

THE PRECAUTIONARY PRINCIPLE: GOOD FOR ENVIRONMENTAL ACTIVISTS, BAD FOR BUSINESS

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Abstract

There are two commonly known concepts in the environmental activism community. The first concept is Sustainable Development which is defined as meeting the needs of the present without jeopardizing the needs of future generations. The second concept is the Precautionary Principle which is often linked to Sustainable Development. This concept is defined as if an action or product has a suspected risk of causing harm to the public or to the environment, precautionary measures should be taken even if harm has not been scientifically established.

There are a multitude of problems associated with the Precautionary Principle with an end result of business environment being damaged for the sake of these environmental policies. It is much akin to robbing Peter to pay Paul.

Sustainable Development will be briefly touched up in terms of its definition and history since often both concepts are used in conjunction with each other.

In this paper we will look at the history behind environmental activism in the United States, the histories of Sustainable Development and the principle and then examine the problems of this concept.

The purpose of this paper is to provide the average business person pertinent information regarding this potential harmful policy so that they could apply resources as they see appropriately.

Introduction

“A claim for equality of material position can be met only by a government with totalitarian powers”.--Friedrich August von Hayek

Definition of Sustainable Development

The United Nation’s Brundtland Commission’s definition of sustainable development is the “ability to make development sustainable—to ensure that it meets the needs of the present

without compromising the ability of future generations to meet their own needs” (World Commission On Environment and Development, 1987).

Another definition according to US EPA, sustainability calls for policies and strategies that meet society’s present needs without compromising the ability of future generations to meet their own needs (US EPA, 2007).

Yet another definition by The National Environmental Policy Act (NEPA) of 1970 formally established as a national goal the creation and maintenance of conditions under which humans and nature “can exist in productive harmony, and fulfill the social, economic and other requirements of present and future generations of Americans” (US EPA, 2008).

The concept of sustainable development was described in a 1981 White House Council on Environmental Quality report: “The key concept here is sustainable development. If economic development is to be successful over the long term, it must proceed in a way that protects the natural resource base of developing countries” (US EPA, 2007).

As one can see, all three definitions of Sustainable Development are vague and this vagueness is the reason for the concept to be problematic. We will next explore the history behind Sustainable Development, which will help explain the problems associated with this principle.

The Three Spheres of Sustainability

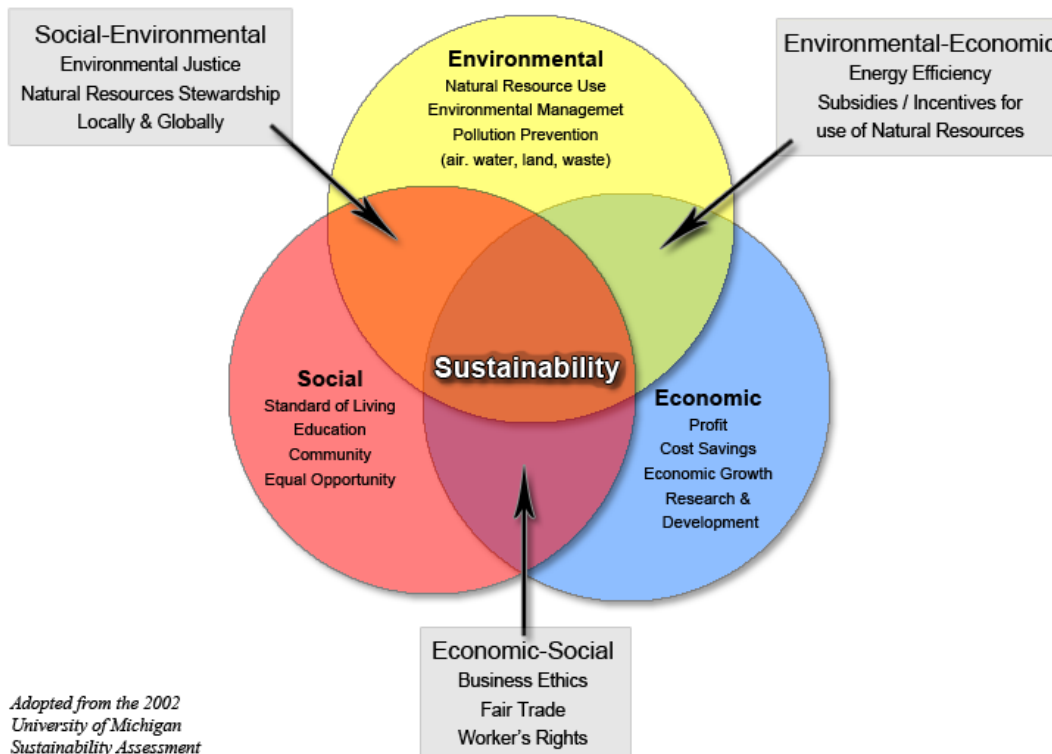


Figure 1 - The Three Spheres of Sustainability

Definition of the Precautionary Principle

The most common version on the precautionary principle found in the United States is the Wingspread Consensus Statement which is as follows:

“The release and use of toxic substances, the exploitation of resources, and physical alterations of the environment have had substantial unintended consequences affecting human health and the environment. Some of these concerns are high rates of learning deficiencies, asthma, cancer, birth defects and species extinctions; along with global climate change, stratospheric ozone depletion and worldwide contamination with toxic substances and nuclear materials.

We believe existing environmental regulations and other decisions, particularly those based on risk assessment, have failed to protect adequately human health and the environment - the larger system of which humans are but a part.

We believe there is compelling evidence that damage to humans and the worldwide environment is of such magnitude and seriousness that new principles for conducting human activities are necessary.

While we realize that human activities may involve hazards, people must proceed more carefully than has been the case in recent history. Corporations, government entities, organizations, communities, scientists and other individuals must adopt a precautionary approach to all human endeavors.

