

Report for ES/POL1-381

for Wellesley College

May 22, 2009

U.S. Environmental Politics
Environmental Studies Program
Wellesley College

Table of Contents

Section 1.0: Climate Change Policy and Alternative Energy Sources	1
<i>Section 1.1: Alyssa J. Levitz, The Future of Renewable Energy: What Should Be the Role of Corn-Based Ethanol?</i>	3
<i>Section 1.2: Leslye D. Penticoff, Nuclear in a Carbon-Free Energy Portfolio: The Future of Nuclear Power in the United States</i>	21
<i>Section 1.3: Shani C. Cohen, U.S. Environmental Policy: The Effects of Cap-and-Trade</i>	38
Section 2.0: Environmental Justice and Federal Environmental Policy	54
<i>Section 2.1: Alana Nelson, The Yucca Mountain Nuclear Waste Repository: A Case Study on Environmental Justice</i>	56
<i>Section 2.2: Lauren Fink, Coal Bed Methane on the Crow Reservation: Environmental Justice Concerns</i>	72
<i>Section 2.3: Melanie Kazenel, Mountaintop Removal Coal Mining: A Question of Environmental Justice</i>	89
Section 3.0: Additional Issue Briefs: Subsidies and Water Distribution	106
<i>Section 3.1: Jessie Cherofsky, Should the Obama Administration Enact Farm Subsidy Reforms?: An Analysis of Current Subsidy Programs and Their Implications</i>	107
<i>Section 3.2: Devaja Shafer, A Problem of Allocation: Imperial Valley Water Rights and Urban Southern Californian Water Needs</i>	125

Section 1.0

Climate Change Policy and Alternative Energy Sources

Alyssa J. Levitz, *The Future of Renewable Energy: What Should Be the Role of Corn-Based Ethanol?*

Leslye D. Penticoff, *Nuclear in a Carbon-Free Energy Portfolio: The Future of Nuclear Power in the United States*

Shani C. Cohen, *U.S. Environmental Policy: The Effects of Cap-and-Trade*

May 22, 2009

U.S. Environmental Politics
Environmental Studies Program

Energy and Climate Section Executive Summary

Renewable and carbon-free energy sources gained a major supporter upon the inauguration of Democratic President Barack Obama in January 2009. Now Congress is considering its first viable cap-and-trade bill to mitigate and decrease domestic carbon emissions, in addition to the billions invested in alternative energies by the stimulus economic package earlier this year. Policymakers emphasize the need for overhauling our energy infrastructure as a means to pull the United States out of the worst recession the country has seen in seventy years. The dawn of a new administration provides the perfect opportunity to redefine the direction of energy policy, directing funds to the lowest-cost and most environmentally sound alternative and renewable energies. Among the more contested of these options are nuclear energy and biofuel technology.

The next United Nations conference on climate change in Copenhagen puts pressure on the Obama administration to pass a new energy policy by December of 2009. The Waxman-Markey cap-and-trade bill, the America Clean Energy and Security Act, in Congress could set the stage for a much-needed international commitment to reduce carbon emissions worldwide, led by efforts in the United States. While the ultimate goal is for firms to take responsibility for carbon emissions, free permits in the initial phases of the ACESA program is among numerous compromises necessary to ensure support from moderate Democrats and get the bill passed.] The United States should not compromise its first viable cap-and-trade bill by giving away free permits and subsidizing ethanol-based fuel. Instead, the bill should recognize that the future of alternative and renewable energy technology lies in proven options like solar, wind, and nuclear energy.

The future is bright for the nuclear industry, which is facing public support but political ambivalence for expansion. Following the loan guarantees provided for new construction under the Energy Policy Act of 2005, seventeen applications for new plants arrived at the Nuclear Regulatory Commission for review after a thirty-year drought of submitted applications. Nuclear energy fell into public disfavor after plant construction far exceeded expected costs, saddling electric customers with the additional charge, and accidents like Three Mile Island exposed the dark side of this zero-emission technology. Now, with a pending cap-and-trade bill that would raise the price tags on dirty oil and gas competitors, the nuclear industry has the chance to reestablish itself as the primary clean energy producer in the United States. The question remains whether lingering apprehension over the risk of radiation exposure and the absence of a permanent nuclear waste depository will prevent the industry from moving forward.

Fuel made from corn, known as ethanol, has been growing in popularity since the 1970s when the energy crisis pushed the federal government to search for alternate sources of energy. The federal government has given the ethanol industry support in the form of research dollars, tax subsidies and mandated usage. Despite proponents' claims of ethanol's benefits, ethanol has received heated criticism for its detrimental impacts on the environment, the economy, other renewable energy sources and ultimately consumers. The EPA currently has two opportunities to help effect ethanol usage in the United States: The first is a method for evaluating different fuels' emission reductions when compared to gasoline; the second is a request by pro-ethanol groups to increase the federally mandated ethanol level to 15% from 10%. For both of these determinations, the EPA ought to decide in favor of reduced ethanol usage.

If government officials make their decisions based on sound science, corn-based ethanol in its current form will become an energy source of the past, while nuclear and other options move forward into the future. Combining sustainable energy sources with an effective cap-and-trade approach will yield the emissions reductions needed to combat climate change.

Section 1.1

Climate Change Policy and Alternative Energy Sources

Alyssa J. Levitz, *The Future of Renewable Energy: What Should Be the Role of Corn-Based Ethanol?*

May 22, 2009

U.S. Environmental Politics
Environmental Studies Program

Summary

Corn-based ethanol has been commonly used as both a fuel additive and pure fuel in the United States since the 1970s. Over the past few decades, it has received significant and increasing amounts of government support in the form of tax credits for production, import tariffs and a mandate for usage known as the Renewable Fuel Standard (RFS). Hailed for the benefits it confers upon energy security, rural communities and the environment, ethanol has been the primary renewable energy source in the U.S. to date, mixed in at least 46% of gasoline. Its ubiquity in the transportation fueling market has raised many concerns. Ethanol harms the environment more through its production and distribution than benefits it through reduced-emission combustion. Ethanol's reliance on subsidies and import tariffs is economically inefficient; its use increases costs to consumers. Finally, support for ethanol comes at the expense of the development of other, likely more sustainable, renewable energy sources. The Environmental Protection Agency (EPA) has two decisions before it now, each of which has the potential to move the United States away from relying upon corn-based ethanol as its primary renewable energy source.

First, as per a mandate from the 2007 Energy Information and Security Act, the EPA must come up with a way to evaluate emissions from various categories of renewable fuel. If emissions are not reduced by a certain amount when compared to gasoline, the fuel does not count toward the RFS. There are two options for this calculation, both of which take into account land-use changes resultant from increased fuel production but do so over different time periods. Corn ethanol as it is currently made does not meet the requirement under either option. However, given the need to reduce greenhouse gas emissions significantly to slow climate change, it would be prudent for the EPA to choose the scenario of emission regulations under which corn ethanol fares worst: the shorter, thirty-year analysis. This not only will push corn-based ethanol toward a lower environmental impact as it tries to qualify as a renewable fuel, but it also will give other renewable energy sources the opportunity to move toward economic viability and environmental sustainability as they fill the void in the mandated RFS.

The ethanol industry is concerned about the "blend wall," which the ethanol industry will hit when the maximum amount of ethanol the United States can reasonably consume is less than what the industry produces. The blend wall occurs because of limitations in consumption – the current maximum blend of ethanol with gasoline is 10%, the 85% ethanol blend requires special fuel

stations that are rare, and a handful of states are hostile toward ethanol. However, the EPA ought to disregard this concern and deny the request of Growth Energy, an ethanol industry lobbyist, for the allowance of higher ethanol blends with gasoline. This decision is as much about allowing the ethanol industry to reach its blend wall in order to protect the environment and consumers as it is about respecting the wealth of data that say standard engines cannot handle ethanol blends above 10%.

Introduction

Finding alternatives to gasoline is becoming increasingly a necessity as the public and governmental officials alike push for energy security and environmental sustainability. Ethanol is one option that has been in place to varying degrees since the 1970s. Ethanol, used mostly as a fuel additive, is made through the fermentation of sugars from various sources. It burns cleaner than pure gasoline and can be produced domestically, primarily using corn as its source for the sugars. The rise of corn-based ethanol in particular has led to an increasing degree of controversy about ethanol's viability as an alternative to gasoline. These concerns range from corn ethanol's environmental impact and carbon footprint to its economic efficiency and impact on consumers. On the other side, those in favor of corn-based ethanol argue for its benefits to energy security, rural communities and even the environment. This ongoing debate has, to this point, resulted in much federal support for corn-based ethanol, especially through the implementation of tax credits for domestically produced ethanol, the imposition of import tariffs on internationally produced ethanol and a mandate for usage known as the Renewable Fuel Standard (RFS).

In early May 2009, the complex relationship between the corn ethanol lobby and the federal government took an unexpected turn as the Environmental Protection Agency (EPA) gave notice of rulemaking on the RFS requirements for reduced emissions. The proposed standards for emissions calculations will be calculated over a fuel's lifetime from production to distribution and consumption, notably including indirect land use changes as a result of increased production. In a separate process, the EPA is evaluating whether the maximum allowable blend of ethanol for standard engines should be raised to 15% from the current 10%. In order to understand these decisions the EPA will be making over the next six months, this paper details the basics of ethanol production and consumption, its federal policy history, the involved parties and the current situation.

Ethanol Production

Ethyl alcohol, more commonly known as ethanol, is the most common biofuel used in the United States. It is made by breaking down starch into simple sugars, which are then fermented. The starch comes from several different types of input materials known as feedstock, the most common of which is corn, comprising nearly all domestic ethanol production.¹ Corn is broken down into its basic sugars through either wet or dry milling – the former involves soaking then crushing the kernels, while the latter is a more efficient chemical process.² Internationally, sugar cane is prominent because it requires relatively little processing before fermentation. These two biomaterials are known as first generation feedstocks, as they are currently in production.

Second generation feedstock creates ethanol from cellulosic materials such as paper and rice hulls or dedicated fuel crops such as switch grass, fast-growing trees and other woody biomass materials. These materials are made of starches more complex than corn and sugar cane and require extensive processing through acid or enzymatic hydrolysis before they can be fermented.³ However, when burned for fuel, they can decrease greenhouse gas emissions by as much as 85 to 95% compared to gasoline.⁴ Currently, cellulosic ethanol is prohibitively expensive. Startup capital costs for a cellulosic ethanol plant rated to produce 50 million gallons per year (mgpy) are estimated by the Energy Information Agency (EIA) to be almost six times higher than a corn ethanol plant with a similar production capacity.⁵

Five Midwestern states – Illinois, Indiana, Iowa, Minnesota and Nebraska – account for approximately 70% of the nation’s ethanol production⁶. To see the distribution of ethanol production, see Figure 1 on page 3. Most all ethanol plants operate using natural gas or coal to power their production, though there is a movement toward using biomass for power, as well. With coal as a more economical option, fewer and fewer plants are using natural gas as the energy input.⁷

¹ “The Impact of Ethanol Use on Food Prices and Greenhouse-Gas Emissions.” Congressional Budget Office. April 2009. 12 May 2009. <<http://www.cbo.gov/ftpdocs/100xx/doc10057/04-08-Ethanol.pdf>>.

² “Biofuels in the U.S. Transportation Sector.” Energy Information Administration. Feb. 2007. 12 May 2009. <<http://www.eia.doe.gov/oiaf/analysispaper/biomass.html>>.

³ Ibid.

⁴ “The Impact of Ethanol Use on Food Prices and Greenhouse-Gas Emissions.” Congressional Budget Office.

⁵ “Biofuels in the U.S. Transportation Sector.” Energy Information Administration.

⁶ Jacobucci, Brent D. “Fuel Ethanol: Background and Public Policy Issues.” Congressional Research Service. 24 Apr. 2008. Page 3.

⁷ McElroy, Anduin Kirkbride. “Coal: A Fuel That Pays Its Way.” Ethanol Producer Magazine. June 2006. <http://www.ethanolproducer.com/article.jsp?article_id=2072>.

This is problematic because much of the environmental impact of ethanol comes from the power inputted to production plants; while significant regardless of the source, coal-powered ethanol plants emit as much as 92% more carbon dioxide than those powered by natural gas.⁸

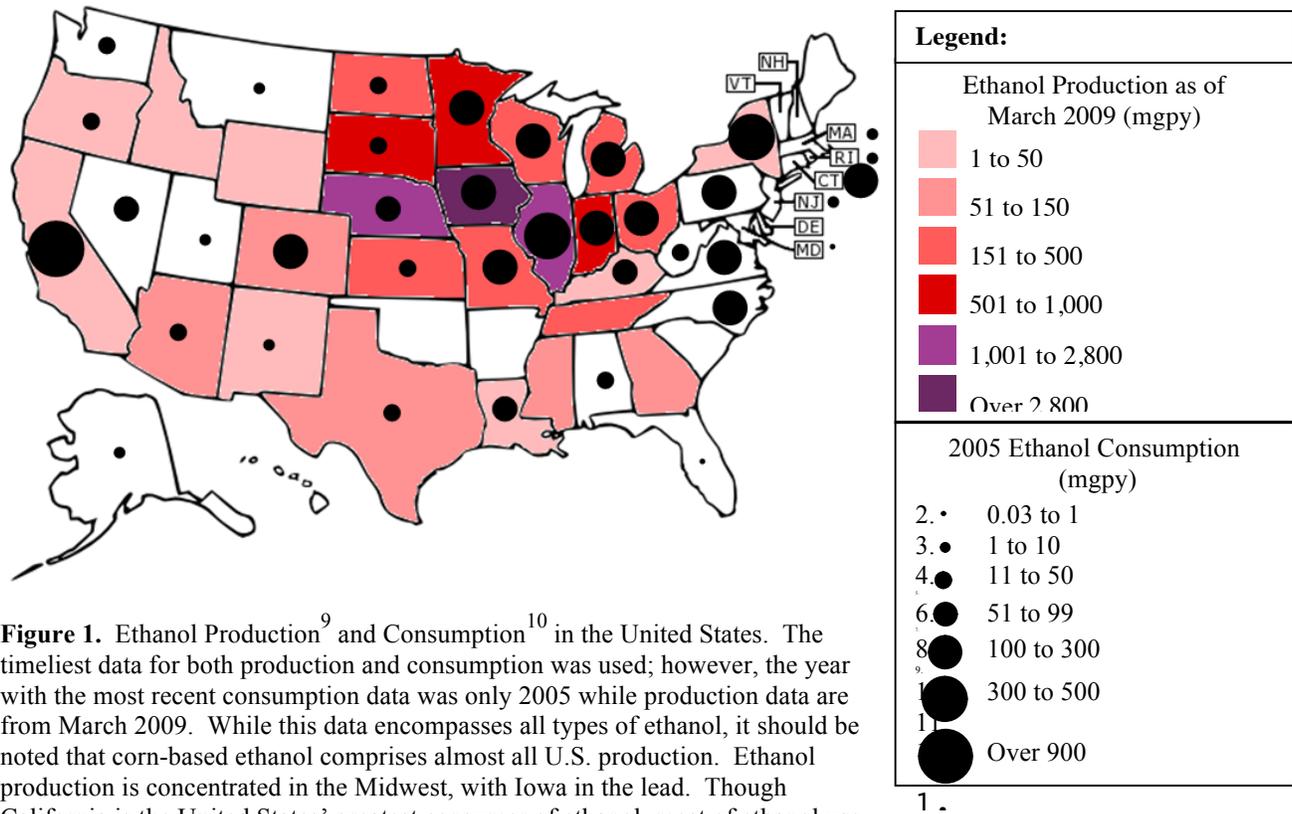


Figure 1. Ethanol Production⁹ and Consumption¹⁰ in the United States. The timeliest data for both production and consumption was used; however, the year with the most recent consumption data was only 2005 while production data are from March 2009. While this data encompasses all types of ethanol, it should be noted that corn-based ethanol comprises almost all U.S. production. Ethanol production is concentrated in the Midwest, with Iowa in the lead. Though California is the United States’ greatest consumer of ethanol, most of ethanol use does occur in the Midwest, as well.

