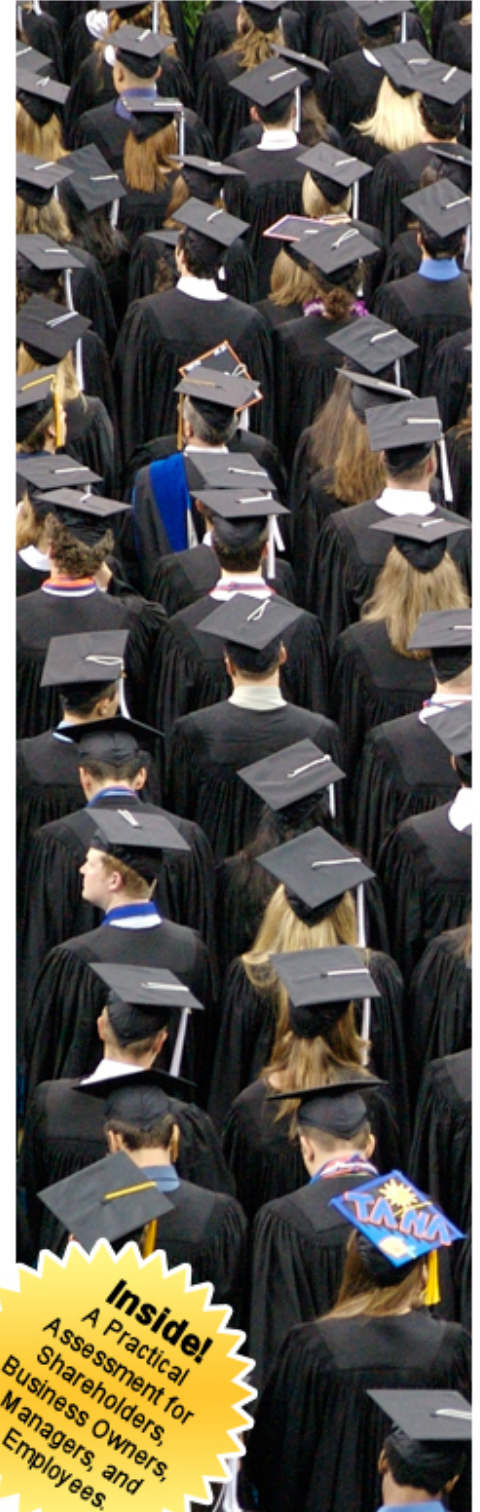
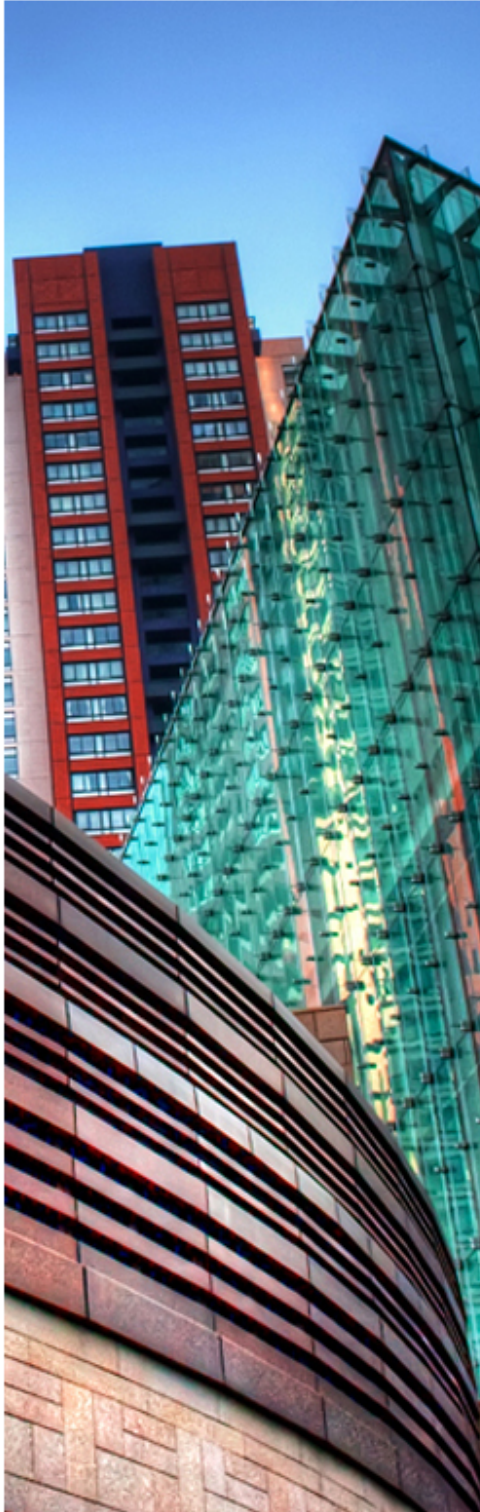




# New Standards

for Long-Term Business Survival

by Jonathan T. Scott Edited by Walter R. Stahel



**Inside!**  
A Practical  
Assessment for  
Shareholders,  
Business Owners,  
Managers, and  
Employees.

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# **New Standards for Long-Term Business Survival**

**by: Jonathan T. Scott**  
**edited by: Walter R. Stahel**

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Every single social and global issue of our day is a business opportunity in disguise.

Peter Drucker  
*The Practise of Management* (1954)

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- The author's website ([www.jonathantscott.com](http://www.jonathantscott.com)), and,
- The websites of numerous environmentally conscious organizations including **Green Cross International**, **CSR Europe**, and the **Responsible Business Forum...**

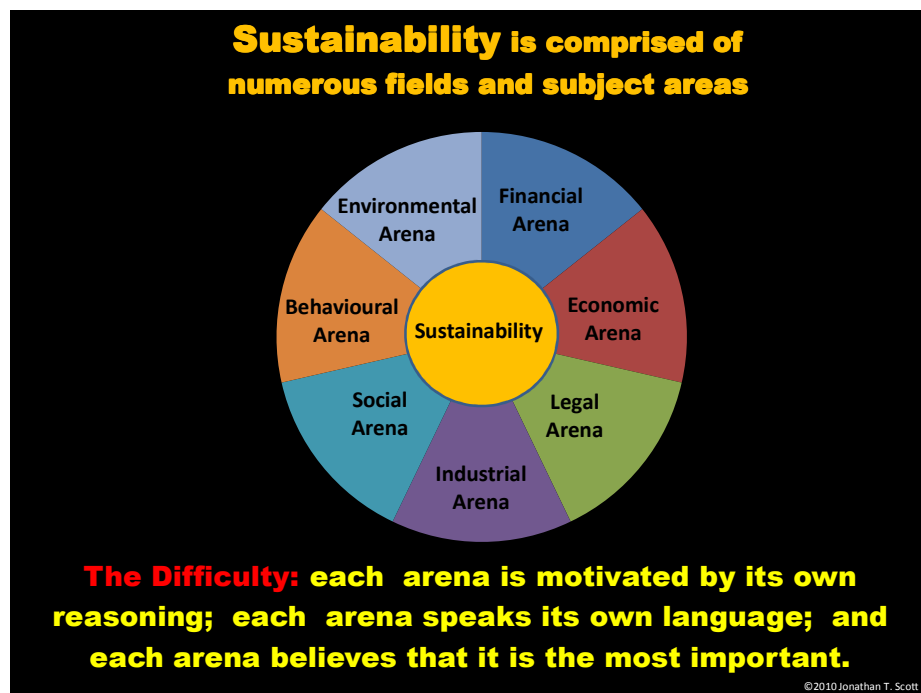
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# INTRODUCTION

Although it has been reported that over 300 definitions of 'sustainability' exist, *the capacity to continue into the long-term* is a more-than-adequate way of describing what the word means. Naturally, some people may not agree with this simplified definition because every discipline that has a stake in sustainability sees it from its own perspective and assumes that its approach is the best. Environmentalists tend to look at sustainability from a carbon emissions or a 'green' angle, others like to place it under the heading of 'corporate social responsibility', and so on. Ironically, the end result desired by most groups is virtually identical and involves long-term continuance in one form or another, but I'm getting ahead of myself. This is a business book, which means that understanding sustainability from a business standpoint requires developing an awareness of what the words 'long-term' encompass before analytic thought does its (necessary) reductive work. Rather than building up from particulars to generals (the empiricist method), one must begin with generals — an intuitive wisdom of the logic behind thinking in the long-term, what it entails, and why it's important. It's difficult to gain an understanding of sustainability by focusing on one area (see the diagram below). The problem with this approach is that once a few facts become clear it's tempting to believe that they possess an independence all their own and to rest in them and believe that they are the foundation of what is being sought (theologians call this 'idolatry'). Dividing the world into parts is something we all do to ease understanding, but in doing so something is always devalued and what is diminished is often an awareness of and contact with that which can only function as a whole.



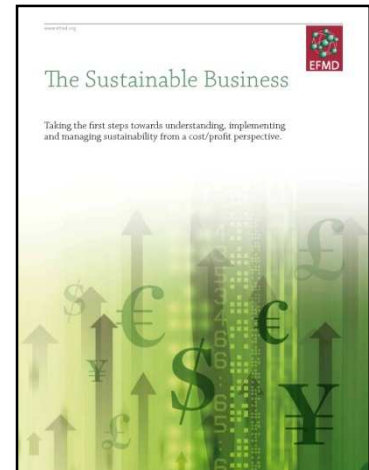
Ironically, although understanding sustainability requires a firm grasp of the big picture, teaching it and applying is best begun by starting at one logical point and conveying its basics to others in a way that *they* understand. To this end, I have chosen to introduce sustainability by focusing on what companies known for their pioneering sustainable business practices (e.g.: *Interface*, *Caterpillar*, the *Sierra Nevada Brewing Company*) say is the best place to begin: waste elimination, i.e.: the elimination of unnecessary expenses - including *future* expenses - in every conceivable form so as to increase profits and facilitate longevity and competitiveness. These expenses consist of the costs associated with short-term thinking and waste, the spiralling cost of raw materials and resource deficits, costs created or exacerbated by poorly designed

products and production processes, the costs of climate change (e.g.: property damage and crop failure), and the costs of unemployment and underemployment - to name just a few. The overall purpose is to optimize what British business consultant John Elkington referred to in the 1980's as the 'triple bottom line':

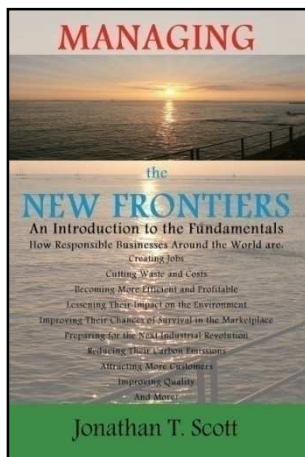
- long-term wealth generation,
- job creation, and,
- resource maximization ( and the elimination of environmental degradation).

