

**Chapter 1 : Economic Development vs the Environment - DebateWise**

*Concludes that the costs of addressing the main environmental priorities are affordable—some because of the improvements in economic efficiency they bring, others because of their environmental benefits—yet even those that appear costless in economic terms may carry a political price.*

Economic Development vs the Environment Yes because Taking care of millions of people who are starving is more important than saving natural resources, Taking care of millions of people who are starving is more important than saving natural resources, most of which are renewable anyway. We cannot expect developing nations to share the green concerns of developed countries when they are faced with dire poverty and a constant battle for survival. We have already wasted and destroyed vast amounts of natural resources, and in so doing have put earth at risk. We must preserve the earth for our children and grandchildren. In any case, poverty and environmental damage are often linked. Destroying the rainforest gives native peoples nowhere to go except urban slums. Polluted water can lead to crop failures. Climate change will turn fertile fields into desert and flood coastal areas where hundreds of millions live. Developing countries have to choose sustainable development if they want a future for their people. Because this is seen as interference in their affairs, it also contributes to a greater divide between the First and Third worlds. Many also believe it is a deliberate attempt to stop possible economic competitors. After all, the USA and EU already put high tariffs import taxes on products made cheaply in developing countries e. By limiting the development of profitable but polluting industries like steel or oil refineries we are forcing nations to remain economically backward. No one wants to stop economic progress that could give millions better lives. But we must insist on sustainable development that combines environmental care, social justice and economic growth. Earth cannot support unrestricted growth. Companies in developed countries already have higher costs of production because of rules to protect the environment. It is unfair if they then see their prices undercut by goods produced cheaply in developing countries at the cost of great pollution. Economic development is vital for meeting the basic needs of the growing populations of developing c Economic development is vital for meeting the basic needs of the growing populations of developing countries. If we do not allow them to industrialise, these nations will have to bring in measures to limit population growth just to preserve vital resources such as water. Unchecked population growth has a negative impact on any nation, as well as on the whole planet. Both the poverty and the environmental problems of sub-Saharan Africa are largely the result of rapid population growth putting pressure on limited resources. Limiting population growth will result in a higher standard of living and will preserve the environment. Obviously the world would be better if all nations stuck to strict environmental rules. The reality is that for many nations such rules are not in their interests. The equal application of strict environmental policies would create huge barriers to economic progress, at a risk to political stability. Nations are losing more from pollution than they are gaining from industrialisation. China is a perfect example. Twenty years of uncontrolled economic development have created serious, chronic air and water pollution. This has increased health problems and resulted in annual losses to farmers of crops worth billions of dollars. So uncontrolled growth is not only bad for the environment, it is also makes no economic sense. Rapid industrialisation does not have to put more pressure on the environment. Scientific advances have made industries much less polluting. For example, efficient new steelworks use much less water, raw materials and power, while producing much less pollution than traditional factories. And nuclear generating plants can provide more energy than coal while contributing far less to global warming. We are also exploring alternative, renewable types of energy such as solar, wind and hydro-power. Scientific progress has made people too confident in their abilities to control their environment. In addition, the nuclear power industry still cannot store its waste safely. Hydro-power sounds great but damming rivers is itself damaging to the environment. It is hypocritical two-faced and unfair for rich developed countries to demand that poorer nations It is hypocritical two-faced and unfair for rich developed countries to demand that poorer nations make conservation their priority. After all, they became rich in the first place by destroying their environment in the industrial revolution. Now that they have cut down their own trees, polluted their water sources and poured