Ethanol Use

Ethanol use comprises just under 5% of fuel consumption (by volume) in the United States.¹¹ As seen in Figure 1 above, most consumption occurs near production centers in the Midwest because of the high cost of transportation, though ethanol is blended into 46% of gasoline nationwide.¹² Its prevalence is limited because it cannot simply be blended into gasoline at

⁸ The AP. “Report: Coal-Powered Ethanol Plant CO2 Emissions 92% Higher than Gas-Powered.” The Des Moines Register. 25 Nov. 2006. <http://www.greencarcongress.com/2006/11/report_coalpowe.html>.

⁹ “Ethanol Production Capacity by State.” Nebraska Energy Office. 6 Apr. 2009. 21 May 2009. <www.neo.ne.gov/statshhtml/121.htm>.

¹⁰ “Nebraska Ethanol Consumption Compared to Other States.” U.S. Department of Energy: Energy Efficiency and Renewable Energy. Accessed 21 May 2009.

<http://apps1.eere.energy.gov/states/compare_states.cfm?firststate=NE&type=ethanol>.

¹¹ Slater, Samantha. “Today’s U.S. Ethanol Industry.” Renewable Fuels Association. 11 Apr. 2007. 20 May 2009.

<http://www.ftc.gov/bcp/workshops/energymarkets/presentations/slater_transportation.pdf>.

¹² Ibid.

refineries and transported via traditional gas and oil pipelines. Due to the ease with which it is contaminated by water, which rusts and corrodes the pipe, ethanol is left separate from gasoline while transported and blended nearer to service stations. Additionally, ethanol transportation moves in the opposite direction from these established lines – gas primarily moves from the coasts inward. As a result, ethanol relies on more expensive modes of transport: trucks, railways, and barges.¹³

Ethanol is blended into gasoline such that it comprises 10% or 85% of the fuel by volume. The 10% ethanol blend (E10, or “gasohol”) accounts for 99% of ethanol use, as it can be used in any vehicle. E85, on the other hand, requires special Flex Fuel Vehicles (FFVs) that can operate on an ethanol blend anywhere between 0% and 85%. As compared to pure gasoline or E10, the use of E85 requires different fueling sites and modes of transportation for the fuel. This special infrastructure is so rare, FFVs rarely use the 85% ethanol blend.¹⁴

History of Federal Ethanol Policy

Over time, Congress has passed laws that have helped to increase both demand for and supply of ethanol. Ethanol first began to receive governmental support following the energy crisis of the 1970s. As concern for energy security increased, Congress passed the Energy Policy and Conservation Act of 1975, which among other things provided incentives for U.S. car companies to manufacture alternative fuel vehicles (primarily for ethanol use).¹⁵ These Flex Fuel Vehicles, or FFVs, have continued to receive support to this day: The 1990 amendments to the Clean Air Act allow the use of FFVs, which can operate on E85, as part of the mitigation of air quality problems; the 1992 Energy Policy Act requires the acquisition of FFVs by state and federal governments.¹⁶ More recently, the 2009 Stimulus Package provided an increased tax credit for developing E85 infrastructure to fuel these vehicles.¹⁷

Demand for ethanol got a further boost in the Clean Air Act Amendments of 1990 with the requirement for oxygenated or reformulated gasoline (RFG). The requirement for using RFG originated in the desire to reduce carbon monoxide emissions from vehicles. Ethanol became a

¹³ “Biofuels in the U.S. Transportation Sector.” [Energy Information Administration](#).

¹⁴ Ibid for all information in this paragraph.

¹⁵ Yacobucci, “Fuel Ethanol: Background and Public Policy Issues.” Page 23.

¹⁶ Yacobucci, “Fuel Ethanol: Background and Public Policy Issues.” Page 7-8.

¹⁷ Capehart, Tom. “Ethanol: Economic and Policy Issues.” [Congressional Research Service](#). 2 Apr. 2009. Page 19.

popular additive for RFG, though the requirement was ultimately eliminated in the Energy Policy Act of 2005 due to its unclear effects on volatile organic compound and NO_x emissions.¹⁸

To increase ethanol production, the 1978 Energy Tax Act created an exemption from the federal excise tax on motor fuels, which led to an effective subsidy of \$0.52 per gallon of ethanol blended into gasoline. This exemption, known as the Blender's Tax Credit, became a flat out income tax credit of \$0.51/gallon beginning in 2004¹⁹. There is an additional credit of \$0.10/gallon for the first 15 mgpy produced for producers of ethanol under 60 mgpy. This credit was applied to approximately 16% of ethanol production²⁰.

Elsewhere in the world, especially in Brazil, production costs of ethanol are lower and government incentives are higher. As a result, the \$0.54/gallon protectionist tariff on imported ethanol has been vital to the domestic industry. To get around this tariff, international producers can dehydrate their ethanol and sell it to one of five countries in the Caribbean who will then sell it to the United States. The Caribbean Basin Initiative makes this possible, though it caps imports at 7% of U.S. ethanol consumption.²¹ Internationally-produced ethanol is typically made with sugar cane that has a higher combustion efficiency than corn-based ethanol; however, there are still problems with land use changes for sugar cane ethanol production, complicating the understanding of sugar cane ethanol's effectiveness at reducing greenhouse gas (GHG) emissions.

For ethanol producers, arguably the most important law Congress passed was the Energy Policy Act of 2005 that established the RFS that dictates how much renewable fuel must be used each year. In the original RFS, consumption of renewable fuels must reach at least 7.5 billion gallons per year (bgpy) by 2012. It should be noted that under the RFS one gallon of cellulosic ethanol counts toward 2.5 gallons of renewable fuel in order to incentivize the higher-efficiency type of ethanol.²² The RFS was expanded further in the Energy Independence and Security Act of 2007 as seen in Figure 2 below, requiring 11.1 bgpy of renewable fuel in 2009 up to 36 bgpy in 2022. The EISA ultimately caps the amount of renewable fuel that can come from corn-based

¹⁸ Yacobucci, "Fuel Ethanol: Background and Public Policy Issues." Page 17-18.

¹⁹ Capehart, "Ethanol: Economic and Policy Issues." Page 20.

²⁰ Ibid.

²¹ Capehart, "Ethanol: Economic and Policy Issues." Page 21.

²² Ibid.

ethanol at 15 bgpy and requires an increasing amount from cellulosic ethanol.²³ Additionally, the EISA states that renewable fuels must meet a certain greenhouse gas emissions reduction standard, from 20% for corn ethanol from new refineries to 60% for cellulosic biofuels.²⁴ The process for determining emissions reductions was submitted by the EPA for comment on 5 May 2009.

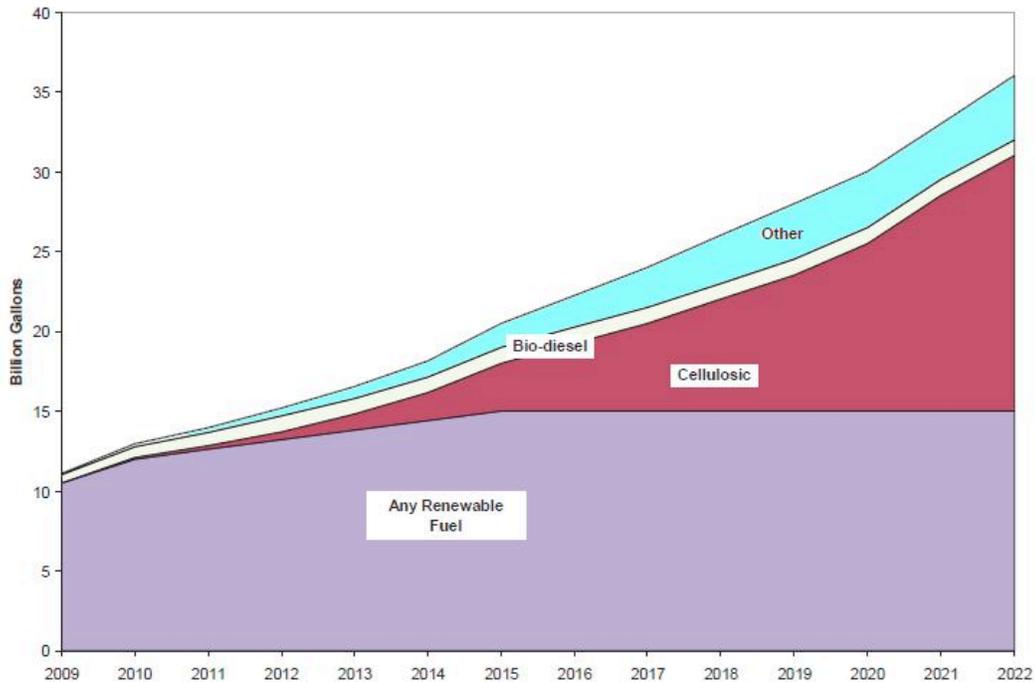


Figure 2. Renewable Fuel Standard Under the Energy Independence and Security Act.²⁵ The “Any Renewable Fuel” category is a hard cap that is expected to be fulfilled primarily through corn-based ethanol, whereas the other three categories are minimum levels that must be achieved.

Stakeholders

Pro Corn-Based Ethanol. The supporters of corn-based ethanol are predictable. The corn growers and ethanol processors like BioEnergy, VeraSun Energy (before it went bankrupt) and Archer Daniels Midland are of course major lobbyists for ethanol. There are also several interest groups that have arisen in support – Growth Energy and the American Coalition for Ethanol (ACE). These groups do all they can to increase governmental support for the industry, using three fundamental arguments: Ethanol increases energy security, benefits rural communities and helps the environment.

²³ “The Impact of Ethanol Use on Food Prices and Greenhouse-Gas Emissions.” Congressional Budget Office.

²⁴ Capehart, “Ethanol: Economic and Policy Issues.” Page 8.

²⁵ Yacobucci, “Fuel Ethanol: Background and Public Policy Issues.” Page 18.

Energy Security. Though it does nothing to change the United States' dependence on energy, increased use of ethanol is shown by most studies to appreciably reduce "overall *petroleum* dependence."²⁶ Supporters see ethanol as a way to reduce the United States' huge trade deficit in crude oil, by having ethanol displace increasing quantities of gasoline. In 2008, the use of ethanol decreased demand for gasoline by 5% or 6 billion gallons, a number that ethanol producers and supporters hope to bolster over time.²⁷

Benefits for Rural Communities. Support for ethanol is always seen as support for rural communities, providing jobs, enhancing income and thus stabilizing the local economies. A study of nine 40 mgpy ethanol production plants shows that not only do these plants directly employ individuals, but they also indirectly provide jobs for (on average) nearly 700 people. This secondary employment is due to revenue circulation that increases demand in other sectors of the local economy.²⁸ In total, the U.S. Department of Energy provides an estimate of 10,000 to 20,000 jobs created for every billion gallons of ethanol produced.²⁹ Furthermore, ACE details on its website that areas surrounding an ethanol plant see a localized increase in corn prices, "adding significantly to farm income in the area."³⁰ There is also tax revenue generated as a result of these plants' production that can then be put back into the local community to improve, for example, the public school system.³¹

Environmental Advantages. When considering the actual consumption of fuel, ethanol burns cleaner than gasoline, with fewer emissions. For short-term analyses of ethanol's life-cycle emissions, the Argonne National Laboratory found that based on the way ethanol is currently made, greenhouse gas emissions are reduced 20% compared to gasoline.³² While this number is impressive, it should be noted that in the long term, ethanol use is not so favorable (see *Environmental Repercussions* section below).

Anti Corn-Based Ethanol. Resistance to continued support by the federal government for corn-based ethanol is coming from an unlikely collection of special interest groups. From soybean

²⁶ Yacobucci, "Fuel Ethanol: Background and Public Policy Issues." Page 16.

²⁷ "The Impact of Ethanol Use on Food Prices and Greenhouse-Gas Emissions." Congressional Budget Office.

²⁸ Erica Swisher. "Ethanol Production's Impact on the Local Community." Ethanol Today. June 2005: pp 20-23, 40-41.

²⁹ "Ethanol's Impact." Growth Energy. 10 May 2009 <www.growthenergy.org/2009/ethanol/index.as>.

³⁰ "Ethanol 101." American Coalition for Ethanol. 10 May 2009 <<http://www.ethanol.org/index.php?id=34>>.

³¹ Swisher, "Ethanol Production's Impact on the Local Community."

³² "The Impact of Ethanol Use on Food Prices and Greenhouse-Gas Emissions." Congressional Budget Office.

farmers to cattle and pork producers, from the National Resources Defense Council to the State of California, and from developers of wind and solar energy sources to advocates of small government, the opponents of corn-based ethanol are using a wide variety of arguments: It is economically inefficient, has negative consequences for consumers and the environment, and takes away needed resources from other renewable energies.

Economic Inefficiency. Free-market interest groups such as the Taxpayers for Common Sense and the Cato Institute are particularly concerned about supporting an industry that fundamentally cannot support itself. The subsidies incentivize an ever-increasing supply of ethanol, and the Renewable Fuel Standard creates an undesirable artificial demand for it. Given the industry's reliance on relatively high gas prices to retain profitability, the Congressional Budget Office states, "It is unlikely that, on average, the producers over the past several decades would have turned a profit if they had not received production subsidies."³³ These groups also tend to advocate for significant reductions in import tariffs to promote free trade.

