

“Making the Profitable Transition towards Sustainable Business Practice”

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Abstract

The last three decades have been difficult for companies and industry. In an increasingly competitive international business climate with shifting national environmental regulations, higher standards are being demanded by the consumer and community groups, not-to-mention the escalating cost of primary resources such as water, steel and minerals. The cause of these pressures is the traditional notion held by business executives and engineers that there is an inherent trade off between eco-efficiency and improving the economic bottom line. However there is significant evidence and examples of best practice to show that there is in fact no trade-off between the environment and the economy if sustainable development through continual improvement is adopted. It is highly possible therefore for companies to make a profitable transition towards sustainable business practice, where along the transition significant business opportunities can be taken advantage of.

Companies are by their very nature dynamic, influential and highly capable of adapting to change. Making an organisational transformation to a sustainable business is not outside the capacity of the typical company, who know much of what is needed already to change their activities to satisfy current market demands while achieving competitiveness. However in order to make the transition towards sustainable business practice companies require some key mechanisms such as accurate information on methodologies and opportunities, understanding of the financial and non-financial incentives, permission from stakeholders and shareholders, understanding of the emerging market opportunities, a critical mass of leaders in their sector and demonstrated case studies, and awarding appropriate risk-taking activities undertaken by engineers and CEOs. Satisfying these requirements will adopt an innovative culture within the company that strives for continual improvement and successfully transforms itself to achieve competitiveness in the 21st Century.

This paper will summarise the experiences of The Natural Edge Project (TNEP) and its partners in assisting organisations to make a profitable transition towards sustainable business practice through several initiatives. *The Natural Advantage of Nations* publication provides the critical information required by business leaders and engineers to set the context of sustainable business practice. The *Profiting in a Carbon Constrained World* report, developed with Natural Capitalism Inc led by Hunter Lovins, summarises the opportunities available to companies to take advantage of the carbon trading market mechanisms such as the Chicago Climate Exchange and European Climate Exchange. The *Sustainability Helix* then guides the company through the transition by identifying the key tools and

methodologies required by companies to reduce environmental loading while dramatically improving resource productivity and achieving competitiveness. Finally, the *Engineering Sustainable Solutions Program* delivers the key engineering information required by companies and university departments to deliver sustainable engineering solutions.

The initiatives are of varying complexity and level of application, however all are designed to provide key staff the critical information required to make a profitable transition towards sustainable business practice. It is then their responsibility to apply and teach their knowledge to the rest of the organisation.

Key Words

Sustainable Business Practice, competitive advantage, profitability, Sustainability Helix, The Natural Advantage of Nations, Engineering Sustainable Solutions Program, The Natural Edge Project, organisational change.

Biographical Information on Presenters at the GCEE 2005

Cheryl Paten is a lecturer in the School of Environmental Engineering, Griffith University (Queensland) where she is working to further embed sustainability principles and practices into the curriculum. Through formal collaboration with Griffith she is also engaged with the TNEP Secretariat as Education Coordinator. As part of her role, Cheryl has co-authored a chapter on 'Greening the Built Environment' in the international publication, "The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century", and assisted with editing other chapters of the book. In addition to her PhD studies and lecturing commitments, Cheryl's key current engagement is working with the TNEP Secretariat on the "Engineering Sustainable Solutions Program - Critical Literacies Portfolio" (ESSP-CL). She is on the Advisory Board to the International Journal of Sustainability in Higher Education, and is a Board member of the Engineers Australia Environmental Engineering College. In 2005 Cheryl was awarded Queensland Young Professional Engineer of the Year.

Charlie Hargroves, a civil engineer is the Project Coordinator of *The Natural Edge Project* (TNEP). Charlie practiced as a Civil and Structural Engineer, before moving into sustainability-related areas to co-found TNEP and co-author and co-edit the publication *The Natural Advantage of Nations*. Charlie has recently undertaken a 12 month sabbatical in Boulder Colorado with his wife, Stacey, for Charlie to take the position of visiting scholar at the University of Boulder Colorado, USA with Professor Bernard Amadei in 2004/05. As part of the visit Charlie was placed on work experience with Natural Capitalism Inc as the Chief Executive Officer, supervised by Hunter Lovins and working on a range of international projects such as consulting directly to the Chicago Climate Exchange and the Chicago Manufacturing Centre. Having recently returned to Australia Charlie is currently coordinating the development of the Engineering Sustainable Solutions Program, Sustainable Business Practice Program and the Industry Training Programs of TNEP.

TNEP is an ongoing, not-for-profit partnership driven by a group of young professional engineers and scientists based in Australia. The team receives mentoring and support nationally and internationally from a wide range of individuals and organisations, in business, government and in research. The project is focused on assisting nations to develop a natural advantage through a whole of society approach, to achieve sustainable genuine-progress (www.naturaledgeproject.net).

