

Alternative Energy (Yucca Mountain)

House Committee on Energy and Commerce

Introduction

Alternative energy exists in a variety of forms which include renewable energy sources that differ from our traditional non-renewable energy sources such as coal, natural gas, and oil. The main forms of alternative energy are solar, wind, hydroelectric, biomass, and geothermal, however there are others such as hydrogen, tidal and more. The thought behind alternative energy sources are to be comparable to traditional energy sources in the way of output and production costs without the by-product of carbon dioxide and other greenhouse gases such as methane which will be released into the atmosphere. This issue is becoming increasingly relevant in today's society as global warming continues to get worse as our earth's temperature increases due to the continued output of greenhouse gases from factories and cars. Additionally, these harmful, traditional, non-renewable energy sources are beginning to run out as they continue to be used up by modern society and will soon begin to run out. The U.S. has already easily consumed more than half of its oil reserves and even nuclear power has been found to only have a limited supply. For these reasons alternative energy is becoming an increasingly pressing topic for today's government.

Yucca Mountain is a mountain in southwestern Nevada which has been chosen as a repository to hold radioactive waste produced by nuclear technologies. It was chosen due to its security and location which were determined based on standards released by the EPA. These standards include: it must be resilient to climatic and geologic issues such as storms and earthquakes, it must prevent all leakage so that it cannot seep into the ground, and it must do both of these things for tens of millions of years. Yucca Mountain appeared to meet these regulations due to its location in the Mojave Desert where it receives less than seven inches of rainfall a year, the rocks that form the mountain can very efficiently keep water out, it is more than one hundred miles away from the closest population center, Las Vegas, and there is no geological movement in the area. Yucca Mountain will be used to store a variety of radioactive and harmful chemicals such as plutonium for more than ten million years in some cases. These chemicals come from medical reactors, atomic bombs, spent fuel from nuclear reactors, and nuclear powered submarines. Currently, this waste is more than one hundred and twenty storage facilities which do not meet the standards set up by the EPA. These storage facilities commonly store them in pools of water or in steel chambers constructed by nuclear plants and government reactors and our country is quickly running out of storage. Additionally, these sites must be under heavy guard at all times in case terrorists or other criminals attempt to steal this waste. Today controversy exists over the science behind Yucca Mountain. In 1996 water was found to be penetrating Yucca Mountain much faster than they had originally thought. Those who oppose the construction also believe that keeping all of our country's nuclear waste in one place is not a safe alternative compared to spread out all over the country as it is now.

History

Alternative energy has had a long history of use and change. The use of fossil fuels first began around 2000 B.C. in China when they began to use coal power as an energy source. Natural gas then came into play around 200 B.C. when the Chinese began to harvest it for an energy source. At the same time natural gas was being used in China, those in Europe began to use watermills for agriculture and such. Three hundred years later the Chinese began to use petroleum for energy. Wind power first arrived in Persia in the form of windmills which were used to pump water around the tenth century A.D. Non-Renewable energy was first used in the U.S. beginning in 1748 with the