Consequences for Consumers. When paying to fuel a vehicle, a measure of efficiency to consider is the comparison of ethanol to gasoline on an equivalent energy basis. For a given volume compared to gasoline, E10 contains 3.3% less energy and E85 has 24.7% less energy; this means that an engine requires more of any ethanol-blended fuel than of pure gasoline, raising the effective price for consumers.³⁴ Thus, even with the tax credits given to ethanol, it can be even more expensive than gasoline on a per-energy unit basis, especially with the recent decrease in gasoline prices. A second factor that consumers will experience is the decrease in fuel economy attendant to ethanol usage. Compared to pure gasoline, a 10% ethanol blend leads to a 2-3% decrease in mpg achieved.³⁵ Higher ethanol blends will result in even larger decreases in a car's fuel economy.

Consumers additionally see a price increase due to substantial jumps in the commodity price of corn: In Iowa, the price of corn was \$3.37/bushel in 2007 and \$4.78/bushel in 2008, compared to an average of \$2.15/bushel the previous five years.³⁶ The USDA predicts that approximately one-

³³ Ibid.

³⁴ "Biofuels in the U.S. Transportation Sector." Energy Information Administration.

³⁵ Yacobucci, "Fuel Ethanol: Background and Public Policy Issues." Page 6.

³⁶ "Monthly Average Prices Received by Iowa Farmers." Iowa Agricultural Statistics Service. March 2009. 12 May 2009. <<http://www.econ.iastate.edu/outreach/agriculture/periodicals/chartbook/Chartbook2/Tables/Table11.pdf>>.

third of the corn crop produced in the year ending August 2009 will be refined into ethanol. Forty-four percent of corn is expected to be used for ethanol by 2018 according to the Food and Agricultural Policy Research Institute.³⁷ The reduction in corn used for food, combined with the high price paid for corn used for ethanol, appears to indicate that consumers would see a higher price at the grocery store, which they did to some degree: Food prices as measured by the Consumer Price Index, a measure of how much consumers pay, increased by 4.0% in 2007 and 5.5% in 2008, preceded by an average annual increase of 2.5% for the previous decade.³⁸ However, the Congressional Budget Office attributes no more than 15% of the food price increase to higher corn prices between April 2007 and April 2008. The CBO also notes that there were several factors other than ethanol that contributed to the corn price increase – increased global demand for meat and thus animal feed, depreciation of the U.S. dollar and apprehensions about a poor harvest.³⁹

The rise in corn prices leads to an increase in the price that animal producers pay for their feed; and that price increase carries through the supply chain, resulting in higher cost to consumers for animal protein products. The National Cattlemen’s Beef Association, National Chicken Council, National Turkey Federation and the National Pork Producers Council have all come out against the proliferation of corn-based ethanol, citing “severe cost to another part of the economy” – livestock production.⁴⁰ Commenting on the rising price of feedgrains to a House subcommittee hearing, a Tyson Foods manager said, “Without adequate safeguards for the unintended consequences [of increased demand for corn], the future of U.S. animal agriculture is put in great jeopardy.”⁴¹ When suppliers have higher costs, so will ultimately the consumers.

Environmental Repercussions. Environmental groups are heavily involved in this debate, arguing that energy from corn ethanol is not as environmentally friendly as it is typically advertised. Traditionally, the environmental impact of ethanol has been calculated using a fuel-cycle analysis that compares the emissions from using the fuel blend to emissions from using pure gasoline. There are many different studies of ethanol’s fuel cycle, and the results vary based on assumptions made to complete the analysis, though “most studies show a 10% to 20% reduction in GHG emissions for

³⁷ Capehart, “Ethanol: Economic and Policy Issues.” Page 14.

³⁸ “Consumer Price Index Summary.” [Bureau of Labor Statistics](http://www.bls.gov/news.release/cpi.nr0.htm). March 2009. 12 May 2009. <www.bls.gov/news.release/cpi.nr0.htm>.

³⁹ “The Impact of Ethanol Use on Food Prices and Greenhouse-Gas Emissions.” [Congressional Budget Office](http://www.cbo.gov).

⁴⁰ Herbst, Moira. “Ethanol’s Growing List of Enemies.” [Business Week](http://www.businessweek.com). 19 Mar. 2007. 21 Apr. 2009.

<www.businessweek.com/bwdaily/dnflash/content/mar2007/db20070316_016207.htm?chan=rss_topStories_ssi_5>.

⁴¹ *Ibid.*

corn ethanol compared with gasoline.”⁴² This does not account for the land-use changes and environmental impact associated with growing corn, which is why conventional wisdom now states that a fuel-cycle analysis is not enough; it is crucial to do a complete and long-term life-cycle analysis that includes emissions from production and transportation.

The high subsidies given to ethanol producers incentivize switching from another crop to corn, putting fallow acres into production or farming on marginal land. The former disrupts the established Midwestern mode of farming that rotates corn and soybeans on the same field, increasing the health and viability of the land. Additionally, the alteration of the rotation pattern “could likely also have important regional economic consequences that have yet to be fully explored.”⁴³ Finally, by farming on marginal land that should not be used, more fertilizers and other chemicals must be used to achieve the same productivity levels. Marginal land use “typically aggravates any problems with soil erosion, as well. As California’s EPA points out, a separate yet significant problem with converting these marginal lands into corn-producing farms is that area currently acting as a carbon sink will instead ultimately produce carbon dioxide.”⁴⁴

Corn is one of the most energy intensive of commodity crops. Even if the life-cycle analysis of corn-based ethanol were not so problematic, the ethanol’s energy balance is less than ideal. A fuel’s net energy balance (NEB) is a ratio comparing energy produced to energy inputted. When taking into account corn production, processing and ethanol transportation, the NEB can be “significantly less than 1.0,” indicating that more energy went into its production than was outputted.⁴⁵ This number is much more favorable for natural gas-powered plants than for the ubiquitous coal-powered plants.⁴⁶ Another factor in corn ethanol’s intensity is its effect on water quality and supply. Taking into account everything from irrigation of corn to transportation of ethanol, production and distribution of one gallon of ethanol uses 800 gallons of water.⁴⁷ As production increases, there will be an even greater need for fertilizers and other chemicals, posing more threats to water quality, already worsened by poor tillage practices.⁴⁸

⁴² Capehart, “Ethanol: Economic and Policy Issues.” Page 17.

⁴³ Capehart, “Ethanol: Economic and Policy Issues.” Page 14.

⁴⁴ “Will California Shuck Corn Ethanol?” Investor’s Business Daily. 24 Apr. 2009: A10.

⁴⁵ Capehart, “Ethanol: Economic and Policy Issues.” Page 16.

⁴⁶ “The Impact of Ethanol Use on Food Prices and Greenhouse-Gas Emissions.” Congressional Budget Office.

⁴⁷ “Biofuel Production and Water Scarcity: A Drink-Or-Drive Issue?” Science Daily. 11 May 2009. 12 May 2009.

<www.sciencedaily.com/releases/2009/05/090501204627.htm>.

⁴⁸ Ibid.

Impact on Other Renewable Energies. The limited funding available for non coal and gasoline energy sources effectively creates competition between various renewable energy sources. Currently, ethanol is the undisputed leader. Receiving more than four times the amount of tax credits as all other forms of renewable energy in the U.S., for a total of \$3 billion in 2007, the corn-based ethanol industry dominates.⁴⁹ If the government is truly trying to increase usage of renewable fuels, the executive director of the American Wind Energy Association Randy Swisher points out “a lack of consistency in policy;” “Why are we supporting ethanol with a mandate, but not wind and solar?”⁵⁰ While corn-based ethanol has received support to date, it is unclear whether it should be the renewable energy choice moving forward into the future – other renewable energy sources and even other forms of ethanol have not been given the time nor the resources to develop to their full potential.

Current Situation

Recession’s Impact on Industry. The ethanol industry has not been immune to the economic crisis that has hit the rest of the world. As gas prices fell and total demand for fuel dropped, ethanol became relatively expensive and undesirable. Production costs have not decreased, and payments on capital investments such as plant equipment have not gone down. As a result, many ethanol plants are currently operating under capacity and other producers have declared bankruptcy. VeraSun, one of the lead producers of ethanol, declared bankruptcy in late October of last year and is selling its plants. The entire industry, by some estimates, is operating at 84% of its potential.⁵¹ Even still, at this time, producers are making more than enough ethanol to meet the RFS mandate – slightly more than the required nine billion gallons were produced in 2008.⁵²

Blend Wall. Ethanol is currently blended in at least 46% of gasoline sold in the United States,⁵³ and it is reaching a plateau of demand. The ethanol industry is facing a “blend wall” of constrained consumption for several reasons. There is limited support for ethanol by many states –

⁴⁹ Capehart, “Ethanol: Economic and Policy Issues.” Page 5.

⁵⁰ “Will California Shuck Corn Ethanol?” Investor’s Business Daily.

⁵¹ Capehart, “Ethanol: Economic and Policy Issues.” Page 12.

⁵² “The Impact of Ethanol Use on Food Prices and Greenhouse-Gas Emissions.” Congressional Budget Office.

⁵³ Samantha, “Today’s U.S. Ethanol Industry.”

only nine states have mandated ethanol usage requirements⁵⁴ – and the Southern and Southeastern United States have been somewhat hostile to the fuel, with Texas going so far as to request a waiver from the federal RFS.⁵⁵ The request, which would have halved the amount of ethanol Texas had to use, was denied.⁵⁶ Additionally, the federally mandated maximum blend of 10% ethanol puts a hard cap on the amount of ethanol that could potentially be consumed in the United States. There is also little ability to expand usage of E85, which could theoretically greatly increase demand, due to inadequate distribution infrastructure and limited availability of FFVs. The blend wall becomes significant when the RFS will require more than people can consume, which is expected to happen by 2013 when the RFS reaches 15 bgpy.⁵⁷

In order to increase the volume of ethanol at which the blend wall occurs, Growth Energy and 52 ethanol producers have petitioned the EPA for a waiver of Clean Air Act §211(f) to allow an increase in the ethanol blend from 10% up to 15%.⁵⁸ Comments are due to the EPA by 21 May 2009, and many groups have come out in opposition. The Center for Auto Safety is concerned that car warranties are only valid for ethanol levels up to 10%; and the Vice President for Government and Industry Relations at American Honda has voiced safety concerns due to unknown effects on engines. Additionally, service station owners, the Union of Concerned Scientists and the Energy Department's National Renewable Energy Lab are all calling for more research.⁵⁹ The EPA must reach a decision by 1 December 2009.

Proposed Legislation in the 111th Congress. Several pieces of legislation have been proposed in the House and the Senate addressing various aspects of the ethanol issue since late February of this year. All have been referred to an appropriate committee for review. H.R. 1112, the E85 Investment Act, would increase the incentives for E85 refueling property;⁶⁰ and H.R. 1476,

⁵⁴ "State Legislation." American Coalition for Ethanol. 20 May 2009. <<http://www.ethanol.org/index.php?id=79&parentid=26>>.

⁵⁵ The Associated Press. "EPA Denies Ethanol Waiver Request." 8 Aug. 2008. 20 May 2009. <www.cnbc.com/id/26088930/for/cnbc/>.

⁵⁶ Ibid.

⁵⁷ Braeutigam, John R. "Ethanol Blend Wall." Valero Energy Corporation. 14 Apr. 2009. 12 May 2009. <http://www.energy.ca.gov/2009_energypolicy/documents/2009-04-14-15_workshop/presentations/Day-1/08-Braeutigam_John_Ethanol_Blend_Wall.pdf>.

⁵⁸ "Notice of Receipt of a Clean Air Act Waiver Application To Increase the Allowable Ethanol Content of Gasoline to 15 Percent; Request for Comment." EPA. 21 Apr. 2009. 12 May 2009. <www.epa.gov/EPA-AIR/2009/April/Day-21/a9115.ht>.

⁵⁹ Jensen, Christopher. "Ethanol Industry's 15% Solution Raises Concerns." New York Times. 8 May 2009. 10 May 2009. <www.nytimes.com/2009/05/10/automobiles/10ETHANOL.html>.

⁶⁰ "H.R. 1112." The Library of Congress. 23 Feb. 2009. <<http://thomas.loc.gov/cgi-bin/query/z?c111:H.R.1112:>>.

the Open Fuel Standard Act of 2009, would require that by 2015, at least 80% of automobiles manufactured in the United States be able to run on fuel blends of 85% ethanol, 85% methanol, or biodiesel.⁶¹ In the Senate, S. 622, the Imported Ethanol Parity Act, aims to reduce the tariff on foreign-produced ethanol so that it is competitive in the U.S. Market.⁶² All of this proposed legislation ultimately aims to move the blend wall, while the Senate bill furthermore addresses concerns about ensuring free trade.

On 14 May 2009, Collin Peterson (D-MN) introduced H.R. 2409 (the Renewable Fuel Standard Improvement Act), which is currently in the House Committee on Energy and Commerce for review. The bill would amend several aspects of the Clean Air Act, most significantly adding in a definition of lifecycle analysis that excludes any land-use changes.⁶³ Peterson has furthermore threatened to do all he can to prevent the passage of the Waxman-Markey Bill if H.R. 2409 does not get passed.⁶⁴ This staunch support for ethanol in the face of needed legislation to address climate change represents the degree to which the corn and ethanol lobbies are entrenched in Washington. In light of the EPA's proposed rulemaking on the RFS (see below), it seems unlikely that this bill will pass through Congress.

Actions by the Obama Administration. On 5 May 2009, the Obama Administration circulated a press release detailing initiatives that primarily further ethanol's production and use. Such support by the White House for ethanol comes as a surprise to no one; as a former Senator from Illinois, President Obama has long been an ally of ethanol.

Establishment of Biofuels Interagency Working Group. The Biofuels Interagency Working Group, headed by the Secretaries of Agriculture and Energy as well as the Administrator of the EPA, in conjunction with the National Science and Technology Council's Biomass Research and Development Board, will create a biofuel market development program to support second generation biofuels, look at infrastructure of the supply and distribution of all biofuels, and identify

⁶¹ "H.R. 1476." The Library of Congress. 12 Mar. 2009. <<http://thomas.loc.gov/cgi-bin/query/z?c111:H.R.1476>>.

⁶² "S. 622." The Library of Congress. 17 Mar. 2009. <<http://thomas.loc.gov/cgi-bin/query/z?c111:S.622>>.

⁶³ "H.R. 2409." The Library of Congress. 14 May 2009. <<http://thomas.loc.gov/cgi-bin/query/z?c111:H.R.2409>>.

⁶⁴ Philpott, Tom. "Peterson: Leave ethanol alone, or I'll nuke Waxman-Markey." Grist. 18 May 2009. <www.grist.org/article/2009-05-18-peterson-nuke-waxman1>.

policies to increase the environmental sustainability of feedstock production.⁶⁵ Many industry groups immediately came out in support of the proposals – Growth Energy, the Renewable Fuels association and the American Coalition for Ethanol, among others. The CEO of Growth Energy, Tom Buis said, “America’s ethanol producers stand ready to help the president, and his working group, meeting their ambitious goals.”⁶⁶

Funding Allocation for Research. From the 2009 American Recovery and Reinvestment Act, \$786.5 million will be directed toward advanced biofuels research, development and commercialization.⁶⁷ The hope is that these funds will help develop cellulosic ethanol such that it reaches commercial-scale levels. While this is certainly a boon for the ethanol industry, it does not address the need to fund research in other renewable energy sectors.