Therefore, it is necessary to implement the Precautionary Principle: When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.

In this context the proponent of an activity, rather than the public, should bear the burden of proof.

The process of applying the Precautionary Principle must be open, informed and democratic and must include potentially affected parties. It must also involve an examination of the full range of alternatives, including no action” (Science and Environmental Health Network, 1998).

History of environmental activism-Sustainable Development and the Precautionary Principle

Some environmental activists speculate that one of the first scholars to touch on the subject of sustainable development was Thomas Malthus. In his book *An Essay on the Principle of Population*, Malthus postulated that the dangers of population growth would preclude the

inevitable progress towards a utopian society. He stated “*The power of population is indefinitely greater than the power in the earth to produce subsistence for man*” (Malthus, 1826).

Another scholar that is credited in early development of sustainable development as a concept was Arthur Pigou. In his book *Wealth and Welfare*, he originated the idea that governments can, via a mixture of taxes and subsidies, correct perceived market failures or “internalized externalities (Pigou, 2008)”. Pigovian Taxes, taxes used to correct negative externalities, are named after him. A “pollution tax” would be an example of a Pigovian Tax.

Publication of Rachel Carlson’s *Silent Spring* was a watershed moment in the environmental movement in the United States. The primary purpose of the book was to instill fear into the population regarding pesticides especially dichlorodiphenyltrichloroethane or DDT, and other synthetic chemicals using claims based upon selectively presented suspect scientific evidence about harm to wildlife (Carson, Principle 1962). *Silent Spring* was the first modern example of environmental alarmism, with an impact that resulted in one of the first new acts for the newly-formed EPA to ban DDT in 1972 (US EPA, 1975). The United Nations Stockholm Convention is attempting to ban the manufacture and use of DDT by 2020 (Stockhold Convention on Persistant Organic Pollutants, 2008). In its early years, EPA had little scientific capability or understanding. Indeed, the familiar scientific disciplines relied on to inform regulations were in their infancies. DDT is a very effective and inexpensive means of controlling the mosquito population that spreads the disease malaria. Improved understanding of how DDT works have shown that, were it not banned, it effectively controls mosquitoes when applied at much lower concentrations that were used to deleterious effect in the post-war period (Tren & Bate, 2004). Since the ban, millions of lives have been lost because alternative products are less effective and more expensive to manufacture, a concern when most countries that have a high prevalence of malaria are very poor. The DDT ban is perhaps the earliest instance of environmental regulation based on the Precautionary Principle (Goklany, 2008; Lockitch, 2007).

Dr. Paul Ehrlich published *The Population Bomb* in 1968. *The Population Bomb* warned of mass starvation of humans in the 1970’s and 1980’s due to overpopulation and advocated the immediate action to limit population growth. This is an example of Dr. Ehrlich’s predictions:

“The battle to feed all of humanity is over. In the 1970's the world will undergo famines--hundreds of millions of people are going to starve to death in spite of any crash programs embarked upon now. At this late date nothing can prevent a substantial increase in the world death rate, although many lives could be saved through dramatic programs to "stretch" the carrying capacity of the earth by increasing food production. But these programs will only provide a stay of execution unless they are accompanied by determined and successful efforts at population control. Population control is the conscious regulation of the numbers of human beings to meet the needs, not just of individual families, but of society as a whole. Nothing could be more misleading to our children than our present affluent society. They will inherit a totally different world, a world in which the standards, politics, and economics of the 1960's are dead. As the most powerful nation in the world today, and its largest consumer, the United States cannot

stand isolated. We are today involved in the events leading to famine; tomorrow we may be destroyed by its consequences.

Our position requires that we take immediate action at home and promote effective action worldwide. We must have population control at home, hopefully through a system of incentives and penalties, but by compulsion if voluntary methods fail. We must use our political power to push other countries into programs which combine agricultural development and population control. And while this is being done we must take action to reverse the deterioration of our environment before population pressure permanently ruins our planet. The birth rate must be brought into balance with the death rate or mankind will breed itself into oblivion. We can no longer afford merely to treat the symptoms of the cancer of population growth; the cancer itself must be cut out. Population control is the only answer” (Ehrlich, 1968).

The Club of Rome published a book in 1972 entitled *The Limits to Growth*. The fundamental argument in this book was that technological development and societal increase cannot continue to grow at an exponential rate as it has been for the past 300 years. This book was followed by a second book entitled “Mankind at the Turning Point in 1974. The explicit message of this book was that human beings had to stop what they were doing and replace growth with a no-growth or steady state economy (Mitcham, 1995).

The first action by the United Nations to address environmental issues was in 1972 at the UN Conference on the Human Environment in Stockholm, Sweden. This was the first global environmental meeting of this kind (United Nations, 1972).

The Brundtland Commission, formally the World Commission on Environment and Development (WCED) was convened by the United Nations in 1983. The commission was created to address growing concern "*about the accelerating deterioration of the human environment and natural resources and the consequences of that deterioration for economic and social development.*" In establishing the commission, the UN General Assembly recognized that environmental problems were global in nature and determined that it was in the common interest of all nations to establish policies for sustainable development. This was one of the first examinations of the concept of sustainable development. The Commission defines sustainable development as follows: “Humanity has the ability to make development sustainable - to ensure that it meets the needs of the present without compromising the ability of future generations to meet their needs” (World Commission On Environment and Development, 1987).

The Ministerial Declaration of the Second International Conference on the Protection of the North Sea in 1987 stated: “*Accepting that in order to protect the North Sea from possibly damaging effects of the most dangerous substances, a precautionary approach is necessary which may require action to control inputs of such substances even before a causal link has been established by absolutely clear scientific evidence*” (Seas at Risk, 1987). This was one of the first mentions of Precautionary Principle type approach in a formalized multinational document. An important achievement was an agreement on the Climate Change Convention which in turn led to the Kyoto Protocol. The Convention on Biological Diversity was opened for signature at

the Earth Summit, and made a start towards redefinition of money supply measures that did not inherently encourage destruction of natural eco-regions and so-called uneconomic growth. The Earth Summit resulted in the following documents:

Rio Declaration on Environment and Development
Agenda 21
Convention on Biological Diversity
Forest Principles
Framework Convention on Climate Change (*UNFCCC*).