billions of tons of carbon into the air, they are in no position to tell others to behave differently. In any case, as countries become richer they become more concerned about the environment, and can afford to do something about it. For developing countries conservation can therefore wait until they are richer. Looking after our fragile world has to be a partnership. Climate change will affect the whole planet, not just the developed world. In fact it is likely to have particularly terrible effects on developing countries as sea levels rise, deserts advance, and natural disasters become more common. It is no use Europe trying to cut its emissions into the atmosphere if unchecked growth in China and India leads to much greater overall pollution. Instead, developed countries need to transfer greener technologies to the developing world, paying for environmental protection and making sustainability a condition for aid. Thus, cutting down more forests to provide more space for crops is no longer necessary. Genetically modified crops can also benefit the developing world by requiring much less water, fertiliser or pesticide use while giving better yields. This is another example of economic development leading to environmental benefits. The Green Revolution is threatening the biodiversity of the Third World by replacing native seeds with hybrids. We do not know what the long-term environmental or economic consequences will be. We do know that in the short run, such hybrid crops can cause environmental problems by crowding out native plants and the wildlife which relies on them. Farmers using hybrid seeds in what was the richest part of India went bankrupt. As a result, fertile lands lay idle and unploughed, resulting in droughts and desertification.

**Chapter 2 : Benefits of Renewable Energy Use | Union of Concerned Scientists**

*9 The costs of a better environment The costs of protecting and improving the environment appear at first sight to be large. Yet such investments must and can be afforded. With good policies, the costs are modest in comparison with the potential gains from improved efficiency and economic growth. Most investments will pay for themselves.*

Shoppers have the opportunity to make a choice every time they make a trip to the grocery store: Many consumers may wonder which type of bag is better for the environment. To assess the comparative environmental impacts of each material is not a simple matter; it requires consideration of the inputs of matter and energy throughout each stage of the life cycle of each product. Plastics are produced from the waste products of oil refining. An analysis of the life cycle of plastic bags includes consideration of the environmental impacts associated with the extraction of oil, the separation of products in the refining process, and the manufacturing of plastics. The total environmental impact depends upon the efficiency of operations at each stage and the effectiveness of their environmental protection measures. Paper is produced from trees; environmental impacts include those associated with extracting timber and processing it for paper products. Again, the environmental impacts depend on whether the timber was obtained from a sustainably managed forest – most industrial timber products in the U. Comparatively, plastic bags require less energy to produce. Both paper and plastic bags have to be transported to stores, which requires energy and creates emissions. In this comparison, plastic is preferable because plastic bags are lighter in weight and more compact than paper bags. It would take approximately seven trucks to transport the same number of paper bags as can be transported by a single truck full of plastic bags. The disposal of bags entails additional environmental impacts. If landfilled, plastic bags are more environmentally benign than paper, as they require less space; paper occupies approximately half of overall landfill volume. Plastics not just bags generate 14 to 28 percent of the volume of trash in general, but because much of it can be compressed, only 9 to 12 percent of the volume of waste in landfills. Although plastics do not biodegrade, modern landfills are designed in such a way that nothing biodegrades, because the waste is isolated from air and water in order to prevent groundwater contamination and air pollution. As manufacturers have continued to make their plastic packaging thinner and lighter to save materials, the percentage of landfill volume taken up by plastics has remained steady since even as plastics have become more widely used. Not all trash ends up in landfills; in the U. Stray plastic bags, which have been estimated at one to three percent of the hundreds of billions that are produced each year, are now found almost everywhere on the planet. Although littering and trash laws in developing countries have significantly reduced the amount of improperly disposed trash, many developing countries have fewer trash receptacles, landfills, and programs to handle the increasing amount of trash. Plastic bags pose a threat to marine life, because, if ingested, the bags can block the stomach and cause starvation. Sea turtles, for example, mistake plastic bags for jellyfish. In a minke whale that washed up on a beach at Normandy was found to have grams of plastic and other packaging in its stomach. Stray plastic bags can also clog sewer pipes, leading to stagnant, standing water and associated health hazards. In , Bangladesh banned plastic bags after drains blocked by bags contributed to widespread monsoon flooding in and Ireland has decreased plastic bag consumption by placing a consumer tax on plastic bags.