use of coal power right here in Richmond, Virginia. Over the next two hundred years more non-renewable energy sources were discovered in the U.S. such as natural gas and oil. Renewable energy sources were not commercially used in the U.S. for another almost one hundred and forty years until a hydroelectric power plant was built in Wisconsin in 1882 but before the twentieth century hydroelectric, geothermal, and wind power were being harnessed by the American people. Three years later, twenty three years after oil was first found in Texas, in 1924, the U.S. passed the first federal law aimed to limit pollution from the oil industry known as The Oil Pollution Act. Alternative Energy made huge progress in 1936 when the Hoover Dam was built which supplies energy to more than 8 million people in California, Arizona, and Nevada. In 1938, seventy-seven years after the first natural gas well was built in the U.S., the federal government passed the first national regulation on natural gas known as The Natural Gas Act. Petroleum became the most used fuel in the U.S. in 1950 mostly due to the increase of cars on the road. At the same time as this, natural gas began to increase in popularity due to improvements in metals and welding techniques which made it easier to build an extensive reach of pipelines. In 1951, Idaho built the world's first nuclear power plant. Two years later in 1953 the first silicon solar cell was developed in what is now AT&T Labs. This event was reported by the New York Times as "the beginning of a new era, leading eventually to the realization of harnessing the almost limitless energy of the sun for the uses of civilization" One year later, in 1954, U.S. Congress passed the Atomic Energy Act of 1954 which permitted the widespread use of atomic energy for peaceful purposes. In 1957, The Price-Anderson Act of 1957 was passed which created a government safety net in the case of a disaster happening at a private nuclear power plant which made the government pay for liability. Also in 1957, the first large-scale, commercial, nuclear power plant in the world began in Pennsylvania. Then in 1958 solar power is first used on a satellite orbiting the earth. 1960, the first hydrogen fuel cells were constructed by General Electric to generate electricity for Apollo and Gemini space missions. Also in this year, the first geothermal electric plants in the U.S. that were able to be used at a commercial level were built in California. Additionally in 1960, The Organization of Petroleum Exporting Countries (OPEC) was formed in Baghdad, Iraq. The Geothermal Steam Act of 1970 was passed in 1970 which allowed federal land to be leased for geothermal energy development. Solar power became increasingly popular and efficient in the 1970's. In 1973 OPEC created an embargo against the U.S. which caused gas shortages and rations and made the Trans-Alaska Pipeline Authorization Act of 1973 pass which increased the domestic oil supplies in the U.S. The federal government increased its involvement in 1975 which helped advance wind energy technology. August 1977, The Federal Surface Mining Control Act was signed by the federal government to Lessen Environmental Impacts of Surface Coal Mining due to more than 1.1 million land owners abandoning coal mine sites in the U.S. The next day, President Carter signed the Department of Energy Organization act which created the Department of Energy (DOE) whose purpose was to manage more than 30 different energy functions. In 1978, The Solar Photovoltaic Energy Research, Development, and Demonstration Act of 1978 was passed whose goal was to make solar energy economically competitive with traditional energy sources. 1986, The largest nuclear accident to every take place happened at Chernobyl in the former USSR. The Exxon Valdez oil spill becomes the largest oil spill in the U.S. in 1989 with 11 million tons of crude oil being released into the environment. One year later the U.S. passes the Spark M. Matsunaga Hydrogen Research, Development, and Demonstration Program Act of 1990 in order to increase the production of hydrogen as a power source.

The history of Yucca Mountain is much shorter than that of alternative energy, starting only in 1982 when congress passed the Nuclear Waste Policy Act which called for the selection of a nuclear repository. By 1983, the DOE had selected nine locations across six states which were being

considered for possible repository sites. These sites were selected due to data which had been collected for 10 years. In 1984 the DOE set guidelines that could qualify and disqualify certain locations. Following these guidelines, in 1984 the DOE narrowed the nine down to five and picked three for closer examination. In 1987, congress amended the Nuclear Waste Policy Act and called that Yucca Mountain was the only suitable spot for the repository. Slowly evidence mounted that called that Yucca Mountain did not have the hydrological and geological barriers as once thought and that water appeared to be penetrating the mountain much quicker than once thought. Then in 2000, after a long rulemaking process, the DOE issued new site guidelines for Yucca Mountain which were very vague and did not include very many requirements made by the Nuclear Waste Policy Act. With these new conditions, factors that can qualify or disqualify Yucca Mountain as a possible site are no longer apparent.

Recent Developments

Alternative Energy- In 2003 Plans were announced to build FutureGen which would be the world's first no emission coal power plant. President Bush announced this to create the world's first zero emission coal power plant to produce electricity and hydrogen power in order to support his Hydrogen Fuel Initiative. The cost of this project was to be shared between industries and the DOE. Later in 2005, the US House prevented drilling in the Arctic National Wildlife Refuge for oil. The government did this with a statement saying that the conservation value is more than that of the resources on this land. In 2007, the Intergovernmental Panel on Climate Change announced that climate change is happening and it is mostly caused by humans. A year later, in 2008, the first commercial cellulosic ethanol plant was constructed in Wyoming. This plant was the "first small scale waste wood facility in the U.S. Later that year, the U.S. Department of Agriculture (USDA) and DOE teamed up to release the National Biofuel Action Plan. This plan's goal was to accelerate the development of a biofuel industry in the U.S. In 2009 at the beginning of the Obama administration, the president signed the American Recovery and Reinvestment Act of 2009 which contained billions of dollars in renewable energy, fossil fuel development, energy efficiency programs, electric grid, and storage technology investments in the form of grants and loans. In 2009, the first framework of wind power development on the U.S. outer continental shelf came into place. Also that year, the president signed a directive to the USDA which allowed it to expand its access to biofuels. Again in 2009 Obama announced 467 million dollars in funding from the American Reinvestment and Recovery Act which allowed it to expand the production of solar and geothermal energy in the U.S. In October that year the U.S. invested 3.4 billion dollars in order to modernize its energy grid. Unfortunately in 2010, the BP oil rig exploded causing the largest oil spill in U.S. history in the Gulf of Mexico with around 30 million gallons of oil leaking into the Gulf. In 2012 the U.S. Nuclear Regulatory Commission (NRC) permitted the construction of two new power plants in Georgia. This was followed by the EPA announcing the first Clean Air Act to regulate carbon pollution from the new power plants. Later that year, the EPA announced the first clean air rules for natural gas produced by fracking. In 2013, President Obama issued his climate action plan which called for the increase use of renewable energy and carbon pollution standards on power plants. Later that year the EPA issued a new proposed rule to cut greenhouse gas emissions from power plants. Finally in 2015 the President announced the clean power plan which would put nationwide regulations on carbon dioxide from power plants.