The Rio Declaration on Environment and Development, or the Rio Declaration, was produced at the same Earth Summit. The Rio Declaration consisted of 27 principles intended to guide future sustainability development around the world. Principle 15 from the Rio Declaration United Nations Conference on Environment and Development states:

“In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation” (United Nations Environment Programme, 1992).

The Precautionary Principle has been described by environmental activists as a common sense way to protect our health and environment. Precaution has always had an essential role in regulating any risks. Every risk involves some uncertainties, which must be bridged by precaution in making any decision to reduce risk. In other words, few if any regulatory decisions could be taken in the absence of some recognition of risk and some precaution to reduce potential risks.

Yet, proponents of the Precautionary Principle do not seek merely to make the application of precaution more explicit. They also seek to apply more precaution than has been applied in the past (Marchant & Mossman, 2004). In fact one could argue that the Precautionary Principle yields a great deal of power to bureaucrats within regulatory agencies with little scientific evidence or cost/benefit analysis to justify its actions. The rationale put forward by the proponents is that the regulation maximizes protection of the environment or human health or occupational safety with little evidence that the regulations will be effective at achieving more than increasing regulatory burdens on the regulated to the benefit of the regulators.

There are two broad classes of definitions of the Precautionary Principle: first the strong version of Precautionary Principle which basically states that take no action unless you are certain that it will do no harm; the second weak version of the Precautionary Principle which would state that lack of full certainty is so justification for preventing an action that might be harmful (Morris, Rethinking Risk and the Precautionary Principle, 2000).

The Precautionary Principle is a tool that allows the one to apply this principle into situations that involve some element of estimates of risk. In environmental applications, the precautionary principle is offered as an alternative to the traditional risk assessment idea that is typically used

by federal and state government to estimate the cause/effect relationship to human, animal or environmental health. Risk assessment can be describes as estimating the hazard of a substance or action in conjunction with an estimate of the likelihood that there will be some exposure to the hazard, resulting in the equation:

$$\text{Risk} = \text{Hazard} \times \text{Exposure}$$

Proponents of use of the Precautionary Principle as a basis for regulating human activity argue that regulations should be based on worst-case estimates of hazard alone, without regard for how small the risk of an adverse effect might be. Taken to one logical conclusion, the hazards of travelling by car (possibility of a crash) alone would be the basis of regulation rather than risks based on actual measurements of exposure to adverse events (risk = probability of a crash x incidents per mile driven). Arguments for regulations based on precaution have gained little success in areas such as transportation, where the population at large has personal experience with potential risks. In areas where the general population has little understanding or experience, such as science-based regulation intended to protect human health and/or the environment, proponents of the Precautionary Principle have been much more successful.

The first effort to bring the Precautionary Principle to the United States was at the Wingspread Conference on the Precautionary Principle in January 1998. The conference brought together environmental activists to discuss implementing the Precautionary Principle and barriers to implementation.

Agreed upon at that conference, the Wingspread Consensus Statement on the Precautionary Principle states:

“The release and use of toxic substances, the exploitation of resources, and physical alterations of the environment have had substantial unintended consequences affecting human health and the environment. Some of these concerns are high rates of learning deficiencies, asthma, cancer, birth defects and species extinctions; along with global climate change, stratospheric ozone depletion and worldwide contamination with toxic substances and nuclear materials.

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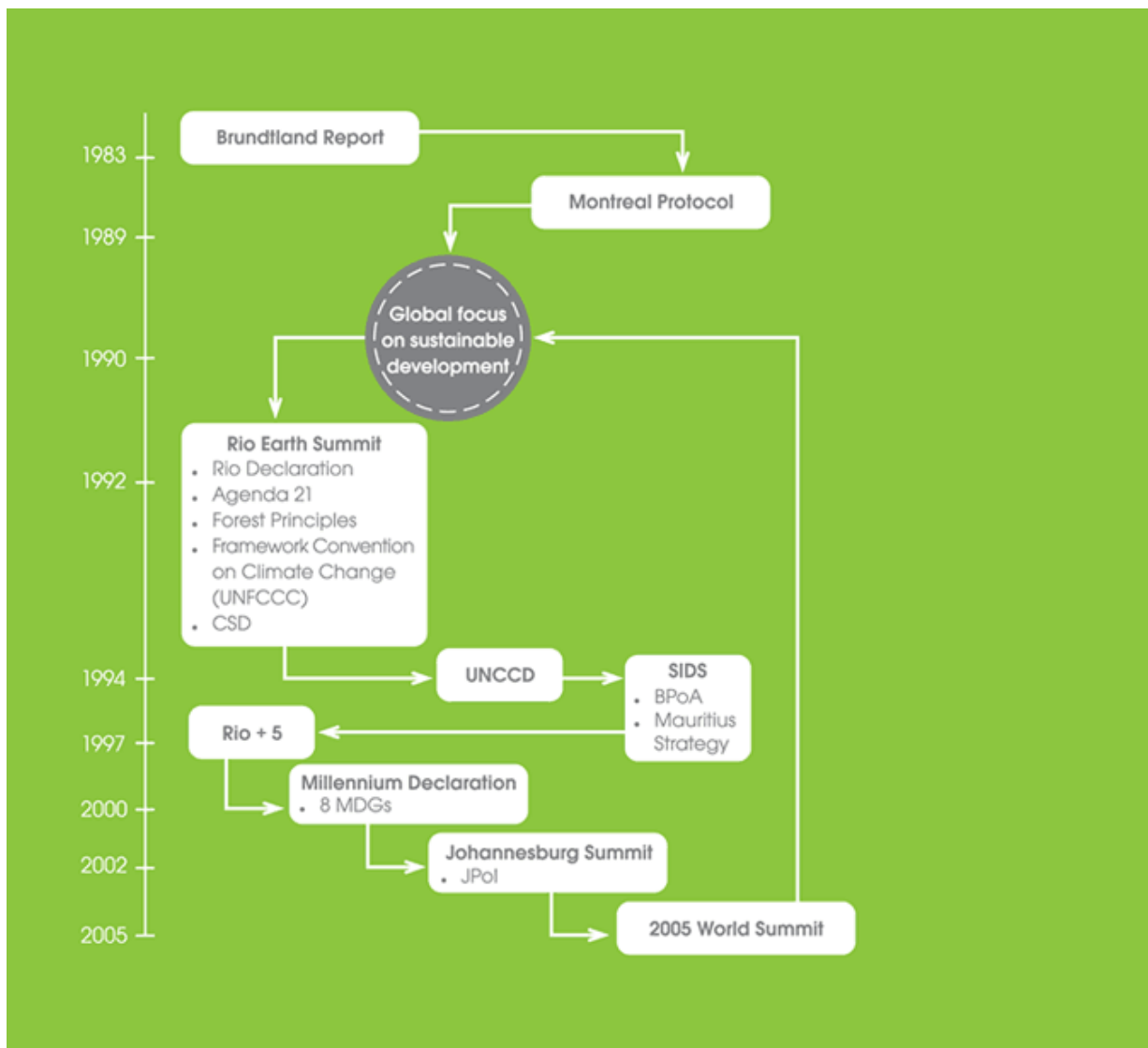


