



The 14th Congressional District's
Santa Cruz County Student Advisory Board

Alternative Energy

2007 Annual Report

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Introduction

Vanessa Silverstein, Student Advisory Board Chair

Ross Perot once said, “The activist is not the man who says the river is dirty. The activist is the man who cleans up the river”. This year the 14th Congressional District Student Advisory Board believes that global warming is an issue that needs not only to be acknowledged, but that actions must be made to stop global warming. This report doesn’t only state that global warming is a problem, it provides many solutions that Congress can put into place to help end global warming.

The board chose to spend over six months researching solutions to global warming because of global warming’s diverse and dangerous consequences. Global warming is not only detrimental to the environment; it is also negatively affects peoples’ safety and health. In addition, not only does the support of alternative energy prevent the harmful dangers of global warming it actually improves the economy and prepares the United States for a future without petroleum.

In the past the students on this board have researched broad topics and provided various solutions to different related problems. This year the Student Advisory Board has chosen to research the much narrower topic of global warming because of its prominence in all aspects of society. Also, the various alternative energy solutions to global warming can be supported simultaneously to jointly resolve the issue of global warming.

We hope that today’s presentation provides you with the desire we have for supporting wind, solar, nuclear, ethanol and bio-diesel alternative energy sources. Thank you to our friends, family, teachers, members of the community and especially Congresswoman Anna Eshoo, for being here and listening to what we have to say.

Global Warming

Vanessa Silverstein, Student Advisory Board Chair

Global Warming Background

The United States and the world in general are currently facing a threat that will continue to damage our health, safety, economy and environment if it is not stopped. This dangerous hazard, global warming, is the increase in the Earth's temperature. Regardless of your political or economic views it is undeniable that the five hottest years on record have all occurred within the last seven years and that the Earth's temperature is continuing to increase each year. In fact, in the 1970's the average global temperature was 14.01 degrees Celsius and just a decade later the warmest year on record occurred in 1998 with an average global temperature of a much higher 14.71 degrees Celsius ("Global Temperature Rise Accelerating"). Before deciding how to stop global warming and before even understanding its many consequences, we must understand the cause of global warming. The two main components that can be linked to global warming are the sun and the emission of greenhouse gases into the atmosphere.

The Main Cause of Global Warming

In late 1978, NASA began monitoring the sun's output from space and discovered that the temperature fluctuations of the sun are huge, but that the Earth's temperature fluctuations are minor compared to its general increasing temperature, so the sun does not have a large effect in global warming even when it undergoes drastic changes ("Causes of Global Warming"). Scientists published in the *Journal of Geographical Research* concluded after studying numerous theories about global warming that less than 30 percent of global warming since 1970 has been contributed by the sun (Solanki 1-8). The more significant cause of global warming is emission of carbon dioxide and other greenhouse gases into the atmosphere from human activities including industrial processes and fossil fuel combustion.

Oil companies rely on the combustion of fossil fuels which creates excess carbon dioxide. CO₂ is one of the greenhouse gases that cause the environmentally damaging greenhouse effect. The greenhouse effect is the result of greenhouse gases trapping some of the infrared radiation that would otherwise escape from the Earth, making the Earth warmer than it would otherwise be (Wikipedia). The United States currently releases 1,600 million metric tons of carbon a year (Environmental Defense) and is the largest contributor of CO₂ in the world. Projected emissions continue to rise at an average rate of 1.5 percent a year from 1996-2010, reaching 1,803 million metric tons of carbon in 2010, 34 percent above the 1990 level (Impacts).

The Dangerous Effects of Global Warming

Allowing present levels of CO₂ production to continue poses a variety of serious perils. Unless these levels are reduced the earth faces raised sea levels, flooded coastal areas, more intense and more frequent heat waves, increased droughts and wildfires, increased range for disease carrying mosquitoes to travel transferring illness, and multiple species extinctions.

In 2002, the western United States experienced its second worst wildfire in the last 50 years and the period of April through June of 1998 was the driest three-month period in 104 years in Florida, Texas and Louisiana. In 2003, extreme heat waves caused more than 20,000 deaths in Europe and more than 250 people died as a result of intense heat waves in the United States in 1999. The number of category four and five storms and ocean temperatures have greatly increased over the past 35 years. 279 species of plants and animals are already responding to global warming and over the past 25 years, some penguin populations have shrunk by 33 percent due to their decreased winter sea-ice habitat. All of these issues can be attributed to the fact that global warming may be responsible for increases in heat wave frequency, probability of drought, risk of wildfires, spread of disease, and destruction of fragile ecosystems (“The Consequences of Global Warming”).