1. Introduction

1.1 Background

The Changing Nature of Competition

Running a business isn't easy. With the increasingly dynamic and non-linear characteristics of the current business environment and rules of engagement, companies continually have to innovate, redefine and transform the way they do business to remain competitive. The challenge of sustainable development, such as climate change and resource scarcity, is at the source of this increasingly changing business environment. Companies are being asked to dramatically reduce their environmental loading while improving resource productivity at the same time.

Dr. Rajendra Pachauri, appointed by the Bush Administration to chair the Intergovernmental Panel on Climate Change (IPCC), believes that the world has "*already reached the level of dangerous concentrations of carbon dioxide in the atmosphere,*" and in January 2005 called for immediate and "very deep" cuts in emissions. He cited a multi-year study by 300 scientists showing that the Arctic was warming twice as fast as the rest of the world, and that its ice cap had shrunk by up to 20 per cent in the past three decades. People have changed the carbon dioxide content of the atmosphere by 20 percent in the last four decades, and today add three times more annually than in 1960.¹ Recent scientific research concludes that abrupt climate change could occur far faster than the models have predicted.

Climate change will have profound implications for business and a key driver for organisational change. Greenhouse gas management is now becoming synonymous with best practice in corporate governance. Leading companies are already committing to sustainable business practices because, whether or not human-induced climate change is real, such practices are worth doing because they are profitable². In fact, business not taking action on greenhouse gas emissions reduction are seen to be irresponsible. The re-insurance industry, in recognising the predicted surge in insurance claims due to climate-change related natural disasters, is now denying coverage to the directors' and officers' liability policies of companies that do not do enough to reduce emissions.³ It is clear that with such pressures to innovate, organisational transformation is on the horizon.

Drivers for Sustainable Development ≈ Drivers for Innovation

How serendipitous is it that the drivers for sustainable development – the need to dramatically reduce our environmental loading whilst dramatically improving resource productivity – are drivers for a business' competitive advantage! The following are some of these key drivers⁴:

- Increase productivity of resources, people and information
- Create product differentiation and reduce operational costs
- Implementing concepts of Lean Thinking, Total Quality Management
- Ethically/socially responsible investment and access to capital
- Reducing risk of consumer boycott & NGO activism

¹ Vital Signs 2003 by WorldWatch Institute: Sheehan, M.O. "Carbon Emissions and Temperature Climb", pp. 40-41.

² Natural Capitalism Solutions, The Natural Edge Project (2005) *Prospering in a Carbon Constrained World: Profitable Opportunities for Greenhouse Gas Emissions Reduction* (CCX/EUX Opportunities Report).

³ Jeffrey Ball, Wall Street Journal, May 7, 2003.

⁴ Hargroves, K. Smith, M. (2005) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*. (Earthscan, London). Pp 94, Table 6.5.

In a recent US study comprising a large sample of the Standard & Poors 500 companies, it was found that adopting sustainability-related activities reduces operating costs as well as 'a significant and favourable impact on the firm's perceived riskiness to investors and accordingly its cost of equity capital and value in the marketplace', suggesting an increase in the company's stock price by as much as 5 percent⁵. Many of such studies and examples of best practice exist to show that a key driver of innovation and organisational transformation in the 21st century will be sustainable development.

Interface Ltd is a primary example of a major company successfully innovating for sustainable development through organisational change. CEO Ray Anderson conceptualised and led the implementation of a new business model based on sustainability, after realising the damage his company was causing to the environment and jeopardising the wellbeing of future generations. The new business model sought to not only implement business practices with a reduced environmental load, but also implemented activities that dramatically improved the productivity of the company's business streams to make it an industry and global business leader. The company made the profitable transition by first identifying opportunities for win-win eco-efficiencies with negative payback periods, resulting in a positive cash flow (US\$260 million per year) which was then used to finance further initiatives, such as the development of a range of eco-products. They have replaced petrochemical based carpets with carpets made from renewable biomass such as corn waste, which can be recycled at little or no loss of product quality; it is the first certified climate-neutral product in the world, is so non-toxic you can eat it, and eliminates the tradition carpet-manufacturing occupational health and safety concerns. In the first four years of the transition towards sustainable business practice, Interface more than doubled its revenue, tripled its operating profit and nearly doubled its employment, achieving a 97 percent reduction in materials used. Ray Anderson completely transformed the way the company did business in a way that can be simply described as, "Doing well by doing good."⁶

Organisational Change: Transitioning towards Profitable Business Practice

Companies are by their very nature dynamic, influential and highly capable of adapting to change. Making an organisational transformation to a sustainable business is not outside the capacity of the typical company, who know much of what is needed already to change their activities to satisfy current market demands while achieving competitiveness. However in order to make the transition towards sustainable business practice companies require some key mechanisms such as accurate information on methodologies and opportunities, understanding of the financial and non-financial incentives, permission from stakeholders and shareholders, understanding of the emerging market opportunities, a critical mass of leaders in their sector and demonstrated case studies, and awarding appropriate risk-taking activities undertaken by engineers and CEOs. Satisfying these requirements will adopt an innovative culture within the company that strives for continual improvement and successfully transforms itself to achieve competitiveness in the 21st Century.