Figure 1-Time Line and Document Flow Diagram of UN involvement in Sustainable

Problems Associated with Sustainable Development

- Since the release of *Our Common Future*, more than 70 competing definitions of sustainable development have been offered by academics and policy analysts (Taylor, 2002).
- How can we reasonably be expected to know, for instance, what the needs of people in 2100 might be?
- In the years following the Brundtland Commission's report, the creative ambiguity of the standard definition, while allowing a range of disparate groups to assemble under the sustainable development tent, also created a veritable industry of deciphering and advocating what sustainable development really means' (Kates, Parris, & Leiserowitz, 2005).
- Since the Brundtland Commission first defined sustainable development, dozens, if not hundreds, of scholars and practitioners have articulated and promoted their own alternative definition; yet a clear, fixed, and immutable meaning remains elusive. This has led some observers to call sustainable development an oxymoron: fundamentally contradictory and irreconcilable. Further, if anyone can redefine and reapply the term to fit their purposes, it becomes meaningless in practice, or worse, can be used to disguise or green wash socially or environmentally destructive activities (Kates, Parris, & Leiserowitz, 2005) (Robinson, 2004).
- Still another way to define sustainable development is in how it is measured. Indeed, despite sustainable development's creative ambiguity, the most serious efforts to define it, albeit implicit in many cases, come in the form of indicators. Combining global, national, and local initiatives, there are literally hundreds of efforts to define appropriate indicators and to measure them (Kates, Parris, & Leiserowitz, 2005).
- First, if economic growth were to be slowed or stopped—and sustainable development is essentially concerned with putting boundaries around economic growth—it would be impossible to improve environmental conditions around the world (Taylor, 2002).
- The bias toward central planning on the part of those endorsing the concept of sustainable development will serve only to make environmental protection more expensive; hence, society would be able to “purchase” less of it (Taylor, 2002).
- Strict pursuit of sustainable development, as many environmentalists mean it, would do violence to the welfare of future generations (Taylor, 2002).
- The data clearly show that most natural resources are becoming more— not less—abundant with time. In fact, a proper understanding of resource economics suggests that this trend will actually improve greatly over time and that resource depletion is simply not a significant worry if the correct legal and economic policies are maintained. Accordingly, “sustainable development”— even if we put aside its theoretical difficulties— is a solution in search of a problem (Taylor, 2002).

■ There are other obstacles to ecological centralized planning beyond those related to information gathering. William Mellor III, president of the Institute for Justice, asks several pointed questions that are seldom addressed by the advocates of sustainable development:

▪Who will decide what is good growth?

▪Who will reconcile competing environmental, social, and economic concerns while anticipating environmental problems rather than reacting to the crisis of the moment?

▪Is it conceivable that the bureaucratic regulatory and enforcement apparatus necessary for such ecologically directed economic policy would be immune from rent-seeking, budget-maximizing, inefficiency, and coercion (Taylor, 2002)?

■ Environmental planning would impose an incredible informational burden on government that is unlikely to be met in the real world (Taylor, 2002).

■ As Chisholm, Hartley, and Porter note:

“Planned intervention to ensure ecological sustainability makes central planning of the economy, as conventionally practiced until recently in Eastern Europe and many other command economies appear as a comparatively unambitious exercise. Government “ecologically-minded” planners wishing to regulate a range of environmental outcomes would need the vast information on consumer tastes, production techniques, and resource availability required of a conventional central planner, information that is typically not available at any reasonable cost. They would need detailed information on myriad dynamically evolving and interacting ecosystems” (Taylor, 2002).

■ Even promoters of the concept are increasingly in agreement that sustainable development must ensure that economic and social considerations are balanced with environmental concerns and are not trumped by them (Taylor, 2002).

■ One of the most serious threats to Sustainable Development is global instability. The civil unrest in Somalia and Ethiopia are examples of this situation (Earthscan Publications, 1995).

■ At the 1992 Earth Summit The document that came out of the summit is not analytical but exhortative and practical. It does not explain the reasons behind the economic and environmental crises but offers solutions for them (Castro, 2004).