Government Funding Improving Renewable Energy Markets

Six former Environmental Protection Agency leaders say that the United States isn't doing enough to fight global warming (Environmental Defense). Government funding is imperative to the success of the alternative renewable energy options that will decrease greenhouse gas emission. Using energy subsidies to fund and support biodiesel, wind and solar energy fields would improve the level of competition between renewable energy and the oil industry. Increased government support for renewable energy sources would make alternative energy options more appealing because it would increase the cost of petroleum. The increase in gas prices would allow the environmentally superior, but typically more expensive, alternative energy options to be more practical for consumers (“The Energy Guy Subsidy Page”).

The fact that government funding improves the success of renewable energy is clearly seen with the emerging ethanol industry. Because government initiatives promoted investment in the ethanol industry, production grew rapidly throughout the 1980's and 1990's. Now, thanks to government support, ethanol has been the fastest growing renewable energy source over the past ten years. In 2005, the ethanol industry supported the creation of more than 150,000 jobs in all sectors of the U.S. economy, boosting U.S. household income by 5.7 billion dollars (The Online Office).

Wind energy has also grown tremendously because of the production tax credit (PTC) which is the main incentive for the use of wind power. Despite the success of the production tax credit, it is not permanent; it has expired and been reinstated four times, and is now valid only until December 2008. Also, according to the National Commission of Energy Policy, wind energy accounted for less than one percent of the total 37 to 64 billion dollars allocated in federal energy subsidies in 2003 (AWEA).

Although Congress has started to promote ethanol, wind and other new types of renewable energy sources, many subsidies for new environmentally friendly technologies are temporary while many older subsidies for environmentally harmful energy technologies are permanent. I suggest that Congress supports all bills that use subsidies to benefit alternative energy sources and not support subsidies that support products like petroleum that add to global warming. In addition, I suggest that the subsidies supporting renewable energy technologies become permanent or at least long-term.

Conclusion: The Overwhelming Benefits of Supporting Renewable Energy Sources

To stop global warming from creating any more damage Congress must enact permanent or long-term subsidies for new, clean energy technologies. The unstable cycle of tax credits and subsidies for renewable energy sources undermines the manufacturers and customers trust in these environmentally superior alternatives to oil (AWEA). Subsidies must be given to alternative energy sources so they can become prominent in the life of the everyday American. Alternative energy is the solution to global warming and Congress can enact this solution by making it possible for Americans to use alternative energy. Throughout this report are descriptions of different reforms and programs supporting wind, solar, nuclear, ethanol, and bio-diesel energy sources that should be supported by alternative energy subsidies.

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Solar Power
Adra Bowman

When considering viable forms of alternative energy, solar power is, in the long run, one of the most worthwhile options available. Although most early solar powered machines were not cost-effective or realistic, recent improvements have made them efficient and practical, both monetarily and ecologically. Unlike nonrenewable energy sources, California has a virtually endless and easily accessible supply of solar energy. This energy is both cheap to maintain and incredibly beneficial for consumers and the environment. In California, and indeed in the entire United States, there are a multitude of practical uses for natural solar radiation. Since solar radiation takes two forms, thermal and photovoltaic (electric), it can be utilized for a wide variety of applications. While solar power is currently not the most popular or the most cost-effective type of inexhaustible energy, by learning from the past failures and successes of scientists, researchers, and the government hopefully Californians will take the steps necessary towards becoming more dependent upon renewable, environmentally friendly, and economically stable energy alternatives.

The idea of using solar power for electricity was first seriously considered in the late nineteenth century as a solution to the world's dependence on nonrenewable energy sources. Although this had yet to become an immediate problem, within 50 years the pioneers of solar energy had actually outlined all of the solar power technologies being pursued today. Since then, it has undergone remarkable advances, endured abandonment, and sparked renewed interest in both the scientific world and the public eye. In 1881, the greatly revised first solar powered machine was declared to be "a technical success but a practical failure" (Smith, solarenergy.com), as it was not cost-effective or in demand. This became the doctrine for most of the machines developed in solar energy's early stages, when many advances were made in solar power technology but no economically sound inventions appeared.

However, within the past thirty or so years solar power has become more popular and practical, both economically and in terms of efficiency. As a result of the energy crises of the 1970's, in 1978 Congress passed the Energy Tax Act, which "encouraged homeowners to invest in energy conservation and wind and solar technologies through tax credits" (gosolarcalifornia.com). In addition, the Californian government's recent Million Solar Roofs program is aimed at increasing the use of solar electricity in both residential and commercial structures. Solar energy and technologies continue to develop as well: "During the 1990's... solar energy has grown at 17 percent per year" (Flavin, *Opposing Viewpoints*, 21). In contrast, the oil industry grew just an average of two percent each year in the same time period.