**Chapter 3 : Is Corn Better As Food Or Biofuel? Environmental Costs Assessed**

*Paper straws cost about 2½ cents, compared with a half-cent for plastic straws, says Adam Merran, CEO of PacknWood. Starbucks is just one of many companies to recently announce that it will phase.*

Mountain View Chamber of Commerce April 17, The truth, of course, is that most of us care more about our standard of living than we do about the health of some species we seldom if ever see. And the truth, even harder to admit, is that most of us care more about our own welfare than we do about that of persons living three or four or five generations hence. If protecting the planet, for future generations and for other species, depended on changing these operational values, then we would be in deep trouble. And perhaps we are in deep trouble, but if we are, it is not because protecting the planet requires neglecting our own interests. Think whatever you wish about the moral standing of these operational values -- this is the reality. It is a deeply held view that protecting the environment constitutes a net expense to our economy. The popular wisdom these days is that environmental concerns have faded from the political radar screen because of the recession. Two years ago, with Earth Day , all the polls showed that the public attached great value to protecting the environment. Today, not even the Democratic presidential candidates are declaring their intention to become "the environmental president. From this view, it follows that the task of public policy is to find the proper balance between the two. In a recession, the balance shifts to promoting economic prosperity and away from quote spending money unquote on the environment. Reality Versus Perception Economic activity, both production and consumption, relates to the environment in two fundamental ways -- we draw resources both renewable and non-renewable from the environment to produce goods and services, and we emit wastes into the environment in the process of both producing and consuming. Too often we think and act as if we were not part of nature. Rather than thinking of ourselves as nested in nature and dependent upon it, we think of ourselves as sitting on top of it, managing it. We think there is the human world and the natural world, and we forget that we are ourselves, with all our technology, part of nature. So what is the reality? What will happen to our industrial civilization if the supply of natural resources is constantly diminished relative to demand? The answer is obvious. Our prosperity will be threatened. And the solution is obvious. We must strive to obtain more goods and services from our finite supply of non-renewable resources, and we must protect -- from both extraction and waste impacts -- the natural productivity of our forests, fisheries, agricultural and range land, and other renewable resources. Yardsticks of Prosperity Its obvious that our continued prosperity depends on protecting both extractive potential and waste absorption capacity. In thinking about how environmental protection expenditures relate to future prosperity, we must first consider the yardsticks we use to measure how we are doing in economic terms. Growth in gross national product has become the seminal indicator of the health of our economy. But how good a yardstick of our present or future prosperity is it? Gross sales of goods and services as a measure leaves something to be desired. If an economic activity produces directly one million dollars in product but also results in one million dollars of costs in health impacts and destruction of essential assets, common sense might lead you to think nothing has been gained. But health services and asset replacement are part of the gross national product, and using GNP as a measure, the loss becomes a gain. To the one million dollars in product is added one million dollars in health services and asset replacement, yielding two million in GNP. Something is clearly wrong with this picture. Lots of things which enhance our quality of life do not contribute to our GNP. For example, if we were to take extremely good care of our constructed assets -- our homes, buildings, vehicles, industrial equipment and so on -- we would spend less on their replacement. This would reduce our GNP, but can anyone reasonably suggest that it would reduce our wealth. GNP measures transactions, not net worth. Beyond this, could anyone really suggest that human well being is adequately measured by net worth? If we maximize net worth, but poison our bodies in the process, would anyone really suggest that we would be better off? Conventional economic thinking says that prosperity is a function of competitiveness, and that competitiveness is a function of efficiency. But when economists think of efficiency, they usually consider only the efficiency of labor and capital. Japan and Germany produce their products with about half the energy input of American industry.