■ The United Nations seems to be promoting a voluntary system spearheaded by the capitalist class. Furthermore, the document says that *“Agenda 21 is a dynamic programme”* that *“will be carried out by the various actors according to the different situations, capacities and priorities of countries and regions”* (United Nations Conference on Environment and Development, 1992, sec. 1.6). There is no benchmark, no firm commitment to action for the environment. Of course a UN commission cannot make sovereign nation-states comply with its resolutions, which may help explain the commission members ‘caution. And it is obvious that the United Nations, as a political body, has to allow for compromises among competing interests. But when it comes to

promoting a free-trade and a pro-business agenda, the commission shows no sign of compromise (Castro, 2004).

■ In the UN document titled “Business Responsibility for Sustainable Development”, they suggest that another “co-regulatory” form of civil regulation is where NGO’s and trade unions have a greater influence in determining how business relates to society and the environment (meant for those businesses that do not fall into line with Sustainable Development). Civil regulation suggests an alternative mode of compliance, where business complies not only with national and international law, or with its own norms and standards (corporate self-regulation), but also with those determined to a large extent by civil society organizations (Utting, 2001) (Murphy & Bendell, 1999).

Problems with the Precautionary Principle

Listed below are some of the documented problems associated with the Precautionary Principle:

■ Multiplicity-Swedish philosopher Per Sandin has documented 19 versions of the precautionary principle in various treaties, laws and academic writings (Sandin, 1999) (Sandlin, Peterson, Hansson, Ruden, & Juthe, 2002) (Graham, 2004). Although these versions are similar in some aspects, they have major differences in terms of how uncertain the science is evaluated, how the severity of consequences is considered and how the costs and risks of precautionary measures are considered.

■ Ambiguity of its component elements: The Precautionary Principle is based on the common-sense adage that it is better to be safe than sorry. There is, however, no standard text for the Precautionary Principle. Each formulation of the Precautionary Principle shares the common prescription that scientific certainty is not required before taking preventive measures. In addition, most versions of the Precautionary Principle involve some degree of burden shifting to the proponent of an activity or product to demonstrate the safety of its product. The many different versions of the PP have a common shortcoming, however, in that they fail to answer the critical question of how much precaution to apply in a given circumstance (Bodansky, 1991) (Marchant 2002) (Marchant, 2003). In addition, applying a concept as vague as the Precautionary Principle as a legal requirement creates two types of problems. First, it creates the opportunity for arbitrary and unpredictable decisions by agencies, governments and courts. Second, it makes it very difficult for courts to perform their responsibility to ensure reasonableness of agency decisions. An example of this is when the EU applied the Precautionary Principle to ban the import of North American beef from animals treated with hormones, even though the EU’s scientific committees and the WTO found no scientific rationale for the ban. Also, several courts have already expressed concern about treating the Precautionary Principle as a legal instrument, Australian courts for example.

■ Weighing Risk vs. Precaution: The 19th century French economist Frederic Bastiat, encouraged one to think more deeply about being precautionary. According to Bastiat, the challenge for social policy is to look beyond the immediate and anticipated effect of an action and to foresee the services of effects of a policy that often unanticipated. The risks and benefits of the unintended consequences of policy need to be taken into account (Bastiat, 1964). The

principle often that this into account. The Precautionary Principle does not take this into account.

- The Precautionary Principle will slow or perhaps stop development or innovation since the burden of proof is on the product/service before it comes to market.

- The Precautionary Principle is based up emotion (fear) and is irrational. If you refer to the Answering the Critics section, you will see that they attempt to instill fear into people “*that babies are born with “toxic substances-not defined” in their bodies*”. This goes towards the environmental activists mantra that nature is good and man-made chemical are bad.

- Since the Precautionary Principle advocates the testing required (whatever that testing may be) to determine if a product or service is safe, this will discourage innovation and discourage development of new products and services. One reason will be is that testing cost to determine safety (which are yet to be defined) will be required before the product go to market. To the contrary of SEHN’s claims, there have been a multitude of studies that have shown that companies have not saved money in the area of pollution prevention. This will be dealt with under the Porter Hypothesis section of this paper.

- The SEHN’s claims that the Precautionary Principle is not all about bans. This is really a half truth. There have been bans based upon The Precautionary Principle. A second common method of compliance is product is restriction of how the product/service is used or sold. Another method of compliance is to make the product in question comply with testing standards at the whim of regulators. An example of this is the REACH program in Europe. In summary, regulators want a method to be able to restrict economic output without any justification.

- The SEHN’s claim that with the Precautionary Principle, we must deal with the “hazards” for which we are responsible for and over which we have control. By making this statement, SEHN is utilizing the concept probability neglect (some people want to avoid risk regard of the probability of the risk actually occurring). One frequently used tactic used by environmental activist is using the cancer scare. With increasing frequency you hear about this chemical or that chemical giving you cancer. One thing you often do not hear from environmental activist is the risk factor for cancer from the environment factors (air & water pollution) is around 2-3% (Doll & Peto, 1981) (Harvard Center for Cancer Prevention, 1996). Occupational related risk factors range from 1-4%. Yet another tactic that activist use is claiming that “environmental” cancer risks are around 70% or greater. This statement is only partial true. In those studies that make those claims the three biggest risk factors (smoking, diet, infection) along with the environmental factors (air & water pollution). One must take care when interpreting cancer risk studies since researcher have the term environment to include the three biggest risk factors.

- SEHN claims that the regulatory environment is not stringent enough. By use of the Precautionary Principle any regulator at the local, state or federal level can ban or restrict a product based upon the belief (remember you do not need scientific evidence) that it may be harmful (another word which is not defined). The affect that this would have on the economy would be devastating.

■ SEHN claims that it is possible to demonstrate that there are safer alternatives to an activity or product. Who defines safety and how a product is determined to be safer than the existing product/service. This is yet another example of the vagueness of the Precautionary Principle.