1.2 Scope of Paper

This paper and presentation will summarise the experiences of The Natural Edge Project (TNEP) in assisting organisations to make a profitable transition towards sustainable business practice through several initiatives. *The Natural Advantage of Nations* publication provides the critical information required by business leaders and engineers to set the context of sustainable business practice. The

⁵ Hargroves, K. Smith, M. (2005) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*. (Earthscan, London). Pp 104, citing Feldman et al (1997) 'Does Improving a Firms Environmental Mangement System and Environmental Performance Result in a Higher Stock Price?', ICF Kaiser International, *The Journal of Investing*, Winter, pp 87-97.

⁶ Anderson, R. (1998) *Mid-Course Correction: Toward a Sustainable Enterprise: the Interface Model* (Pereginzilla Press, Atlanta)

Profiting in a Carbon Constrained World report, developed with Natural Capitalism Inc led by Hunter Lovins, summarises the opportunities available to companies to take advantage of the carbon trading market mechanisms, the Chicago Climate Exchange and European Climate Exchange. The *Sustainability Helix* then guides the company through the transition by identifying the key tools and methodologies required by companies to reduce environmental loading while dramatically improving resource productivity and achieving competitiveness. Finally, the *Engineering Sustainable Solutions Program* delivers the key engineering information required by companies and university departments to deliver sustainable engineering solutions.

The initiatives are of varying complexity and level of application, however all are designed to provide key staff the critical information required to make a profitable transition towards sustainable business practice. It is then their responsibility to apply and teach their knowledge to the rest of the organisation.

1.3 The Natural Edge Project

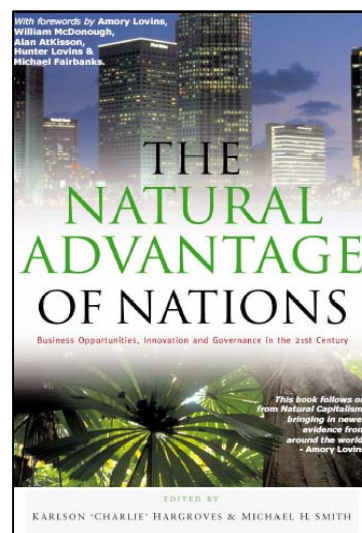
The Natural Edge Project (TNEP) is an ongoing, not-for-profit partnership driven by a group of young engineers and scientists based in Australia. Hosted by Engineers Australia, the team receives mentoring and support nationally and internationally from a wide range of individuals and organisations, in business, government and in research. TNEP is focused on assisting nations to develop a natural advantage through a whole of society approach, to achieve sustainable genuine-progress⁷.

2. Transformational Change Initiatives

2.1 Whole of Society Approach to Organisational Change – The Natural Advantage of Nations

The flagship initiative of TNEP, *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*, is a comprehensive synthesis book whose central message is that by taking a whole of society approach it is possible for economies to achieve high economic and job growth rates whilst dramatically reducing their negative impacts on the environment. The book integrates a vast literature to demonstrate that, far from harming economic growth and jobs, the smart application of sustainable development can yield higher economic prosperity and economic growth for all economies. It shows how wise strategies for sustainable development can improve businesses' competitiveness.

The Natural Advantage of Nations is a publication that takes a truly holistic, 'whole of society approach' (Figure 1) to building a vision for a sustainable future and then showing us how to get there, through the support and contribution from individuals and organisations from business, professional bodies, educational bodies, media bodies, governments and agencies, NGO's and foundations, research institutions and the community. It was produced in conjunction with over 30 contributors and over 75 significant organisations worldwide all who have come together to cooperatively focus on the challenges of sustainable development. These include significant organisations such as the World Federation of Engineering Organisations' ComTech, which represents over 7 million engineers globally. The sheer number and variety of organisations represented in this book is the best sign yet of



⁷ Visit The Natural Edge Project's Website, (www.naturaledgeproject.net)

a growing critical mass of understanding, global consensus and real commitment to restoring the balance and achieving sustainable development before it is too late.



Figure 1 TNEP's 'whole of society approach' to the development of its initiatives

This publication shows that a new form of development, triple bottom line development, is far from being in conflict with economic goals and actually builds on the traditional central goal of economics that seeks to improve the wellbeing of all. The book is in total accord with the Australian Treasury Department's new wellbeing framework⁸, and with the goals of with the Federal Government's Environment Industry Action Agenda that is seeking to quadruple Australia's exports in this field.