The good news is that by introducing sustainability from a business and financial perspective to business students, managers and employees, these folks often willingly and enthusiastically want to learn more about the other subject areas that sustainability encompasses including environment issues, corporate social responsibility concerns, the role of government and legislation, and even human psychology.\*

Please note that because of the sheer scope of what long-term means in a business context, ***New Standards for Long-Term Business Survival*** is designed merely as a starting point for application purposes and/or curriculum-building. To learn more, you are encouraged to download the acclaimed 152-page book, ***The Sustainable Business*** which is distributed free of charge by its publisher (EFMD) in English, Polish, Russian, Portuguese and Mandarin Chinese (with other languages on the way) from the websites of the following organizations:

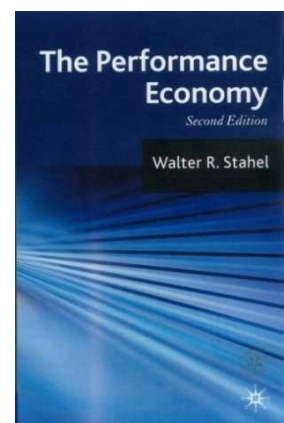


- ***The European Foundation for Management Development***, Brussels, Belgium ([www.efmd.org](http://www.efmd.org)),
- ***Sustainable Business Performance***, Warsaw, Poland ([www.sustainbusper.com](http://www.sustainbusper.com)),
- ***The Product-Life Institute***, Geneva, Switzerland ([www.product-life.org](http://www.product-life.org)),
- ***The author's website*** ([www.jonathantscott.com](http://www.jonathantscott.com)).



For more information about waste elimination (a.k.a.: efficiency) and sustainability, as well as how they relate to management theory and practice, you are welcome to read ***Managing the New Frontiers***, which is also available as a free download from the organizations mentioned above.

After the basics of waste elimination have been grasped, it is recommended that you progress to ***The Performance Economy*** by Walter R. Stahel. Published by Palgrave MacMillan, ***The Performance Economy*** is based on 30 years of Stahel's research and application in the field of sustainability.



\*My belief that businesses and business students understand sustainability better if it is presented from a business standpoint rather than from an environmental or corporate social responsibility standpoint was supported at the 2011 EFMD conference for university presidents and deans by Dr. Danica Purg, founder and President of the *IEDC-Bled School of Management* (Slovenia), and the founding President of the *Central and East European Management Development Association* (CEEMAN).

## Part I: Understanding Waste

Imagine a business taking 30%, 40%, 60% or more of its hard-earned revenues, placing this money on a pyre, and burning it. If that is too difficult to imagine, try to picture a business flushing its revenues down a drain or throwing them away as if they were garbage. As preposterous as these scenarios may seem, businesses around the world perform the equivalent of them every day – and because discarding money is not conducive to long-term business success, it is here that the story of modern-day sustainability begins.

Back in the 1970's, the United States was wracked with a growing number of costly problems that were often explained away as a necessary component of conducting business. For example, in the state of New York, children living in an area named Love Canal began developing rare forms of cancer and other illnesses at a rate that far exceeded what was considered normal (the residents eventually learned that their community had been built on top of a toxic waste dump). In other cities across the country people were told to stay indoors to avoid the harmful effects of smog. And in Ohio, the Cuyahoga River, one of the state's main waterways, caught on fire after becoming saturated with oil, chemicals and garbage.

Further south, in Chattanooga, Tennessee, a similar story had been unfolding for years. According to the *World Resources Institute*, Chattanooga was once renowned for its natural beauty, but as a means of facilitating job growth and economic prosperity the city decided to attract a variety of industries (including textile mills, chemical plants, and coke foundries) into its confines without first considering the short-term profit models that drove these businesses. As long-term planning continued to be thrown to the wayside, the region slowly morphed into a thriving industrial waste site. Soon its riverfronts were clustered with factories and its mountains were reduced to what looked like stains behind thick clouds of industrial smoke.

By the late 1960s, companies were dumping toxic waste into the area's rivers at an increasing pace and the air quality was, according to federal authorities, the worst of any city in the United States. People driving cars had to turn their lights on in the middle of the day and the mountain ridges often could not be seen from the city below. Girls covered their heads with scarves so that soot would not get in their hair on the way to school. Meanwhile, tuberculosis cases grew to three times the national average and other problems began to emerge. As times changed and industries refused to change, a significant number of manufacturing jobs became obsolete – and in what became a familiar pattern across numerous American industrial cities, unemployment grew, bringing crime, social unrest and racial tensions, and ultimately, flight to the suburbs and abandonment of downtown areas (source: [www.wri.org](http://www.wri.org)).

Faced with these and other mounting problems, as well as the unprecedented nation-wide healthcare and pollution cleanup costs resulting from them, the federal government introduced a series of laws that restricted the amount of pollutants a business could dump while making companies responsible for cleaning up the messes that they created. And needless to say, the majority of America's business communities angrily reacted by claiming that these laws would greatly damage the nation's businesses as a whole, resulting in massive employee lay-offs, huge rises in the cost of products and services, and a decline in the economic prosperity and competitiveness of the country.

Imagine the surprise then when the *3M Corporation* publicly stated that it not only welcomed the new cleanup laws, but that it would voluntarily go beyond them by setting higher standards. *3M* administrators confidently made this announcement because one of their managers, a Chinese immigrant named Joseph Ling, had successfully explained to them that the truckloads of garbage the company regularly sent to landfill sites, and the smoke billowing from its factories, and the discharges flowing from its drainage pipes were nothing more than signs of waste – and that waste is irrefutable proof that a business is hemorrhaging money (today, waste is defined as not obtaining 100% from purchases and investments). Ling went on to rationalize that if *3M* made efforts to reduce its waste, substantial cost savings could be enjoyed in



Joseph Ling

terms of lower raw material expenses, fewer disposal expenses, and reduced pollution cleanup costs.

Further shockwaves were created when the company declared that it would rely on two pioneering methods to eliminate its waste. First, rather than collect and treat waste after it was created (as the law stated), 3M declared that it would prevent waste at its source before it became a problem. Second, the company insisted that front-line employees would play an integral role in obtaining this objective (the usual method at the time was to employ engineering specialists and pollution control consultants).



Ling's ground-breaking waste elimination program began simply enough by asking employees to stop being wasteful. Leaks, spills, and other forms of material waste were reduced or eliminated; scrap material was recycled back into production processes; products were reformulated using less toxic and more sustainable substances; and equipment and manufacturing processes were redesigned so that they required fewer raw materials and less energy to produce.

Fifteen years and hundreds of improvements later, 3M discovered that its efforts had lowered overall waste and emissions by 50% and had resulted in the

company saving over \$500 million in costs. In fact, the program was deemed to be such a success that the company launched an improved version of it in 1990 with the intent of reducing additional waste and emissions by a further 90% in ten years. Dozens more efficiency projects were launched and millions more dollars were saved before employees and managers figuratively stepped back and wiped their brows, firmly believing that there were no cost-effective projects left to pursue. Unbeknownst to them, however, an independent 3M plant in Midland, Michigan thought differently. Entrenched in the belief that eliminating waste is a never-ending process, plant administrators set two new objectives designed to push themselves and their employees further. The first objective was to cut waste and emissions an additional 35%. The second was to integrate local health and environmental experts into the program – a move that introduced workers to different perspectives and provided them with new ways of thinking. Working with the community in which the plant was located – as well as with outside environmental activists and pollution control specialists - employees were able to initiate 17 more projects that lowered costs an additional \$5.4 million.

Shortly thereafter, in 2005, 3M's program celebrated its 30th anniversary with enough accumulated data to reveal that Joseph Ling's waste elimination idea had saved the company over \$1 billion in costs.

## **Explaining Ling's Waste-Reduction Concept with a Practical Example**

Joseph Ling's legacy includes not only looking for symptoms of waste, but also determining the cause (imagine a patient with a hacking cough going to a doctor and being treated for the cough rather than the cancer that is causing it and the value of understanding symptoms and causes becomes apparent). Just as importantly, Ling's whole-system approach involved every employee in finding and eliminating the cause.

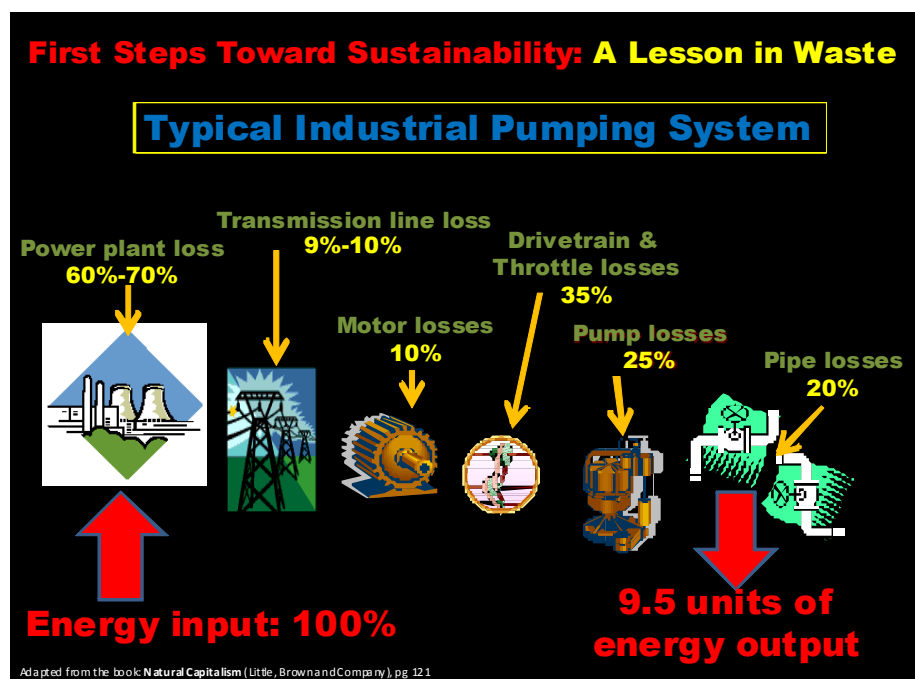
A good way to explore waste and costs and how expensive the overall picture can get is with motors. Every business contains motors; some have thousands. Even offices can contain scores of motors because motors come in a breath-taking array of sizes from the enormous to the miniscule and are behind just about everything that moves mechanically (e.g.: a fan in a computer, a coolant pump in a refrigerator, or a machine on an assembly line). Combined, a business's motors can account for up to 60% or more of its overall fuel costs. Indeed, motors consume so much electricity that the amount they use over their lifetime *always* costs



more than the purchase price of the motors themselves. For example, a new electric motor purchased for \$1,500 can cost as much as \$13,000 a year to run and a typical 100-horsepower AC induction motor purchased for \$5,000 can require \$35,000 worth of electricity to operate annually (some motors actually consume more than the amount of their purchase price in electricity costs every *week*). Taking the time to purchase an efficient motor should therefore be an integral part of the motor-buying process because just a four-percent increase in efficiency can amount to more than \$20,000 in electricity savings over the life of a typical 100-horsepower motor. That being said, these costs represent only one part of the complete picture.