■ SEHN claims that the virtue of the Precautionary Principle is to continuously try to reduce out impact rather than trying to identify a level of impact which is safe or acceptable. The first problem the statement perpetuates the idea of nature being benevolent nature. The second problem is that the statement implies that the Precautionary Principle has defined goals, test methods, testing protocols which it does not.

■ The Precautionary Principle has been invoked on occasions for an ulterior motive. EU applied the Precautionary Principle to ban the import of North American beef from animals treated with hormones, even though the EU's scientific committees and the WTO found no scientific rationale for the ban. This is not the first time this happened.

■ When does the principle and does not apply: Consider first the important differences between different versions of the Precautionary Principle. Sandin identified 19 different formulations of the Precautionary Principle that differ across four dimensions he described as threat, uncertainty, action, and command (Sandin, 1999). Different versions of the Precautionary Principle vary, for example, in the level of the threat necessary to trigger the principle from "threats of serious or irreversible damage" to "possible risks," a discrepancy of enormous policy importance. While some of the variations between different formulations of the principle are mostly semantic, other differences go to the core of the meaning and application of precaution (Marchant, 2003).

■ Differences in major versions of the Precautionary Principle: Consider the important differences between two well-known versions of the Precautionary Principle.

The Rio Declaration produced by the 1992 United Nations Second Special Session on Environment and Development (United Nations Conference on Environment and Development 1992) endorsed the following Precautionary Principle formulation:

"When there are threats of serious and irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."

The Wingspread Statement prepared by Precautionary Principle proponents defined the Precautionary Principle as follows:

"When an activity raises threats of harms to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically" (Science and Environmental Health Network, 1998).

These two Precautionary Principle formulations have critical discrepancies. The Rio Declaration applies only to "serious and reversible risks," whereas the Wingspread Statement presumably applies to any risk. The Rio Declaration applies by its terms only to actions that would result in

environmental degradation, whereas the Wingspread Statement is broader, applying to actions that would harm either the environment or human health. The Rio Declaration indicates that any regulatory actions undertaken should be cost effective, whereas the Wingspread Statement gives no consideration to costs. The Rio Declaration imposes no affirmative duty to act, but the Wingspread version is phrased in terms of a positive obligation to act. The combined effect of these differences could easily result in inconsistent regulatory outcomes in many cases (Marchant, 2003).

■ The Principle gives uncontrolled power to Judges and Regulators. Dr. Gary Marchant, author of the book *Arbitrary and Capricious*, who has this to say:

"Proponents of the precautionary principle see power in its ambiguity. It gives regulators and courts unlimited discretion, and its ambiguity undermines transparency, accountability and fundamental principles of jurisprudence. Inevitably, the precautionary principle provides a shaky foundation for Europe's legal decision-making. It will collapse on itself -- but not before it does serious harm to Europe's economy and society" (Marchant & Mossman, 2004).

It has been suggested that proponents see that this principle is easily manipulative and that is another reason for its appeal among lawmakers.

An example of this is in the UN document, *Trading Precaution: The Precautionary Principle and the WTO*, it states that developing countries has concerns regarding the Precautionary Principle. An example given in the report noted that several African countries (Malawi, Mozambique, Zambia and Zimbabwe) rejected donated from the US because some of it contained genetically modified maize (taboo according to the Precautionary Principle in the UN's The Cartagena Protocol on Biosafety) during the famine of 2002 and 2004 (United Nations University and World Trade Organization, 2005).

Also, according to the document, the debate on the precautionary principle is complex and often abstract. To a certain extent, the precautionary principle can be seen as a "*culturally framed concept [...] muddled in policy advice and subject to the whims of international diplomacy and the unpredictable public mood over the true cost of sustainable living*" (United Nations University and World Trade Organization, 2005).

In addition, the Precautionary Principle has been applied to various environmental issues and has over twelve different definitions in international agreements. What is lacking is a uniform description of the precautionary principle in these agreements, leading some critics to argue that the principle is overused without a clear understanding of its meaning and consideration of its implementation. The flexible definition of the precautionary principle may be its strength, but also one of its greatest weaknesses.

■ There will always be a trade-off between over-regulation (false positives) and under-regulation (false negatives) in regulation of uncertain risks (Stewart 2002; Wiener and Rogers 2002). The total number of false positives and false negatives can be reduced, although never eliminated, through the development of more accurate risk assessment methods and data. The relative

balance between false positives and false negatives can also be shifted by applying more or less precaution but only at the cost of increasing one type of error by reducing the other. The more precaution that is applied, the more false negatives we will have avoided, but also the more often it will turn out that we have acted excessively (i.e., false positives) (Goldstein, 1999). It should come as no surprise, therefore, that some examples of overregulation and under-regulation can be identified after the fact, as there will always be some of both error types (Marchant G. E., 2003).

■ Many of the risks now cited as exemplars showing the need for greater precaution were not, and perhaps could not have been, foreseen at the time of initial product deployment. To be sure, a strong case can be made that industry and government regulators moved too slowly in preventing additional harm once the evidence of such adverse effects was available, or that imposing stronger premarket testing requirements on product manufacturers may have permitted earlier detection of product risks. But prior to that time, the problem was ignorance rather than uncertainty about risks that were outside the scope of foreseeable effects (Bodansky, 1991) (Hoffmann- Riem and Wynne 2002). It is difficult to see how the PP can help address risks for which we are ignorant rather than uncertain. As stated in the study *Ignorance, the Precautionary Principle, and Sustainability*, “[w]e cannot prevent the unanticipated: the Precautionary Principle still leaves us bound by present knowledge” (Dovers & Handmer, 1995).

■ It is easier to prove the existence of risk than the absence of risk (Hansson 1997). There is no serious doubt, for example, that asbestos causes mesothelioma or that DES caused adenocarcinomas, whereas any conclusion that a particular agent presents no significant risk is necessarily more tentative and qualified. For example, a new study could show tomorrow that the MMR vaccine does indeed cause autism, even though the data available to date indicate there is no such association (Madsen et al. 2002). In contrast, it is inconceivable that a new study could demonstrate, for instance, that asbestos does not cause mesothelioma. Thus, examples of false positives are likely to be more provisional (and perhaps then undercounted) than examples of false negatives (Marchant & Mossman, 2004).