The Natural Advantage of Nations is one of a number of books published in the last 5 years to show how it is possible to decouple economic growth significantly from negative environmental and social impacts. NAON builds on from such books and shows that there are often numerous unforeseen benefits for business, government and society to restore the balance and achieve sustainable development. What is reassuring, is that this is no longer a walk into unknown territory; rather, as the book demonstrates, in many cases the solutions already exist and are being implemented by companies, governments, civil society groups, churches, trade unions, universities, schools and professional bodies around the world. So, if we are humble and willing to learn from the best around the world and apply it to our own context, many of the answers are already there all we need is a unifying sense of urgency and the will to change. There are now significant national and global networks within many sectors throughout the whole of society that are working on these challenges. Hence, the book is a collection of possible ways to address the systemic problems we will face in the coming century. It provides demonstrably relevant and successful solutions, already being applied, of which its co-authors have first hand experience. These are people who are working at the coal face (or

⁸ Link to the Australian Treasury Department's wellbeing framework, http://www.treasury.gov.au/documents/876/PDF/Policy_advice_Treasury_wellbeing_framework.pdf

should we say solar face) of change, having been either a part of these processes of reform within significant institutions or advisors to them.

The Natural Advantage of Nations is being widely seen as one of the successors to the paradigm-shattering and internationally bestselling book *Natural Capitalism*. Reviewers have commented that *The Natural Advantage of Nations* publication and companion web site will be one of the key sustainable development resources for the next decade. The publication is designed to be self-explanatory and user-friendly, and has a comprehensive table of contents, index, notes and reference list. Whilst written clearly for the layperson, it is also academically extremely rigorous with over 1500 notes and references. In addition, there are over 150 freely downloadable references on the publication's companion web site (www.thenaturaladvantage.info).

The numerous examples given here of profitable ways to improve the environment, human wellbeing and the bottom line come not from the familiar poster children of the sustainability movement, but from communities across Australia and Asia. It proves a belief that has grown for several years that while the tipping point of environmental devastation may be frighteningly close, the people with the commitment to implement the solutions, that we already know can solve the problems, are also at hand.'

2.2 Transformational Change in Business through the Sustainability Helix

Business, and in particular the manufacturing industry, is undergoing significant organisational change by incorporating sustainable business practices. In taking a whole of system approach, manufacturing companies – large-, medium- and small-sized – are realising the need to dramatically improve resource productivity and reduce pollution as a major opportunity to innovate and compete in the new business paradigm.

TNEP, in partnership with US-based consultancy Natural Capitalism Incorporated,⁹ are working to incorporate sustainable business practice with small and medium-sized manufacturers in the Chicago (United States) area. Coordinated by the Chicago Manufacturing Centre, the *GreenPlants* initiative seeks to assist manufacturers in the region in transform themselves and their practices to survive the increasing pressures of competitiveness – from emissions reduction requirements and increased resource and utility costs, to rising consumer awareness and demands from the insurance and financial sector, suppliers and customers.

*GreenPlants also has an economic development mission. The GreenPlants' initiative expands on Mayor Richard Daley's goal to make the city the greenest in the nation. CMC wants to make Chicago the "greenest and most sustainable" industrial region in the country. No one organization can accomplish this lofty goal. Many sustainability leaders think that is only through sustainable business development that we can look forward to a bright future for our citizens.*¹⁰

The key component in the *GreenPlants* organisational change initiative is the *Management Helix for the Sustainable Organisation*¹¹, co-developed by TNEP and Natural Capitalism Solutions. Known more commonly as the *Sustainability Helix*, it provides an integrated framework to assist businesses in making a profitable transition towards sustainable business practice to achieve competitive advantage. Figure 2 below outlines the Sustainability Helix framework.

⁹ www.natcapinc.com

¹⁰ <http://www.cmcusa.org/initiatives/greenplants.cfm>

¹¹ The tool is summarised in detail in Hargroves, K. Smith, M (2005) *The Natural Advantage of Nations* (Earthscan, London). Chapter 10 'Operationalising Natural Advantage Through the Sustainability Helix'.