Solar power is a beneficial energy alternative, especially in California, for multiple reasons. Immediately apparent is the obvious abundance of sun exposure in California, sunshine that is both free and inexhaustible in the foreseeable future. Additionally, the monetary costs of installation are constantly decreasing – solar power products manufacturer BP Solar reported the cost of solar cells in 1999 to be one-seventh of those in 1980 – and the environmental toll is no more than the minor impact of production and maintenance. Perhaps one of the most popular effects of solar power, and undeniably one of the main reasons for implementing it, is the reduced dependence on nonrenewable energy sources. For instance, most solar cells are built

with silicon, one of the Earth's most abundant materials. The aspiration that the U.S. can decrease dependence on foreign and nonrenewable energy resources by replacing them with natural and renewable reserves is definitely attainable in the near future. Additionally, using solar power has enormous ecological benefits due to the absence of pollution emitted once the systems are in place. In the long run, using solar power will have enormous benefits for both California and the country's environment and economies.

Another reason for using solar energy is the fact that it has many economical uses for all Californian consumers, whether individuals, corporations, or governmental institutions. As previously stated, solar energy can be converted into two forms: thermal (heat) and photovoltaic (electric). A popular outlet for individual consumers of thermal solar power, for example, is the heating of swimming pools. Thermal energy can also be used to heat both residential and commercial buildings, either in place of or in conjunction with traditional heaters. Photovoltaic, or PV, energy can be used to power lights and appliances or can be stored in batteries for nighttime or emergency use. All of these uses and more are practical utilizations of a growing industry.

Practical uses aside, there exist other factors when considering whether or not to utilize solar power – principally, the costs of installation and upkeep. Although throughout its history solar energy has never been very cost-effective for the individual consumer, Governor Schwarzenegger's Million Solar Roofs Program will hopefully change that with this ambition: "California has set a goal to create 3,000 megawatts of new, solar-produced electricity by 2017" (www.gosolarcalifornia.ca.gov). In order to achieve this, the Californian government has instituted the California Solar Initiative (CSI), which offers cash incentives for consumers, and which can be combined with federal tax credits for a total of up to 50% coverage of residential solar systems. After installation, solar systems under the California Solar Initiative are warranted to run for twenty or more years with only minimum maintenance costs. Additionally, the CSI provides that "All electric customers of PG&E, Southern California Edison (SCE), and SDG&E are eligible to apply for incentives."

As of 2004, solar energy has accounted for approximately 0.3% of California's electricity supply, although it is easily the state's most abundant renewable energy source. While solar energy alone cannot replace California's use of non-renewable energy sources, it can contribute by largely reducing dependence on such resources. As a means of beginning to broaden Californians' knowledge about and especially utilization of solar power, the California Solar Initiative, mentioned above, is one of the most efficient and practical ventures currently in place. According to www.gosolarcalifornia.ca.gov, a cooperative effort of the California Energy Commission and the California Public Utilities Commission,

The California Solar Initiative Offers:

- Photovoltaic incentives starting at \$2.50 per watt for (residential and commercial) systems up to one megawatt in size.
- Funds for solar installations for existing and new low-income and affordable housing.
- A pay-for-performance incentive structure to reward high-performing solar projects.

Although it is not mentioned above, as of January 2007 the CSI will also provide incentives for government and non-profit organizations beginning at \$3.25 per watt. Given the many benefits and few risks involved with implementing the CSI, it is my suggestion that Congresswoman Eshoo, and all Californian Congressmen and Congresswomen, support and promote California's Million Solar Roofs program.

Endorsing the California Solar Initiative is undoubtedly a progressive step that California's Congressmen and Congresswomen can take to increase the state's utilization of solar power. However, something must also be done on the federal level to ensure that solar power has a permanent place in the U.S. energy industry. Based on this necessity, I recommend that Congresswoman Eshoo propose a federal program similar to the CSI in objective and implementation. Such a federal program would encourage individual, corporate, and governmental consumers to utilize solar power and consequently cement solar energy's position as an economically and ecologically beneficial alternative energy.

By implementing programs such as the CSI, and otherwise promoting the use of solar power, California can reduce dependence on exhaustible sources of energy and increase utilization of solar power. The lowering costs of using solar power and growing scarcity of nonrenewable energy sources make it a beneficial alternative energy supply for both the present and the future of California and the United States.