Energy represents about ten percent of the cost of production, and so they achieve with their efficiency about a five percent competitive advantage in world markets relative to US goods. This advantage is certainly significant, but to it must be added the price edge of using other natural resources more efficiently. These efficiencies benefit countries, companies, and local communities. Using our natural resource base in a more efficient way, and maintaining a larger supply of both non-renewable and renewable resources relative to demand, makes the products of a nation, a company, or a community more competitive in the marketplace. At the same time, we must begin to calculate into our economic reasoning the costs imposed by wastes. When wastes reduce the productivity of natural systems -- forests, fisheries, agricultural and range lands -- they reduce our supply of economic inputs. When wastes damage our existing investments -- acid rain eating our bridges, etc. And when wastes damage our health, they impose costs even as they add to GNP by generating demand for health services. But a big piece of the puzzle has still been left out. When thinking about the operation of the market in metering the use of natural resources, we must realize the extent to which we subsidize resource use and thereby distort price signals. Perhaps the most obvious and dramatic example of this is in transportation. When we make transportation decisions, or when we make decisions about the location of our housing and employment sites, we consider the cost of getting from here to there. As the cost goes up, we are likely to decide to forgo trips or situate our home and job closer together. Or we might decide to use transit, or bike or walk, rather than drive. The cost of automobile transportation is today subsidized enormously. If the true cost is every expenditure that is generated by auto use, a brief listing of some of these expenditures that are not actually paid by drivers in proportion to their driving will illustrate the subsidy. We build roads in many cases with general taxes. We also build roads by putting the cost on new development, and the bill is ultimately paid in mortgage and lease payments. We maintain, repair and rebuild roads for the most part with general taxes. And we service them -- traffic patrol, accident response, and so on -- also mostly with general taxes. Parking including the garages in our homes is for the most part provided by mortgage and lease payments -- and for commercial structures, is passed along in the prices of products and services. If all of these costs were paid by auto registration fees and gas taxes, or through other "use related" charges, the cost of auto use per mile would go up dramatically. Certainly it would at least double, and by many calculations might increase as much as three or even four times. Economics teaches simply that anytime any good or service is subsidized, the market undervalues it and its use goes up. If we paid all of the true costs of auto use in per mile and per vehicle charges, powerful price signals would be created to avoid unnecessary trips, shorten trip lengths, and shift to transit. If these shifts were made in a revenue neutral way -- that is, if general taxes, development fees, product prices and so on were reduced to an extent equal to the increase in registration fees and gas taxes -- we would not pay more for auto use. We would just pay in a way that would send much more accurate price signals. The environmental impact of this would be dramatic. In California, auto use is the single largest source of air pollution, greenhouse gases, acid rain, imported oil demand, and urban land use. Better price signals for auto use would have major environmental benefits, and at the same time, again per Economics, produce a more economically rational and efficient allocation of all the resources required for auto use. So let's look at water. Most of us realize that water consumption, not just for agriculture but for all uses, is enormously subsidized by general taxes. The subsidy may exceed 90 percent for agriculture, but is substantial for all uses. What if we paid lower taxes but paid the true cost of water? We would become more efficient in our use of water. How about solid waste? Although this is finally beginning to change, most residents of California still pay flat garbage fees, and in many areas of the country, garbage disposal costs are borne by the general taxpayer. Would we work to throw away less if we paid for disposal by the pound? More than half of the resource use and environmental impact of food production is related to meat. The cost of producing meat is greatly reduced by water subsidies, but is likewise reduced by artificially lower prices for energy, fertilizer, transport and refrigeration. Would more accurate price signals mean change? What if we eliminated price supports and direct agricultural subsidies? You can begin to see the pattern. Subsidies to cotton and wool production could be ended. Subsidies to the feedstocks of synthetic fabrics could be ended. Subsidies to the transport of raw and finished clothing products could be ended. The tax burden would go down. The cost of clothing would go up. Maybe more of us would return to mending our socks. It goes on and

on. Natural resource use and environmental impacts are increased by our pervasive addiction to subsidies for consumption. Economics says this decreases efficiency. And by ending subsidies to consumption, more would be saved and invested in increasing the then much more cost-effective investments in increased efficiency. Treating Capital Drawdown As Income But all of this represents but a fraction of our subsidies for consumption and environmental destruction. A big part is our habit of treating consumption of our stocks of non-renewable resources as pure income -- and likewise treating our unsustainable draw of renewable resources as pure income. A friend of mine has a good way of describing the economic irrationality of this. Valuing forest products as equal to the cost of extracting them, he says, is like valuing our life savings by the cost of driving to the bank to withdraw them. Our forests, fisheries, agricultural and range lands, mineral resources, fossil fuel resources, slow to recharge aquifers, and other natural resources are being consumed. Yet in the national accounting system driven by GNP, we fail to calculate net income. Our forests shrink, but we do not subtract the shrinking asset value from gross income to see if we are realizing net income.