Notice of Proposed Rulemaking on the Renewable Fuel Standard. The Renewable Fuel Standard set in the EISA set out four categories of renewable energy: general renewable fuel (expected to be fulfilled by corn-based ethanol), advanced biofuel, biomass-based diesel and cellulosic biofuel. This new rule expands the RFS to include not just gasoline but all transportation fuel. As authorized by the EISA, this rule furthermore creates “mandatory GHG reduction thresholds for the various categories of fuels.” These reductions must be met in order for a fuel to count toward the renewable quota and are based on a full lifecycle analysis compared to a baseline of the lifecycle emissions of petroleum fuels in 2005.⁶⁸ As evidenced by Representative Peterson’s attempt to redefine “lifecycle,” this regulation is received poorly by corn ethanol supporters who worry their fuel will not make the cut.

The requirement for reducing GHG emissions through the lifecycle of ethanol production is controversial in and of itself; however, the main point of discussion in the proposed rule is the length of time over which the lifecycle of ethanol should be calculated. The first option is a thirty-year scenario in which the impact of all emissions is valued equally; the second option evaluates emissions over one hundred years and “discounts future emissions at 2% annually.” Corn-based

⁶⁵ “President Obama Announces Steps to Support Sustainable Energy Options.” White House Press Release. 5 May 2009. <www.whitehouse.gov/the_press_office/President-Obama-Announces-Steps-to-Support-Sustainable-Energy-Options/>

⁶⁶ Zimmerman, Cindy. “Ethanol Industry Pleased with White House Action.” *Domestic Fuel*. 5 May 2009. <<http://domesticfuel.com/2009/05/05/ethanol-industry-pleased-with-white-house-action/>>.

⁶⁷ “President Obama Announces Steps to Support Sustainable Energy Options.” White House Press Release.

⁶⁸ The information in the preceding paragraph is from: “EPA Proposes New Regulations for the National Renewable Fuel Standard Program for 2010 and Beyond.” May 2009. <www.epa.gov/OMS/renewablefuels/420f09023.htm>.

ethanol appears to be a better option under the one hundred-year scenario, as emissions resultant from land use changes are mitigated by the replacement of gasoline by ethanol over time. Despite the improvement in the one hundred-year scenario over the thirty-year scenario, neither calculation would give corn-based ethanol the 20% cut in emissions it needs to be considered under the RFS. Notably, however, the standards for GHG emission reductions does not apply to any plants constructed before December 2007, grandfathering in nearly 15 billion gallons worth of first-generation biofuels.⁶⁹ This grandfather clause placates the industry to some degree, though it is still concerned about future growth.

Recommendation

The damage done through the planting, fertilizing and harvesting of corn and the subsequent production, distribution and combustion of ethanol outweighs any potential benefits of its use as a replacement for gasoline. Given that experts such as Tim Searchinger of Princeton's Woodrow Wilson School believe that the existence of corn ethanol is inevitable,⁷⁰ how does the federal government slow the growth of corn-based ethanol? The EPA should disregard the ethanol industry's self-interested concerns about the blend wall and make decisions that will move the United States toward a more diversified renewable energy portfolio. To this end, the EPA should use the thirty-year scenario to determine lifecycle GHG emissions of renewable fuels and deny the waiver request to increase ethanol blends up to 15%.

Given the need to reduce GHG emissions fairly significantly in the next forty years as per the American Clean Energy and Security Act,⁷¹ it would be prudent for the EPA in its proposed rulemaking on the RFS to choose the scenario of emission regulations under which corn ethanol fares worst: the thirty-year analysis. This will not only push corn-based ethanol toward a lower environmental impact as it tries to qualify as a renewable fuel, but it will also give other renewable energy sources the opportunity to move toward economic viability and environmental sustainability as they fill the void in the RFS.

⁶⁹ The information in the preceding paragraph is from: Philpott, Tom. "The EPA Holds Corn Ethanol Accountable...Sort of." *Grist*. 5 May 2009. <www.grist.org/article/2009-05-05-epa-ethanol-biofuel/>.

⁷⁰ Philpott, "The EPA Holds Corn Ethanol Accountable...Sort of."

⁷¹ Komanoff, Charles. "Waxman-Markey: '80% less by 2050' is too hard, let's do 46%." *Grist*. 21 May 2009. <www.grist.org/article/waxman-markey-80-less-by-2050-is-too-hard-lets-do-46/>.

Finally, the EPA ought to deny the request from ethanol producers and Growth Energy that would allow higher blends of ethanol with gasoline. This decision is as much about allowing the ethanol industry to reach its blend wall in order to protect the environment and consumers as it is about respecting the wealth of data that say standard engines cannot handle ethanol blends above 10%.

Corn-based ethanol has served its purpose in the U.S. transportation market, providing a renewable fuel when no others were viable. However, it is now time to move toward the next generation of renewable energy, whether it is cellulosic ethanol, wind, solar, geothermal or a source yet unknown. Allowing well-established energy sources with questionable benefits to overshadow other options blatantly disregards the need to find a sustainable future, both for the United States and the world as a whole.

Section 1.2

Climate Change Policy and Alternative Energy Sources

Leslye D. Penticoff, *Nuclear in a Carbon-Free Energy Portfolio: The Future of Nuclear Power in the United States*

May 22, 2009

U.S. Environmental Politics
Environmental Studies Program

Summary

Nuclear power currently leads the alternative energy industry by producing 73% of the carbon-free electricity consumed in the United States,¹ but recent policy under President Barack Obama has aimed federal subsidies at renewable technology like solar and wind instead. Expansion of the nuclear sector is seen by many as an integral component of a strategy to mitigate carbon emissions that cause global warming. In accordance with this view, the Energy Policy Act of 2005 provided loan guarantees to the first six nuclear plants to receive licenses from the Nuclear Regulatory Commission.² This spurred an influx of applications for approval to construct new reactors around the country, signaling the beginning of what is being called the “nuclear renaissance.”³ Submitting an application in no way guarantees that the reactor in question will be built: active local opposition, burdensome regulatory costs, and high initial investment for construction all can stall or eventually cause the cancellation of a proposed project.

The nuclear industry faces several challenges before an effort to expand can move forward. First, no permanent waste repository exists for the spent radioactive fuel generated by nuclear power production. The Yucca Mountain project was all but canceled by President Obama, and if the Yucca Mountain debate was any indication, approving another site may take several decades.⁴ Second, the lack of standardization in constructing nuclear power plants can cause construction and maintenance costs to skyrocket unexpectedly. Only some form of loan guarantee, from the private or public sector, can prevent consumers from paying the price. Third, the shared regulatory responsibilities between the states and various factions of the federal government make the licensing process long and costly for utility companies that propose a nuclear plant. In this case, the executive branch of the government has the most power to streamline the regulatory process and clearly delineate enforcement authority.

Given the urgency of climate change and the opportunity for nuclear expansion under a new cap and trade policy, federal officials should consider addressing these challenges to encourage more nuclear power plants to be built. Nuclear accidents at Three Mile Island are not forgotten, but

¹ Kadak, Andrew. “Green Nuclear.” MIT Technology Review. March/April 2009. Online: <http://www.technologyreview.com/energy/22142/?a=f&gclid=CM6DkvDzppoCFQVfFQod6l6R1Q>. Viewed 5 May 2009.

² See the full text of the Energy Policy Act of 2005 here: http://www.epa.gov/oust/fedlaws/publ_109-058.pdf.

³ EIA. “Status of Potential New Commercial Nuclear Reactors in the United States.” Energy Information Administration. February 2009. Online: http://www.eia.doe.gov/cneaf/nuclear/page/nuc_reactors/reactorcom.html. Viewed on 5 May 2009.

⁴ Washington Post. “Mountain of Trouble.” Washington Post Editorials. March 8, 2009. Online: <http://www.washingtonpost.com/wp-dyn/content/article/2009/03/07/AR2009030701666.html>. Viewed on 5 May 2009.

more stringent safety and environmental standards make nuclear power plants some of the most robust structures in the country. Furthermore, promising new technology could make reactors even more efficient and safe to operate. It is critical that policymakers focus on fixing the industry's problems of today so that the United States can enjoy carbon-free and abundant energy production for tomorrow.

Introduction

Nuclear energy is poised to be a major producer of carbon-free electricity as the United States moves forward to adopt a comprehensive strategy to mitigate climate change. Nuclear power currently provides 20% of total energy consumption in the United States, constituting 73% of all non-carbon emitting energy production.⁵ The Energy Information Administration predicts that the U.S. is entering into a “nuclear renaissance” judging from the influx of government funding, media coverage, and the resulting flood of applications to build new commercial plants.⁶ The Nuclear Regulatory Commission, responsible for issuing the combined licenses required for new construction, did not have any applications submitted for three long decades until five arrived in 2007.⁷ To many, this renaissance is long overdue and signals a much-needed movement towards energy independence and zero-emission technology. To others, this represents a costly distraction from the real solution to the energy and climate crisis: clean, renewable sources like solar, wind, thermal, and biomass.

Mention of nuclear power has been conspicuously absent from climate change policy introduced after President Barack Obama took office in January 2009. Before his inauguration, a firmly pro-nuclear George W. Bush renewed new reactor projects through the passage of the Energy Policy Act (EPAAct) of 2005 and a similar bill in 2007. These bills fund loan guarantees for the first six licensed nuclear reactors, significantly reducing the risk of the initial capital investment. The Obama administration, on the other hand, has yet to take a unified stance on the expansion of nuclear power in the United States. President Obama himself is a self-proclaimed “agnostic”

⁵ Kadak, Andrew. “Green Nuclear.” MIT Technology Review. March/April 2009. Online: <http://www.technologyreview.com/energy/22142/?a=f&gclid=CM6DkvDzppoCFQVfQod6l6R1Q>. Viewed 5 May 2009.

⁶ EIA. “Status of Potential New Commercial Nuclear Reactors in the United States.” Energy Information Administration. February 2009. Online: http://www.eia.doe.gov/cneaf/nuclear/page/nuc_reactors/reactorcom.html. Viewed on 5 May 2009.

⁷ IBID.

towards the question,⁸ but new Energy Secretary Stephen Chu has spoken in support of including nuclear expansion as a component of a sustainable future.⁹ In the arena of nuclear policy, Obama has only moved to end consideration of Yucca Mountain as the location for a permanent nuclear waste depository.¹⁰ What this means for the proposed new plant construction is yet unknown, although both Congress and Obama are open to looking into other site options.

With no new cues from the current administration, the nuclear industry follow suit with the incentives laid out in the EPAct of 2005 to expand to twenty new locations as indicated by applications received by the Nuclear Regulatory Commission to date.¹¹ There is no guarantee that these projects, subject to state laws and regulatory delays, will go forward even if approved by the NRC, and even then it will be years before construction begins. Though these new projects will contribute significant amounts of electricity to the grid, they may just barely be enough to maintain nuclear's 20% share of the market: research by the Department of Energy suggests that three reactors will need to be built per year starting in 2016 to meet rising energy demands.¹² Still, this is a share of the market that will not be monopolized by oil or gas interests. Furthermore, it is a timeline that other renewable energies may not be able to meet: current renewable energy in production only supplies 1% of the nation's electricity.¹³ Given the urgent timeline of reducing carbon emissions, it is critical to at least maintain the nuclear contribution to the energy market. To facilitate this process, the Obama administration should consider taking the following steps: requiring the standardization of nuclear reactor construction to moderate upfront capital costs; streamlining the licensing process to prevent regulatory delays; and, constructing a safe, permanent nuclear waste repository.

⁸ Sentinel. "Sen. Barack Obama on Nuclear Power." Youtube. November 25, 2007. Online: <http://www.youtube.com/watch?v=xRx12cVFTLw>. 4 May 2009.

⁹ DOE. "A Sustainable Energy Future: The Essential Role of Nuclear Energy." Department of Energy National Laboratories. August 2008. Online: http://www.ne.doe.gov/pdfFiles/rpt_SustainableEnergyFuture_Aug2008.pdf. Viewed on 5 May 2009.

¹⁰ Washington Post. "Mountain of Trouble." Washington Post Editorials. March 8, 2009. Online: <http://www.washingtonpost.com/wp-dyn/content/article/2009/03/07/AR2009030701666.html>. Viewed on 5 May 2009.

¹¹ EIA, February 2009.

¹² NEI. "New Nuclear Plants." Nuclear Energy Institute. 2009. Online: <http://www.nei.org/keyissues/newnuclearplants/>. Viewed on 19 May 2009.

¹³ Kadak, 2009.

Stakeholders

Nuclear Industry & Related Interest Groups. The nuclear industry represents a powerful lobby in Washington D.C., projected to be worth \$18 billion by 2013.¹⁴ Major players include reactor manufacturers like General Electric and public utilities like Tennessee Valley Authority. In addition to private lobbying, these two corporations and many more pay membership dues to the nuclear industry's primary policy organization, the Nuclear Energy Institute (NEI).¹⁵ The NEI is a national non-profit that advocates for the expansion of peaceful nuclear technology by compiling research, funding advertising campaigns, and providing consulting services to policymakers. The NEI also plays an active role in NRC decision-making processes in support of fewer requirements for plants under construction and more consistent regulatory costs. Additionally, NEI supports the creation of a government-backed clean energy bank that would provide loan guarantees to cover enough new plants to meet the estimated 25% increase in electricity demand by 2030.¹⁶ These requests are meant to address the high costs of building new power plants so that construction projects can move forward more quickly.

Although the nuclear industry has the unstated support of President Obama, none of their policy requests have yet been granted by the new administration. Recently on Capitol Hill, the nuclear industry lobbied for the inclusion of \$50 billion in loan guarantees in the stimulus package. Instead, the proposal was scratched in favor of other emission-free technologies, causing nuclear giant Exelon to begin developing solar technology.¹⁷

The benefits of nuclear power are numerous and, as a result, support for nuclear power comes from a wide array of sectors and both major political parties (though Republican support of nuclear is stronger). Democrats will often cite the need for reducing carbon emissions and creating green jobs as the most compelling arguments for nuclear. Republicans point to the need for energy independence and reliable electricity production as reasons to invest in nuclear expansion. Both

¹⁴ Wikipedia. "Nuclear Power: Use." Wikipedia.org. Online: http://en.wikipedia.org/wiki/Nuclear_power. Viewed on 18 May 2009.

¹⁵ NEI. "Governance and Membership Roster." Nuclear Energy Institute. May 2009. Online: http://www.nei.org/filefolder/NEI_Member_Roster_2.pdf. Viewed on 20 May 2009.

