Nuclear power in the united states

As the severity of the global warming threat attains universal recognition, the United States must look for ways to decrease its reliance on fossil fuels for electricity production. The combustion of fossil fuels such as oil and coal to generate electricity produces carbon dioxide and other greenhouse gases that lead to a variety of environmental problems. Nuclear power, on the other hand, is a comparatively clean source of energy. Though still widely employed, concerns over security of stored waste and a public distrust of reactor safety–fueled by the incidents at Three Mile Island in 1979 and Chernobyl in 1986, and the paranoia behind the sensational but popular film The China Syndrome–have led to calls for the decommissioning of older plants in current operation. However, it makes little sense, economically and in terms of energy capacity, to decommission plants currently in operation. Conversely, the environmental superiority of renewable sources of energy, the problem of storage of nuclear-waste, nuclear energy’s risks and dangers, and the high expense of nuclear power due to high construction costs and enormous funding for incremental research make the construction of new nuclear power plants an impractical means of decreasing the United States’ reliance on fossil fuels for electricity. No new nuclear power plants should be built because the increasing energy demand in the United States can be met with less negative environmental impact with power generated by renewable sources such as wind, solar, and tidal power. The “ zero emissions" benefit of nuclear energy is a common misconception. The actual reaction in a nuclear power plant only creates steam and radioactive waste; it does not produce greenhouse gasses or particulate matter that the combustion of fossil fuels creates. But, due to reliance on existing fossil-fuel power for plant construction, decommissioning, and fuel processing as well as the mining,

enrichment, and transport of uranium, the nuclear cycle produces a significant amount of emissions (Sovacool 761). Specifically, including these factors in the carbon dioxide equivalent per kWh (gCO2e/kWh), the mean value of emissions for nuclear energy over the lifetime of a plant is 66 gCO2e/kWh. Similar “ lifecycle greenhouse gas emission estimates" were projected for other various electricity generators as well. From a carbon equivalent emissions standpoint, nuclear power is much better than coal, oil, and natural gas generators, with mean emissions of 1, 050 gCO2e/kWh, 778 gCO2e/kWh, and 443 gCO2e/kWh respectively. However, nuclear power is worse than electric generators such as offshore wind, hydroelectric, and photovoltaic solar, with mean emissions of 9 gCO2e/kWh, 10 gCO2e/kWh, and 32 gCO2e/kWh respectively (Sovacool 761). It is also important to remember that these sources of electricity generation are renewable (with wind, water current, and sunlight powering them) while nuclear energy requires uranium, which is a finite resource. 112, 000 Clipper 2. 5 megawatt wind turbines could supply all of America’s homes with electricity in a decade if the Obama administration is willing to pursue such a program (Miller, 56). Also, electricity from a nuclear plant is estimated to cost 14 cents per kilowatt hour, while wind energy is currently estimated to cost just 7 cents per kilowatt hour; half the cost (Cohen 16). A huge problem with increasing the amount of nuclear facilities is that as more nuclear power is produced, more radioactive waste is produced. As of now, there is no agreed-upon or perfect solution to the problem of nuclear waste, and constructing more sites that produce this waste would only add to the problem. Nuclear waste is highly radioactive and serious health problems such as the development of cancers accompany exposure to it. Due to the

long half-life of radioactive waste, safe direct contact is only possible after 10, 000 years (Taubes 173). The most heavily funded and discussed solution has been to store the nuclear waste at Yucca Mountain in Nevada, a geologic repository built in a region with 30 fault lines running through it (Taubes 178). To add to the danger of this storage “ solution", 56, 000 truckloads of nuclear waste would have to make the journey across our highways for over 30 years to even fill it (Taubes 180). After years of research and billions of taxpayers’ dollars, The U. S. Senate voted in July 2009 to shut down Yucca Mountain, so nuclear waste is either stored in temporary sites around the country or on-site at nuclear facilities (Mariotte 23). With no safe storage, adding to the rate at which nuclear waste is produced would be irresponsible. The dangers and risks associated with conventional nuclear power plants are the most publicly realized downsides to this type of electricity generation. Threats to the nuclear fuel cycle have increased as terrorist activities have increased. Possible terrorism scenarios include the diversion of nuclear-weapons material to build a crude nuclear device (or dirty bomb), the diversion of radioactive material to create a radiological dispersal device, or a planned attack on a nuclear facility to cause a major, uncontrolled release of radioactivity (SteinhÃ¤usler 56). An increase in the amount of nuclear sites would just add to the amount of accessible terrorist targets. Health risks occur from the wastes that nuclear sites produce. Sites store their wastes in casks of concrete and steel that the waste can eventually infiltrate. The possibility of a nuclear meltdown is accompanied by the risk of radioactive waste exposure. Leukemia rates went up 300%-400% and lung cancer rates went up 600%-700% in a community near Pennsylvania’s Three Mile Island (the site of a nuclear plant that experienced