**Chapter 4 : Environmental news, opinion and analysis from Guardian US | The Guardian**

*A better measure of the resources required to support environmental protection activities is total value-added, which Nestor and Pasurka find amounted to percent of GDP in "5 The EPA and BEA estimates of environmental expenditures average percent of.*

Being concerned about the environment and the creatures on the earth is a noble gesture. It ensures that we have a place to call home long into the future. To help reverse some of the damage that has already been done to the planet, people are discovering new ways to be environmentally friendly and practice sustainability. One way to help the environment and animals is to look for clothing that is made out of synthetic leather. This practice saves animals from being used strictly for their hides and has an impact on the environment—

or does it? New evidence shows that using PVC and other common leather substitutes might negatively affect the environment. However, producing PVC is incredibly dangerous—both to humans and the environment. PVC releases toxic chemicals during processing, including polychlorinated biphenyls PCBs , vinyl chloride, dioxins, ethylene dichloride, furans and mercury. Polyurethane Polyurethanes were first invented in the s. They can be turned into fine threads, which can then be combined with other materials to make fabrics. Some of the most common fabrics polyurethanes can be found in include spandex, swim suits and to help hold up socks. Because polyurethanes are derived from oil, they will only last as long as the oil supply lasts. For those who are trying to reduce negative impacts to the environment, you might want to reconsider wearing polyurethane as an alternative leather. Below are some novel materials that are being used to create vegan leather.

Cork Cork is considered to be the most environmentally friendly material for creating fake leather. It is water resistant, durable and easily recyclable. Because it comes from trees, it can be grown sustainably to lessen the impact on the environment. Waxed Cotton This material is waterproof and durable. It can look and feel like patent leather, without the need for harsh chemical treatments to produce it. Using organic cotton ensures that you are treating the earth kindly but looking great at the same time. Tree Bark Leather Like cork, this product comes from trees and can be grown and harvested in sustainable fashion. It is both durable and strong, not to mention unique. It is derived from cellulose fibers that are extracted from pineapple leaves. It looks and feels like cowhide, and it is durable and watertight. Not only is it environmentally friendly, but it is also economically friendly for pineapple farmers. There are a variety of ways to accomplish the task, and using fake leather products is one way to make an impact. However, not all vegan leathers are environmentally friendly. Emily Folk is a freelance writer and blogger from Lancaster, PA. She covers topics in conservation, sustainability and renewable energy. To see her latest posts, check out her blog [Conservation Folks](#) , or follow her on [Twitter](#).

**Chapter 5 : Quality Control and Environmental Costs**

*Once literate, all these drugs will not be consumed leading to a better and cleaner environment. Thus industrialization is actually boosting up the conservation of environment, and if not, then at least it is limiting the pollution so that in the future we don't have tons of stuff to clear.*