¹⁶ NEI. "Nuclear Policy Recommendations for a New President." Nuclear Energy Institute. December 2008. Online: <http://www.nei.org/resourcesandstats/publicationsandmedia/insight/insightnovemberdecember2008/nuclearpolicyrecommendations/>. Viewed on 5 May 2009.

¹⁷ Boak, Joshua. "Exelon plans to build solar power plant on Chicago's South Side." Chicago Tribune. April 22, 2009. Online: http://www.chicagotribune.com/features/lifestyle/green/chi-wed-solar-powerapr22_0_5438800.story. Viewed on 20 May 2009.

parties agree on the need for diversifying our energy portfolio to meet increasing demand, and many propose nuclear as the most affordable long-term option.

Opponents of Nuclear Power. Opponents of nuclear power come from an equally diverse field. Many environmental organizations (e.g. Greenpeace) come down solidly against nuclear energy in spite of the potential carbon emissions reductions, citing the astronomical cost of new reactor construction and the environmental impact of mining, enriching, and disposing of radioactive nuclear fuel.¹⁸ Other opponents point to the latent heat from nuclear reactors, often released in the form of overheated water, as disruptive to surrounding ecosystems. Many other public interest and human rights organizations (e.g. Public Citizen’s Critical Mass Energy and Environment Program) actively lobby against nuclear expansion, criticizing the high risk of public harm in the event of an accident at a nuclear plant.¹⁹ After the September 11th attacks, the new threat of terrorism makes nuclear power plants even more vulnerable to arguments that cite the need to protect public safety.

Many mainstream environmentalists have fluctuating positions on nuclear power. Former Vice-President Al Gore, once a nuclear supporter, now speaks against expanding the industry because it carries such unpredictable costs and the potential for proliferating nuclear technology around the world.²⁰ If the United States asserts that the answer to energy shortages is in nuclear technology, Gore says, the world will want to follow suit with each country creating its own nuclear sector.²¹ The developing countries that most desperately need abundant electricity, the argument continues, then could build their own cache of nuclear weaponry in the process. Despite Gore’s personal views, his We Can Solve It Campaign that proposes a strategy for addressing climate change does not officially take a stance on nuclear technology.²²

Federal Agencies. Congress may have the power to increase or reject funding from the nuclear industry, but the biggest stakeholders in nuclear regulation are the federal agencies: the

¹⁸ Hickman, Leo. “Gore on Lovelock, nuclear power and climate change skeptics.” The Guardian. March 2009. Online: <http://www.guardian.co.uk/environment/blog/2009/mar/16/climate-change-al-gore>. Viewed on 5 May 2009.

¹⁹ Antonelli, Stephen. “Comment re: Programmatic ITAAC.” Public Citizen’s Critical Mass Energy & Environment Program. August 8, 2001. Online: <http://adamswebsearch.nrc.gov/idmws/ViewDocByAccession.asp?AccessionNumber=ML012250241>. Viewed on 20 May 2009.

²⁰ Hickman, March 2009.

²¹ IBID.

²² See the We Campaign’s “Solutions” page to note the absence of nuclear in its discussion of a clean energy technology: <http://www.wecansolveit.org/content/solutions>.

Nuclear Regulatory Commission and the Department of Energy. These agencies ultimately have to answer to President Obama as the chief executive, so the executive branch of power is uniquely situated to influence the future of nuclear technology. The NRC is single-handedly responsible for accepting and reviewing licensing applications, for certifying new reactor designs, and for imposing operational standards for safety. The Department of Energy supports the system more generally by maintaining the infrastructure and investing in research for proliferation-resistant, advanced nuclear technology. From the DOE website, it supports expanding the nuclear industry to ensure that the U.S. energy portfolio is not too dependent on one source like natural gas.²³ The DOE is also responsible for the long-term schedule for permanent disposal of nuclear fuel. The Environmental Protection Agency also has some oversight of the environmental impact assessment process, but its influence is minimal in comparison.

States. Historically, the federal government and the states have shared regulatory responsibilities over nuclear plants: The states have control over environmental and economic issues, specifically setting prices for consumers; federal agencies, on the other hand, are given the authority to manage radiological safety, notably disposal practices.²⁴ According to this, states have always had basis to object to nuclear plants because of its potentially high construction costs, which are then passed on to customers. Nonetheless, in reality states had little power to prevent utility companies from bidding on local land. This changed in 1983 when the Supreme Court upheld a California statute that placed a moratorium on all new plant construction pending the availability of a permanent storage facility for spent fuel.²⁵ The decision marked an increase in a state's power to influence on- and off-site disposal practices, once a domain governed exclusively by the NRC. Before a single nationwide storage facility is built, the states will continue to hold the authority to impose regulations on the management of nuclear waste in addition to any federal regulations. Oregon, for example, established an advisory group within its Department of Energy to review the decommissioning of the Trojan nuclear power plant, duplicating many of the NRC's requirements. Many criticize this regulatory structure as being inefficient, inconsistent across state borders, and burdensome to an already cost-stricken industry. Others maintain that it is an important tool to protect local communities from the imposition of an unwanted nuclear power plant.

²³ DOE. "Nuclear." U.S. Department of Energy. 2009. Online: <http://www.energy.gov/energysources/nuclear.htm>. Viewed on 4 May 2009.

²⁴ Reynolds, Nicholas and Robert Draper. "Onsite storage: The Impact of State Regulation on Nuclear Policy." Public Utilities Reports, Inc. February 1995. Online: <http://www.pur.com/pubs/445.cfm>. Viewed on 20 May 2009.

²⁵ Reynolds and Draper, 1995.

The classic example of state intervention is the Shoreham nuclear power plant on Long Island, New York, representing the only completed plant to never generate a kilowatt of commercial power.²⁶ From the time it was first proposed in 1965 to the time it was decommissioned in 1994, the plant racked up a price tag of \$6 billion—85 times larger than was expected—and incited 15,000 people to form the largest protest in Long Island’s history.²⁷ Despite public outrage after Three Mile Island, astronomical construction costs, and sustained local opposition, the utility LILCO forged ahead to complete the plant in 1984. Grabbing at the only leverage they could access, the governor of New York decided to deny the plant the evacuation plan it needed to receive NRC approval to operate. Instead, New York State bought the completed plant for \$1, offering tax breaks to the utility to compensate for its losses, and dismantled the plant.²⁸ It is memories of this nature, along with the continued burden on taxpayers in the region, that make apprehension about nuclear energy so entrenched in American culture.

The People. Opinions of citizens have been changing over time toward favoring nuclear energy. National campaigns for energy independence and carbon emissions reductions have overcome some of the lingering concern people acquired after the nuclear accidents at Three Mile Island and Chernobyl (see Operational Risks below). Since 2005, the popularity of nuclear power nationwide has increased from 39% to 50%.²⁹ Still, a Gallup poll conducted in 2007 shows that only 34% of Americans actually support the construction of a nuclear power plant near their homes,³⁰ and only 10% would dedicate taxpayer money to expanding the nuclear industry.³¹ The American public may be warming up to nuclear technology in theory, but new nuclear power plants will likely still face local opposition. In spite of this apprehension, an overwhelming majority of Americans want to keep the option open for future expansion.

Around the world, nuclear power has also enjoyed increasing popularity as more countries develop their nuclear sector. France, for instance, supplies 80% of its energy from nuclear reactors; 52% of French citizens poll in favor of nuclear, only a fraction higher than in the U.S., quoting the

²⁶ Fagin, Dan. “Lights Out at Shoreham.” *Newsday*. May 25, 2007. Online: <http://www.newsday.com/community/guide/lihistory/ny-history-hs9shore,0,563942.story>. Viewed on 20 May 2009.

²⁷ IBID.

²⁸ Cohen, Bernard. *The Nuclear Energy Option*. “Costs of nuclear power plants – what went wrong?” Plenum Press, 1990. Online: <http://www.phyast.pitt.edu/~blc/book/index.html>. Viewed on 20 May 2009.

²⁹ PRC. “Declining Public Support for Global Engagement.” Pew Research Center. September 24, 2008. Online: <http://people-press.org/report/453/declining-public-support-global-engagement>. Viewed on 18 May 2009.

³⁰ USA Today/Gallup poll. April 19, 2007. Sample size: 1007.

³¹ Union of Concerned Scientists poll. 1991. Sample size: 1200.

cleaner air and low fuel prices as the main reasons.³² In line with this development, significantly fewer French citizens are strongly opposed to building a power plant near their home (30%) than shown in polling data taken from the EU as a whole (42%).³³

Status of the Nuclear Industry in the U.S. and the World

Current and Proposed Plant Types. There are 104 nuclear reactors in operation in the United States today that can be divided into two certified types.³⁴ Sixty-nine reactors are categorized as pressurized water reactors (PWRs). These reactors heat water under intense pressure to prevent it from boiling and turning into steam. This radioactive water moves in a closed loop into a steam generator where it heats pure water into steam in a second closed loop, which then turns the turbines. The remaining 35 reactors fall under the second type, called a boiling water reactor (BWR). BWRs use the nuclear reaction to heat water directly to steam that in turn causes turbines to generate electricity, all contained within one closed loop. In both cases, both the purified water and radioactive water can be recycled multiple times.

Although more abundant, the PWR does not have a significant cost or safety advantage over the BWR. However, PWR manufacturers underscore the stability of the reactor because dangerously high temperatures in the reactor vessel actually slow the movement of neutrons, acting to inhibit the reaction. Unlike the BWR, the turbine generator is not contaminated by radioactive water that originated from the nuclear vessel. However, the infrastructure necessary to keep the radioactive water pressurized in a PWR incurs higher construction cost in comparison. Boric acid is also used to moderate the reaction in a PWR, leading to brittle walls in the reactor vessel over time. The BWR operates under lower temperatures and with fewer construction flourishes, but dangerous temperatures in the reactor vessel can create steam pockets that quicken the reaction and increase the risk of accident. Neither type can be refueled while operating; sometimes refueling forces the plant to shut down for weeks at a time. Other technologies beyond these two types exist, such as China's fast breeder reactor that uses liquid sodium for coolant, but they have yet to be certified for operation in the U.S. by the NRC.

³² Eurobarometer poll. 2005. Sample size: (no specific number for France only)

³³ Harris Interactive poll. November 6, 2006. Sample size: France, 1121. Total, 5407.

³⁴ EIA. "U.S. Nuclear Reactors." Energy Information Administration. 2009. Online: http://www.eia.doe.gov/cneaf/nuclear/page/nuc_reactors/reactsum.html. Viewed on 5 May 2009.

The NRC has accepted seventeen permit applications for new nuclear reactors and anticipates three more as of February 2009.³⁵ Almost all of the proposed sites are located on the East Coast or in the South, the major exceptions being one site in Idaho and another in Michigan. Of these, fourteen applications are for PWR reactors, some including advanced passive safety techniques. The remaining six BWRs are also expected to have passive safety features (one example is a sealed pocket containing nuclear “poison” that rampant high temperatures cause to melt, thus inhibiting the reaction) as well as reduced construction timetables. It is important to note that General Electric exclusively manufactures all BWRs in the U.S., so GE has billions to gain from the successful approval of these six applications.³⁶ Westinghouse Electric and the French Areva NP manufactured current PWRs in operation, but Babcock & Wilcox and Combustion Engineering also have certified PWRs on the market that could be utilized.

New Technologies on the Horizon. Scientists are now exploring technologies that would allow for reprocessing, essentially reusing the uranium core so that nuclear reactions could in theory continue for hundreds of years with only one fuel assembly. This has both economic and safety implications, because reducing the fuel spent would not only decrease the amount needed to be disposed but would also lessen the number of times a worker would need to complete the risky job of refueling. If these technologies can be developed, many of the concerns raised by opponents of nuclear power regarding safety and environmental impacts would be addressed. However, all is dependent on further research and NRC approval.

One alternative technology now under review is the traveling wave reactor (TWR). The TWR uses primarily uranium-238 instead of uranium-235 to fuel a reaction that could conceivably continue for over a hundred years.³⁷ Since 95% of nuclear waste produced by current technology is U-238, the TWR would not require any additional mining and very little additional cost.³⁸ The end products of the TWR would not produce any additional radioactivity and, within 500 years, would return to the radioactive level of the uranium ore in its natural state. Another advanced technology

³⁵ EIA, February 2009.

³⁶ Rothschild, William. *The Secret to GE's Success*. McGraw Hill Professional, 2006. Online: http://books.google.com/books?id=WnSA0MhW-qgC&pg=PA94&lpg=PA94&dq=nuclear+reactor+safety+BWR+versus+PWR&source=bl&ots=UpLXZndbW0&sig=IdCnemU-h1FhteF9mRskd_wtYJw&hl=en&ei=qFIUSriUNYSi8QSMgLGGBA&sa=X&oi=book_result&ct=result&resnum=1. Viewed on 20 May 2009.

³⁷ Wald, Matt. “TR10: Traveling Wave Reactor.” MIT Technology Review. March/April 2009. Online: http://www.technologyreview.com/read_article.aspx?ch=specialsections&sc=&id=22114. Viewed on 5 May 2009.

³⁸ IBID.

under exploration is the liquid fluoride thorium reactor (LFTR) that would significantly reduce the size of a reactor and increase the efficiency of a nuclear reactor. Other technologies explore the possibility of self-containing reactors that inhibit the chain reaction when temperatures run too high, also known as passive safety technologies.

One criticism of generating new nuclear technology is the threat of weapon proliferation. To appease these criticisms, Energy Secretary under President Bush, Samuel Bodman, announced the establishment of the Global Nuclear Energy Partnership in 2006.³⁹ The international agreement reached in the GNEP, signed onto by 21 countries and 17 more observer countries, identifies certain countries as “supplier nations” and others as “user nations.” Countries with the technology to enrich uranium, the process of extracting U-235 from mined uranium ore, become the supplier nations. The user nations are allowed to accept already-enriched uranium to use in their own nuclear power plants, and then must return spent fuel to the supplier nation. This exchange prevents enrichment technology, which is used under different conditions to power nuclear weapons, from transferring into hostile hands; simultaneously, it encourages the free sharing of technology so developing countries can take advantage of nuclear power.

Fuel and Disposal. All nuclear plants in the U.S. use uranium as the primary fuel source, most of which is mined in the western United States.⁴⁰ Natural uranium ore exposes miners to low levels of radioactivity, but the enrichment process to prepare uranium pellets and the use of the fuel in nuclear reactors exponentially increases radioactivity. Uranium in its natural state consists primarily of uranium 238 (U-238) and some uranium 235 (U-235). Current technology utilizes an enriched form of U-235, even though it is the scarcer of the two. Excess U-238 is stockpiled around the world.⁴¹ The U-235 is contained within a ceramic pellet that, individually, can supply the electricity equivalent to 150 gallons of oil.⁴² These pellets, packaged inside fuel rods in larger fuel assemblies, are then bombarded with neutrons. This reaction creates energy and more neutrons, which continue to spark with other uranium pellets, creating a chain reaction.