■ Although the false negatives may be easier to detect, they also generally involve more serious consequences than the false positive. The societal costs of unnecessary carcinogenicity warnings for saccharin or forcing apparently safe products such as silicone breast implants or Bendectin off the market may be substantial but pale in comparison to the consequences of many false negatives such as asbestos or mad cow disease. This asymmetry may not apply in all cases, such as when overly stringent regulation of one set of health risks may increase overall risk as a result of risk–risk trade-offs (Cross 1996; Graham and Wiener 1995). Other cases, however, will often involve balancing the health effects from potential under-regulation (false negatives) versus the economic costs of potential overregulation (false positives). Our strong (although not infinite) preference for lives over dollars provides much of the justification for the principle (Geistfeld 2001) (Marchant & Mossman, 2004).

■ Typically humans are Loss Adverse. This will be discussed in length in the next section.

■ The myth of a benevolent nature: Loss aversion is often accompanied by a mistaken belief that nature is essentially benign (safe), leading people to think that safety and health are generally at

risk only or mostly as a result of human intervention. A belief in the relative safety of nature and the relative risk of new technologies often informs the Precautionary Principle. Because natural processes are often dangerous and human interventions often promote safety, a commitment to nature can be life threatening (Sunstein, 2005).

- The availability heuristic. This will be discussed at length in the next section.
- The neglect of probability. This will be discussed at length in the next section.
- System neglect. This will be discussed at length in the next section.
- Implicit policy vs. hidden policy statement: Federal, State and local levels, precautionary principle-like policy is enacted more and more frequently. This could be done as an implicit policy statement like the City of San Francisco. This is typically not the case. Usually regulators do not use the term precautionary because of the negative connotation that is attached to this type of policy.
- It has been claimed that the Precautionary Principle is absolutist or overly rigid. According to one author, “*in several treaties, the Precautionary Principle is formulated in absolutist terms. It stipulates that once a risk of a certain magnitude has been identified, preventive measures to erase that risk are mandatory*” (Sandlin, Peterson, Hansson, Ruden, & Juthe, 2002). Another way to look at this is that decision-makers must pay unreasonable attention to even those things that are extremely unlikely scenarios.
- The Precautionary Principle leads to the imposition of new risks since cautiousness in one respect often leads to unintended risk in another. An example of this would be the use of a pesticide in a developing country may be forbidden in that country due to perceived health risks, but then that county runs the risk of having their crops destroyed by pests (Sandlin, Peterson, Hansson, Ruden, & Juthe, 2002).
- Critics of the Precautionary Principle say that the principle is not science based. Considering the fact that you do not need science based argument of theory to get the principle started. Science based decisions are only made at pre-designated junctures when the principle calls for it (Marchant & Mossman, 2004).
- Critics of the Precautionary Principle have argued that the principle is a value judgment or an ideology and not based upon actual judgment. The Precautionary Principle merely expresses a subjective attitude of fear against risk taking and there can neither be confirmed or falsified by scientific studies (since scientific studies are not needed according to most versions of the Precautionary Principle) (Sandlin, Peterson, Hansson, Ruden, & Juthe, 2002).
- The Precautionary Principle is unscientific and marginalizes the role of science. This is the case since precautionary measures be taken against a threat even if scientific evidence has not been established. There are two meanings to the word unscientific. First if the preemptive measure is not based on science. Second, the precautionary measure may be unscientific if it contradicts science (Sandlin, Peterson, Hansson, Ruden, & Juthe, 2002).

The Porter Hypothesis

■ The misconception that regulation or government intervention spawns innovation and competitiveness in the private sector. Proponents of the Principle and Sustainable Development believe that by government intervention, the government is actually helping with innovating new products, process, or saving companies' money via environmental regulation. There are two studies that are frequently cited in this area:

Green and Competitive: Ending the Stalemate, Porter, Michael E., van der Linde, Claas. (Porter & van der Linde, 1995)

Toward a New Conception of the Environment-Competitiveness Relationship, Porter, Michael E., van der Linde, Claas. (Porter & van de Linde, 1995)

In these papers, the claim (The Porter Hypothesis) is that properly crafted environmental regulation can serve at least six purposes. These are:

- Regulation somehow signals companies about likely resource inefficiencies and potential technological improvements.
- Regulation focused on information gathering can achieve major benefits by raising corporate awareness.
- Regulation reduces the uncertainty that investments to address the environment will be valuable.
- Regulation creates pressure that motivates innovation and progress.
- Regulation levels the transitional playing field. During the transition period to innovation-based solutions, regulation ensures that one company cannot opportunistically gain position by avoiding environmental investments.
- Regulation is needed in the case of incomplete offsets. In such cases, regulation will be necessary to improve environmental quality.

The authors further explain the while the costs of compliance may rise with stringency, then, the potential for innovation offsets may rise even faster. Thus the net costs of compliance can fall with stringency and may even turn into a net benefit.

However, there are several major flaws with this hypothesis:

One study stated: *“We take strong issue with their view. If this were simply a matter of intellectual sparring, it would be inconsequential outside academe”* (Palmer, Oates, & Portney, 1995). If environmental regulations are essentially costless, then it would be unnecessary to

justify and measure with care the presumed social benefits of environmental programs (Palmer, Oates, & Portney, 1995).

The hypothesis states the private sector systematically overlooks profitable opportunities for innovation and that regulatory authorities are looked upon to correct this “market failure” (Palmer, Oates, & Portney, 1995). The hypothesis claims that regulators can help firms “*to overcome organizational inertia and to foster creative thinking*”, thereby increasing profits, in other word regulators can run the business more efficiently than the business owner (Palmer, Oates, & Portney, 1995). The hypothesis is static in nature and fails to address the inherent uncertainty in research and development decisions (Palmer, Oates, & Portney, 1995). The hypothesis does not allow for any sort of strategic interaction (Palmer, Oates, & Portney, 1995).