Share via Email People form a barricade as they protest against the destruction of the Hambacher forest. This has the unintended consequence of rewarding destruction. Hence the German situation in Hambacher: And, in an infinite world, there are always more 12-year-old forests. This form of thinking might have been a useful simplification when human population and activities were at the levels of the Enlightenment, when much of the philosophy that still drives the economy was developed. Indeed, for any one individual the world is still a remarkably big place and it is difficult to imagine it running out of anything. And that is without considering increased rates of consumption. Maybe the better question is: I remember the rationing of food, clothing and fuel in the s. It was tiresome but necessary and it ensured that no one in UK starved. Rather than destroy our environment, we need to introduce a system of mileage rationing for people using modes of transport which run, directly or indirectly, on fossil fuels. It takes a peculiar form of obstinacy for news channels such as the BBC to consistently not mention climate change. Last week, for example, Jeremy Corbyn committed the Labour party to a huge investment in green technology coupled, to zero carbon emissions by This was ignored in favour of yet more pointless debates about Brexit. But is there any chance he could get together with, say, Owen Jones, Caroline Lucas and Justin Welby, to tell us how, practically, to get from where we are to where we should be, without catastrophic unemployment, poverty and civil unrest? Stop driving fossil-fuel cars. Do not follow fashion. Do not upgrade phones with every new model. Buy products, including clothes, furniture and household items to last. At an individual level, we all need to forget what everyone else might be doing, and tailor our activities and consumption to much reduced totals. This has to mean a much simplified lifestyle: It means a fundamental change of attitude to everyone else. At a political level, we need to replace competitive politics with cooperative politics. Left and right politics is redundant, as are most of our politicians. But why will he not take his argument to its logical conclusion? There is one overarching problem which is behind all the others: It is the population problem: Someone, I forget who, has suggested that if everyone on earth had a European standard of living we would need about three planets to sustain us five for a North American standard. Some people get very exercised over the thought that there might be 9 or even 10 billion of us by That is the wrong concern: I believe that it is not enough to slow or stop population growth; we need to reverse it “ drastically, and fast ” but this obviously raises some unpleasant decisions. The time to start thinking is now.

**Chapter 6 : The Economy Vs. The Environment -- Is There A Conflict?**

*So Is Driving a Tesla Better for the Environment? Today's infographic, which looks at the well-to-wheels impact of electric and gas vehicles, was created in association with Delbrook Capital, a financial services company that has launched the CO2 Master Solutions Fund.*

What are the benefits of renewable energies—and how do they improve our health, environment, and economy? These gases act like a blanket, trapping heat. In the United States, about 29 percent of global warming emissions come from our electricity sector. Carbon dioxide CO<sub>2</sub> is the most prevalent greenhouse gas, but other air pollutants—such as methane—also cause global warming. Different energy sources produce different amounts of these pollutants. To make comparisons easier, we use a carbon dioxide equivalent, or CO<sub>2</sub>e—the amount of carbon dioxide required to produce an equivalent amount of warming. In contrast, most renewable energy sources produce little to no global warming emissions. The comparison becomes clear when you look at the numbers. Burning natural gas for electricity releases between 0. Different sources of energy produce different amounts of heat-trapping gases. As shown in this chart, renewable energies tend to have much lower emissions than other sources, such as natural gas or coal. Increasing the supply of renewable energy would allow us to replace carbon-intensive energy sources and significantly reduce US global warming emissions. For example, a UCS analysis found that a 25 percent by national renewable electricity standard would lower power plant CO<sub>2</sub> emissions million metric tons annually by the equivalent of the annual output from 70 typical MW new coal plants [ 4 ]. Improved public health The air and water pollution emitted by coal and natural gas plants is linked with breathing problems, neurological damage, heart attacks, cancer, premature death, and a host of other serious problems. The pollution affects everyone: Wind, solar, and hydroelectric systems generate electricity with no associated air pollution emissions. In addition, wind and solar energy require essentially no water to operate and thus do not pollute water resources or strain supplies by competing with agriculture, drinking water, or other important water needs. Biomass and geothermal power plants, like coal- and natural gas-fired power plants, may require water for cooling. Hydroelectric power plants can disrupt river ecosystems both upstream and downstream from the dam. A relatively small fraction of US electricity currently comes from these sources, but that could change: In fact, a major government-sponsored study found that clean energy could contribute somewhere between three and 80 times its levels, depending on assumptions [8]. And the previously mentioned NREL study found that renewable energy could comfortably provide up to 80 percent of US electricity by Jobs and other economic benefits Two energy workers installing solar panels. Solar panels need humans to install them; wind farms need technicians for maintenance. This means that, on average, more jobs are created for each unit of electricity generated from renewable sources than from fossil fuels. Renewable energy already supports thousands of jobs in the United States. In , the wind energy industry directly employed over , full-time-equivalent employees in a variety of capacities, including manufacturing, project development, construction and turbine installation, operations and maintenance, transportation and logistics, and financial, legal, and consulting services [ 10 ]. Other renewable energy technologies employ even more workers. The hydroelectric power industry employed approximately 66, people in [ 13 ]; the geothermal industry employed 5, people [ 14]. Increased support for renewable energy could create even more jobs. The Union of Concerned Scientists study of a percent-by renewable energy standard found that such a policy would create more than three times as many jobs more than , as producing an equivalent amount of electricity from fossil fuels [ 15 ]. In contrast, the entire coal industry employed , people in [ 26 ]. For example, industries in the renewable energy supply chain will benefit, and unrelated local businesses will benefit from increased household and business incomes [ 16 ]. Local governments also benefit from clean energy, most often in the form of property and income taxes and other payments from renewable energy project owners. Farmers and rural landowners can generate new sources of supplemental income by producing feedstocks for biomass power facilities. Stable energy prices Renewable energy is providing affordable electricity across the country right now, and can help stabilize energy prices in the future. As a result, renewable energy prices can be very stable over