³⁹ DOE. “Implementing a Comprehensive Energy Strategy: A Status Report.” U.S. Department of Energy. 2006. Online: http://www.energy.gov/media/FINAL_8-14_DOE_booklet_copy_sep.pdf. Viewed on 5 May 2009.

⁴⁰ EIA. “Nuclear Energy (Uranium): Energy from Atoms.” Energy Information Administration. February 2009. Online: <http://www.eia.doe.gov/kids/energyfacts/sources/non-renewable/nuclear.html#Nuclear%20Fuel>. Viewed on 5 May 2009.

⁴¹ Kadak, 2009.

⁴² EIA, “Nuclear Energy (Uranium): Energy from Atoms.”

Because it takes months or even years for a single fuel assembly to expire, the nuclear industry has produced a very small volume of waste over the past fifty years. If all the used nuclear fuel in the U.S. were stacked end-to-end, it would cover a football field to a depth of less than ten feet.⁴³ Currently, all spent fuel is kept on-site in NRC-approved steel and concrete reinforced containers certified up to 100 years. As part of a long-term disposal plan, Congress required the Department of Energy to start accepting spent fuel for long-term disposal by the end of 1998 in its 1997 Energy & Water Appropriations Act.⁴⁴ As of yet, the DOE has not followed this federal mandate. Consequently, on-site storage vaults are running out of room and any further waste is stored in secondary containers under constant monitoring.⁴⁵

Selecting a long-term nuclear disposal site is universally preferred over short-term on-site storage containers, but the exact location of said repository is subject to heated debate. The proposed disposal site at Yucca Mountain in Nevada has been considered the only option for long-term disposal since 1987.⁴⁶ Congress originally reviewed two other options that were dismissed to expedite the selection process: Defsmith County, Texas and Hannaford, Washington. No state chosen to host such a nuclear repository would willingly approve such a project, even though up to \$31 billion could be expended on its construction within the state's borders.⁴⁷ Following suit, Nevada strongly opposed this narrow focus on Yucca Mountain and actively stalled the required environmental impact statement by refusing to issue the appropriate permits to the DOE. The DOE was finally able to submit a permit application for the NRC's approval in June of 2008, but President Obama indefinitely stalled the application when he stripped any funding for the project from his proposed budget.⁴⁸ The main reason he cited was the discovery of a fault line beneath the mountain.⁴⁹ Now the Senate Committee on Energy & Natural Resources is moving to establish a commission that will review alternative options for a permanent depository,⁵⁰ although the DOE

⁴³ NEI. "Integrated Used Fuel Management." Nuclear Energy Institute. 2009. Online:

<http://www.nei.org/keyissues/nuclearwastedisposal/integratedusedfuelmanagement/>. Viewed on 20 May 2009.

⁴⁴ State of Nevada. "Nuclear Waste Policy Dilemma for the First Fifty Years." State of Nevada, Agency for Nuclear Projects. Online: <http://www.state.nv.us/nucwaste/yucca/nwchron1.htm>. Viewed on 20 May 2009.

⁴⁵ NEI. "Storage of Nuclear Fuel." Nuclear Energy Institute. 2009. Online: <http://www.nei.org/keyissues/nuclearwastedisposal/storageofusednuclearfuel/>. Viewed on 20 May 2009.

⁴⁶ See the 1987 amendments to the Nuclear Waste Policy Act of 1982: <http://epw.senate.gov/nwpa82.pdf>.

⁴⁷ NEI. "Yucca Mountain." Nuclear Energy Institute. 2009. Online: <http://www.nei.org/keyissues/nuclearwastedisposal/yuccamountain/>. 20 May 2009.

⁴⁸ Washington Post, 2009.

⁴⁹ Sentinel, 2007.

⁵⁰ Hansen, Brian. "US lawmakers to consider nuclear waste bill Wednesday." Platts. May 4, 2009. Online: <http://www.platts.com/Electric%20Power/News/6294060.xml?sub=Electric%20Power&p=Electric%20Power/News&>. Viewed on 5 May 2009.

will still move forward on the environmental assessment on Yucca Mountain.⁵¹ The commission would have two years to submit a policy recommendation. Considering that the Yucca Mountain site would have taken until at least 2020 to construct upon approval, starting the process from the beginning will take an undeterminable number of years to reach its completion.⁵²

Nuclear Power: A Threat to Public Safety and the Environment?

Exposure to Radioactive Fuel. An important worry about employing nuclear technology is the danger of exposure to radiation. High-level radiation (from spent fuel, for instance) is much more deadly than low-level radiation (from tools or clothes exposed to the nuclear reactor). The average nuclear industry employee is exposed to no more than 2.4 mSv/year (mSv is the standard⁵³ unit for radiation). Additionally, the maximum exposure on record for Australian uranium miners was 10 mSv/year. To put this into context, no evidence of cancer is seen at levels less than 100 mSv/year, and the World Health Organization used levels at 350 mSv/year to justify evacuation after Chernobyl. Some residents around Chernobyl following the accident experienced upwards of 1000 mSv, some up to 6,000 mSv, as a result of the growing fire. This level of disaster is very unlikely given NRC safety standards that cap public exposure to radiation at 1 mSv/year. All plants are built robustly to prevent fire and include a hard containment dome, unlike the plant at Chernobyl. Another opportunity for accidents is during transport of the fuel, though low-level radiation risk objects have been transported by train and truck to three depository sites around the country without incident for several years.⁵⁴

Operational Risks. The memory of Three Mile Island still makes many Americans fearful of the potential risk from operating a nuclear facility near residential districts. In 1979, the PWR in a nuclear plant near Harrisburg, Pennsylvania experienced a partial meltdown, releasing radioactive coolant into the plant and causing the pressurized water to flash into steam to fill in the empty pockets. As a result, some radioactive noble gases were released into the air and contaminated water seeped into the foundations of the plant. No direct correlation has been drawn between these hazardous contaminants and an increased incidence of cancer in the area. However, the accident

⁵¹ New York Times Editorial. "Follow the Science on Yucca Mountain." New York Times. May 20, 2009. Online: http://www.nytimes.com/2009/05/21/opinion/21thu2.html?_r=2&ref=opinion. Viewed on 21 May 2009.

⁵² NEI, "Yucca Mountain."

⁵³ WNA. "Radiation and Nuclear Energy." World Nuclear Association. March 2009. Online: <http://www.world-nuclear.org/info/inf05.html>. Viewed on 20 May 2009.

⁵⁴ NEI, "Storage of Nuclear Fuel."

cost a total of \$975 million to clean up and was responsible for the immediate downturn of the nuclear market. More than fifty proposed new reactor projects were blocked in the following five years, and no new applications were seen for another thirty years.⁵⁵

The accident at Three Mile Island was contained and the regulatory agencies moved directly to address the primary causes: poor maintenance training, superficial oversight from the NRC, and irregular safety assessments. Despite the NRC improving training procedures and standardizing emergency response protocol, safety in old nuclear power plants is still a key issue. Plant licenses must be renewed every 20 years, and each renewal process includes a detailed environmental impact assessment. Each plant is also required to publish an annual report compiling the year's data from monitoring levels of radioactivity in the proximal environment.

Another main risk facing nuclear power plants today is the threat of terrorist attack. Since the September 11th attacks, each nuclear power plant has an established security procedure in the event of a deliberate attack by an aircraft. Studies conducted by the NRC show that existing nuclear plants are robust enough to withstand a terrorist attempt and, in the unlikely case of radioactive spillage, emergency personnel on- and off-site would have the time to respond appropriately.⁵⁶

Nuclear Power and the Environment. Many refer to nuclear as a zero-emission technology. Though nonrenewable, nuclear reactions do not release greenhouse gases. If reprocessing technology can extend the life cycle of one rod of uranium to over 100 years, some would even call nuclear a renewable fuel source. This is a mistake, however, because nuclear relies on a finite resource (uranium) that is only available in limited quantities. Its classification as an emission-free technology does not eliminate the environmental impacts of nuclear energy generation. Nuclear plants release a significant amount of waste heat, sometimes in the form of water, into their surrounding ecosystem. Also, the environmental costs of uranium extraction should be considered.

Nuclear is still an integral part of policy regulating greenhouse gases even if the American Clean Energy & Securities Act does not explicitly mention it. Comparing an EPA-sponsored study of projected allowance prices that assumed the nuclear industry would continue to expand with an

⁵⁵ WNA. "Three Mile Island: 1979." World Nuclear Association. March 2001. Online: <http://www.world-nuclear.org/info/inf36.html>. Viewed on 21 May 2009.

⁵⁶ NRC. "Security Spotlight." Nuclear Regulatory Commission. 2009. Online: <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/security-spotlight/overview.html>. Viewed on 21 May 2009.

MIT study that assumed that nuclear would be restricted demonstrated that limiting nuclear expansion significantly increases allowances prices in the short-run.⁵⁷

Cost-Benefit Analysis of New Construction and Current Regulation

One of the biggest unknowns in building a new nuclear plant is the cost and timeline for construction. Multiple plants built in the 1980s cost millions of dollars more than the intended budget, a cost that was eventually passed onto the consumer. Part of the reason this occurs is the lack of standardization in the industry: each reactor is manufactured individually and, consequently, the original manufacturer must provide all future spare parts.⁵⁸ The initial capital cost for construction is substantially higher for nuclear than it is for any fossil fuel processing plant, as shown in Table 1 below. Once the plant is built and the costs covered, nuclear plants can take advantage of low fuel costs and efficient operation to edge out competitors. Electricity derived from nuclear plants has recently competed well in the market with rising natural gas prices, and the profit potential for nuclear will increase under the establishment of a carbon emissions cap and trade schedule.

Assumption	Coal Plant	Advanced Coal Plant	Advanced Natural Gas GCC	Advanced Nuclear Power Plant
Capital costs	\$1,217/kw	\$1,386/kw	\$555/kw	\$1,913/kw
Construction Schedule	4 years	4 years	3 years	6 years
Fixed O&M costs	\$25.07/kw-year	\$25.21/kw-year	\$10.65/kw-year	\$61.82/kw-year
Variable O&M costs	0.418 cents/kwh	0.265 cents/kwh	0.182 cents/kwh	0.045 cents/kwh
Fuel Costs	\$1.40/million Btu	\$1.40/million Btu	\$5.08/million Btu	\$0.66/million Btu

Table 1: Cost of Nuclear Power Compared to Coal & Natural Gas. The initial capital investment and the operation and maintenance (O&M) costs are much higher for nuclear plants, but this deficit is compensated for in cheap fuel and cheap electricity production in the long-term. Source: The U.S. Department of Energy.

⁵⁷ EPA. "Preliminary Analysis of Waxmen-Markey Discussion Draft." Environmental Protection Agency. April 20, 2009. Online: <http://www.bcenergyblog.com/stats/pepper/orderedlist/downloads/download.php?file=http%3A//www.bcenergyblog.com/uploads/file/WM-Analysis.pdf>. Viewed on 5 May 2009.

⁵⁸ Rothschild, 2006.

Much of the current regulatory structure for nuclear energy was inherited from the Bush administration and the Energy Policy Act of 2005.⁵⁹ Under this legislation, the federal government agreed to insure the nuclear industry against costs incurred for regulatory fees or indictment costs. In plain language, in order to expedite the construction process the federal government agreed to cover the significant cost of getting a nuclear project approved. The provisions in the EPAct only add another layer of “reimbursement” and in effect raise the transaction cost of applying for licensing. Despite this, their strategy worked: within two years, the Nuclear Regulatory Commission received its first application in thirty years for a new reactor project. The Energy Independence and Securities Act of 2007⁶⁰ adds even more federal support by creating a “risk pool” that provides a safety net from unforeseen incidents. Still, the exact cost of a new power plant to an independent contractor is difficult to estimate, especially with ever-evolving technology on the market. Unpredictably high costs of construction are one of the primary reasons a nuclear plant would not be built.

Policy Recommendation

There are undeniable risks to generating electricity from nuclear power, but nuclear energy is a crucial component of the carbon-free energy portfolio of the future. The unknown cost of building new nuclear reactors makes federal subsidies necessary for investors to take the chance, shifting the some of the financial burden to the taxpayers and even more to the customers. Nuclear reactors are a prime target for terrorist attack and even are vulnerable to human error, so safety and security assessments need to be constantly undertaken to protect public health. Finally, there is no foreseeable location for a permanent repository for spent nuclear fuel. Even if a location could be chosen, concern about transporting radioactive fuel across the country will make any state along the route apprehensive to the proposal.

On the other hand, nuclear is a well-established zero-emission technology that could be instrumental in achieving real reductions in carbon emissions in the United States. A cap and trade program imposing additional fees to fossil fuel based electricity sources will make nuclear one of the cheapest available energies in the short-term. Renewable energy technology may have the

⁵⁹ See the full text of the Energy Policy Act of 2005 here: http://www.epa.gov/oust/fedlaws/publ_109-058.pdf.

⁶⁰ See the full text of the Energy Independence and Securities Act of 2007 here: <http://www.energyjustice.net/energybill/hr6-senate.html>.

capacity to compensate for the loss of fossil fuels and nuclear one day that now provide the majority of power to the country, but considerable investment would be required.

Given the urgent nature of mitigating global climate change, it would be unwise to phase out nuclear in the short-term. President Obama should instead focus on simplifying the regulatory process for the twenty proposed new plants to reduce the overall cost to both investors and customers; simultaneously, the President should demand accountability and standardization in the construction process to ensure excessive costs are avoided. The Nuclear Regulatory Commission should stop accepting any additional applications for new construction pending those first twenty until a permanent disposal site is available and an implementation plan is scheduled. Congress should move swiftly to establish such a site in a safe location protected from geological uncertainties or terrorist attack. Once a site has been established, federal officials should consider subsidies at least equal to other forms of alternative energies because of the potential for nuclear to outcompete dirtier fuels like oil and gas that other renewables are too new to surpass.

Section 1.3

Climate Change Policy and Alternative Energy Sources

Shani C. Cohen, *U.S. Environmental Policy: The Effects of Cap-and-Trade*

May 22, 2009

U.S. Environmental Politics
Environmental Studies Program

Summary

In response to both U.S. Climate Action Partnership (USCAP) recommendations and the Obama Administration's agenda to dramatically reduce greenhouse gas emissions, representatives Henry A. Waxman (D-Ca) and Edward J. Markey (D-Ma) joined to create the **American Clean Energy and Security Act of 2009 (ACESA)**. Large industrial firms, responsible for a total of 85% of U.S. greenhouse gas emissions will be responsible for meeting emissions targets.