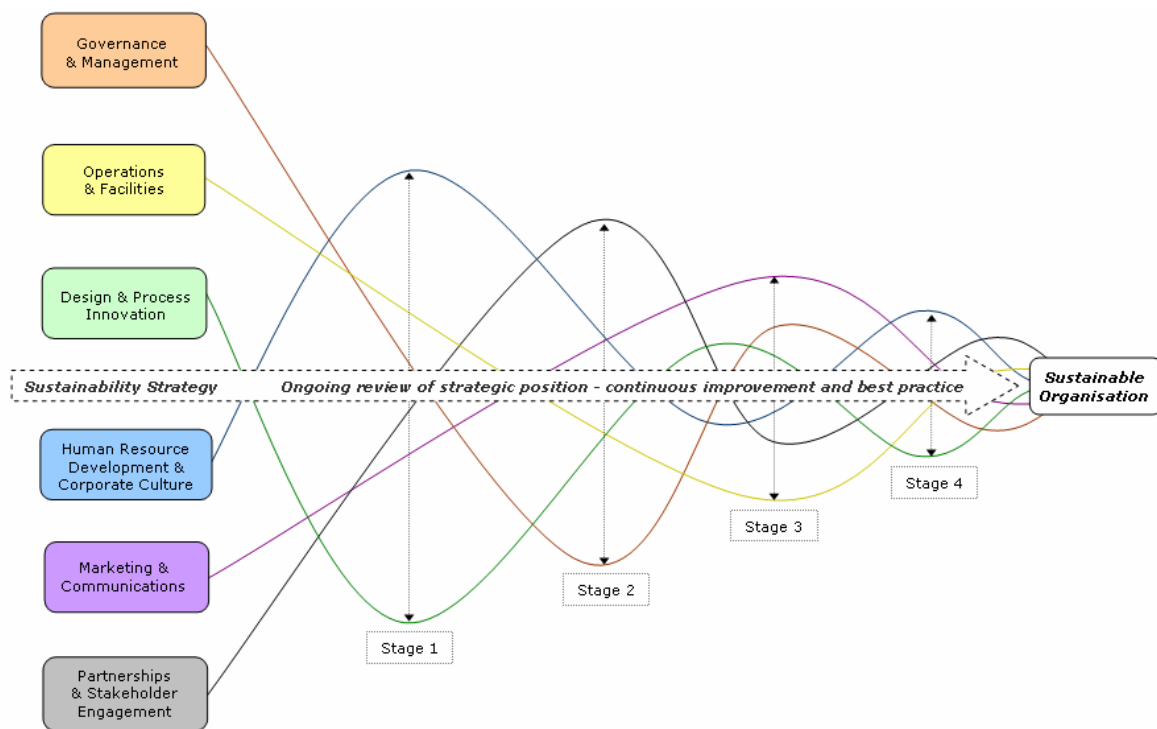


Figure 2 Management Helix for the Sustainable Organisation

The Helix structure of the framework exists to represent the complex and interactive relationship between the six primary business streams of any company: Governance and Management, Operations and Facilities, Design and Process Innovation, Human Resource Development and Corporate Culture, Marketing and Communications, and Partnerships and Stakeholder Engagement. Guided by a Sustainability Strategy. Each business stream of the Helix comprises sustainable business practice methodologies and tools to be implemented over four significant stages during the business transformation period:

Stage 1: Explore the Sustainability Opportunity. The first stage of the business transformation begins by developing an understanding and definition of 'sustainability' to the organisation, and then exploring its value to the mission and business model of the company. The organisation will investigate and learn from competing organisations implementing sustainable business practice that adds business value to the organisation.

Stage 2: Testing the Business Case: key initiatives and pilot projects. Organisations embarking on Stage 2 are now willing (based on the activities of Stage 1) to make a commitment to sustainable business practice by setting clear objectives and indicators of success, impact assessment, and implementing pilot projects across each business stream. This stage gives the organisation the opportunity to capacity build, develop and test internal tools and procedures to improve resource efficiency and business productivity.

Stage 3: Sustainability Leadership. At this stage the company is convinced of business opportunities available through achieving sustainable development, and is ready to systemically implement sustainable business practices throughout the organisation. It takes a public leadership role within its industry to enhance shareholder value through improving resource productivity while dramatically reducing their environmental load, and beginning to do business in such a way that reinvestment in all forms of capital is core business practice.

Stage 4: A Restorative Company. Reaching the final stage of business transformation in the Sustainability Helix process suggests that the organisation can sustain a high level of competitive advantage through the integration of sustainable business practices, with the end goal of becoming a truly sustainable organisation. The company's core business activities will maximise shareholder value, restore human and natural capital, and contribute to the sustainability of the whole of society – business civil society, government and other stakeholders.

The Sustainability Helix takes a whole of system approach to transforming business practice by facilitating interaction across the boundaries of each business stream, as well as focusing on improving areas of weakness throughout the company (for example, a manufacturing company may be at Stage 3 in the Operations and Facilities stream and Stage 1 in the Governance and Management stream. The Sustainability Helix recognises and rectifies such imbalances). The Sustainability Helix therefore provides a coordinated approach to the implementation of existing tools and methodologies, within each business stream and at each stage of implementation, to ensure a profitable transition towards sustainable business practice takes place.

2.3 Profiting in a Carbon Constrained World – Making the transition through the Chicago & European Climate Exchange market mechanisms¹²

Transformational organisational change is rapidly occurring within companies committed to reducing greenhouse gas emissions. Recent global consensus that human-induced climate change is real has manifested in the ratification of schemes such as the Kyoto Protocol and increasing government commitment internationally, through the advice of the credible bodies such as the Intergovernmental Panel on Climate Change (IPCC), to reduce CO₂ emissions to 40% below 1990 emissions by 2050¹³. What first seems like a moral and regulatory obligation for industry to reduce greenhouse gas emissions is actually a major business opportunity in disguise. Many leading companies such as DuPont, BP and STMicroelectronics are transforming the way they do business so that they can take advantage of the opportunities presented by reducing greenhouse gas emissions.