a partial meltdown of one of its reactors) (Mariotte 23). Nuclear power is extremely expensive to generate. The costs add up through a process called the “ nuclear fuel cycle, " which begins when uranium is mined and then converted into a gas which is “ enriched" (this means that uranium-235, which is useful for producing energy, is separated from uranium-238). Uranium-235 is placed in rods in the reactor’s core and a fission reaction is triggered. Heat is released from the reaction which is utilized to turn water into steam, and the steam turns turbines to generate electricity. The spent fuel rods contain radioactive waste which must be safely stored (Weeks 222). Building nuclear power plants and decommissioning them when they are worn out add to the massive costs (Decommissioning is expensive because many precautions are taken to ensure there is no radioactive material left after demolition). The World Nuclear Association says that it is common for nuclear plants to build in a decommissioning fund during the life of a facility that is passed on to consumers through the price of the electricity (Cohen 16). In addition to the costs of the actual production of nuclear power, funding for incentives to build nuclear plants, to develop methods to make the production of nuclear energy more efficient and safe, and to find effective methods for storage of nuclear-waste have proven to be very hefty. Since 1954, taxpayers have borne the burden of financing successful private corporations in nuclear power. To exemplify this point, with the passage of the Energy Policy Act of 2005, Congress approved multiple incentives for the production of nuclear power facilities. These incentives include $2 billion in risk insurance, tax credits for the first new reactors, and loan guarantees for innovative technologies that help reduce emissions and air pollution (Weeks 225). Also, private companies have a

capped liability in the case of nuclear accidents under the Price-Anderson Act. If the assessed cost of the damage exceeds the amount in the Act’s fund, then Congress pays the difference (Weeks 226). In 2007, the Bush Administration funded $250 million for research and development in reprocessing used nuclear fuel. Other research and development allocations include $250 million by the U. S. government in 2008 toward the use of thorium, an alternative to uranium that is more abundant and less toxic (Stieglitz and Docksai 21). Electricity consumers have paid $22 billion since 1982 for research on a repository for nuclear-waste at Yucca Mountain in Nevada; a fund that grows by $800 million each year. President Obama announced in 2009 that he would never open the Nevada’s Yucca Mountain, but he would provide $197 million to pay for licensing activities and to “ explore alternatives". Yucca Mountain’s failure to open also generated a hefty fee; it is estimated that by 2020 the federal government will owe utilities $11 billion, costs which must come from the general treasury, not the nuclear-waste fund (Kriz and Harder 22). Indecisive politics in the United States make it so that huge sums of money, which yield meager progress, are thrown at the nuclear power industry. This problem of wasteful spending will only intensify with an increased reliance on nuclear power. While there are legitimate concerns about nuclear power, it is not logical to make the argument that existing nuclear power plants should be decommissioned. With 104 reactors in constant operation from 1998 to 2008, nuclear energy accounts for an irreplaceably large portion of our energy demand; 19. 6% of total U. S. electricity generation in 2008, up from 18. 6% in 1998 (Stieglitz and Docksai 19). The existing nuclear power plants in the United States should only be decommissioned prematurely if renewable methods of

electricity generation can account for the whole share of electricity generation in the United States, replacing fossil fuel electricity generation first. The argument that can be made, however, is that no new nuclear reactors should be constructed. If no nuclear reactors are constructed, economic costs associated with running nuclear plants will be limited to current levels and programs that offer incentives to build new plants can be cut. Also, the economic costs associated with the problems of the storage of radioactive waste will still increase, but the increase will be more modest. The American public will not have to worry about an increased risk of terrorism-related nuclear disasters, accidents, and the health problems associated with those things. More importantly, if no new nuclear reactors are built, the United States can focus on developing renewable sources of energy that will reduce our reliance on fossil-fuels; a prospect with gigantic implications on the health of both the environment and our nation’s economy and people. Works Cited Cohen, Aaron M. “ Cost May Threaten Nuclear Power’s Future. " Futurist May 2009: 16. Academic Search Complete. Web. 2 Dec. 2009. . Kriz, Margaret, and Amy Harder. “ Deep-Sixing Yucca Mountain. " National Journal (May 2009): 22. Academic Search Complete. Web. 2 Dec. 2009. . Mariotte, Michael. “ Second Thoughts on Nuclear Power. " Futurist Nov. 2009: 23. Academic Search Complete. Web. 2 Dec. 2009. . Miller, Conrad. “ Energy Generation in the Obama Years. " Tikkun July 2009: 56-73. Academic Search Complete. Web. 2 Dec. 2009. . Sovacool, Benjamin K. “ Nuclear Energy and Renewable Power: Which is the Best Climate Change Mitigation Option? " Proceedings of World Academy of Science: Engineering & Technology 39: 758-762. Academic Search Complete. Web. 2 Dec. 2009. . SteinhÃ¤usler, Friedrich. “ On the Need to Strengthen Nuclear Security

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