Permits, which correlate to 1 ton of CO₂, determine the amount of CO₂ that firms are allowed to emit each year. While many permits will be distributed for free in the early stages of the bill in an attempt to stabilize the economic impact of the ACESA, firms will have to purchase permits in the long term. In principle, the sale of permits and excessive costs associated with polluting beyond established targets incentivizes program compliance. Gradually, emissions will be reduced to the ultimate goal of 83% below 2005 levels by 2050. The ACESA, which is comprised of four titles, provides a schedule for the gradual reduction of CO₂ emissions, details the allocation of permits, offsets, and provides program flexibility to achieve goals across different sectors of the economy.

While there are critiques from some firms and conservative groups about potential effects of the ACESA on consumers and the economy at large, many support the bill. Changes, such as the allocation of some permits for free in the program's initial stages, have garnered support from moderate democrats and some republicans. The ACESA's recent passage in the House Energy and Commerce Committee constitutes a big win for environmentalists, scientists, and Democrats in favor of seeing the sometimes disastrous effects of climate change diminished and greenhouse gas emissions rolled back.

The ACESA, recommended in this report, represents a feasible piece of legislation capable of scaling back climate change, fostering the innovation of new clean technologies, and enhancing efficiency. As in the case of the successful cap-and-trade scheme to regulate sulfur dioxide emissions, the ACESA can be achieved through cooperation. If enacted, this legislation will provide lasting benefits for both industry and Americans.

Introduction

The Obama Administration has pledged a commitment to reducing America's dependence on foreign oil and to diminishing greenhouse gas emissions in order to offset the potentially disastrous effects of global warming. Among the Administration's ambitious goals is an **80%**

reduction in greenhouse gas emissions by 2050. These goals are a part of a larger plan to create a greener future for America that includes increased investment in the research and development of alternative fuels and energy sources as well as the creation of green jobs for Americans. While President Obama has not *officially* endorsed **The Waxman-Markey American Clean Energy and Security Act of 2009 (ACESA)** which uses a cap-and-trade approach to regulate greenhouse gases, Representatives Waxman (D-Ca) and Markey (D-Ma) created the legislation in response to the Administration's ambitious agenda.

In a cap-and-trade system, the government (or international body), distributes credits, "allowances," to firms which correlate to a specific amount of carbon dioxide (CO₂) and or other greenhouse gases the firm is then allowed to emit per year. Under a cap-and-trade scheme, firms that emit less than the allowed amount may then trade surplus permits to other firms for a fee. The system rewards firms in this manner for polluting less and discourages over-pollution. The logic behind such a scheme is that emissions are capped at an established level and that fewer credits are distributed overtime which gradually reduces emissions in a cost-effective manner determined by the market. While cap-and-trade policy has been employed by the European Union since January 2005 when the supranational organization launched its European Union Greenhouse Gas Emission Trading System, cap-and-trade schemes remain hotbeds of political debate in the U.S.

While support is growing in Washington for a cap-and-trade system to regulate greenhouse gases, the allocation of permits is a controversial topic. Large scale firms push for free permits to offset potentially negative economic effects. While the Waxman-Markey bill originally contained plans for permits to be auctioned by the government, the debate has shifted. Stakeholders are now concentrating on the quantity of permits to be allocated freely, how many years permits will be allocated freely, and the timeframe over which free permits will be distributed.

"The American Clean Energy and Security Act of 2009" (ACESA)

In the spirit of meeting the goals set forth by the Obama Administration, Representatives Waxman and Markey drafted the **American Clean Energy and Security Act of 2009**. The bill is comprised of four titles which, combined, form an overarching plan to promote a greener future through renewable energy sources, investment in new technology, development of a "smart grid," creation of green jobs, and the imposition of a nationwide cap-and-trade system to reduce greenhouse gas emissions.

Global Warming Pollution Reduction Program

The Global Warming Pollution Reduction Program discussed in Title III of the ACESA utilizes a market-based cap-and-trade system to reduce greenhouse gas emissions from large industrial companies that combined are responsible for 85% of total U.S. global warming emissions.¹ Companies that emit less than 25,000 tons of greenhouse gases per year are not included in the program.² The Waxman-Markey ACESA originally required firms to pay for allowances (instead of receiving credits free of charge from the Federal government) through a 100% auction program to be run by the federal government. However, recent developments necessitated compromise—while some permits will be available for purchase, large quantities of permits will be distributed for free in the initial phases of the ACESA. True to the original nature of the program, participants will eventually be required to purchase all permits.

Offsetting, the practice of polluting beyond the allowed amount is allowed provided firms obtain additional permits to cover the excess emissions from other sources. Once purchased, permits are tradable, and firms that develop a surplus may re-sell to other companies, since the aggregate level of emissions nation-wide is still regulated. Offsets may not exceed 2 billion tons per year under the ACESA. Additionally, companies using offsets must submit 5 offset credits for every four tons of emissions being offset to the federal government. This provision is included to encourage compliance among program participants and exceeding emissions targets.

In order to lend flexibility to the program and to help firms adjust to the ACESA, a provision allowing the unlimited banking of credits by firms is included. Companies are allowed to save credits to be used later on should they choose not to sell to other firms. Additionally, the two-year rolling period, designed to help firms adjust, allows companies to borrow from next year's credits without suffering penalties. Under limited circumstances, the government can choose to allow firms to borrow from between two to five years in the future. The Environmental Protection Agency (EPA) must also create a "strategic reserve" comprised of approximately 2.5 billion allowances by keeping a certain number of allowances off the market yearly to be made available though government auction should prices rise faster than expected or to unexpectedly elevated levels. The goal of the program is to gradually reduce the aggregate level, diminishing greenhouse

¹ http://energycommerce.house.gov/Press_111/20090331/acesa_summary.pdf

² Ibid.

gas emissions to **3% below 2005 levels by 2012, 20% below 2005 levels by 2020, 42% below 2005 levels by 2030, and 83% below 2005 levels by 2050.**³

Alternative Approaches Included In ACESA

Under the ACESA, a cap-and-trade approach is integrated along with other strategies to create a comprehensive, overarching plan to reduce emissions nation-wide. The EPA is directed to achieve reductions by signing agreements that crack-down on international deforestation by 2020. EPA agreements are supposed to reduce U.S emissions to the equivalent of 10% of U.S. 2005 emissions. Approximately 5% of revenue from the Global Warming Pollution Reduction Program will be used to secure these additional reductions in greenhouse gas emissions.

Cap-and-Trade System Analysis

Independent organizations and numerous stakeholders alike see both downsides and positive results in the ACESA cap-and-trade system. Opponents of the ACESA and cap-and-trade systems predict dire effects on the economy, consumers, jobs, and the American household. They fear rising energy costs and the negative impact such rises would have on both consumers and the industrial sectors at large, particularly in light of the recent economic downturns. ACESA supporters envision a brighter, “greener” future for America in which pollution is greatly lowered and energy is more efficient.

The Stakeholders:

The primary stakeholders in the cap-and-trade debate are large scale corporations and environmental groups such as the Environmental Defense Fund and the Energy & Environmental Research Center (EERC). USCAP (United States Climate Action Partnership) which describes itself as “a diverse coalition of 25 leading businesses and 5 environmental NGOs”⁴ incorporates both large firms such as BP America, Chrysler, GE, Ford, and Shell as well as environmental and research oriented groups like Boston Scientific and the Pew Center on Global Climate Change. The ACESA is based upon USCAP recommendations, which is a clear indication of the coalition’s enormous role in both shaping policy and contributing to the cap-and-trade debate.

³ Ibid.

⁴ USCAP, “Uscap Hails Waxman-Markey Climate Discussion Draft As Strong Start,” Washington DC, March 31st, 2009.

While the coalition continues to show support for the introduction of a cap-and-trade system, it remains concerned about the allocation of permits. USCAP “recommends that a significant portion of allowances be initially distributed for free to some firms (distribution depends largely on the sector, size of the firm, and other criteria) covered by the ACESA in order to mitigate costs to consumers and particularly vulnerable sectors of the economy. This free distribution should then be phased out over time.”⁵

USCAP’s statements illustrate that some corporations are poised to support cap-and-trade legislation in concert with leading environmental groups. The allocation of permits is one of the most poignant issues concerning the ACESA and its resolution is crucial to the passage of the bill. Even environmental groups have changed their thinking regarding the allocation of permits in order to pursue the ultimate goal of enacting cap-and-trade carbon dioxide regulation. In a press release titled “Goals Can Be Met Without Auctioning Emission Allowances,” The Pew Center on Global Climate Change advocates the gradual transition from free permits to a system that requires firms to pay in the long run. The Center commented, “there will be far less economic upheaval if higher prices come gradually, which our transition program would ensure.”⁶ The Center argues that “if this approach is not taken, the whole argument for climate change legislation could be moot – senators and representatives from those states might effectively kill legislation mandating cap and trade.”

While some firms and conservative groups, such as The Heritage Foundation, remain strongly opposed regardless of compromises, many moderate democrats and republicans consider permit allocation to be a determining factor when it comes to the potential economic impact on industry, consumers and voting.

History

As the discussion of U.S. cap-and-trade continues, many look to the EU system of cap-and-trade, known as the Emissions Trading Scheme (ETS), for clues as to how such legislation would function in the U.S. In an informational report furnished by the European Commission Electorate General for the Environment based upon research conducted by McKinsey & Company and Ecofys, it is clear the ETS has impacted corporate behavior substantially. According to the document which reviewed the first year of the ETS program, over 60% of firms believed benchmarking was a

⁵ Ibid

⁶ Eileen Claussen and Jim Rogers, “Goals Can Be Meet Without Auctioning Emission Allowances,” Pew Center on Global Climate Change, March 31, 2009.

feasible approach towards regulating greenhouse gases, nearly half of firms surveyed (2/3rds of which were firms from the power sector) already priced in the cost of CO₂ and approximately 70% intended to do so in the future⁷ It is important to keep in mind the ETS has only operated for a period of three years. However, while some have noted considerable success, others have criticized cap-and-trade in Europe, while many see a mix of success and failure in their analyses of the program.

For those in favor of the ACESA, the successful U.S. regulation of sulfur dioxide (SO₂) through cap-and-trade is evidence that cap-and-trade regulation of CO₂ can work. Prior to the enactment of the program, costs were largely overstated. According to the Environmental Defense Fund, the market price estimated for SO₂ allowances was between \$579-1,935 per ton while the actual market price following enactment of the program was cited at \$150 per ton.⁸ Program costs were estimated to range between \$3 billion and \$25 billion per year.⁹ Program costs after the first two years of the program hovered around \$0.8 billion yearly.¹⁰ In 2007, the long-term program costs were expected to fall between \$1 billion and \$1.4 billion per year.¹¹ Additionally, in the 1990s, compliance among program participants reached 100%, emissions were reduced by 22% (7.4 million tons), and emissions fell below target levels.¹²

The Critiques:

The American Worker: Jobs and Income Losses

Lay-offs across all sectors of the economy are a concern as companies strapped for cash struggle to find funding to meet new efficiency standards and purchase carbon credits. With the national unemployment rate at 8.5% (higher in some states), it seems a dangerous time to rock the boat by forcing industries to incur further costs that will lead to increased job losses. Critics wonder what will happen to those who have lost their jobs in the interim while the country transitions from a “dirty” economy to Obama’s “greener future.” Where will these green jobs come from initially? Additionally, it is questionable whether green jobs will pay as much as the jobs that will

⁷ European Commission Directorate General for the Environment, McKinsey & Company and Ecofys, “Review of the EU Emissions Trading Scheme, Survey Highlights,” November, 2005.

⁸ Environmental Defense Fund, “The Cap and Trade Success Story,” September 14th, 2007.

⁹ Ibid.

¹⁰ Ibid.

¹¹ Ibid.

¹² Ibid.

undoubtedly be lost. Some statistics, such as those provided in Tables 1 & 2, point to alarming income disparities between jobs associated with oil and gas extraction and “green jobs.”

	Building Retrofitting	Mass Transit	Energy Efficient Automobiles	Wind Power	Solar Power	Cellulosic Biofuels	National Average per Hour
Average wage	\$18.95	\$18.52	\$31.57	\$19.36	\$15.72	\$14.48	\$20
Category weights	18.5%	13.6%	18.6%	15.0%	26.1%	8.2%	

1/ National wage rounded to nearest dollar. Category weights based on PERI and BLS/OES data.

	Oil & Gas Extraction	Drilling Oil & Gas Wells	Support for Oil & Gas Activity	Average per Hour
Average wage	\$63.71	\$38.58	\$33.86	\$45
Category weights	34.2%	19.8%	46.1%	

1/ Hourly wages based on 2,080 hours. Industry average rounded to nearest dollar. Category weights base on BLS data.

(Tables 1 & 2)¹³

In Table 1, low and high “green” jobs range from \$14.48 to \$18.95 per hour. The “dirty” Oil & Gas Extraction and Production wages presented in Table 2 range from \$38.58 to as high as \$63.71 dollars per hour. Together, tables 1 & 2 demonstrate large disparities between “green” and “dirty” jobs. Some have estimated the average wage for a green job at \$20 per hour which totals to \$42,114 per year while the average oil and gas industry exploration job yields a wage of \$45 dollars per hour, and totals to \$93,575 dollars per year.¹⁴ Opponents of cap-and-trade legislation, such as Senator Joe Barton, (R-TX), cite these figures and argue that salary cuts of more than half are unfair penalties imposed on American workers.

While these figures have been widely circulated, it is important to note, none of the wages listed in either Table 1 or Table 2 correspond to specific jobs, but large categories such as “solar power” and “oil and gas extraction.” In the labor market, wages vary depending upon specific jobs within industries and large categories. For example, what is the individual’s involvement in “solar power?” Is he or she installing panels? While both Tables raise important questions about “green” jobs and equity, without more detailed information, the tables are somewhat inconclusive.

¹³ House Energy and Commerce Committee Republicans, Cap-and-Trade: Rescuing the Planet from the People, March, 31st, 2009, <http://republicans.energycommerce.house.gov/News/PRArticle.aspx?NewsID=6926&IID=8>, May, 8th, 2009.

¹⁴ House Energy and Commerce Committee Republicans, March, 31st, 2009.

Regardless of potential disparities between “green” and “dirty” jobs, many are concerned that a market-wide cap-and-trade approach could push more industries overseas. Should a cap-and-trade approach go into effect, natural gas prices which would be used as a substitute for coal in electricity production could raise the cost of energy for industries and consumers, as well as contribute to lay-offs. It is already believed that in the period since 2000, the high cost of natural gas has greatly contributed to the loss of over 3,000,000 manufacturing jobs.¹⁵ As natural gas prices continue to elevate as a result of the cap-and-trade system, industries may be forced to look overseas for more cost-effective options, therefore further reducing American jobs.¹⁶ The Heritage Foundation adamantly opposes the legislation and claims the U.S will witness an unemployment rise of between 844,000 and 1,900,000 jobs, depending on the year.¹⁷

Limited Impact of Cap-and-Trade Policy on Climate Change

The Global Carbon Project has produced data to suggest that during the period from 2000 to 2007, the emission of greenhouse gases increased by a total of 26%.¹⁸ While China and India’s emissions spiked remarkably (by 98 and 36 percent respectively), U.S. CO₂ emissions only increased by 3% during the period.¹⁹ According to cap-and-trade opponents, these statistics are part and parcel of a larger set of statistics that indicate while developing countries increase their emissions overtime, U.S. emissions are gradually decreasing and emphasize the futility of cap-and-trade policy to produce global impact.