Further 'big picture' costs that need to be added to the equation include those associated with operations waste. The diagram below reveals the amounts of waste inherent in a common industrial pumping system. As much as 70% of the energy produced from burning coal is lost in the power plant due to poorly insulated and poorly designed furnaces. From the amount of electricity that emerges from the plant, 10% is lost due to inefficiencies in the transmission lines. From what emerges out of the transmission lines, 10% is can be lost because of inefficiencies in the motor, and so on. It all adds up to huge financial losses for businesses and consumers because the more that is wasted, the more has to be purchased.

Now let's go even broader. All together, the amount of electricity motors consume translates to around 40% of the world's electrical power or roughly 75% of all industrial electricity usage. And since most electricity is derived from burning coal, an examination of the costs behind coal must be taken into account. A good example is a recent 2011 Harvard University medical study by Paul Epstein ('Full Cost Accounting for the Life Cycle of Coal') which concluded that coal mining and



the use of coal for generating electricity costs the United States economy between \$140 billion to \$242 billion a year. These costs include premature deaths associated with coal mining, the expenses of lung and heart disease, the cost of climate change and other environmental impacts as well as the negative financial effects on local economies from lost business and tourism in dirty coal-mining areas. What has not yet been factored in to this data is the effect coal consumption has on groundwater pollution including benzene, arsenic, mercury, lead and other coal-producing carcinogenic materials that typically find their way into household water supplies. The study concluded that these and numerous other unseen pollution-related health impacts could raise the total costs of mining and burning coal to \$500 billion annually. Indeed, cleanup costs for a 2009 rupture of a fly ash containment area in Harriman, Tennessee alone (fly ash is a toxic residue left over after coal is burned, which is often mixed with water to keep it from dissipating into the air) are estimated to be over \$ 1 billion (this particular disaster flooded over 300 acres of forest, wiping out roads and railroad tracks and destroying several homes, thereby making it the worst industrial accident in American history).

Obviously, as the demand for electricity (and other forms of energy) increases due to growing populations and rising affluence, such large amounts of waste and costs become difficult to ignore - and governments cannot afford to continue building power plants to compensate for wasteful infrastructure, nor can they continue to ignore big-picture externalized costs that are traditionally dumped onto consumers.

Lastly (keep in mind that these examples are by no means complete), disposal costs must be included in the mix. Motors are heavy, which means that throwing one away can be expensive (landfill disposal costs are usually based on weight). It's therefore necessary to know how much it costs to discard a motor when it reaches the end of its product life - particularly if the local landfill site is full, or if it's discovered that the motor contains toxins that render it impossible to dispose of in a straight-forward manner. One business throwing away its toxin-filled motors may seem insignificant, yet when hundreds of thousands of businesses do the same, serious problems can arise – and a similar tale can be told about virtually every tool, piece of equipment, production process and product in business.

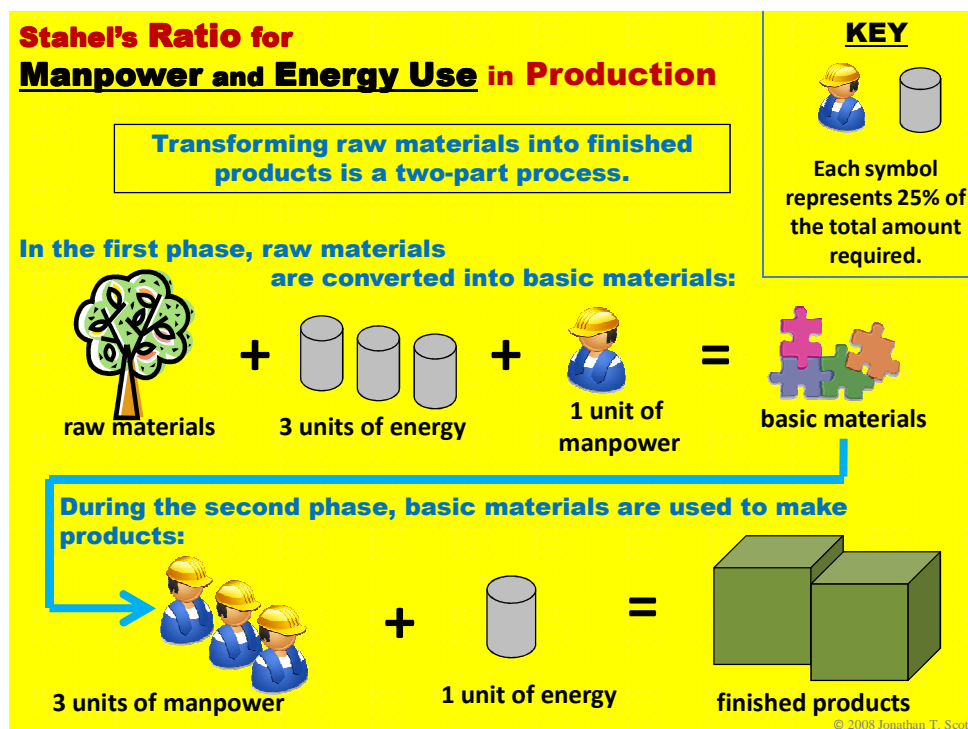
## Waste Reduction and the Third Dimension (Product-Life Extension)

Coincidentally, at the same time Joseph Ling was dealing with production waste at 3M, several far-sighted individuals working for the *European Commission* woke up to the reality that oil prices would probably continue to increase as the world's populations multiplied. Additionally, it was acknowledged that no matter how many jobs new and growing businesses could create in the coming years it would probably not be enough to satisfy demand. Not knowing how to resolve these challenges, a call for research papers was made to investigate the relationship (if there was one) between energy use and manpower.

The puzzle was solved by Walter Stahel, a Swiss architect working out of Geneva, Switzerland. Sometime earlier, Stahel had discovered that roughly three-quarters of all industrial energy consumption is associated with the extraction and/or production of basic building materials (e.g.: wood, steel, glass...). The remaining one-quarter, he observed, is used in the transformation of these materials into a finished building. Conversely, he noticed that the opposite is true of



labour. About three times the manpower is used to convert basic materials into a building than is used in the extraction and production of basic raw materials.



Stahel used this information to conclude that it's less wasteful and more cost effective to remodel old buildings rather than construct new ones. In other words, extending the life of a building draws out the value of the labour and energy that went into it

(i.e.: increasing the use of a building to twice its intended life means that the original costs of its materials and energy are halved and the cost and subsequent waste of constructing a new structure are avoided). Using the grant awarded to him by the *European Commission*, Stahel went on to prove that his life-extension principle also applies to products. Put another way, it is less wasteful and more cost effective to reuse, repair, remanufacture, or recycle existing products (which facilitates job creation and profit maximization) than to manufacture new products from virgin raw materials.

As the illustration on the previous page shows, Stahel's award-winning observation not only reveals that the first stage of many manufacturing processes provides jobs for the least amount of people (while producing the most amount of greenhouse gas pollutants), but also that *more money is usually spent on energy than labour when it could be the other way around*. In other words, by extending the life of the materials that go into a product or extending the life of the product itself, less energy is used, less waste (and pollution) is created, and more people are employed with no long-term increase in costs. Indeed, reuse and remanufacturing costs tend to decrease with product life-extension practices.

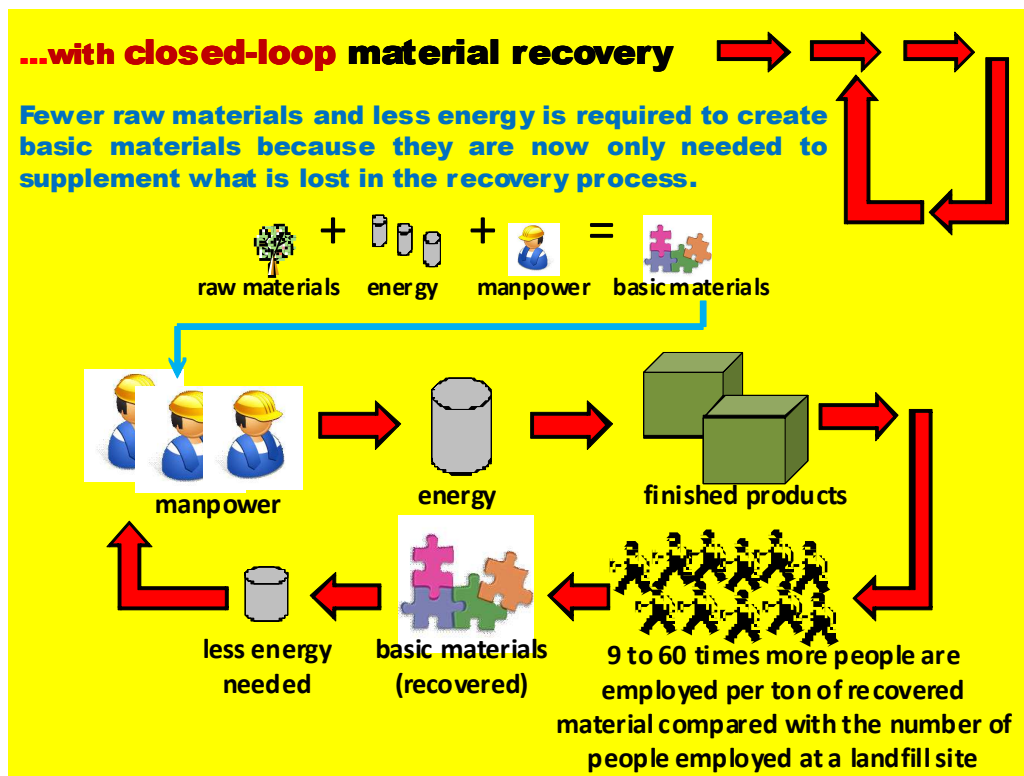
To expand and build upon his discovery, Stahel founded the *Product-Life Institute* to research and promote a closed-loop economy (i.e. a circular economy) as opposed to today's

'linear' economy in which finished products are thrown away after they have been purchased and used. The idea of a closed-loop or circular system is to reuse materials, labour, energy and other resources for as long and as often as possible to promote a healthy, sustainable economy in which long-term wealth generation, job creation and waste elimination are the end result.

Generally speaking, there are two ways Stahel's closed-loop or circular economy can be achieved. The first is to reuse, repair, or remanufacture products and their materials, which facilitates job creation and decreases virgin material usage (by reusing molecules). The second is to optimize the profitability of products by *converting them into a service* so as to keep the product's materials in the hands of the manufacturer in order to lower raw material and production costs.

The key behind turning a product into a service is in understanding that most consumers, when they purchase a product, are not particularly interested in owning the actual physical product; rather, they seek the benefit the product provides. For example, when customers buy home heating oil most of them don't want to own a dirty, toxic, expensive fossil fuel, nor are they particularly interested in the expense of delivering, storing, and burning the oil. Instead, they seek the heat the oil provides.