Alternative Energy in Automobiles
Jasbir Nijor, Student Advisory Board Secretary

Today in America it is almost common knowledge among active citizens that Global Warming is happening. We also know that it is happening fast, and that it will not just affect our children and their children, but that it is affecting us right now. Due to politicians, scientists, and other sources, both parties of our government agree that the time has come to start to figure out some sort of solution to this growing problem. For a while, it was mainly Democrats, but as we heard in the State of the Union, the President himself said that it was time to address Climate Change. Now that our government has come to a conclusion, we need to start working on this immediately. Carbon Dioxide (CO₂) is the dominant greenhouse gas that causes global warming. The main source of CO₂ is the burning of fossil fuels. America is the biggest contributor of CO₂ to the atmosphere in the world. We contribute 1,600 million metric tons of carbon a year (www.environmentaldefense.org). Obviously something needs to change, and fast. There are many things we can do as Americans to balance our output of CO₂, but the real battle lies in America's automobiles. America has a big challenge to face in terms of dealing with pollution due to automobiles. The vast majority of Americans drive cars that require lots of petroleum. The way we can tackle this issue is to provide petroleum alternatives that will cut down CO₂ emissions substantially. In all reality, it is very challenging to just convert all of our cars to alternative fuels, but we can take the initiative to at least start the process. The way we can do this is for Congress to endorse and create certain policies that fund research and development in alternative fuel. If we do these things fast, then the solution process will begin to take form and we can take the upper hand and stop this problem from growing out of control.

For Americans, cars are probably the most efficient way to travel. Ever since the Ford T-Model, cars (for the most part) have been dependent on petroleum. When this fossil fuel burns, it puts a good amount of CO₂ into the atmosphere. About 100 years of these types of emissions are finally catching up with us. The CO₂ emissions are the biggest reason for the Greenhouse effect. If we continue to use petroleum the way we Americans use it, we will speed the process of Global Warming even faster than it's going now. Gas is starting to become a problem in itself. The corporate companies that distribute all of the gas have their drills mainly overseas. This is more of a business problem more than anything else. If a big corporate company has their entire product overseas, especially in countries such as Saudi Arabia and Middle East (because of political instability) there could be potential for a massive gas shortage. Also, gas is becoming very expensive for everybody in America. Gas prices are sky high and it costs over \$60 to fill up your average SUV. Crude oil is down right now, but just last year prices were averaging at \$66.02 a barrel. And these prices are projected to go up as the years continue (<http://www.eia.doe.gov>). We have less than 50 years of petroleum to keep our cars running on oil. We must act now.

There are a few different tactics to cut down the CO₂ emissions from automobiles. One way is hybrid technology. Companies like Toyota and Honda have taken the initiative to market cars that run both on gas, and electrically. The best hybrid cars get almost 50 miles per gallon (mpg), while the best SUV's get about 16 mpg (www.greenhybrid.com). Hybrid cars are a great solution because you spend less money on gas, and because they contribute a substantially minimal amount of CO₂ into the atmosphere compared to your average SUV. There lies a

challenge in this solution though; hybrid cars aren't exactly the most affordable cars. If in the next couple years, they could market an affordable version of a hybrid car, we would be even better off.

The more efficient way to cut down these emissions is alternative energy. A particular alternative energy that is very popular right now is ethanol. Ethanol is alternate fuel that works to not only get rid of carbon emissions, but actually cleans our air while it burns. The majority of ethanol is created from corn. But it can be made from grain, wheat, barley, or even potatoes. Manufacturing ethanol is done in 7 steps, and the final product does create co-products. The two co-products are Distillers grain, and CO₂. Lucky for us, the two co-products are completely efficient. The distiller's grain happens to be an excellent feeding material for livestock and other animals. The CO₂ is cleaned of any alcohols and pollutants, and is usually marketed by the factories that produce the ethanol. The CO₂ is sold and then used to carbonate beverages, flash freeze meat, and to manufacture dry ice. This would be an ideal fuel alternative because it is much cheaper to manufacture than petroleum. There is a property of ethanol that makes it a bit less appealing as it sounds though. Ethanol engines, on average, use about 25% more ethanol per mile, than a gasoline engine uses gas. This means that the ethanol driver would actually have to make more trips to the pump than the petroleum driver. Also, ethanol can't travel through pipelines well because it picks up impurities and water that change it. This means that ethanol travels mainly through trucks, barges, ships, etc. In spite of these challenges, the future for ethanol looks bright for a couple reasons. One is that ethanol production efficiency is definitely growing substantially. It's true that because of high demand, ethanol is just as expensive as gas if not more right now. But the ethanol industry is projecting that prices for ethanol are going to become substantially less expensive than gas (Business Week).

Other alternative energies are biodiesel, hydrogen fuel cells, and solar/wind power. These are all good futures for the automobile, but the trick is that they are very expensive to research and develop. Hydrogen cars have been made, but hydrogen fuel is not affordable for the average American at all. The cars that run hydrogen aren't affordable either. Biodiesel is very promising because it can be used from the oil and waste of restaurants, and other things, but biodiesel tanks are fairly expensive to install. The way we can get the ball rolling on research and development for these fuels is to have Congress start legislation over them. There are a number of policies that we should create, and also a number we should endorse for the benefit of not just the United States, but the entire planet.

