

THE MORAL CHALLENGE OF GREEN TECHNOLOGY

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Abstract. Sustainable development requires that private corporations adopt “green technology”, which in many cases also improves firm profitability. When this occurs, the actions are simply good business and are morally neutral – neither good nor bad. If “greening” is expected to harm the company financially then green technology is typically not adopted, and this can be morally problematic. In this paper we discuss DuPont CEO Chad Holliday’s decision not to withdraw from the market or redesign the highly profitable product Teflon® even though it may present significant public health concerns. We conclude that the unregulated free market system is incompatible with our search for sustainability. Experience has shown that if green technology threatens profits, green technology loses and profitability wins.

Keywords: morality, sustainability, green technology, sustainable development, DuPont, Teflon, free market

1. Introduction

In 1987 the World Commission on Environment and Development, sponsored by the United Nations, conducted a study of the world’s resources. Also known as the Brundtland Commission, their 1987 report, *Our Common Future*, introduced the term *sustainable development* and defined it as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987). The underlying purpose of the commission was to help developing nations manage their resources, such as rain forests, without depleting these resources and making them unusable for future generations.

The concept of sustainable development has also resonated in the richer countries since it addresses intergenerational responsibility while acknowledging continuing technological change. Unstated was the assumption that intergenerational equity is a core ethic, and that future generations deserve as much opportunity to achieve a high quality of life as present generations.

If the process of sustainable development succeeds, it will lead to *sustainability*, or that stage of economic and technical development where the use of material and energy is at a steady state. The means for attaining sustainability is *green technology*, a term that recognizes that engineers and scientists are central to the practical application of the principles of sustainability to everyday life. Green technology will make it possible for sustainable development to lead us to sustainability.

At present human populations are not approaching sustainability. Wackernakel et al (2002) provides evidence that humanity's demand for natural resources has rapidly increased in the last few decades. In 1961, demand corresponded to 70% of Earth's capacity for biological productivity; by the 1980s, demand began to exceed the biosphere's capacity; and by 1999, humans were using 120% of the natural resources the Earth was able to regenerate. In other words, it would require 1.2 Earths to regenerate what humanity used in 1999 (Wackernakel et al 2002). Clearly, this does not meet the test of sustainability.

If sustainability is to be achieved, it has to occur within and in accord with the prevailing economic system. In today's world, the free market system is predominant, and it seems to be gaining ground in competition with others. Therefore, sustainability has to occur within this system, and private corporations have to start practicing green technology if we are to move toward sustainability. The objective of this paper is to ask whether our free market system fails to facilitate the adoption of green technology and perhaps even blocks such adoption. We analyze one example where a large company has expressed its determination to adhere to principles of sustainability and green technology, but has found that such management objectives conflict with the requirements for profitability.

2. Motivation for engaging in green technology

The primary motivation of private business has been profitability, and corporate leaders are judged on their ability to achieve financial success. As Milton Friedman stated so famously, "The one and only social responsibility of business [is] to use its resources and engage in activities designed to increase its profits so long as it ... engages in open and free competition, without deception or fraud" (1962).

About twenty years ago some companies discovered that if they followed the requirements and recommendations of governmental agencies they could alter their production or use of materials and actually save money. This notion became known as *pollution prevention pays (PPP)* and was embraced by regulatory agencies such as the U. S. Environmental Protection Agency as proof that doing the right thing is actually beneficial. The companies that decided to promote this ideal discovered that not only were they saving money, but they had created a public relations bonanza – they could promote environmental regulations and make money at the same time.

Today's business leaders widely recognize that a corporate program in sustainability or green technology often yields profits, and managers have been quick to capitalize on this. For example, Bill Ford, CEO of Ford Motor Company, said that it is his "strong belief that – in addition to being the right thing to do – preserving the environment is a competitive advantage and a major business opportunity" (Mitchell 2001).