A classic example of this is seen in *Safechem*, a division of *Dow Chemical* that incorporates benefit provision into a service portfolio range that's offered to industries across Europe. These services include waste collection and refinement, machine parts washing, oil collection, and chemical recovery and disposal. In short, *Safechem* is a service company. Its customers do not have to purchase the solvents they need to conduct their operations nor do they have to pay for costly application equipment or high disposal fees. Instead, *Safechem* travels to the places where its customers work and applies its solvents for them. Afterwards, *Safechem* cleans up the work site, transports the used chemicals back to its workshop, and cleans and/or recycles everything it used - including the solvents, the washers, the spray guns, and the steel drums - in preparation for the next customer. By selling 'square meters of cleaning' rather than gallons of solvents,




*Safechem* saves and makes money in three important ways: (1) it reduces waste and the cost of waste, (2) it reuses its raw materials instead of making (or buying) more, and, (3) it re-sells the same product over and over again. Moreover, by providing a service rather than simply selling a product, the company is obliged to focus more intently on the benefits its customers seek - which is the cornerstone of optimal selling.

Similar schemes have been devised for home washing machines (the customer only pays for the number of washes), computers, cars, refrigerators – almost any product that is traditionally bought, used, and then thrown away. The *Michelin* tire company, for example, has moved into selling the performance of truck tires rather than just tires, because it can produce a long-life tire that's easy to re-tread, thereby earning a higher profit. If a re-treadable tire that is sold as a service can travel twice the distance (e.g.: the distance the tire can travel is sold rather than the tire itself – with the tire remaining under the control of the company) the

company earns more money whereas if it produced and sold a longer-distance tire, the buyer would probably not pay the higher price involved to pay for R&D and disposal costs (note also that manufacturing a new tire requires, among other expenses, 56-liters of oil to produce).

The hotel industry has benefitted from a similar practice for years thanks to linen suppliers that provide a service rather than sell a product. Many hotels do not own their linens (sheets, towels, etc). Instead, they belong to a textile

**Key Teaching and Learning Point**




**Joseph Ling's**

**Waste Minimization**

**and Walter Stahel's**

**Closed-Loop Economics**



**Save Money and Make Money in 3 Ways:**

- 1. They prevent waste,**
- 2. They re-use valuable resources, and,**
- 3. They promote the re-selling of products (and the resources in them) multiple times.**

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company that does the washing and repair with an average economic break-even point of around three years per item. In other words, the linens have to last at least three years before the company can make a profit so the company is driven to lease high quality textiles that last longer. A similar example, called pay by the hour, is found in the gas turbine industry.

## Putting the Infrastructure in Place: A Call for New Standards

A common argument against material recovery and closed-loop business practices is that the infrastructure for returning used products back to their places of manufacture for purposes of 'de-manufacturing' and reuse does not exist. Significant amounts of capital will therefore be required. Although this is true, it is not a valid argument. Consider the light bulb. When the light bulb was perfected in the late 1870's no electrical power plants existed, no transmission lines criss-crossed towns and countries, no houses or businesses were wired for electricity, and no lamps were being manufactured. Nevertheless, the financial (and other) benefits of the light bulb outweighed the cost of the infrastructure needed to support it so the necessary capital and investment was eventually - and willingly - put forward. For the same reason, new, government-mandated standards, coupled with financial support (as well as the nurturing of a network of cooperating businesses), will play a critical role in creating and promoting a circular, closed-loop economy.

Author Roger A. Pielke reiterates the principle behind this belief by stating that pioneering inventions and innovations are not enough to guarantee economic progress. As he put it, few people remember that in the United States during the 1800's, a nation-wide lack of standards meant that weights and measures - including measured units of electricity - could have as many as eight definitions, which overwhelmed industry and consumers with a confusing array of incompatible choices. Meanwhile, Germany's standards agency,



established in 1887, was busy setting rules for everything from the contents of dyes to the process for making porcelain - with other European countries following suit. The result was higher-quality products that helped Germany's trade growth exceed that of the United States in the 1890s. Pielke goes on to state that in 1901, the United States became the last major economic power to establish an agency to set technological standards and that afterwards, a boom in product innovation occurred in almost all aspects of life. These technological standards not only promoted innovation, they also helped protect national industries from falling behind those of another. Similarly, today, China, India and other rapidly growing nations - including those in the European Union - are adopting new standards that speed the deployment of new technologies and products. Companies that cannot compete risk losing overseas markets while innovative goods from other countries flood their domestic markets. A good strategy, therefore, is for a nation to not only continue developing higher standards and better infrastructure, but also to devise a strategy to apply its new and tougher standards consistently and quickly. This approach is taken by Japan's *Top Runner* program, which sets energy-efficiency standards by identifying technological leaders in a particular industry and mandating that the rest of the industry keep up with its innovations. As technologies improve, higher standards are therefore established that enable a virtuous cycle of improvement. At the same time, government should be working with businesses to devise further multidimensional standards and incentives to ensure that consumers don't balk at products because they sacrifice cost for efficiency (adapted from: 'Let There Be More Efficient Light' by Roger A. Pielke, *International Herald Tribune* ([www.ihrt.com](http://www.ihrt.com)), 10, March 2011).

## One More Time: Why is Waste Elimination Important?

It is unrealistic for businesses to expect profits and taxpayer money to indefinitely cover the expenses associated with industrial waste. Simply put, economic prosperity and job security are compromised when the financial damage from the waste a business creates exceeds the good that the business generates. Moreover, businesses and industries that fail to comprehend the issue of finite resources and increasing demand should elicit no sympathy when they claim they 'didn't see it coming'. No manager wakes up and suddenly discovers that his or her business can no longer afford its raw materials, or that consumers (or government) will no longer tolerate wasteful practices, or that a new law has made certain chemicals or forms of production illegal. Instead, what usually happens is that management chose to ignore the warning signs – and now, suddenly, it can no longer afford to sit passively and do nothing.

Following is a look at several market force trends that are currently impacting businesses either directly or indirectly through suppliers and supply streams and are redefining how businesses compete.

### Rising energy prices

As world populations increase, become more affluent, and use more energy, the cost of non-renewable energy escalates accordingly. This is why former *Shell Oil* president John Hofmeister recently stated that by the year 2012 Americans will be facing a 66% increase in gasoline prices. When factored in with the inefficiencies of the average combustion engine (which wastes up to 85% of the fuel it consumes) or the amount of energy wasted in buildings (50% wastage is quite common), it's easy to see how high energy prices not only affect a business's bottom line, but can also instigate change. For example, legislators in California recently passed laws stating that the amount of leaked heating and cooling in HVAC systems (which averages around 30%), must be reduced to 6% or less; and that 15% of the light that flows upward from streetlamps and car park lights must be lowered to 6% or less. It has even been proposed



that by 2013, every big screen television sold in the state must use 49% less energy compared to current levels. Why? Because setting tougher new standards helps deficit-stricken governments like California's in three ways: (1) it reduces energy and resource demands by promoting efficiency, (2) it decreases the need to build more multi-billion dollar power plants, and, (3) in cases where fines can be levied, it fills empty government coffers with a new source of revenue. Put another way, why should responsible people and businesses that don't waste resources be forced to pay for those that do? Waste does not equate with freedom nor is it a God-given right. Expect more governments to follow California's lead.

### **Increases in raw material and commodity costs**

Raw material costs increase for the same reason that energy prices rise: demand coupled with a lack of supply. Currently, 20% of the world's population uses 80% of the planet's resources and as world populations continue to grow and become more affluent the demand for the earth's finite resources increases. For example, minerals like tin and zinc are rapidly dwindling while 'rare earth' elements (which are not rare, but rather are toxic and expensive to extract and refine) and other high-tech materials



needed to produce industrial magnets for turbine generators, create photoelectric cells and opto-electrics (lasers) and make micro-electrics for computer chips and steel resistant to high temperatures (e.g.: niobium in jet engines and gas turbines) are experiencing dramatic price increases. The price of indium (which is used in slim-screen televisions and solar batteries), for example, has increased ten-fold over the past decade. Even metals as ubiquitous as aluminum are predicted to be in short supply within 100 to 150 years. Agricultural commodities are suffering the same fate. Floods and bad weather in the world's major cotton nations (India, Pakistan and China) have resulted in prices rising 80% since 2010 and droughts combined with floods have triggered increases in basic foodstuffs resulting in rioting and an expected doubling of food price rises in 2011. Both NATO and the Pentagon have released reports stating that no nation can maintain security and stability without a steady supply of affordable energy and food - the latter being impossible without adequate supplies of fresh water. This is important to note because the availability of fresh water is becoming so problematic that both NATO and the CIA predict that wars will erupt over it in the near future. Once again, wasting resources – or championing systems that result in the wasting of resources – cannot continue to be tolerated. Expect an increasing number of governments to take action.

### **Increases in waste and disposal costs**

During a ten-year period in the United States, the average cost of disposing one ton of garbage into landfill rose 425%. And that number continues to rise as land areas where material waste can be safely deposited becomes scarcer. Indeed, many island nations such as the UK and Japan have no more available land onto which waste can be dumped. This is why paper, plastic and other reusable materials are increasingly being turned away from landfill sites. The bottom line is that throwing stuff away costs money - and the bigger



the business and the more it throws away, the greater the costs involved. More to the point, both the American EPA and the Scottish EPA estimate that the true cost of waste in a business is often 5 to 20 times greater than what is seen. This is not only unacceptable in terms of resource waste, for most businesses it is financially untenable.

## Changes in waste legislation

Quick. Name three countries in the world that are not in debt. As governments struggle to deal with historic deficits, they are rapidly waking up to the fact that the world's current economic model – which is based on a linear, throw-it-away-after-using-it, 'materials economy' - is creating too many costly problems. And to deal with these problems, directives designed to mitigate future waste problems and expenses are increasing at a breath-taking rate. Examples include the WEEE (Waste Electric and Electronic Equipment) initiative which took effect



in 2005 (designed to mitigate the incineration and dumping of electronic waste) and RoHS (the Restriction of Hazardous Substances), a 2006 law that bans electronic equipment containing certain levels of cadmium, lead, mercury, and other toxic substances. Further regulations include the 2007 EUP directive (Energy Using Products), which requires producers to design and track products according to closed-loop waste-reduction practices, and the REACH authorization (the directive on Registration, Evaluation, and Authorization of Chemicals), which requires manufacturers to publicly display toxicity data and prove that the chemicals used to make products are safe. Last but by no means least, EU Waste Directive 2008, which went into effect last year, states that re-using goods and extending the service-life of goods are two strategies that must be fulfilled to mandate waste prevention. Rest assured that more such legislation is on the way.

## The costly build-up of toxins - and increases in environmental laws

It has been estimated by the American EPA that it will take \$1 trillion to clean up America's trichloroethylene residues (trichloroethylene is a toxic substance used to remove grease from metal) and that \$100 billion is spent in the USA on medical expenses related to polluted air alone. Added to this is a 2001 survey that found perfluorooctanoic acid – a substance found in food wrap, Teflon, and stain-resistant fabric coatings – swirling in the blood of 96% of the children it sampled - one of dozens of toxins now found regularly in human bodies. Traces of arsenic, mercury, and benzene are also common alongside heavy metals such as lead, cadmium, zinc, chromium, and copper. In river sediments and estuaries these substances are ubiquitous. Escalating levels of polycyclic aromatic hydrocarbons (PAH's), polychlorinated biphenyls (PCB's), and pesticides only make matters worse –as do residues from billions of doses of prescription drugs which are also now found as a matter of course along shorelines and wetlands. Swallowed to combat cancer, pain, depression, and other ailments, most medications do not harmlessly dissolve into patients and disappear. Instead, they exit the body and work their way into the environment. Researchers in Canada found a dozen toxic drugs in water samples taken from the St. Lawrence River in Quebec, while across the border in the USA a vast array of pharmaceuticals (including antibiotics, anti-convulsants, mood stabilizers, and sex hormones) were found in the drinking water supplies of 41 million Americans. In short, many scientists believe that toxin build-up in air, soil, and water is more costly and damaging than climate change – which is why environmental crimes committed by negligent company directors can now result in fines of over \$1million and jail time of up to ten years.



