development, there is certainly cause for a certain amount of optimism. The climate change documentary "*An inconvenient truth*" won an Oscar in 2007. Environmental sustainability was articulated as one of the UN's eight Millennium goals. Sustainability as a concept has been embraced by the mainstream. It seems that "customer pull", the first of the four factors identified as necessary for sustainability to thrive is making itself felt, to the benefit of companies that embrace the sustainability agenda. The success of companies listed on the Dow Jones Global Sustainability Index is testament to the place of sustainability as a key part of commercial endeavour.

What of the other three factors - corporate commitment to the long term, a supportive tax and legislative regime, and governmental support? There have been significant corporate moves towards embracing sustainability practices. However, progress in creating a supportive tax and legislative regime, and a clear demonstration of government support is less well developed. A recent example from the UK illustrates this very well. In late May 2007, it was reported that BP had abandoned plans to build the world's first carbon capture



and storage (CCS) power plant in Peterhead, Scotland, following the UK government's decision that funding and tax relief would only be available for the project via a competition that wouldn't be decided until 2010⁵. The proposal would have transformed natural gas piped from the Miller oilfield northeast of Aberdeen, into carbon dioxide and hydrogen. The hydrogen would be burned as fuel, but the carbon dioxide would be captured and piped back to and stored in the oilfield, avoiding 90 per cent of the carbon emissions normally created by fossil fuels. However, given the uncertain economic operating environment, BP felt that it could not justify keeping the oilfield open in the hope of future government support for its CCS project.

The £500 million Peterhead proposal was one of the most advanced solutions on the table, and offered the chance for the UK to establish a clear lead in cleaner forms of energy.

This project had the potential to bring together customer opinion, commercial willingness to invest in the long term, in a business environment which rewards sustainability. It may still go ahead, but there is no clear signal that it will in the near future.

Sustainability at Arup

- 1946: Arup founded by Ove Arup, Danish philosopher and engineer, proponent of a multi-disciplinary approach to design that included societal factors as well as design and technical issues.
- 1970: In a seminal speech to the firm, Ove Arup articulated his vision of the firm's obligation to our environment. The speech is still relevant today.
- 1998: Arup adopts as its mission: 'we shape a better world'. It underlines the significant impact the firm has on almost all aspects of the built environment.
- 2001: Arup's first sustainability forum at Boston's Massachusetts Institute of Technology
- 2005 *Forum for the Future* presentation to Arup's global strategy meeting.
- 2007: Sustainability policy is being ratified, which recognizes the wider influence we have in the work we do for clients, as well as by running our business in a sustainable way

Is it a rocky road ahead?

While an increasing number of individual companies are choosing a sustainable approach and will derive benefit from differentiating themselves as such, they are still in a minority. It is our belief that the importance of pursuing a sustainable business agenda cannot be overstated.

⁵ Reported in The Observer, by Robin McKie:
<http://environment.guardian.co.uk/climatechange/story/0,,2104913,00.html> There is a lively discussion on the merits of the technology on The Observer's site



In summary, we believe that:

- The commercial imperative is vital; business will only act if there is a business imperative;
- The political cycle must be overcome, if governments are to cease thinking short term. Big business has the opportunity to demonstrate long-term thinking and to take the difficult but business case-driven decisions to embrace sustainability.
- Governments have the opportunity – perhaps an obligation – to create benign investment environments for renewables and other cleaner forms of energy, and to encourage sustainable development
- Promoting a sustainability agenda throughout every aspect of the professional education of designers, engineers and others intimately linked with the built environment, will allow sustainability principles to take root for the future.
- Instilling every stage of the design process with sustainable considerations will allow better, more sustainable development to be achieved.
- A holistic approach is the only approach which will be successful.
- To complete the circle, sustainability-friendly policies and taxation from governments is also needed.

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