CEO of DuPont Charles Holliday wrote, "We would point out that we embrace CSR [corporate social responsibility] for the purposes of competition. Being better at CSR than one's competition is going to become more and more advantageous as the century advances and as society's expectations of business continue to change" (Holliday et al 2002). World Bank president James D. Wolfensohn concurs: "Corporate sustainability today includes recognition of the leadership role that the private sector must take in ensuring social progress toward improved equity, higher living standards and stewardship for the environment. Corporate responsibility is not philanthropy – it is good business" (Holliday et al 2002).

Such statements by corporate leaders have had far-ranging effect and many corporations have undertaken widely publicized efforts to reduce emissions or the use of hazardous materials. Holliday et al (2002) provide three examples:

- STMicroelectronics, the third largest electronics firm in the world, began in 1995 to devote an average of 2% of its annual capital investment to reducing pollution. The results? CEO of STMicroelectronics Pasquale Pistorio stated, "Thanks to these measures, the planet has been spared the burden of another 100-megawatt power plant; the water we have saved could quench the thirst of 50 million people a year. We are using 28% less electricity and 45% less water than in 1994 (and this) translates in a savings of \$50 million in 2000 alone."
- DuPont agricultural products team from LaPorte, Texas, reduced its toxic emissions by 99% through closed-loop recycling, off-site reclamation, selling former wastes as products and substituting raw materials. Overall savings included \$2.5 million of capital and more than \$3 million in annual operating costs.
- A DuPont global team developed a new technique for the manufacture of Terathane®, used in the manufacture of Lycra®. The innovation increased yields, resulting in additional revenues of \$4 million while eliminating 2 million kilograms of waste per year.

Not only do such efforts result in greater profitability, but they present a public relations opportunity, demonstrating how corporations have become "green." The publicity from the efforts can be considered an asset that can be used at a later date.

DuPont's well-publicized decision to discontinue its \$750 million a year business producing chlorofluorocarbons (CFCs) was a public relations bonanza. Not only did DuPont make it politically possible for the United States to become a signatory to the Montreal Protocol on ozone depletion, but the company already had alternative refrigerants at the production stage and was able to smoothly transition to these. In 1990 the U. S. Environmental Protection Agency gave DuPont the Stratospheric

Protection Award, validating the company's decision to get out of CFC manufacturing (Billatos and Basaly 1997).

Sometimes companies see a direct benefit from positive publicity. If the public believes that a corporation is "green," the firm often reaps enhanced sales and thus profits. According to a study by *The Economist*:

Companies operate in a climate of opinion. To be successful and profitable, they must take account of how they are perceived. Big, successful businesses, which often find themselves in the public view, strive constantly to improve and protect their reputations. This is just as it should be: concern for the way they are judged by customers, suppliers and the world at large is a useful discipline. If it were absent, there would be no economic pressure on companies to behave decently. If nobody is paying attention, why worry about dealing honestly with people, or honoring a contract? The pressure of outsiders' perception is an indispensable force. Without it, companies in a private enterprise system would be nasty, brutish, and very short-lived (Crook 2005).

In short, pollution prevention often pays, so companies have embraced the idea. A widely influential book by Schmidhery and Zorraquin (1996) supports this argument by listing the reasons for adopting a policy of corporate social responsibility (CSR):

- regulations are getting tougher
- banks are more willing to lend to cleaner companies
- insurers are more willing to insure cleaner companies
- investors are more likely to invest in cleaner companies
- the best and brightest people want to work for clean companies
- green sells
- employees are motivated if they believe the company is trying to be socially and environmentally responsible
- media coverage is getting more sophisticated (i.e. it is more difficult to hide things)
- relatives of company directors will pressure the directors to clean up.

Note that none of these say that being clean and adopting green technology is simply the right thing to do. These are not moral rules and thus have little or nothing to do with morality. Companies that boast about their "greenness" are most often talking about how they saved money by adopting principles of green technology. The leaders of such companies are not benevolent; they are good business people. The hard fact is that if companies become too benevolent they will go out of business.