Still not convinced? Think about this: In 2008, the *Securities and Exchange Commission* was petitioned by representatives of seven American states to force companies to reveal the actions they are taking to deal with climate change. This was not due to a sudden marked interest in endangered species or nature's beauty, but rather a belief that investors should have the opportunity to avoid investing in companies that are ignoring the spiralling costs of a changing environment. Bottom line: digging up the earth and turning it into waste (i.e.: future costs and problems) is no longer a viable business model.

## Changes in customer demands and expectations

A major telecom manufacturer recently stated that in 2007 it received 50 request for proposal bids (out of 400) asking for information on the company's sustainability initiatives; in 2008, the number increased to 125, and in 2009 it was over 200. It doesn't take a rocket scientist to deduce that B2B customers and B2C customers want lower costs, fewer toxins, less guilt, less waste, and more incentives associated with the products they buy. To assist responsible customers, firms such as *Planet Metrics* collect information on raw material sourcing, production methods, delivery systems, and energy use – indeed all aspects of a product's life cycle – to provide a clearer picture of the chemicals used to make it or what might happen if oil prices increase or water becomes scarce or a law changes, or a higher price is placed on CO2. In other words, it's now possible for buyers to know in advance if the products they purchase are more likely to experience cost increases (or get hit by new legislation) when big-picture changes become reality – and for these same buyers to be notified of responsible companies that prepared for change in advance and therefore don't have to raise the price of their products and services.

## Competitive advantage

During the 2001-2003 recession, global carpet giant *Interface* (the world's largest producer of commercial carpet tiles) faced a 36% worldwide slump in carpet sales. Yet at the same time the company gained market share because it had changed its business model so that it would not be negatively affected by the big-picture changes mentioned in this section. More recently, the *Tennant* floor maintenance company introduced a commercial floor cleaner that electrically charges tap water to behave like a heavy-duty cleaner. The safe, toxin-free result cleans floors better than anything else on the market, thereby enabling customers to forego the expense of purchasing cleaning solvents and the cost and time of training employees how to use them. In addition, valuable storage space that once held toxic cleaners is now a thing of the past for *Tennant's* customers. The message could not be clearer: innovation is a key component of long-term thinking. Companies that maintain the status quo (or who think that 'greening' their products is good enough) may discover that when they finally take action their competitors have already passed them by.



## Transparency issues

In 2010, *Google* added carbon emissions data to the 'key statistics and ratios' section of its finance pages. Meanwhile, the FTC's new *Green Guide* helps consumers identify vague marketing claims by clarifying how companies can use words such as green, eco-friendly, compostable, and recyclable. Even mobile phone apps are getting in on the act. The *Barcoo* app, for example, scans product barcodes and provides instant information that includes (among other things) the sustainability footprint of the manufacturer. Business writer Andrew Winston says it best - transparency (in terms of the safety, morality and ethics of products and production) comes in two flavours: voluntary (information donated by the company) or involuntary (information donated by a consumer watchdog group or disgruntled customers). Guess which one is best for your business?



**Fact: the more a business wastes, the more it has to purchase.**



## The acquisition, retention, and motivation of talented employees

The ability to make a difference, feel a sense of accomplishment, work with pride and purpose and other intrinsic motivators is, to some employees, more powerful than money. 'In the competition for the best business school graduates and other high-flyers, especially once the economy starts to recover, companies that show they were not mere fair-weather friends of sustainability will be at an advantage,' the Economist magazine wrote in 2010. As if to prove this point, Ray Anderson, founder and former CEO of *Interface* carpets says that nothing galvanizes his employees more than the company's commitment to thinking ahead and becoming more responsible. And outdoor clothing pioneer *Patagonia* - itself a company that takes pride in

sustainably looking at the big picture - receives, on average, more than 1,000 CV's for every job position available. Think about how that minimizes talent search and recruitment costs.



## Unemployment and underemployment

Expenses associated with laying-off employees (as well as negative job growth in general) include loss of investment in human capital and skills (particularly in individuals that have been unemployed for a long time), social and economic deprivation (rises in crime, depression, divorce, family break-ups, poor health, lower life expectancy, etc...), and a reduction in regional and national economic growth potential (particularly from the one-two punch of fewer tax revenues and increased government spending designed to spur growth). When poverty is added to the mix these problems only intensify. Sustainable, closed-loop business practices can help offset these scenarios: for example, while carpet giant *Interface* worked to make its operations more circular and sustainable, it doubled its profits, doubled employment, and watched its stock price increase 550% over a five-year period (the company recently stated that it is now about halfway toward achieving most of its sustainability goals).

## Political unrest

Currently, the majority of the world's businesses focus almost exclusively on the 800 million or so people that sit comfortably at the top of the world's economic pyramid, while ignoring the remaining 4 billion to 5 billion that languish at the bottom of the pile. Furthermore, contrary to popular belief, the world's poorest countries have had zero or negative economic growth since the early 1980's and the years between 1990 and 1999 mark the slowest growing decade the world economy has seen in the past 40 years. Of particular concern are the approximately one billion people that live on \$1 a day or less, the 16,000 children that die daily from malnutrition, and the fact that the number of people suffering from chronic malnutrition has almost doubled since 1970. Meanwhile, in the world's poorest regions (areas like sub-Saharan Africa) \$25,000 is spent every minute servicing the debt owed to rich countries. Today, the *World Bank* estimates that the developing world spends around \$13 in debt repayment for every \$1 it receives in grants. Needless to say, this is not conducive to peace and/or long-term business and economic prosperity.



**Progress occurs when the gap between what is believed and what is actually happening grows so wide it can no longer be ignored.**

## Part II: New Standards for Long-Term Business Survival

### On-Going Waste Elimination: the First Step

Many companies that have witnessed an increase in their bottom line due to the adoption of sustainable business practices state that waste elimination is the first priority – and for a good reason. For example, imagine that a company wants to become more energy efficient by producing its own electricity and that it needs 100 kilowatt-hours of electricity to maintain its operations. It must therefore purchase a wind turbine, solar cells, or a fuel cell that can generate 100 kilowatt-hours of power. However, if the business is able to reduce the amount of electricity it uses (or wastes) by 40%, it now only needs 60 kilowatt-hours of electricity. As such, it now saves money because it requires a less-costly source of energy (e.g.: a smaller turbine, fewer solar cells, or a smaller fuel cell) and produces less waste.

The elimination and prevention of waste in a manufacturing or production setup follows the same logic. For example, several years ago, engineers at airplane manufacturer *Boeing* discovered that a production process for a landing gear support assembly was 1.6 kilometres long. So the engineers consolidated operations into a series of close-knit procedures that reduced the length of assembly by 80%. In the process, a large machine costing more than \$1 million was replaced with a \$15,000 alternative and a large ‘oven’ used for curing was replaced with a smaller one that matched the part’s size and shape and cost one-percent that of the larger oven’s price tag (the smaller oven also uses less than one-percent of the electricity of the larger oven). Further production achievements from the improved setup reduced the various stages required to manufacture metal parts from five days to 25 minutes. Next, several giant, multi-function machine tools at a number of production sites were replaced with a series of smaller, simplified machines that performed the same functions at a fraction of the cost. For example, a contoured composite part used on 777 aircraft was previously machined on a \$1 million grinder capable of performing five different functions (four of which could not be used when the machine was in operation). *Boeing* replaced this machine tool with a one-function grinder specifically designed to do only what was required. The cost of the smaller machine? \$50,000. (source: ‘Why Boeing is Big on Right-Size Machine Tools’ by Peter Zelinski, *Modern Machine Shop* [www.mmsonline.com], 2007)

Another good example of waste elimination as a core operational concept is found at *Caterpillar Inc.*, a manufacturer of earth-moving and construction equipment. In the early 1970’s, *Caterpillar* decided to open up a remanufacturing plant in Bettendorf, Iowa, close to its Peoria headquarters in a bid to lower its production costs. The idea was to test closed-loop practices and see where they would lead.

### How difficult is it to find waste and wasteful practices in a business?



These first-year university students found **over €15,000** of waste in this company in 2 hours and 45 minutes.

**Both the Scottish EPA and American EPA estimate that when waste is discovered in a business, the actual amount is usually 5 to 20 times greater than what is seen.**

© 2010 Jo nathan T. Scott

Ten years later, convinced that it was moving in the right direction, the company relocated its growing remanufacturing activities to Corinth, Mississippi and set-up shop in an abandoned factory building. Three years passed before a second *Caterpillar* remanufacturing operation was opened up across town. Soon thereafter the company began operating a third facility in nearby Prentiss, Mississippi. Today, *Caterpillar*'s Sawyer plant in Corinth receives worn engines and assemblies from all over the country - mostly from dealers who send the company around 160 tons of used equipment (about 17 truckloads) every day. On average it takes two workers a half-day of work to reduce one engine to its components. Every piece, including the tiniest screw, is saved because employees have been taught that anything placed in the trash is money thrown away.

Of course, it hasn't all been smooth sailing. One of the



The 8 Kozminski University students in this photo showed this business how it could save **€236,113** every year by eliminating its waste (author Jonathan T. Scott is on the far left).

difficulties inherent in closed loop-practices is maintaining a steady stream of used equipment. Without prior preparation it's quite possible to receive several truckloads of used products one week and then nothing for several weeks afterwards. *Caterpillar* eliminates this problem by offering its customers incentives that make them unwitting suppliers. For example, when a customer needs a new part or a new piece of equipment, he or she is first asked to submit the old one. The customer is rewarded with a new part at up to half its full price. If the customer does not hand in the old part, the full price is charged.

Additional lessons have also been learned. By designing and producing higher quality parts in advance, *Caterpillar* has discovered that it can get two or three lives out of its products. Manufacturing a component with another millimetre layer of metal on it may cost more, but the company knows that this investment will ultimately yield more profits because the improved product can be remanufactured. For example, *Caterpillar* estimates that it can remanufacture a good engine three times before it can't be used again – a practice that has produce more than \$1 billion worth of sales in 2005 at *Caterpillar*'s Corinth operation alone. Before the recession of 2009, this number grew 15% annually. Today, approximately 90% of the waste stream at the company's Corinth plant is either reused or recycled – which has sparked off similar money-saving, waste-reduction programs in local schools, government offices, and 15 nearby industries. And *Caterpillar* is now the first foreign company to be invited to build what will be the first diesel engine remanufacturing plant in China.

## Examples of Waste that can be Found in Businesses

Waste isn't found only in a garbage can or on a production line. Wasted time, people, opportunities, markets, even under-used building space also rob a business of its revenues. Examples include:

- In Tyche, Poland, an importing and exporting business began saving €28,800 per year simply by switching off unneeded lights in its warehouses.