time. Moreover, the costs of renewable energy technologies have declined steadily, and are projected to drop even more. The cost of generating electricity from wind dropped 66 percent between and [ 21 ]. Costs will likely decline even further as markets mature and companies increasingly take advantage of economies of scale. In contrast, fossil fuel prices can vary dramatically and are prone to substantial price swings. For example, there was a rapid increase in US coal prices due to rising global demand before , then a rapid fall after when global demands declined [ 23 ]. Likewise, natural gas prices have fluctuated greatly since [ 25 ]. Coal news and markets report. Using more renewable energy can lower the prices of and demand for natural gas and coal by increasing competition and diversifying our energy supplies. And an increased reliance on renewable energy can help protect consumers when fossil fuel prices spike. Reliability and resilience Wind and solar are less prone to large-scale failure because they are distributed and modular. Distributed systems are spread out over a large geographical area, so a severe weather event in one location will not cut off power to an entire region. Modular systems are composed of numerous individual wind turbines or solar arrays. Even if some of the equipment in the system is damaged, the rest can typically continue to operate. For example, Hurricane Sandy damaged fossil fuel-dominated electric generation and distribution systems in New York and New Jersey and left millions of people without power. In contrast, renewable energy projects in the Northeast weathered Hurricane Sandy with minimal damage or disruption [ 25 ]. Water scarcity is another risk for non-renewable power plants. Coal, nuclear, and many natural gas plants depend on having sufficient water for cooling, which means that severe droughts and heat waves can put electricity generation at risk. Wind and solar photovoltaic systems do not require water to generate electricity and can operate reliably in conditions that may otherwise require closing a fossil fuel-powered plant. The risk of disruptive events will also increase in the future as droughts, heat waves, more intense storms, and increasingly severe wildfires become more frequent due to global warmingâ€”increasing the need for resilient, clean technologies.

**Chapter 7 : Environmental Impacts of Renewable Energy Technologies | Union of Concerned Scientists**

*6 A Better Approach to Environmental Regulation: Getting the Costs and Benefits Right would incorporate into her purchase decision the higher expense of gas over the period she expects to own the car.*