The first thing Congress needs to do is ratify the Kyoto Protocol. If we join the Protocol then we can at least have international standards to live up to. It would also help other countries to help us figure out our situation as the number one CO₂ contributing country in the world. Ratifying the Kyoto Protocol in partnership with a few key policy solutions, would definitely jump start the process of getting us out our automobile deficiency problem.

We need to propose a bill that would tax foreign oil investment. The taxes would go towards the research of alternative fuels. This bill's goal is to reduce our nation's dependency on foreign oil, and to have the government invest in alternate fuel research. If enough people voted in favor of this bill we could begin to research very important information to start making

alternative fuel affordable and efficient. This bill is designed to let our country evolve from dependency on polluting oil, to clean and environmentally sound materials to run our nation.

Another idea is that Congress should form a bill that would endorse certain groups to research alternative fuel (especially for automobiles). It would be wise to invest some of the money of our government in this fuel research because it would enable scientists to have all kinds of alternatives we haven't even found yet. It would also enable scientists to do further development on things like hydrogen fuel cells. A side effect of this would be increased availability of alternate fuel, which would result in cheaper environmentally friendly energy for everybody.

Congress also needs to vote against bills that put more money into international oil. The more money that we put into foreign oil, the more we are bound to that form of fuel. If we continue to fund overseas drilling then it will only make our situation worse in terms of petroleum usage. We need to start investing in alternative energy now, so that we can start mass usage in the next decade or two.

In conclusion, Global Warming is affecting everything around us. It's affecting our environment and it will ultimately be a huge problem if we don't act now. We need to initiate the process somehow. Why not start by attempting to cut the biggest source of CO2 emissions; automobiles using petroleum. If Congress starts to endorse and fund the research of fuels such as ethanol, biodiesel, and hydrogen fuel cells, then we as Americans can begin to combat CO2 emissions, by burning cleaner fuels instead of harmful ones like petroleum. If we take the upper hand by signing the Kyoto Protocol and creating Congressional legislation to limit the endorsement of foreign oil, we can take the issue of Global Warming and crush it before it becomes a gargantuan problem.

Nuclear Energy

Ariel Bowman

About seventeen percent of the world's energy comes from nuclear power plants. Some countries rely on nuclear energy more than others. France, for example gets about 75 percent of its energy from nuclear power plants. In the United States, however, nuclear power is a much less heard of form of energy. Instead, the US relies largely on the burning of fossil fuels for energy, and is therefore, the largest contributor to harmful emissions in the atmosphere. As such it is necessary that the US develop alternate forms of energy. ("moving Ahead with Nuclear Energy", D.O.E., Nuclear Energy)

Many Americans fear the use of nuclear energy because of disasters that have occurred with nuclear plants in the past. They are afraid that the tragedies that happened at Chernobyl and Three-Mile-Island will reoccur. However, those events took place before the physics of nuclear energy was fully understood, and the factories were not following all the safety measures they were instructed to take. Now security measures are much stricter and fission is much better understood. (FRG, Stanford University)

Induced fission, which only U-235 can undergo, is a process in which a neutron is accelerated toward a U-235 nucleus. The nucleus will absorb the neutron, become unstable, and split. As the newly formed, lighter atoms settle into their new states, they release a great deal of energy. One of the problems in the past is that, as the atoms settle, they also release more neutrons, which are then absorbed by the surrounding U-235 nuclei, thus perpetuating fission. So, in the past, it was very difficult to stop fission. Now, however, scientists use control rods that absorb neutrons to control the speed of, or even stop fission. ("Fission", Energy Information and Administration)

Another concern that many Americans have with nuclear energy is that if more countries begin the use nuclear energy as a main source of energy, some would misuse the enriched uranium to make weaponry. However, uranium used for energy (U-235) is only about 2-3 times more concentrated than uranium is naturally. On the other hand, uranium used in weaponry must be enriched to 90 percent higher concentration than its original state. So, it is impossible to use energy uranium for weapons construction. ("Safety and Security", The Nuclear Energy Institute)

Nuclear power is a very environmentally friendly form of sustainable energy. For example, a properly functioning nuclear plant produces even less radioactive waste than the average coal plant. Also, moving toward nuclear energy instead of oil and coal would decrease our reliance on other countries for our energy supply. This would also allow energy prices to be more stable and political conflict would not effect our supply or price of fuel. There are risks to using nuclear energy, but the negative effects of continuing to burn fossil fuels are certain. We must change our standards and limit the emissions of greenhouse gases.