When the companies from the Porter case studies were re-interviewed, they stated that any environmental regulations amounted to a significant net cost to their company, counter to the claims made in the hypothesis (Palmer, Oates, & Portney, 1995). Furthermore, highly regulated markets tend to benefit larger corporations than midsize and small corporations. The reason why is because large companies have the resources to comply with regulations or the addition of regulations. Small or mid-size companies do not have the resource base available to them. This may cause the smaller companies to be less profitable or perhaps even close given the severity of the situation (Crain, 2005).

Annual expenditures for environmental protection in the United States net any offsets, currently are at least \$221 billion (2004) (Crain, 2005). Extremely severe regulations might cause plants to close down, leading to measured compliance costs being low rather than high (Jaffe & Palmer, 1997). In addition, there are several econometric studies that suggest that environmental regulation has a negative impact on productivity growth (Jaffe & Palmer, 1997).

More regulated plants have significantly lower productivity levels and slower productivity growth rates than less regulated plants. The magnitudes of the impacts are larger than expected: a \$1 increase in compliance costs appears to reduce TFP by the equivalent of \$3 to \$4. Thus, commonly used methods of calculating the impact of regulation on productivity are substantially underestimated (Gray & Shadbegian, 1993). “We estimate the relation between the “visible” cost of regulatory compliance (costs that firms’ accounting systems correctly classify as “environmental”), and “hidden” environmental costs embedded in other accounts. Empirical results show that a \$1 increase in the visible cost of environmental regulation is associated with an increase in total cost (at the margin) of \$10-11, of which \$9-10 are hidden in other accounts. The findings suggest that inappropriate identification and accumulation of the costs of environmental compliance are likely to distort costs in firms subject to environmental regulation” (Joshi , Krishnan , & Lave, 2001).

Finally, “*Using plant-level data for three manufacturing industries, we have found a significant negative relationship between a plant’s pollution abatement costs and its total factor productivity level and growth rate*” (Gray & Shadbegian, 1993). These are just a few of the many studies that show that the Porter Hypothesis has been proven false in the actual business environment.

Cognitive Bias - Why the Precautionary Principle is Appealing to Activists

There are several cognitive biases suggesting why this Principle seems so appealing to some people.

■ **Loss aversion:** People dislike losses far more than they like corresponding gains. The result is that out-of-pocket costs, or deteriorations from the status quo, seem much worse than opportunity costs, or benefits lost as a result of continuing the status quo. In the context of risks, people often tend to focus on the losses that are associated with some activity or hazard, and to disregard the gains that might be associated with that activity or hazard. A closely related point is that unfamiliar risks produce far more concern than familiar ones, even if the latter are statistically larger; the Precautionary Principle, in practice, is much affected by that fact (Sunstein, 2005) (Sunstein, *Beyond the Precautionary Principle*, 2003) (Adler, 2003).

■ **The availability heuristic that contributes to cognitive bias:** It is well known that people focus on some risks simply because they are cognitively “available,” whereas other risks are not. When the Precautionary Principle seems to require stringent controls on one risk, even though other risks are in the vicinity, the availability heuristic is a common reason. And when the availability heuristic is at work, certain hazards will stand out whether or not they are not statistically large (Sunstein, 2005) (Sunstein, *Beyond the Precautionary Principle*, 2003).

■ **Probability neglect:** People are sometimes prone to neglect the probability that a bad outcome will occur; they focus instead on the outcome itself. The Precautionary Principle often embodies a form of probability neglect. At least, that is the case when people invoke the principle to favor stringent controls on a low-probability risk and when the consequence of those very controls is to give rise to new risks of equal or greater probability. In the context of the sniper attacks in the Washington, D.C. area in October 2002, people were far more concerned, and took many more precautions, than the statistical realities warranted, in part because the high salience of the attacks led to a form of probability neglect. It is highly likely that some of those precautions, including those that involved extra driving, actually increased people’s risks (Sunstein, 2005) (Sunstein, *Beyond the Precautionary Principle*, 2003).

■ **System neglect:** The Precautionary Principle often reflects a general neglect of the systemic effects of regulation. When a single problem is placed in view, it can be difficult to see the full consequences of legal interventions. Sometimes, the principle has the appearance of being workable only because a subset of the relevant effects is “on screen” — and hence there seems to be no need to take precautions against other possible adverse effects that do not register. I suggest that the Precautionary Principle seems appealing to many people in large part for the same reason (Sunstein, 2005) (Sunstein, *Beyond the Precautionary Principle*, 2003).

Conclusion

There have been a multitude of articles written on the subject of the problems associated with the Precautionary Principle and Sustainable Development; however, this is an attempt to bring most

of these problems of both concepts together in a comprehensive paper written in a style that the average business person would understand.

Even though both the concepts of Sustainable Development and the Precautionary Principle sound appealing in nature, both concepts are fraught with major problems. As one author states, the Precautionary Principle is “paralyzing” (Sunstein, *The Paralyzing Principle*, 2002). In addition, another organization states that “The precautionary principle is, however, a very useful one for consumer activists precisely because it prevents scientific debate. The burden of evidence and proof is taken away from those who make unjustified and often whimsical claims and placed on the scientific community which, because it proceeds logically and rationally, is often powerless to respond. This is what makes the principle so dangerous. It generates a quasi-religious bigotry which history should have taught us to fear. Its inherent irrationality renders it unsustainable” (Social Issues Research Centre).

The tools of Sustainable Development and the Precautionary Principle are tools of control which are utilized by environmental activist to help promote their change in social, political and economic policies on the local, state, federal and global levels.

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