In 1999 leading chemicals manufacturer DuPont committed to reducing its own greenhouse gas emissions by 65 percent by 2010, while raising revenue 6 percent over the same time period and sourcing 10 percent of its energy and 25 percent of its feedstocks from renewable energy. So far they are performing better than expected. Since 1990, global energy consumption is down 7 percent despite a 33 percent increase in production and greenhouse gas emissions (based on the Kyoto basket of gases) are down 72 percent. By 2010, or as quickly as the targets have been reached, DuPont estimates to have saved US\$2 billion¹⁴. Also British Petroleum (BP), as part of its organisation transformation towards sustainable business practice has re-branded itself as 'Beyond Petroleum' and in 2000 announced its commitment to reduce greenhouse gas emissions by 10% by 2010. BP achieved this in only two years and saved the company US\$650 million.

There now exists market mechanisms to further encourage mainstream industry to reduce greenhouse gas emissions and make a profitable transition towards sustainable business practice. The advent of carbon trading mechanisms such as the Chicago Climate Exchange (CCX) and European Climate Exchange (EUX) are providing a platform for companies committed to reducing greenhouse gas emissions to make money by trading carbon credits. The CCX is a self-regulatory exchange that

¹² This section is primarily summarised from Natural Capitalism Solutions, The Natural Edge Project (2005) *Prospering in a Carbon Constrained World: Profitable Opportunities for Greenhouse Gas Emissions Reduction* (CCX/EUX Opportunities Report).

¹³ IPCC (2001), *Climate Change 2001: Synthesis of the Third Assessment Report*, Intergovernmental Panel on Climate Change, United Nations Environment Program/World Meteorological Organisation, Cambridge University Press.

¹⁴ Natural Capitalism Solutions, The Natural Edge Project (2005) *Prospering in a Carbon Constrained World: Profitable Opportunities for Greenhouse Gas Emissions Reduction* (CCX/EUX Opportunities Report). Citing DuPont's *Progress Report Data Summary*.

delivers a program for reducing and trading greenhouse emissions in North America, with Offset Providers from Brazil¹⁵. CCX direct-emissions Members commit to reducing greenhouse gas emissions 1 percent per year from 2003-2006 relative to a 1998-2001 average; by 2006 program-wide net emissions must be 4 percent below baseline. Members that reduce emissions below their required level can sell surplus emission allowances, Carbon Financial Instruments (CFIs), on the exchange to those members who cannot achieve the reduction target. Members not meeting the emissions target can also purchase project-based offsets such as methane collection and carbon sequestration projects.

A key advantage in assisting companies to trade effectively on the CCX and EUX markets is the right information highlighting the opportunities to profitably innovate for greenhouse emissions reductions. TNEP, in partnership with Natural Capitalism Solutions (NCS), CCX and EUX have developed a Opportunities Report¹⁶ to demonstrate to managers of companies, communities, universities and religious organisations that there are cost-effective and profitable methods to reduce greenhouse gas emissions. The Report highlights the opportunities to enter the carbon trading markets to create and trade CFIs by bringing into context examples of best practice, discussing the political and social regulatory forces involved and bringing forth rigorous evidence to show that today's environmental leaders and outperforming the laggards in many sectors. The Report further highlights that a climate management strategy is the risk management strategy of the 21st Century.

The Opportunities Report provides the essential information required by businesses engaged in transforming their organisation into one that can profitably reduce its influence on climate change and trade more effectively on the CCX and EUX markets. It does this in three sections:

The New World of Carbon Trading: How Emissions Reductions make Sense and Money.

Becoming a member of the Chicago and European Climate Exchange markets presents significant opportunities. Organisations that can reduce their greenhouse emissions effectively can successfully trade Carbon Financial Units (CFUs) on the market. The creation of both carbon-credit futures markets by both the CCX and EUX provides tools to manage exposure to price volatility in the emissions allowances market, which create significant opportunities for sector leaders to become carbon-credit producers and profit from supplying those members not meeting emissions reduction targets. A member of the CCX and EUX can earn Carbon Financial Instruments by reducing:

1. Onsite direct emissions e.g. stationary combustion, energy efficiency, process emissions reduction and sequestration activities.
2. Offsite emissions offsets and demand management e.g. mobile combustion (vehicle emissions), offset projects (such as forestry), and demand management (peak load shaving).

Case Studies of Greenhouse Gas Reductions that Achieve CFIs.

Through case studies of best practice members of the CCX and EUX markets are provided practical examples of achieving tradable CFIs through cost-effective greenhouse gas reduction methodologies. Increasingly companies are proving that setting greenhouse gas emissions reduction targets drives corporate innovation, uncovers waste throughout the company, and provides competitive advantage. Case studies exhibit innovative onsite and offsite emissions reductions, such as the reduction of

¹⁵ Chicago Climate Exchange Overview, http://www.chicagoclimateexchange.com/about/pdf/CCX_Corp_Overview_2005.pdf

¹⁶ Natural Capitalism Solutions, The Natural Edge Project (2005) *Prospering in a Carbon Constrained World: Profitable Opportunities for Greenhouse Gas Emissions Reduction* (CCX/EUX Opportunities Report).

stationary fossil fuel combustion and CO2 gases, non-CO2 gases, efficient use of electricity, onsite sequestration, mobile combustion, offset projects and demand management.