Yucca Mountain

The Obama Administration ended federal funding for the production of the site once a report was published which stated that the actual cost of production would be closer to 90 billion

dollars. In 2014 the Nuclear Regulatory Commission (NRC) finally released a report on Yucca Mountain's sustainability and found that it met the criteria of its requirements.

Democratic Viewpoint

The democratic stand on the issue of alternative energy is basically they want more of it and less drilling. They want the Arctic National Wildlife Refuge (ANWR) and other national landscapes to be preserved however they do support the drilling for oil in other places as long as it is done safely and responsibly. Also, they believe that government subsidies to major companies should be ended and the money from those subsidies should instead go to research and development of alternative energy. By doing this they hope to reduce our nation's dependence on other, foreign countries for oil. By decreasing our dependency for oil from other countries, members of the Democratic Party believe they can build a stronger nation. The Party believes in tax credits to private sector companies who convert to using renewable energy for their energy purposes and incentives to citizens who buy energy efficient vehicles in order to become less energy dependent as a country. Additionally, they want the government to help fund research on hydrogen fuel in order to overcome the obstacles it currently poses. President Obama summed up the democratic viewpoint on alternative energy in a statement saying, "We need to reduce our dependence on foreign oil by ending the subsidies for oil companies, and doubling down on clean energy that generates jobs and strengthens our security."

Republican Viewpoint

The Republicans agree with the Democrats that America needs to become more energy independent and they also want to achieve a zero emission future. Unlike the Democrats, they believe the bridge to a renewable futures is through the use of fossil fuels. They think that we should move towards using renewable energy but in the meantime we should drill in our oil reserves including those in the ANWR and other pristine natural sources so that we can become more energy independent in the short term until we can get sufficient alternative energy sources. For states in which oil is being drilled the Republican Party believes the state should be given a portion of the profits resulting from the sale of the oil that is drilled in that state. Unsurprisingly, the Republican Party thinks that the best way to grow the market of alternative energy is through competition in the private sector. They plan to increase research and development of alternative energy sources in the private sector through incentives and tax reductions to companies who do research on making alternative energy more efficient and attainable. They want to grow our renewable energy sources but also want to use our fossil fuels until we can get enough renewable energy sources to become sustainable on them. The republican viewpoint is summed up in this quote saying, "Conservatives take a look at the long view: How do we sustain our economy, how do we clean up our energy portfolio and secure longterm security for our citizens." As shown in this quote, the conservative view is to maintain long term economic sustainability through fossil fuels while also increasing the amount of alternative energy until we can rely on that solely.

Conclusion

The issue of alternative energy has had a long history of changes and legislation. On the other hand Yucca Mountain is a pretty recent development in our nation. Recently, alternative energy is rising into a focus issue in our nation's congress as the oil reserves of our nations continue to become depleted and our nation begins to become less energy dependent on other nations. Both the republicans and the democrats agree that we need to become less energy dependent and that growing our alternative energy would not hurt our nation. The issue they disagree on is how.

Republicans believe that we must drill in our nation's oil reserves even if it means endangering the environment in order to get that oil. They believe that we can become energy independent today by drilling in these reserves and over time we can grow our alternative energy sources through the private sector. Democrats on the other hand believe that we must protect these natural resources like the Arctic National Wildlife Refuge and prevent drilling in those places. Similar to the Republicans the Democrats do believe that drilling could provide temporary energy independency until we can grow our alternative energy however they believe that drilling should be done responsibly, away from natural sources. They also want to cut tax credits to oil companies and instead use that money to promote research on alternative energy.

Questions to Consider

1. Is Yucca Mountain structurally sound to hold our nation's nuclear waste?
2. Is it worth drilling in the Arctic National Wildlife Reserve for oil?
3. What are the best ways for our nation to start moving toward using more alternative energy?
4. Should alternative energy be developed by the private sector or the public sector?
5. What will it take for America to reach energy with zero emissions?
6. Should all of our nation's nuclear waste be stored in one spot?
7. What regulations should be required for a nuclear depository?
8. If development does not pursue on Yucca Mountain, what should we do with the current facility?
9. How important is it for America to become more energy independent?
10. Should the government continue to provide tax credits to domestic oil companies so that we do not need to rely on foreign oil or should the money go to alternative energy?

Sources for Additional Research

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4. Environmental Protection Agency: Radiation Protection
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