Actions undertaken by a corporation in response to legal concerns and financial requirements are actually *obligatory*, in that society essentially demands that businesses make their decisions in line with legal and financial factors (Sethi 1975). On the other hand, for an action to be **morally** admirable, the motivating force is far different in character.

Consider this example: You are walking along a river and see a man in the water, obviously in trouble. You have a moral decision to make as to whether or not you will try to save his life. The example might be complicated in three ways.

1. Suppose you are actually a lifeguard and it is your (legal) responsibility to save people from drowning. If you save the man because it is your job to do so, this action has no moral components. Your job demands that you make the effort to save the man. Only if you choose to not try to save the drowning man, even though it is your duty to do so, does this become a moral question.

2. A second case might be that you recognize the man as someone who owes you a lot of money. If he drowns you will not be paid back, and so you put yourself in harms way in order to save his life. Saving his life becomes good business.

3. Now consider a third case. What if the man in the water is actually a person to whom you owe a lot of money? If he drowns you would not have to pay him back, and thus not helping him is to your advantage. The morally courageous act is then to save his life even though this ends up costing you money. Such actions require *moral courage* -- acting ethically even if the result might not be to your benefit (Kidder 2005). In this case doing the right thing might not be profitable.

These three cases are analogous to the operation of a corporation when decisions regarding green technology and sustainability have to be made. A situation in which regulations require a company to build a wastewater treatment plant is analogous to the lifeguard who has a legal duty to act. There is nothing morally admirable about this action. It becomes a moral problem only if the company chooses to ignore the regulations and tries to get away with secretly dumping untreated effluent into the watercourse.

When a company undertakes voluntary measures to practice green technology because this increases their profitability, such action is analogous to saving a drowning man because he owes you money. Saving the man because it is to your benefit to do so is not morally admirable, nor is doing green engineering because it is profitable: both are done for personal advantage or profit.

But what about actions that would enhance environmental quality or public health, but would reduce corporate profitability? That is, what about an action that is not required by law and does not increase profits, but is simply the right thing to do, analogous to saving the drowning man even though you owe him a lot of money? Such a problem presently faces Chad Holliday, CEO of DuPont.

3. A moral dilemma

Holliday was educated as an industrial engineer and holds a professional engineering license. When he became the CEO of DuPont in 1998 he set out to remake the conglomerate into a life sciences company. He has been in the forefront of the campaign for corporate social responsibility (CSR) and has co-authored a widely read book entitled *Walking the Talk*. He has been a strong proponent of sustainable growth, defined as creating shareholder and social value while reducing the 'ecological footprint' throughout the value chain. This mission

is promoted throughout the company with a program called “The Goal is Zero,” which has an objective of reducing the adverse impact of DuPont’s operations while continuing to enhance productivity and innovation.

In a speech to The World Business Council on Sustainable Development,¹ Holliday summed up his philosophy:

We’re talking about commerce and profits. Those are the means we can use to bring the power of the modern global market to bear on improving human lives while safeguarding the global environmental commons. Real business growth – sustainable growth – represents the only effective way we can employ the wealth and resources of the world’s largest companies to help sustainable development in the world’s smallest economies (Holliday 2001).

In short, Chad Holliday has tried to make himself and his company a paragon of environmental virtue. He is a poster boy for the new corporation – the corporation with a heart. And this is why the “Teflon scandal” has been such a difficult problem for him and for his company.

The story begins at another large chemical company, the 3M Company, which for many years manufactured products using fluorinated chemicals. One of its best sellers was Scotch-Gard®, a spray used on fabrics to make them stain-resistant. One of the major components of these sprays was perfluorooctane sulfonate (PFOS) which had other industrial and domestic uses such as the manufacture of breathable all-weather clothing, firefighting foam, and as a coating for the inside of food containers because of its non-stick properties. PFOS was, at the time of its development, believed to be inert and non-toxic.