The Business Case for Greenhouse Gas Emissions Reduction Strategies.

The business case for climate impact management is put forward by showing how organisations that take a systemic approach to incorporating strategies to reduce greenhouse gas emissions throughout the organisation increase shareholder value whilst better serving the community. Rigorous evidence is provided to show that companies that implement climate management programs can outperform others in their sector, reduce risks and capture multiple benefits for the organisation. Companies that implement greenhouse gas reduction activities as part of a whole of system corporate sustainability strategy will achieve multiple benefits for shareholders besides reducing their impact on global climate change. These benefits will come in the form of:

1. Energy and materials cost savings within industrial processes, operations and facilities.
2. Enhanced core business value such as first mover advantage, improved corporate governance, enhanced reputation, insurance access and costs, legal and regulatory compliance, increased employee productivity, development of a culture of innovation, and industry sector leadership. Figure 3 below indicates, as one of many examples across the sectors, of environmental leaders outperforming the environmental laggards.

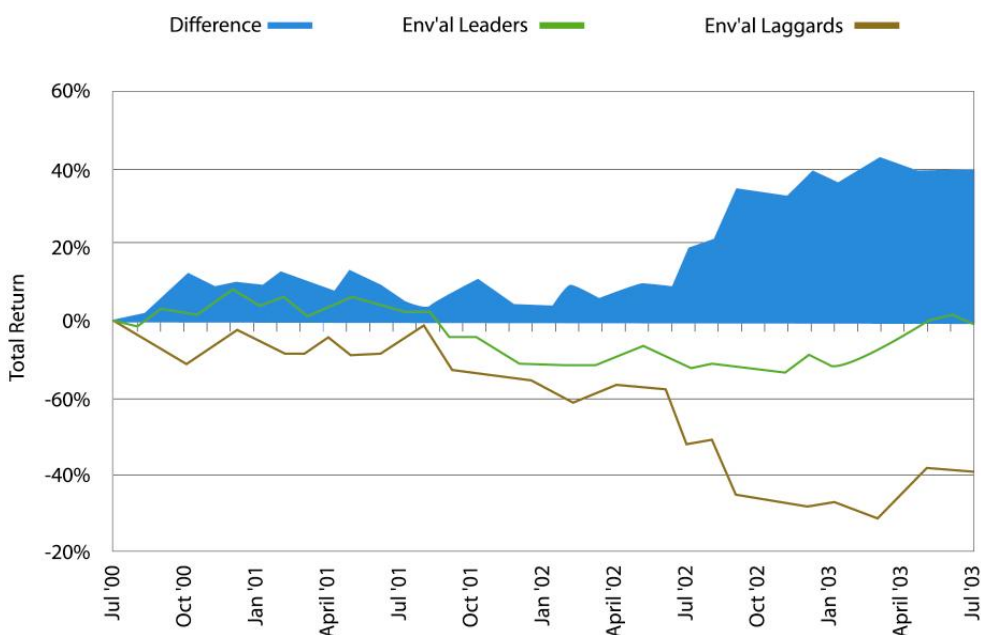


Figure 3 Percentage change in total return of environmental leaders vs laggards in the EU electric utilities sector 2000-2003 (Source: Innovest Group¹⁷)

2.4 Engineering Sustainable Solutions Program - Training for an Innovative Culture

Globally, Engineering Institutions, Practicing Engineers, United Nations (UN) divisions such as UNESCO, UNEP, UNDP, non-government organisations and universities are now focused on

¹⁷ "Corporate Environmental Governance: A study into the influence of Environmental Governance and Financial Performance," Prepared by Innovest Strategic Value Advisors November, 2004, www.innovestgroup.com/publications.htm

providing professional training/curricula materials and courses to capacity build professionals to create a sustainable future. The UN has announced that 2005-2014 will be the Decade of Education for Sustainable Development, and UNESCO has launched the Global Higher Education for Sustainability Partnership that to date involves over 1000 universities. There exists international consensus of the need for a change in traditional engineering practices to overcome the challenges put forward by sustainability.

In response to the global demand for capacity-building training for engineers to deliver sustainable solutions, The Natural Edge Project (TNEP) have developed the Engineering Sustainable Solutions Program: Critical Literacies Portfolio (CLP) module and associated industry programs. These programs seek to assist in the delivery (through a 'train the trainers' model) of the critical information required by engineers to create sustainable solutions, and is relevant to the practicing engineer with entry-level knowledge of the role their profession plays in sustainable development, and in particular business competitiveness through innovation.

The CLP begins with the Introductory Module, a series of six units (lessons) establishing the context of sustainable development and the role that technology and systems innovation will play in achieving the pollution-reduction and resource-productivity targets required.