How quality control concepts can reduce environmental expenditures. Journal of Cost Management Summer: By using the concept of Total Quality Management TQM in the environmental arena, companies may be able to shift expenditures away from remediation toward efforts to prevent environmental problems from ever occurring. More and more companies are realizing the need to focus on long-term environmental cost savings. Short-term cost reductions often lead to much higher expenditures and liabilities over the long run such as environmental cleanup cost required by the federal, state or local environmental legislation. The quality perspective TQM has taught managers to recognize the full extent of quality costs and to recognize that poor quality has its own cost. Managers realized that quality control is not about inspecting quality into products but about prevention. The same cost categories that have been used to analyze quality cost are introduced in this paper to analyze environmental costs. These costs categories are as follows: Prevention costs, Appraisal costs, Internal failure costs, and External failure costs: Expenditure made now to reduce future outlays. Prevention is an investment. Companies can experience a long-term competitive advantage when environmental engineering efforts are undertaken to reduce and eventually eliminate pollutants. Coors is a good example of this. As William Coors said, "Using fewer resources means lower cost in the long run, even if the upfront cost is high. Due to regulatory pressures to reduce air, land and water emission appraisal has become critical. Charges for the depreciation of test equipment Costs of supplies used in test and inspections Costs of obtaining outside laboratory endorsements These activities can be compared to the appraisal or inspection costs that companies incur in TQM programs. In TQM, much of the appraisal effort focuses on inspecting the inputs and production processes. For environmental effects, efforts focus on monitoring the production processes and by-products. By engaging in monitoring activities companies will be bale to discover problems early and corrective actions can be taken quickly and economically. Expenditures made to correct environmental breakdowns discovered in appraisal efforts. This type of environmental cost is comparable to the internal failure costs in TQM but there are several important differences. One major difference has to do with how internal failure costs arise. With environmental expenditures, these costs are linked more to the production processes. The type of risk and the level of exposure related to internal failure costs constitute another difference. Environmental expenditures relate to a broad range of production processes, which means that companies will encounter significant internal failure costs. It is then up to regulatory agencies or litigation to dictate the specific corrective measures to be taken. With TQM, external failure costs begin with the sale or delivery of a flawed product to a customer. Inland Steel is an example of a U. External environmental costs under both TQM and in the environmental area include these types of corporate liability for damage and remediation activities but they may also include possible lost sales because of poor reputation. Cost categories and strategies By classifying environmental expenditures in the different cost categories, a number of approaches for controlling expenditures become apparent. Companies must focus their effort on prevention and appraisal as more control can be exercised over these two costs. As management exercises more and more control over these two costs, the up-front costs increase while failure cost internal and external decrease. The goal is to find the level of control that leads to the lowest total costs. When failure costs increase for example, the optimal solution involves tighter control. This implies that more resources should be pumped into prevention and appraisal programs. If prevention and appraisal costs decline, the optimal solution will again involve tighter control. This is true because companies can afford to expand more effort to gain control over effects on the environment and this does not necessarily have to mean more dollars. There are reasons to believe that these types of changes may occur. First, the decrease in the cost of information and production can lead to costs savings for companies. Gains from synergy are also possible considering design integration and production engineering by many advance manufacturing companies. Finally, increased social pressure may drive up the costs of using inputs that generate undesirable by-products

and waste. Based on these reasons, prevention may well lower the total environmental costs that a company will face. Conclusion The TQM framework for analyzing quality costs may be equally useful for analyzing environmental expenditures. Companies will be able to adopt production technologies that eliminate the hazard waste itself as opposed to paying for expensive hazardous waste removal. This should lead, in the long run, to an overall reduction in cleanup costs and a lower exposure to contingent liabilities for environmental problems. The measurement of quality costs: Costing for manufacturing wastes. Managerial accounting and environmental compliance costs. Sustainability and "Lean Operations". Waste minimization at 3M Company: A field study of nonfinancial performance measurement. Journal of Management Accounting Research Management and reporting of environmental liabilities. Cost and Management July-August: Bringing the environment down to earth. Harvard Business Review July-August:

## Chapter 8 : SafetyWorks!: Safety Pays for Everyone

*The solar power cost curve is about to get better help us do that better." (that are greatly subsidized by not paying for their pollution and harm they inflict upon the environment and.*

## Chapter 9 : Creating a Better Workplace

*Environmental impacts included prevention of about 6, lb of on-site solid waste in the first year. Instead of buying , plastic utensils, the school purchased just 12, metal reusable utensils.*