- In 2010, *Wal-Mart* ordered its suppliers to reduce their packaging by 5%. This decreased the amount of garbage that had to be thrown away to such a degree, that the company now saves \$3.4 billion every year in disposal costs (you read that correctly, the amount being saved is actually \$3.4 *billion* per year).
- By making a few structural changes and virtually eliminating ducts and suspended ceilings (using under-floor ventilation and wiring) a six-story building can fit into a five-story structure (five-stories is usually the limit for building code heights in many towns and small cities). When super efficient windows and day-lighting are incorporated, subsequent energy costs can be reduced by one half to three-fourths – with the extra floor space facilitating additional profits (e.g.: more leasing space, more work space, more storage space, etc).
- By redesigning the common plastic milk jug so that it is more square-shaped, packaging expenses are reduced by 20 cents per jug, 50% more milk can be stored in transport crates, and cooler capacity is increased from 80 jugs to over 200 (one retailer eliminated over 11,000 deliveries to its stores per year by adopting the new jug).
- When wiring a building, use the next higher size diameter of electrical wire than that recommended by building code requirements. Thicker copper wire costs more, but because it reduces electrical resistance it costs less to operate. In a typical office lighting circuit, using a larger wire size yields about a 193%-per-year (after tax) return on investment.
- ...for hundreds of additional examples on how waste can be eliminated and prevented, please refer to the free-to-download book *The Sustainable Business* (see page 5).

## Key Teaching and Learning Points

- **Waste elimination and resource maximization are two sides of the same coin. One cannot occur without the other.**
- **Waste elimination is an on-going process. There is no finish line.**
- **Waste creation does not equate with freedom nor is it a basic human right: the world is interconnected and has limited resources – and waste impedes the well-being and security of others.**
- **Waste is a financial burden to businesses, customers, and local, national and international communities.**
- **Spending money on lawyers and lobbyists to fight against higher efficiency standards or for the right to create waste is counter-productive, self-defeating, costly and pointless.**
- **Taxing waste has the capacity to serve two purposes: (1) the money collected can fund and support infrastructure building, and, (2) businesses and industries would be encouraged to be less wasteful.**



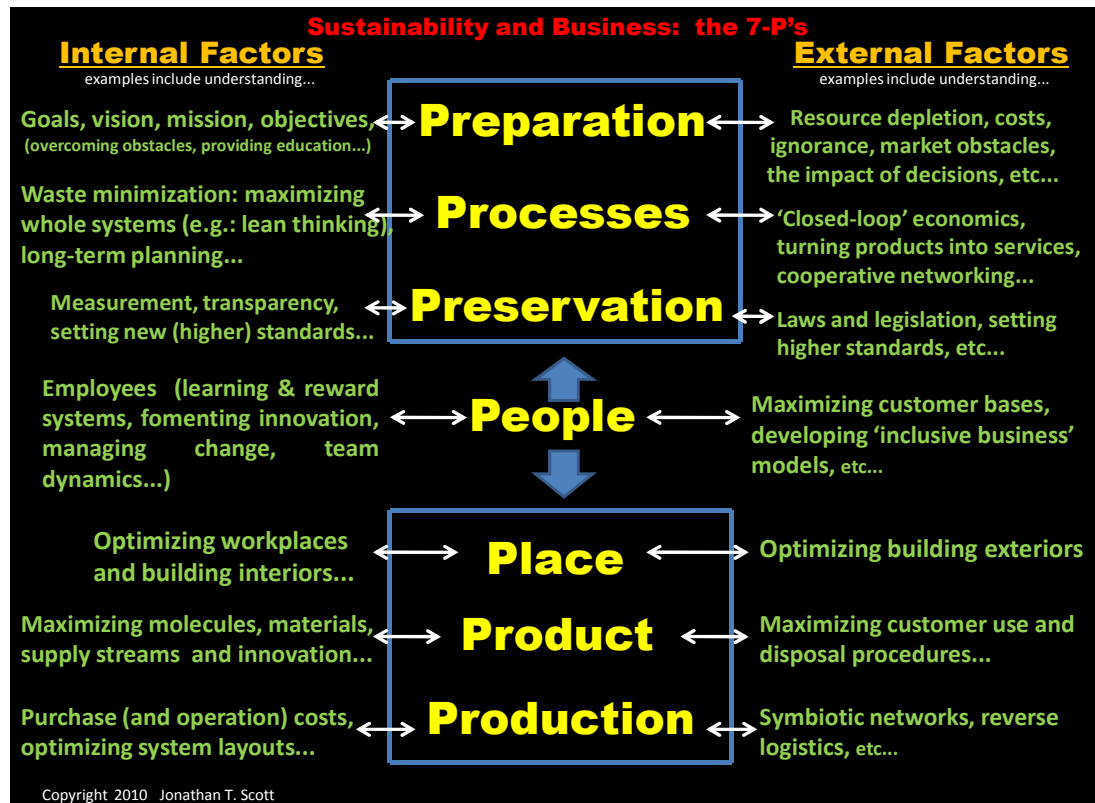
## Divide and Attack (the 7-P's)

The table below and the explanations that follow are an overview of the waste elimination process from an application and teaching perspective. This model consists of an alliteration with each subject area labelled by a word that begins with the letter P to help with memorization. The first part of the model (*Preparation*,

*Processes* and *Preservation*) is classified as 'strategic' and involves (among other things) education, motivation, and measurement. The second part (*Place*, *Product*, and *Production*) constitutes the 'tactical' aspects of application and focuses on implementation. The common thread that runs

between the two (linking them together and optimizing them) is *People*.

Note that each of the 7-P's contains **internal** aspects (which represent the internal workings of the business) and **external** aspects (exterior influences that must be dealt with). These two categories, like the 7-P's themselves, are used for explanatory purposes as each heavily influences the others thereby making it difficult, if not impossible, to determine where one category ends and another begins. In this regard, waste-elimination is much like quality in that ignoring one component compromises the entire system. Following is a brief description of the 7-P's along with a few of their internal and external characteristics:



### Waste-Elimination and Sustainability: **Key Strategic Elements**

**Preparation** (see pages 9-28 of *The Sustainable Business*) entails building a foundation for change. To a great degree, this involves accepting and understanding what a reformer is up against when trying to implement profitable, long-term practices in a short-term thinking world (500 years ago Machiavelli described this process as 'the incredulity of mankind, who do not believe in anything new until they have had actual experience of it').

Establishing a strong foundation (which includes writing down desired goals and objectives and committing to their enforcement) is necessary to instil managers and non-managers with enthusiasm, answers and support. Without this foundation, attempts at change will be prone to confusion, suspicion, disorganization, and dwindling motivation.



**Internal aspect examples:** educating employees about the importance of waste elimination; acquiring a thorough understanding of the business's internal workings (including supply and disposal streams); understanding and applying basic human psychology; setting achievable goals, missions and objectives; etc.

**External aspect examples:** understanding the forces of resource scarcity; acknowledging and accepting the growing involvement of stakeholders and activists (both local and worldwide) in business activities; understanding the long-term effects of your business's actions and decisions; overcoming the obstacles and difficulties inherent in markets and customer bases when changes are introduced; and so on.

**Processes** (see pages 47-64 of *The Sustainable Business*) are the series of progressive, interrelated steps and actions that a business performs to obtain an end result. In regards to sustainability, this means adopting long-term belief systems, philosophies, business models, and thought patterns that will successfully match a business with customer demands, core capabilities, and best practices.

**Internal aspect examples:** optimizing long-term planning; understanding and eliminating waste in all its forms; implementing lean-thinking processes; understanding and acting upon customer wants and needs; learning to manage performance; etc.

**External aspect examples:** understanding the big picture (e.g.: closed-loop [circular] economics and its effect on long-term wealth generation); understanding the need for job creation and resource efficiency; developing an awareness of cooperative networking (working with other businesses and organizations to help accomplish what one business cannot do on its own); etc.

**Preservation** (see pages 30-45 of *The Sustainable Business*) involves the protection, maintenance and safeguarding of the sustainability process. Specifically, preservation is the act of facilitating wanted change and innovation, building upon it, and keeping it moving in a positive direction.

**Internal aspect examples:** collecting and displaying real-time measurement to satisfy the human desire for short-term satisfaction by providing instant feedback and a chance to be rewarded for improvement.

**External aspect examples:** keeping ahead of laws, pending legislation, new business and industry standards, innovations, competitive trends and changing consumer demands.

### Waste-Elimination and Sustainability: **Key Tactical Elements**

**Place** (see pages 80-98 of *The Sustainable Business*) – the buildings and areas (e.g.: factories, offices, warehouses, stores, homes, etc) where work is performed and/or products are sold.

**Internal aspect examples:** optimizing building interiors and workplaces to facilitate increases in goal achievement, efficiency, production, employee comfort, and sales and profits.

**External aspect examples:** maximizing the location, shape, and physical positioning of a building in order to enhance its efficiency and profitability; optimizing exteriors to reduce resource use (e.g.: water used in irrigation, energy needed for heating and cooling, etc) and maximize the effects of the outside environment (e.g.: using colour and texture exterior to best advantage, safely handling storm-water run-off, using indigenous plants and other natural structures to best effect, and so on...).

**Product** (see pages 100-118 of *The Sustainable Business*) is described as goods and services that are free from unnecessary waste ('non-product') and toxins. This begins with an emphasis on design so that the materials, energy, and manpower that comprise products (and their packaging) can be treated as investments and continuously reused in efficient, closed-loop processes.



**Internal aspect examples:** understanding raw material resourcing and ecological rucksack; using science and knowledge to lower toxins, improve product performance (innovation), and maximize molecules (organic and inorganic); designing products so their components and materials can be quickly disassembled and reused in a closed-loop process, and so on.

**External aspect examples:** reducing ecological rucksack and other forms of waste alongside suppliers; maximizing use of the product (including packaging) so that customers find it easy to use the product without creating waste; maximizing the ease of disposal of the product (including packaging), etc.

**Production** (see pages 120-139 of *The Sustainable Business*) – the physical, mechanical, biological, and chemical processes used to transform raw materials into products or services and transport them to where they need to be.

**Internal aspect examples:** reducing the amount of hazardous processes, energy requirements and toxic substances that are used to manufacture a product or service (i.e.: clean production); right-sizing production processes so that nothing more than what is needed is produced; optimizing system layouts (e.g.: assembly lines and assembly procedures) to reduce inventory, eliminate wasted time, and eradicate wasted movement (unnecessary motion); etc...

**External aspect examples:** establishing symbiotic networks that allow the waste from one business to be redirected to others so they can use it as a raw material; building and investing in closed-loop infrastructures (reverse logistics) that collect and bring back used products (and their materials); optimizing the efficiency of shipments and deliveries; working with other businesses (cooperative networking) to fill in any gaps or shortcomings (financial or skill-wise), etc.

### **The Link between the Strategic and the Tactical**

**People** (see pages 66-78 of *The Sustainable Business*) – at its core, sustainability is not a technological issue; rather it begins as a behavioural issue and as such it is dependent upon teamwork, cooperation, and motivation. Understanding the importance of people throughout all phases of the sustainability process is necessary to ensure that a thorough and combined effort is made on all fronts while working diligently to avoid the wasting of people.