Wind Power

Jessica Silverstein

With so many energy sources competing to become America's preferred energy source, it's hard to decipher which energy source is both financially and environmentally safe, or if that option even exists. While there are countless alternative energy sources vying for California's funding, there is one energy source that has been severely overlooked. If given the proper funding and attention, wind power could become a strong contributor to all California energy systems. Wind power is not only one of the most environmentally sound options, but it has displayed a great increase in production reliability and economic standing. Americans have shown an increased interest in the state of our environment; the government must reassure them that California is worth protecting. Even without considering the many environmental benefits, wind energy has the potential to be financially safer than using oil. It's imperative to plan ahead for the time when current energy sources are depleted or become too expensive for the average American to afford. Energy obtained from wind power can help reduce harmful chemical emissions, while simultaneously helping to release the productivity pressure placed on energy sources that require rapid escalations in price and environmental damages.

Wind power is one of the only alternative energy sources that pose virtually no threat to the environment. Turbines used to rotate wind and create energy have no harmful emissions. Unlike competing energy sources, wind turbines emit absolutely no carbon dioxide, sulfur, nitrogen-oxide, trace metals, or solid waste associated with global warming, acid rain, pollution, asthma or any other negative environmental or health consequence ("Wind Pros and Cons"). While more popular energy sources are receiving the majority of government funding, wind powers' staggering environmental benefits have been sorely ignored. Wind turbines provide little threat to wildlife and natural habitats and do not interfere with surface activity such as farming and livestock. Unlike oil drilling and other harmful energy sources, wind power is a promising new energy source that can help save our disintegrating environment.

While many agree that wind power is beneficial for the environment as a whole, some are worried about the risks wind turbines pose for bird life. However, there are many precautions that have been taken in order to ensure bird safety. All of the turbines built today are constructed to be larger and more effective than those built in the past. Due to this, turbines rotate slower and pose a smaller threat to bird species. A report recently prepared for the Bonneville Power Administration stated that the annual mortality was estimated at approximately 6,400 bird fatalities per year for all species combined. In comparison to other causes of bird fatalities, wind power is a minor contributor. Birds frequently collide with a variety of other buildings. Altogether, human infrastructure and industrial activities are responsible for one to four million bird deaths per day. It's also important to examine the danger the effects that competing energy sources pose to bird life. Consider the 500,000 bird deaths from the Exxon Valdez oil spill in Alaska or the 3,000 reported bird deaths near a Florida coal-fueled plant. Wind power will help to rescue our environment, not cause harmful new problems ("Advice from an Expert-").

Transmission cost of wind energy is another issue that has been misinterpreted by the public. While many people believe that it is too difficult to effectively deliver wind power to customers, some rectifications could easily solve these problems. In fact, the American Wind

Energy Association, the AWEA, seeks to modify current wind energy practices through three main objectives. The AWEA looks to improve access to transmission interconnection and delivery service, encourage transmission organizations and policy makers to develop new transmission facilities, and actively study cost and new frontiers in wind energy. With the help from Congress, these objectives can be studied further and put into action. When dealing with such a promising new option such as wind power, it would be simply illogical to neglect to attend to each of these viable solutions.

In addition to wind power's obvious environmental benefits it is also an exceptional financially sound venture that deserves more government funding. A unique feature of wind power is that every wind energy turbine plant has the opportunity for phased growth. It is always possible for wind farmers to increase their production capacity as needs grow. Based on wind power's current contributions, it is poised to produce more energy at an inexpensive price. The California Energy Commission found that in just seven years, capital costs of wind power have been halved while performance, or energy output per installed kilowatt, has almost doubled. The AWEA has proven that the generating capacity of wind power is continuously increasing. According to the AWEA wind power generating capacity increased by twenty-seven percent in 2006 and is expected to increase an additional twenty-six percent in 2007 ("Policy").

Wind energy has just begun to receive the funding and recognition that it deserves. The United States Congress recently extended the federal production tax credit through December 2008 to additionally increase the number of wind farms throughout the United States ("AWEA Legislative"). I urge Congress to continue to support wind power by extending this provision for an additional five years. I would also suggest that members of Congress support initiatives such as the Clean and Diversified Energy Initiative ("Clean Power Now"). Initiatives like these will help to advance each alternative energy source that is of value to the United States. With support from strong initiatives, small problems such as the transmission cost of wind energy can be dealt with and rectified. Wind power has proved itself to be a mainstream option for a generation of new, financially and environmentally successful energy sources. Wind power is an essential source of energy that is both advantageous for the environment and undeniably valuable to our nation's energy security and future success in the field of alternative energy.