In 1997, 3M did a routine study of workers at the plant that manufactured fluorocarbons and found that PFOS appeared to be in the bloodstream of most of the workers. This was troubling to them and they decided to expand their investigation, measuring PFOS levels in the blood of people not working at the plant. To their amazement they discovered after a number of studies that PFOS could be found in almost all blood samples, suggesting that nearly everyone in the United States has significant concentrations of this chemical in their blood (Oslen et al 2003).

After 3M notified the U. S. Environmental Protection Agency (EPA) of its concern, researchers began to discover that PFOS had troubling toxicological properties. We now know that this chemical can damage the liver and produce severe birth defects in laboratory animals, and it is persistent in the environment and bioaccumulates in the food chain. In addition to its extraordinary toxic properties, PFOS has been designated a potential carcinogen by the EPA. Under great pressure from the EPA, in May 2000 3M announced that it would shut down the plant producing PFOS and related chemicals.

One of the related products 3M manufactured and sold to other corporations was perfluorooctanoic acid (PFOA), with DuPont being one of its best customers.

¹ The World Business Council for Sustainable Development is an organization of the CEOs of almost 200 of the largest corporations. Their stated purpose is to run their corporations in the best interest of human society and the natural environment. (www.wbcd.org)

DuPont uses this chemical to manufacture many consumer products such as paints, non-woven fibers, and non-stick coatings such as Teflon®. Today Teflon®-related products represent almost 10% of the total profit for DuPont (GMWatch 2005).

The manufacture of Teflon® requires the use of a surfactant, and ammonium perfluorooctanoate (PFOA) was found to be the most effective and economical. DuPont has known for many years about potential health problems associated with PFOA. Not only was DuPont kept apprised of the research done by 3M, but the company also conducted its own clandestine research on the chemical, as was uncovered during investigations related to a lawsuit in West Virginia (Cortese 2003). The trial revealed that DuPont scientists had known since 1982 that PFOA was in the domestic water supply and had been linked to developmental problems in rats. The company also knew that a leaking landfill had contaminated a creek and groundwater supplies, resulting in the death of numerous cattle. In addition, internal DuPont studies discovered that their own workers' exposure to PFOA resulted in their being 15 times more likely to die of stroke than unexposed workers (Olsen et al 2001). DuPont did not report the results of these studies to the EPA as required by federal law, so the EPA has now filed a formal complaint charging DuPont with withholding evidence of its own health and environmental concerns regarding the use of PFOA.

The decision by 3M to stop manufacture of PFOA put DuPont in a quandary. The company needed the chemical for the manufacture of Teflon®, so DuPont managers decided to begin producing PFOA and constructed a new plant in Fayetteville, North Carolina for that purpose. They also invested millions of dollars to expand facilities that produce Teflon® cookware and stain-resistant fabrics, anticipating increased market demand.

Recognizing that there was some concern about PFOA, DuPont initiated a public relations campaign to deflect criticism. The web site devoted to publicizing the company line, www.C8inform.com, lists only those studies that question the statistical validity of health effects of PFOA (called C-8 by DuPont) and restates the company position that “no adverse health effects have ever been proven,” which is of course true. At present all that research is able to say is that 3M in 2001 detected PFOS in the blood of 96% of children ages 2 through 12 – at levels as high as 56 ppb. Because there is little epidemiological evidence on the effect of PFOA and related compounds on people, the “safe” level is impossible to determine. At one time, DuPont set the standard at 1 ppb in the bloodstream for workers at their own plant. Following a court case where the level of PFOA salts far exceeded the 1 ppb limit; the “safe level” was reset at 14 ppb. Further investigations have shown that levels in many people are far higher than this, and the “safe level” is now considered to be 150 ppb. This is a case of “reverse expediency,” setting the standard at the highest number possible without causing alarm or apparent public health problems.²

² The “principle of expediency” states that the level of a contaminant should be set at the lowest number practical, taking into account technology, economics, and public health effects.