**Internal aspect examples:** optimizing employees (who seek security and motivation) and other stakeholders who want a return on their investment with the business.

**External aspect examples:** getting the most from paying customers (who want safe, inexpensive, value-laden products) and the world community (including the two-thirds of humanity who are currently left out of the global economic loop - who desire jobs and inclusion, and who represent an economic force all their own).

## **Key Teaching and Learning Points**

The word *sustain* is defined as: **to keep something in existence for a prolonged period of time (or, the capacity to continue into the long-term).** In business, this begins with two fundamental principles both of which contribute to long-term wealth generation, job creation, and reduced environmental degradation:

- 1. the elimination and prevention of waste, and,**
- 2. the optimization of resources (e.g.: labour, energy, raw materials, commodities, molecules, markets, etc).**

# ASSESSING YOUR BUSINESS

Ready to eliminate waste, boost employee morale, and increase the competitiveness of your business in the process? The following check-list is designed to help identify areas that might need to be addressed. Please note that these questions do not represent the complete sustainability picture. They merely represent the beginning of the waste elimination process. If the answer to any of these questions is 'no', then it's time to set and achieve new, higher standards. If help is needed, consult the books mentioned on page 5.

## PREPARATION

### Internal Aspects

Yes No

- |   |                          |                          |
|---|--------------------------|--------------------------|
| 1. Do you and your employees realize that a business is more than just a money-making enterprise; that as part of a community it is also responsible in playing a larger role?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Do the people that manage the business and who work in the business understand the full scope and impact of sustainable business activity - as well as the definition of sustainability (the capacity to continue into the long term) in regards to costs? | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Do the people that own the business and who work in it understand the definition of waste (money spent in which no value or only partial value is received from what is purchased) and how it translates to everyday business activities?                  | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Do the people in the business know the difference between product (e.g.: the goods or services a business sells) and non-product (e.g.: costly waste and inefficiencies that the business produces but cannot sell)?                                       | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Does the business spend money on lawyers and lobbyists who are hired to ensure that the business is allowed to keep producing waste? Or is the business using its resources to eliminate waste?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Are the business's long-term vision, mission, and objectives (in terms of sustainability) written down and were they developed with the input of employees, customers, suppliers and other stakeholders  | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Is the business's management team aware of the common psychological obstacles and setbacks inherent in introducing change into an organization? If so, what is it doing to overcome them?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Are in-depth employee training programs in place to help fulfil the business's sustainable vision, mission, goals and objectives?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Is everyone in the organization onboard, informed and participating (including high-level administrators, employees on the front-lines of application, customer service deliverers, cleaning crews, security personnel, and so on)?                        | <input type="checkbox"/> | <input type="checkbox"/> |



|  | Yes                      | No                       |
|--|--------------------------|--------------------------|
| <b><u>External Aspects</u></b>   |                          |                          |
| 1. Does the business have (and continuously monitor) a profile of its material supply streams – and is it aware of possible changes in national policies, impending legislation, new industry standards and other factors that will influence both it and its suppliers? | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Is the business aware of the impact that increasing competition for energy, resources and raw materials will have on it (or its suppliers)?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Is the business taking advantage of profitable synergistic links with other businesses?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Are the financial impacts of the business's decisions calculated and discussed in terms of long-term consequences?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Is the business aware of the economic potential inherent in the world's largest - mostly untapped - markets?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Is the business aware of what its competitors are doing in terms of sustainability-related action and planning?   | <input type="checkbox"/> | <input type="checkbox"/> |

## PROCESSES

|  | Yes                      | No                       |
|--|--------------------------|--------------------------|
| <b><u>Interior Aspects</u></b>   |                          |                          |
| 1. Do employees understand the definition of waste (i.e.: not achieving 100% from purchases and investments)?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Are employees actively seeking out waste in every aspect of the business including its purchases, operations, and disposal procedures as well as time, labour, physical setups, structures and systems? | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Is the business actively seeking ways to eliminate waste before it invests in new machinery, equipment, and production processes?   | <input type="checkbox"/> | <input type="checkbox"/> |

|  | Yes                      | No                       |
|--|--------------------------|--------------------------|
| <b><u>External Aspects</u></b>   |                          |                          |
| 1. Is the business exploring ways in which its products can be converted into services that reuse its material inputs?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Is the business spending more money on lawyers and lobbyists and/or fighting higher standards as opposed to correcting its current and future waste problems?         | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Is the business exploring ways to work with other businesses and organizations so that its gaps or short-comings (in terms of closed-loop practices) can be resolved? | <input type="checkbox"/> | <input type="checkbox"/> |

## Preservation

Yes No

### Internal Aspects (e.g.: measurement)

1. Does the company's accounting system actively record and display itemized operation costs and disposal expenses in addition to raw material costs and equipment purchase prices and share them with employees? ☐ ☐
2. Do the company's production systems and machines (including office systems) clearly display energy usage, material use and other inputs (and outputs) as they happen - in real time and in an understandable way? ☐ ☐
3. Have employees conducted a complete waste assessment of all processes and operations, which includes the creation and analysis of an easy-to-understand process map? ☐ ☐
4. Has a process map analysis been conducted that focuses on supplies, supply streams and suppliers? ☐ ☐
5. Are measurement and record-keeping systems (and results) easy to understand and posted for all to see? ☐ ☐
6. Is quality control and process monitoring in all production processes increasing? (i.e.: increases in the frequency of production inspections and inspection points) ☐ ☐
7. Are regular, scheduled meetings held to relay and collect assessment input from every department and area? ☐ ☐

### External Aspects (e.g.: legal and ethical compliance)

Yes No

1. Is the business keeping ahead of changes in laws and legislation that affect how the raw materials for its products are sourced and manufactured? (examples include: bans on non-renewable resources, laws that affect hazardous chemicals and materials, greenhouse gas legislation, the introduction of cap-and-trade schemes, new efficiency standards for machines and equipment [e.g.: incandescent light bulbs, water pumps, electronics, engines, etc...]) ☐ ☐
2. Is the business keeping ahead of changes in laws and legislation that affect how products are disposed after they have been purchased and used by consumers? (examples include: take-back laws, landfill site regulations, bans on hazardous materials, etc...) ☐ ☐
3. Is the business fully transparent in regards to its material resourcing, its manufacturing processes, and its disposal methods? ☐ ☐
4. If claims are being made about the business's products and/or packaging being 'green', does the business have adequate documentation, audit reports and/or valid inspection certifications to avoid accusations of vagueness, irrelevant claims, or out-and-out lies? ☐ ☐

5. If the business is involved in carbon off-setting schemes, can it provide proof that the money it is collecting is actually being used for the intended purpose of off-setting CO2?

☐ ☐

## PEOPLE

### Internal Aspects

**Yes No**

1. Are employees aware of the business's sustainability efforts and are they being informed of these efforts in a way that they understand? (note: the key aims of sustainable-activity are to: (1) generate real long-term wealth [as opposed to short-term, boom-and bust financial cycles], (2) facilitate job creation, and, (3) maximize resource efficiency [mitigate environmental degradation]) ☐ ☐
2. Has a management-level person (that reports directly to the CEO) been appointed who is responsible solely for waste elimination and the incorporation of sustainable-oriented activity? (waste elimination and sustainable-oriented activities include: strategy, production processes, information and measurement collection and management, communication [internal and external], work performance expectations [target setting], performance evaluations, and product innovation) ☐ ☐
3. Do employees have access to on-going waste elimination and sustainability training? ☐ ☐
4. Is accurate, real-time measurement data readily available (displayed) and shared and discussed amongst employees? ☐ ☐
5. Does everyone in the business accept waste-elimination and sustainability-oriented activity as a crucial, on-going process? ☐ ☐
6. Are responsibilities and tasks clearly defined? ☐ ☐
7. Are effective motivation and reward systems in place that encourage employee participation and facilitate cooperation? ☐ ☐
8. Is regular inspection taking place (perhaps by security staff when they make their rounds) to identify electrical equipment left on after working hours, leaking pipes (as well as leaking toilets and faucets), and other forms of wasted money? ☐ ☐

### External Aspects

**Yes No**

1. Are consumers aware of the business's sustainability efforts and are they being informed of these efforts in a way that they understand? ☐ ☐
2. Is your business involved in a positive way with its surrounding communities? ☐ ☐

3. Are efforts being made by your company to adopt business inclusion methods that help provide a leg-up to the two-thirds of humanity that are currently out of the world's economic loop? ('business inclusion' methods can involve ethically sourcing materials and/or setting up embedded processes that help create localized, mutually-supportive, intermediary business networks and markets)

☐ ☐

## PLACE

### Internal Aspects

**Yes No**

1. Are you and your employees aware of the positive impact that natural light and ventilation, indoor foliage, non-toxic building materials and ergonomic design have on employee performance and reducing absenteeism – and both the cost savings and profit enhancement that these practices yield? ☐ ☐
2. Is natural light (sunlight) used as a source of illumination wherever and whenever possible in work and retail areas? (see the bottom, page 81 of *The Sustainable Business*) ☐ ☐
3. Is the building where work takes place properly insulated inside and outside (including the use of super-insulated windows)? ☐ ☐
4. Is the electrical wiring in the buildings slightly thicker than the law requires (to reduce resistance thereby reducing energy use)? (note: thicker wire yields a 193% per year return on investment in terms of energy costs) ☐ ☐
5. Has your building's HVAC system been checked for leaks? ☐ ☐
6. Is your business actively seeking to reduce its water use in production and other areas? ☐ ☐
7. Has the business explored clean and efficient methods of wastewater treatment? ☐ ☐
8. Has the business looked into renewable energy as a partial or full replacement for its energy needs? ☐ ☐

### External Aspects

1. Has the exterior of the building (in terms of colour, texture, position, landscaping, etc) been designed to make the most of its physical environment? ☐ ☐
2. Is the landscape comprised of indigenous plants? ☐ ☐
3. Has the irrigation system been optimized (e.g.: drip irrigation) and is rainwater or gray water being used in place of potable water in the irrigation system? ☐ ☐



- |   |                          |                          |
|---|--------------------------|--------------------------|
| 4. Are parking areas covered with light-coloured surfacing to reduce exterior temperature loads?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Are the parking areas gravelled to maximize rainwater absorption and reduce storm-water pooling?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Does your building have a 'green' roof? If not, why not?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Does your building make the most of vertical landscaping?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Are the exterior walls (and/or roof) of your building maximized in terms of energy production (i.e.: are solar panels and wind turbines incorporated into the exterior structure)? | <input type="checkbox"/> | <input type="checkbox"/> |