The first three units introduce the engineer to sustainable development – the challenges we face as a society and the reasons for such challenges, the role of the engineer in sustainable development, definitions and concepts for sustainable development. The material is focuses on highlighting the opportunities for creativity and innovation as part of what is being known as 'the next wave of innovation' (Figure 4 below).

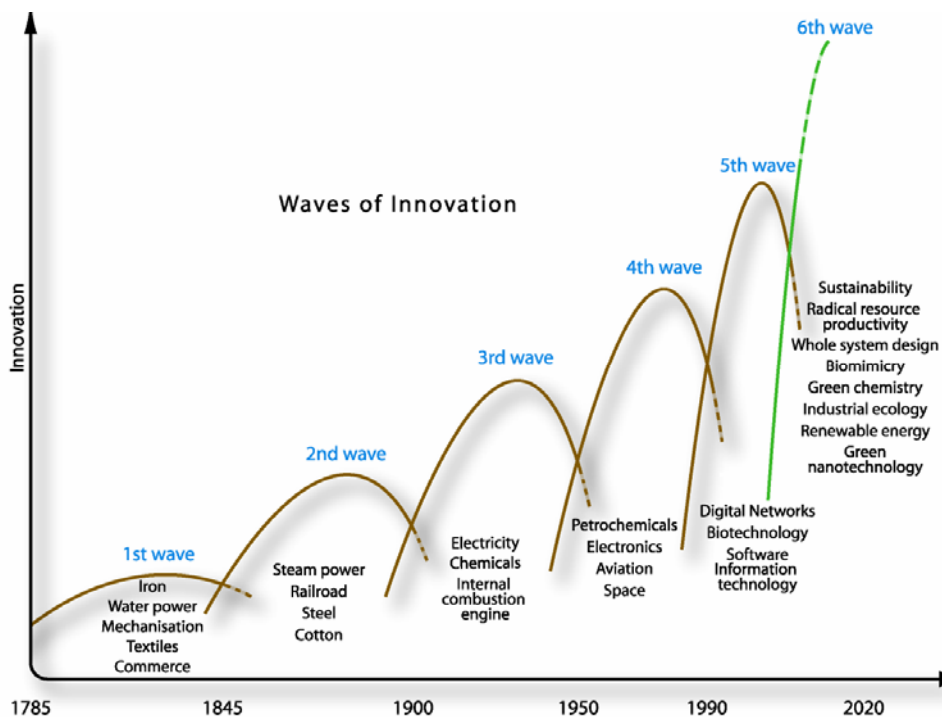


Figure 4 Waves of innovation of the first and the next industrial revolution (Copyright© 2004 The Natural Edge Project)

The last three units and introduce the engineer to best practice engineering approaches and robust case studies of sustainable technological solutions. The units span the engineering disciplines through

key engineering topics – Profitable Greenhouse Solutions, Greening of Industry, Greening the Built Environment, Sustainable Urban Transport, Water: Nature's Gold, and Zero Waste: Value Loops.

The Natural Edge Project (TNEP) is engaging with training partners to conduct train the trainer sessions to

- train internal trainers and key staff in the first principles and critical literacies of engineering sustainable solutions;
- enable and support internal trainers to deliver such training throughout the company and to selected clients and partners; and
- form an ongoing training partnership to assist in the delivery of the training, internally and externally, and support the updating and enhancement of the material, and assist the organisation with its transition towards sustainable business practice.

The training program incorporates a range of teaching mechanisms, such as direct lecturing, group discussion, individual research, and participatory workshops. As one of the goals of the program is to capacity build trainers the sessions are very interactive and participants will be encouraged to become involved in the discussion around key topics. The exercises and activities within the course will be influenced by and compliment the tools, processes and procedures of the company to assist in the swift uptake of the material across the company.

Each training program is tailored to meet the needs of the company and a hybrid version then be licensed to the partner for further use both internally and with clients supported by TNEP through a Support and Licence Agreement (SLA).

3. Conclusion

To assist companies make the profitable transition towards sustainable business practice, The Natural Edge Project have developed a range initiatives to provide companies with the necessary information to make the organisational change required. *The Natural Advantage of Nations* publication provides the critical information required by business leaders and engineers to set the context of sustainable business practice. The *Profiting in a Carbon Constrained World* report summarises the opportunities available to companies to take advantage of the carbon trading market mechanisms, the Chicago Climate Exchange and European Climate Exchange. The *Sustainability Helix* framework then guides the company through the transition by identifying the key tools and methodologies required by companies to reduce environmental loading while dramatically improving resource productivity and achieving competitiveness. Finally, the *Engineering Sustainable Solutions Program* delivers the key engineering information required by companies and university departments to deliver sustainable engineering solutions in light of the opportunities highlighted and systems identified in the first three initiatives. These initiatives work with the understanding that organisations themselves know how to change, and with the right mechanisms such as accurate information on methodologies and opportunities, the most relevant opportunities can be identified. The use of such mechanisms will adopt an innovative culture within the company that strives for continual improvement and successfully transforms itself to achieve competitiveness in the 21st Century.

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