The PFOA case should be a classical application of the “precautionary principle” which states that if a problem is sufficiently severe and the consequences sufficiently serious, one would not need *proof* before action is taken to alleviate the potential damage. The precautionary principle is not a soft, emotional argument. Substantial work has been done on the validity of the precautionary principle, leading beyond the common sense interpretations to rational arguments for its acceptance (Foster et al, 2000, Farmer and Randall 1998). Applying the precautionary principle to the potential contamination of the entire population of the United States would have validity.

At this writing, Chad Holliday and DuPont have chosen to continue to manufacture PFOA, even though the preponderance of evidence indicting this chemical as a serious public health threat is growing daily, and even though the U. S. EPA has accused them of withholding scientific evidence that proves the severe toxicity of this chemical.

In choosing to continue to produce PFOA, Chad Holliday is making a moral decision. He is weighing the benefits of continued production of PFOA against the potential harm that this might cause to others. In effect, he has chosen not to save the drowning man because to do so would cost him too much money.

Chad Holliday should, of course, know better. If he would recall the Code of Ethics of his own profession – engineering – he might remember that the first canon of nearly every engineering discipline states,

The engineer shall hold paramount the health, safety, and welfare of the public.

But in his job as the CEO, responsible for the health and wealth of DuPont, Holliday is unable and unwilling to make the moral decision and to accept reduced profitability. He is caught in a dilemma resulting the incompatibility of green technology and corporate profitability in this case.

4. Conclusion

In recent years, society has become ever more concerned about human impacts on the natural environment. Some business leaders share these concerns personally and have moved their companies to embrace green technologies; other business leaders have responded to social pressures and have similarly adopted green technologies. These decisions have resulted in the reduction of adverse environmental impact by the use of non-hazardous raw materials, redesigned products, and reduced discharges to the environment. Often these decisions have also increased corporate profitability. But the green color associated with these policies in most cases has more to do with the green of money than with the green of the environment. That is, while many companies consider adopting green technologies because of personal concerns and societal pressures, they only move forward with these technologies if doing so does not adversely affect their companies’ bottom lines. The ultimate focus is thus on financial concerns, not moral concerns. In

other words, corporations that develop environmentally friendly technology and then profit from such development are simply “doing good business.”

The demands of morality are simple. We are asked to do that which an impartial, disinterested observer would agree to be the right thing to do without incurring undue and unreasonable cost. Has Chad Holliday acted morally in his decision to not acknowledge the health risks of its most profitable product? Would redesigning Teflon® and related products or even withdrawing it from some of the markets be too great a cost for DuPont? Would the public agree that DuPont ought to have been honest with its concerns about the manufacture and use of Teflon®?

When the principles of sustainability and pollution prevention collide with profitability, companies and their leaders must choose between the two. In virtually every case in publicly traded companies, profitability wins. If the demands of profitability can override the best of intentions at a highly visible company like DuPont and present moral dilemmas for seemingly ethical corporate leaders like Chad Holliday, we have to recognize that there must be tremendous pressure on all industrial leaders to ignore the principles of sustainability and to concentrate only on profitability. Green technology or social responsibility will never be allowed to threaten the life of the company.

The unregulated free market system is poorly designed to promote sustainability, and adherence to the system can force business leaders to forsake their best intentions in order to maintain profitability. While the current market system does not promote sustainability, a market system does not exist within a vacuum, and one may find hope in that some individuals in business, government and civil society are working to change the market by changing expectations as well as the available tools for use in business, science, policy and engineering to help business leaders choose sustainability. These tools range from human and environmental toxicological data to investment tools that favor companies with strong sustainability programs, to full cost accounting of environmental and community externalities, to pollution cap and trade programs, to strong enforcement of environmental laws. The full burden of responsibility for sustainability cannot rest with business leaders who must also meet their legal responsibilities to promote their companies’ financial health. We believe that most people want to do the right thing, but they need the tools and contextual drivers that will allow them to do so without excessive cost.

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