## PRODUCT

- | Internal Aspects   | Yes                      | No                       |
|--|--------------------------|--------------------------|
| 1. Has your product or service been designed so that the resources and materials used to make it require the smallest amount possible? | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Can the materials that comprise the product be used in a circular (closed-loop) recovery system?                                    | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Do employees understand the difference between reuse, repair, remanufacturing and recycling?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Has the complexity and/or number of components that makeup the product been minimized?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Has the toxicity of the product's raw materials and components been replaced with less-costly, non-toxic alternatives?              | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Can the product be easily disassembled for material recovery after disposal?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Has the amount of energy required to make the product been minimized?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Are newer, cleaner and safer materials and technologies being used in the product's makeup?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Is sustainable (closed-loop) remanufactured, recycled or scrap material being used to manufacture the product?                      | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Have packaging requirements been minimized - or eliminated?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. Are all the materials used for packaging recyclable? (if not, why not?)  | <input type="checkbox"/> | <input type="checkbox"/> |

12. Does the product meet enough qualifications to earn a valid 'green' accreditation? ☐ ☐

### External Aspects

Yes No

1. Do you know how your products and their components stand against new legislation that regulates toxic chemicals or research that questions their safety? ☐ ☐
2. Has a lifecycle analysis (process map) that focuses on waste reduction been conducted that examines the ways customers use and dispose the product? ☐ ☐
3. Has a study been done that examines how your product's resources and basic materials are sourced, produced, and distributed? (knowing how serious a supplier is about waste reduction and sustainable practices is a good way to determine if your business is paying too much for its materials and/or how at-risk it is to supply-and-demand price increases that result from resource scarcity) ☐ ☐
4. Is your company exploring ways in which its products can be returned to the place of manufacture so they can be disassembled, harvested, and used to make new products? ☐ ☐
5. Is your company examining ways in which its packaging can be returned either for direct reuse - or disassembled, harvested, and/or reconstituted to make new packaging? ☐ ☐

## PRODUCTION

### Internal Aspects

Yes No

1. Are work areas and stations - as well as machinery (including motors, pipes and pump systems) - placed in a logical and sequential order? ☐ ☐
2. Is every item of machinery and equipment super-efficient in terms of energy and material use? ☐ ☐
3. Is every piece (and size) of machinery and equipment necessary - and is every production process necessary? ☐ ☐
4. Is real-time measurement taking place in regards to energy consumption, raw material input and processing (including water, chemicals, etc), waste outputs and so on? (i.e.: Do your employees know the lifecycle and operational costs of every piece of equipment and machinery?) ☐ ☐
5. Has an in-house employee training and sharing program been established to explain and explore waste elimination? ☐ ☐

- |  |                          |                          |
|--|--------------------------|--------------------------|
| 6. Have you and your employees explored ways to replace the toxic or hazardous substances that make up your production processes with safer, less costly alternatives?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Is every piece of machinery and equipment maintained properly through regular scheduled inspections?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Is every item of machinery and equipment operating at optimal levels? (i.e.: Are all machines and equipment the right size in relation to the work required of them?)   | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Are only the correct amount and volumes of material used when processing or filling an order?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Are all recoverable output materials collected for reincorporation back into production processes or gathered for outside recycling? (output recovery includes heat, steam, oil, solvents, chemicals, cleaning solutions, material scraps, etc...) | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. Are boilers and furnaces insulated with super-efficient materials (such as ceramic fibers)?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. Is drinking water being used in production processes? If so, can rain water or 'gray' water be used in place of potable water?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 13. Can waterless alternatives be used in production sequences?  | <input type="checkbox"/> | <input type="checkbox"/> |

#### External Aspects

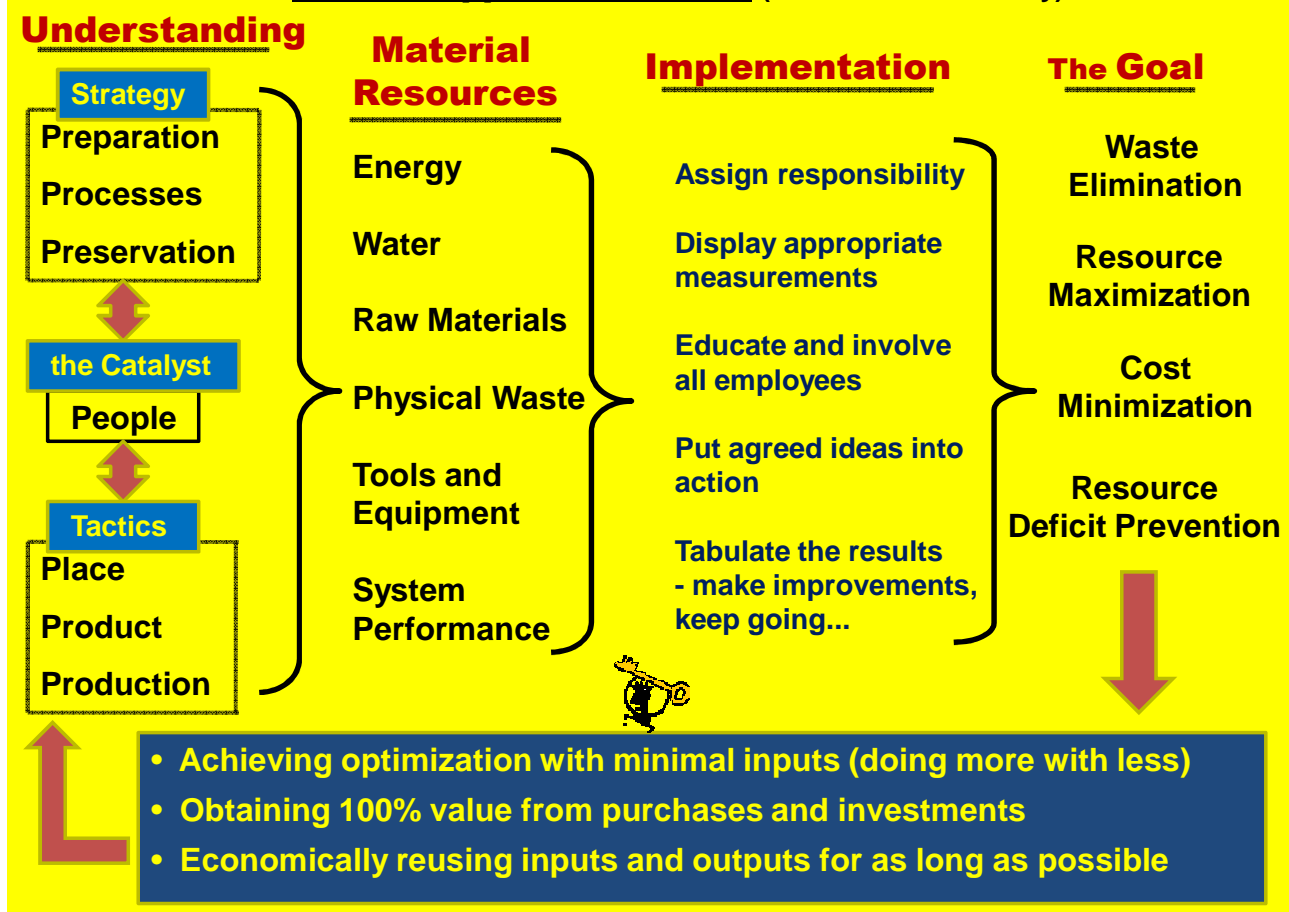
**Yes    No**

- |   |                          |                          |
|---|--------------------------|--------------------------|
| 1. Has your organization explored ways in which its waste and/or other outputs can be used as a raw material by another business or industry?                       | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Can the waste outputs of other businesses or industries be used as a raw material by your business?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Are you working in partnership with other businesses (e.g.: suppliers, partners, etc) to explore ways to reduce waste, pollutants, energy (fuel) use, and so on? | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Is your business situated in an ideal location (e.g.: close to customers, convenient for deliveries...) so as to maximize travel, deliveries and shipments?      | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Are all your business's vehicles energy efficient?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Have drivers been trained in energy efficient driving techniques and maintenance?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Are shipping loads and delivery services consolidated to maximize fuel use and labour?   | <input type="checkbox"/> | <input type="checkbox"/> |

## 10 Reasons for a Business to become more Sustainable

1. Rising energy prices
2. Increases in raw material costs
3. Increases in waste and disposal costs
4. Changes in waste legislation
5. Increases in environmental laws
6. Changes in customer demands and expectations
7. Competitive advantage
8. Transparency issues
9. The acquisition and retention of employees
10. The cost of procrastination

### The 7-P Application Model (toward sustainability) © 2008 Jonathan T. Scott





## About the Author

**Jonathan T. Scott** ([www.jonathantscott.com](http://www.jonathantscott.com)) is a lecturer, manager, and business leader with over 25 years of work experience in eight different countries. As a manager he was recognized for tripling productivity, reducing costs by up to 40%, and increasing net profits by over 55%. In the process he conducted three separate turn-arounds (the first occurred in a war zone; the second was described as 'the best of its kind in the country') and pioneered multi-million dollar projects in parts of the world where they previously did not exist. He has founded and runs two businesses and is also the founder and director of the *Center for Industrial Productivity and Sustainability* at Kozminski University – Poland's highest rated private business school. He serves - or has served - as a faculty member at four business schools: the Rotterdam School of Management (Erasmus University – the Netherlands), *Kozminski University* (Warsaw, Poland), the *Audencia Nantes School of Management* (Nantes, France) and *Bradford University* (Bradford, UK). He has also taught at the *University of Perugia* (Italy). In 2009, he was presented with an 'outstanding achievements in teaching' award. Scott's education includes attending *Brevard College* (Brevard, North Carolina) before graduating with a Bachelor of Science degree from Florida State University (Tallahassee). He has studied at the *Universite de Bourgogne* (Dijon, France) and earned an MBA (in management) from *Western International University* at its former London, UK campus. He also has a teaching certification from *Oxford Brookes University* (Oxford, UK) and an MA (in management) from *Kozminski University* (Warsaw, Poland). His books include **Fundamentals of Leisure Business Success** (1998) as well as the award-winning trio: **The Concise Handbook of Management** (2005), **Managing the New Frontiers** (2008), and **The Entrepreneur's Guide to Building a Successful Business** (2009). In 2010, **The Sustainable Business** was published by the *European Foundation for Management Development* and distributed to over 1.3 million people. It has since been translated into four languages. Scott's specialty subjects are management, entrepreneurship, and sustainability.



## About the Editor

**Walter R. Stahel** ([www.product-life.org](http://www.product-life.org)) is the head of Risk Management at the *Geneva Association* (Switzerland). He is a respected international business advisor and the founder and director of the *Product-Life Institute* (Geneva, Switzerland), Europe's oldest sustainability-based consultancy and think tank. Stahel's pioneering research and ground-breaking work in the field of sustainability stretch back several decades – firmly establishing him as one of the subject's founders (he not only coined the term 'cradle to cradle', he also conceived the concept and was able to prove that it worked in industrial settings). Stahel is a visiting professor at the Faculty of Engineering and Physical Sciences at the *University of Surrey* (UK) as well as a regular guest lecturer in the graduate department at *Tohoku University* (Japan). An alumnus of ETH, the *Swiss Federal Institute of Technology* (Zurich, Switzerland), he is the author of several prize-winning academic papers and pioneering books including **The Limits to Certainty** (1989/1993), written with Orio Giarini (published in six languages) and **The Performance Economy** (2010), which contains over 30 years of his research and findings on closed-loop (i.e.: circular) industrial and economic practices.



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