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Alternative Energy and the Energy Market

Aaron Colton

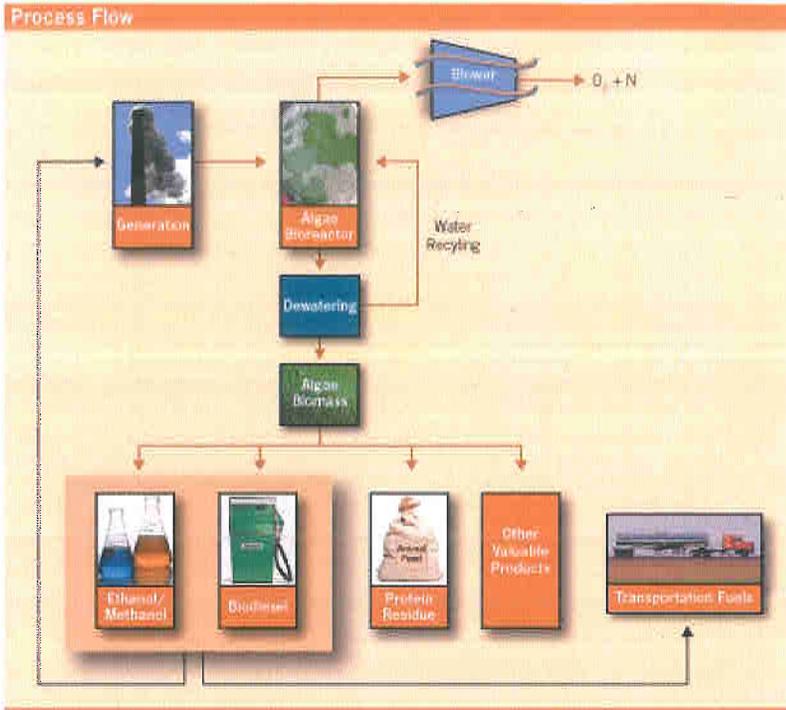
Diversity in Energy

A key factor for any successful economic system is diversity. It is diversity, and furthermore the potential of creativity that the American economy thrives upon. It is a diverse economy that allows an individual to enter a market and use creativity as a competitive edge against larger competitors. Diversity keeps a system alive by providing many outlets of safety in case risky, more dangerous aspects of the system should fail. A limited product system can collapse from what would only be a temporary loss to a multifaceted system. The failure of a national energy system would be catastrophic and comparable (in terms of safety and economics) to any other threat that a nation may face. For the survival of the United State's energy market, it is essential that the energy we buy and produce be diverse in source and content.

The Energy Information Administration (eia.doe.gov) breaks down the United State's energy production and consumption into nine categories; oil, coal, natural gas, nuclear, hydro-electric, biomass, geothermal, solar, and wind. Those categories are grouped into three sections, fossil (oil, coal, natural gas), nuclear, and renewable (hydro-electric, biomass, geothermal, solar, wind). Approximately eighty-five percent of the United State's energy consumption comes from the fossil fuel section, and of that approximately fifty percent comes from petroleum. The Magazine, *Oil and Gas Journal* (ogj.com), estimates that in the most positive situation there are approximately two hundred and fifty-two years remaining of coal processing, seventy-two of natural gas, and only thirty-two of oil. It is obvious United State's energy needs are nearly dependent upon oil, and single source dependency is dangerous to a system.

Coal and especially oil, are both large emitters of carbon-dioxide gas, a major catalyst for global warming. The United States is the largest contributor to the global greenhouse effect. As a world superpower, it is the responsibility of the United States to set an example of maintaining a stable environment. Historically, The United States has been a model in the eyes of other industrialized nations, so as such; we must not set a standard of environmental harm. If every industrialized nation were to produce carbon emissions at the rate the United States does, the climatic results would be dangerously unpredictable. The problem of environmental pollution does not fall only upon the product, but also upon the formation of an unchanging energy market.

It is well known that in today's energy market it is nearly impossible for a small business to enter competition. The market is dominated by multibillion dollar corporations such as Pacific Gas and Electric. It is possible however, for smaller companies to attempt to diversify the market with innovative and environmentally friendly products. An example of such a company can be found in GreenFuel Technologies. GreenFuel Technologies' business is both economically satisfying as well as environmentally friendly. Their new technology allows CO₂ (carbon dioxide) based waste from power plants to be converted to different energy rich sources. Waste is processed by algae with added nutrients to maximize growth rate. Byproducts of this conversion process include biodiesel, ethanol, hydrogen, and solid biomass -all of these are clean sources (when compared to petroleum) which can be sold for profit.



GreenFuel Technologies illustrates two concepts which are beneficial for economic markets; diversity and competitive ingenuity. Most importantly, domestic energy solutions like GreenFuel Technologies provide the opportunity to reverse the current economic trends of the United State's energy market. Domestic energy keeps currency circulating within the United State's economy, which allows for more growth within the U.S., and can eventually cycle to further aid other sectors. Furthermore, the sale of domestic energy to Central American nations such as Mexico can bring

revenue into the United State's economy.

The United States has the potential to set an example for its neighbors in clean energy production, and to better its economy in the process. Yet, this is not easily accomplished. In recent years, many oil based corporations have taken in record profits, and show little signs of seeking environmental cleanliness. On October 28, 2005 the Washington Post reported:

High prices for crude oil, gasoline and natural gas helped Exxon Mobil Corp. to its highest-ever quarterly profit, \$9.92 billion, up 75 percent from the third quarter last year, the company said yesterday. (Blum "Exxon Mobil Profit Soars 75%")

With such enormous growth and profits, no business would be compelled to change their plans. The lack of diversity in the energy market results in the growth of environmentally unstable practices. Because there are few competitive forces to invoke competitive innovation in the energy industry, the only remaining entity to regulate this industry is the federal government. It is then the government's responsibility to make green energy business, the most competitive in the energy market.

The Austrian scientist and Director of the Center for Ecoliteracy in Berkeley (CA), Fritjof Capra recommends that the government take environmental action in the form of a tax:

There is a lack of feedback, and basic ecological literacy tells us that [our] system is not sustainable. One of the most effective ways to change the situation would be an ecological tax reform. Such a tax would be strictly revenue neutral, shifting the tax burden from income taxes to "eco-taxes." This means that taxes would be added to

existing products, forms of energy, services, and materials, so that prices would better reflect the true costs. (300)

What this implies is that our businesses, and specifically those in the energy market, are not pricing their product relative to its true environmental cost. Yes, businesses charge to make a profit, but the cost does not reflect the toll a product such as oil takes on the environment. In order for such costs to be aptly implemented, it is the government's responsibility to tax energy businesses that cause environmental harm, and use those taxes to fund programs which protect and replenish the environment. Such programs could provide loans or grants to companies like GreenFuel Technologies. Ideally, what an eco-tax would do is create an environmentally neutral, if not positive loop of large, polluting businesses indirectly funding smaller, clean energy businesses through a tax based on environmental impact. Furthermore, an environmental tax providing loans and grants would allow smaller companies to enter to competition in the energy market. This would increase competition and diversify the market, ultimately benefiting the consumer as well as the environment. Such a tax would also have a high chance of passing in Congress, because measures supporting energy related economic diversity have already been enacted, such as H.R. 6. Fritjof Capra predicts a positive outcome if such a tax is implemented:

Such long term and slow ecological tax reform would gradually drive wasteful and harmful technologies and consumption patters out of the market. As energy prices go up, with corresponding income tax reductions to offset the increase, people will increasingly switch from cars to bicycles, use public transportation, and carpool on their way to work. As taxes on petrochemicals and fuel go up, again with offsetting reductions in income taxes, organic farming will become not only the healthiest but also the cheapest means of producing foods. (300-301)

As a pattern of human nature, people will likely use what is cheapest, not what is environmentally friendly. In order to protect its citizens from climate change associated dangers, it is the government's responsibility to make sure that the cheapest and most profitable means of producing energy is environmentally friendly. Through punishing environmental offending corporations with higher taxes, and using those taxes to fund environmentally supportive groups and corporations, this is entirely possible. I recommend that a bill be drafted to create such a taxation program.

Works Cited

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Conclusion

Jessica Silverstein, Student Advisory Board Vice-Chair

There is no doubt in my mind why this year's 14th Congressional Student Advisory Board selected alternative energy as our topic. I know it was with an eye for the future that each member willfully agreed to dedicate months of hard work and practice to this particular subject.

French writer Antoine de Saint-Exupery once stated, "As for the future, your task is not to foresee it, but to enable it." Students of the 14th Congressional District Student Advisory Board have truly come to take this message to heart. We recognize the endless possibilities of America's energy sources, and the changes that are ready to be put into action. Through our avid research and pensive discussions we have become inspired to be a part of this movement for change. Although the majority of us are not yet old enough to vote, we do grasp the importance activism has on the future.

We are dedicated to improving future aspects of this country, and wish to share this passion with others. We urge both Congress and ordinary citizens to consider the changes they can make in order to ensure the world's future. The members of the 14th Congressional Student Advisory Board have seen the exciting prospects that each type of alternative energy has to offer, and the great potential of the entire field of alternative energy. We only hope that we can continue to inspire others to become a part of this vital cycle of dynamic change.

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