¹⁵ Institute for Energy Research, “Cap and Trade: Eight reasons why cap and trade harms the economy and reduces jobs,” http://www.instituteforenergyresearch.org/wp-content/uploads/2009/03/Cap_and_trade_Primer.pdf

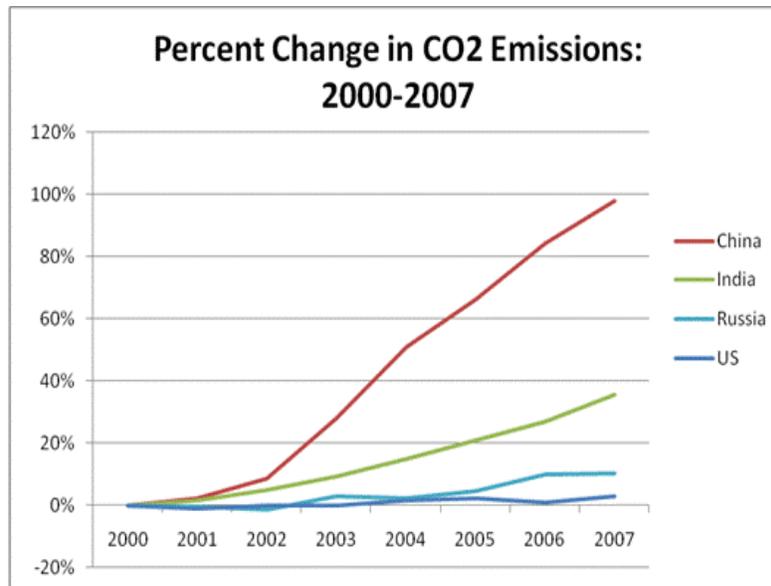
¹⁶ Ibid.

¹⁷ “The Economic Impact of Waxman-Markey”

<http://www.heritage.org/Research/EnergyandEnvironment/wm2438.cfm>, May 13th, 2009

¹⁸ Institute for Energy Research.

¹⁹ Institute for Energy Research.



(Graph 1)²⁰

Economy-wide CO₂ Regulation Is Unrealistic

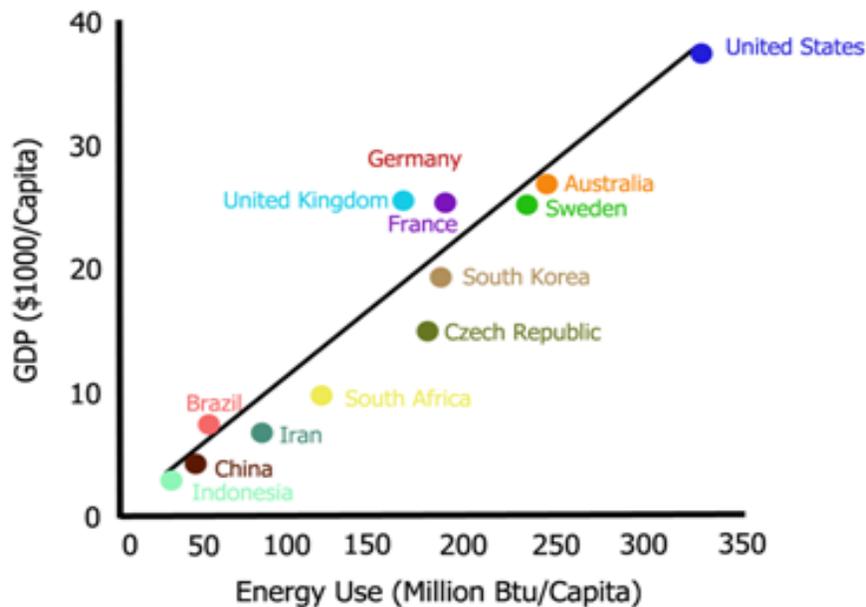
Those against the regulation of CO₂ under a cap-and-trade system state that CO₂ regulation will be far less successful than sulfur-dioxide regulation. According to the Institute of Energy Research, there are simply too many sources to regulate. While the sulfur-dioxide regulation program initially targeted 110 coal-fired plants, and gradually expanded to include 445 plants, greenhouse gases are emitted from millions of plants and other sources including furnaces, ships, and automobiles, rendering regulation under cap-and-trade unrealistic and costly.²¹ The Institute argues that while many cost-effective options for the regulation of sulfur-dioxide existed at the time, such as “low-sulfur coal” there is no “low-carbon dioxide coal” or other such viable options available at this time.²² The Institute argues the only realistic way to reduce carbon dioxide emissions is to reduce energy usage which would have damaging effects on the economy, and cites a strong correlation between energy usage and economic achievement.²³ Graph 2 shows that countries with the highest GDP’s like the U.S, Australia, Sweden and France use larger quantities of energy than countries with low GDP’s such as Iran, Indonesia, and South Africa.

²⁰ Ibid.

²¹ Ibid.

²² Ibid.

²³ Ibid.



(Graph 2)²⁴

Energy Security

While proponents of a cap-and-trade system argue the program will be good for American energy security by forcing the development of alternative energy sources in America therefore reducing our dependence on foreign oil, opponents argue the system will in fact have the opposite effect. Assuming a lack in sufficient technology (at least during the transition phase to a new “greener” economy), a cap-and-trade system could harm energy security by encouraging the import of foreign oil from the Middle East through the penalization of Canadian oil sands and U.S oil deposits.²⁵ Oil extracted from Canadian sands is produced more expensively than oil from the Middle East, and is supposed to grow increasingly more expensive under a cap-and-trade system, thus encouraging the import of oil from the Middle East.²⁶

The American Consumer: Rising Energy Costs

Conservative groups such as the Heritage Foundation predict disastrous results for the consumers and the economy at large. Ralph Hall cited the Heritage Foundation at the mark-up of

²⁴ Peter Huber & Mark P. Mills, “The Bottomless,” p.136, 2006.

²⁵ http://www.instituteforenergyresearch.org/wp-content/uploads/2009/03/Cap_and_trade_Primer.pdf

²⁶ Ibid.

the bill in the House, stating the Waxman-Markey bill will cost \$24,000 per family through 2035.²⁷ According to other Heritage Foundation figures, the Waxman-Markey bill will lead to a reduction in U.S. GDP by \$7.4 trillion, a rise in electricity rates by 90%, natural gas prices by 55%, and the elevation of an average family's yearly energy bill by \$1,500 which has caused for a great deal of concern among ACESA opponents.²⁸

The Benefits:

Green Jobs Created

The Environmental Defense Fund is a strong supporter of the ACESA and that carbon caps reward innovation. Companies will be forced to look for other energy alternatives and government investment in research and development as outlined in the ACESA will aid innovators in finding efficient solutions to current problems.

In addition to new innovations that could make Americans the leaders in efficient technology, many new job opportunities will be provided. An average wind turbine contains more than 8,000 parts which will require workers to manufacture, weld, and deliver them as well as workers to construct site facilities.²⁹ Cree, Inc., a leader in efficient lighting technology, has seen its work force almost quadruple between 2002 and 2008. Expansions at United Solar Ovonic (a company that produces solar laminates for rooftops) which has provided hundreds of new jobs so far is just one example of jobs that can be created out of the ACESA and a "green" future.³⁰

State investment in training programs for workers to learn more about the "green" industries, such as those enacted in Michigan, promotes job growth.³¹ Title IV of the ACESA, authorizes the Secretary of Education to provide grants to universities to support curriculum and training programs that will prepare students for careers in renewable energy and energy efficiency.³² Other portions of the draft authorize the Secretary of Labor to create training programs for jobs in these sectors.³³

²⁷ "The Sound and the Fury." Wall Street Journal. <http://blogs.wsj.com/environmentalcapital/2009/05/18/climate-bill-plenty-of-sound-and-fury-in-waxman-markey-hearings/>

²⁸ The Heritage Foundation, Waxman-Markey.

²⁹ "Why A Cap On Carbon?" Environmental Defense Fund, February 26th, 2009

³⁰ Environmental Defense Fund, 2009.

³¹ Ibid.

³² House of Representatives, "Discussion Draft Summary," 2009.

³³ Ibid.

Positive Impact of Cap-and-Trade Policy on Climate Change

Disasters caused by global warming effects, a potential consequence of inaction, could total billions. By some estimates, results of global warming (hurricanes, real estate losses, high energy and water costs) could total \$1.9 trillion annually by the turn of the century.³⁴ The University of Maryland cites costs of \$272 million in insurance losses for droughts in 2007 not including \$1.3 billion in damages related to crop losses in Georgia's 2007 drought and an additional \$300 million in spending to re-build New Orleans after Hurricane Katrina.³⁵ Costs will continue to rise if Congress delays in passing the ACESA. For example, a wait of even two years would require more than double the cuts in greenhouse gas emissions yearly than those currently discussed in order to reach the same targets.³⁶ A Tufts University study claims Florida's GDP could be reduced by over 5% and U.S. GDP by 3.6% at the turn of the century as a result of hurricane damages.³⁷ According to Congressman Markey and ACESA supporters, decisive action on climate change will lead to reduced pollution and provide positive health benefits for Americans that will last forever.

Impact on the American Consumer

While the House Republican Leader, John Boehner (R-OH), quotes President Obama as having said, "under my plan of cap and trade, electricity rates would necessarily skyrocket" ACESA supporters argue the benefits of cap-and-trade legislation are great and costs have been largely exaggerated or misunderstood.³⁸ Boehner has said cap-and-trade legislation "will drive energy costs for American families through the roof," but evidence suggests these claims are overstated.³⁹ Based on results from an MIT study titled Report No., 146 Assessment of U.S Cap-and-Trade Proposals, Boehner calculated that energy costs for the average American family would elevate to \$3,100 per year as a result of the ACESA.⁴⁰ However, according to the conductor of the MIT study, who recently released new figures in the press, information provided in the report was "misrepresented."⁴¹ The conductor of the study said the figure of \$3,100 "is nearly 10 times the

³⁴ Ibid.

³⁵ The Center for Integrative Environmental Research (CIER), "The US Economic Impacts of Climate Change and The Costs of Inaction," October, 2007.

³⁶ Environmental Defense Fund, "Delay Is No Longer an Option," May 14th, 2009.

³⁷ Elizabeth A. Stanton & Frank Ackerman, "Florida and Climate Change: The Costs of Inaction," November 2007.

³⁸ John Boehner, "Regional Roundup"

<http://republicanleader.house.gov/News/DocumentSingle.aspx?DocumentID=116848>, Mar. 31st.

³⁹ Ibid.

⁴⁰ Ibid.

⁴¹ <http://thinkprogress.org/wp-content/uploads/2009/04/republican.pdf>

correct estimate which is approximately \$340.”⁴² Regardless, it is important to consider the costs of *inefficient* energy technology when considering the ACESA. Senator Markey says the legislation will save Americans almost \$100 billion dollars in electricity costs.⁴³

Additional evidence provided by an array of environmental organizations and research groups indicates the cost of enacting a cap-and-trade system may be less than anticipated by ACESA opponents. According to Environmental Defense Fund studies, “the median projected impact of climate policy is less than one-half of one percent of U.S GDP for the period 2010-2030, and under three-quarters of one percent through the middle of the century.”⁴⁴ The Environmental Defense Fund projects the cost of capping greenhouse gases will cost 1% or less of household budgets in the next twenty years.⁴⁵

While it is generally acknowledged the ACESA will have some impact on consumers, there are great opportunities to benefit from efficient technology. Governor Jennifer Granholm of Michigan notes in a report that \$20 billion dollars are spent annually on energy in Michigan alone.⁴⁶ However, re-investing in efficient technology is an opportunity for states, like Michigan, that import almost all their fuels, to develop energy efficient products and spend money in local economies.⁴⁷

Compromises Made on the ACESA

Garnering support for CO₂ regulation is challenging in part because of regional concerns. Republicans are generally against caps on CO₂ emissions but even moderate democrats from “coal” and heavy industry states are reserved on cap-and-trade legislation. Gene Green (D-Texas) said quite simply, “I can’t vote for a bill unless my refineries [are protected]; because of the nature of my district, it’s a job base and a tax base.”⁴⁸ While the long term goal of 45% reductions in greenhouse gas emissions by 2050 has not been changed, the ACESA mandates only 17% reductions below 2005 greenhouse gases emissions instead of the original 20%. The renewable energy standards have also been reduced somewhat to bring democrats concerned their states will not be able to reach the emissions targets on board. As Rick Boucher (D-VA) commented, “the revisions which are being made to the ACESA appropriately recognize regional differences by making necessary

⁴²Ibid.

⁴³ Congressman Ed Markey, “Republican Energy and Climate Distortions ‘Wrong In So Many Ways,’” April 2nd, 2009.

⁴⁴ Environmental Defense Fund, May 14th, 2009.

⁴⁵ Ibid.

⁴⁶ Michigan Energy Office, “Michigan Jobs from Energy Efficiency & Renewable Energy,” March 6th, 2006.

⁴⁷ Ibid.

⁴⁸ Kate Sheppard, “Undecided Reps on House Panel Hold Key To Climate Bill,” May 2nd, 2009.

improvements to expand the list of qualifying fuels and to lower the alternative compliance payment.”⁴⁹ The most contentious issue has been the allocation of permits. Revisions to the ACESA allow for most of the permits to be distributed freely during the legislation’s primary stages. Energy-intensive industries will receive the bulk of the free permits which will be scaled down over time ultimately forcing companies to pay.

The Current Status of the ACESA

As of May 21st 2009, the Representatives Waxman and Markey succeeded in getting the ACESA passed in the House Energy & Commerce Committee 30-25. The bill will be debated in other committees but Thursday’s win constitutes a big step forward for the ACESA which withstood the proposals of over 400 amendments by its opponents and suggests that it will ultimately pass. The ACESA’s success in the House Energy & Commerce Committee is evidence that compromises were necessary to make the bill passable. Unfortunately, changes, like the distribution of free permits instead of the 100% Auction Program, though necessary to secure support from moderate democrats and republicans, left some environmentalists slightly disappointed. Overall, environmentalists are very pleased with Thursday’s accomplishment. Eileen Claussen from the Pew Center on Global Climate Change sums up the response in her statement, “The House Energy and Commerce Committee achieved something extraordinary—passage of a bill that sets us on a path to tackle climate change, drive our economic recovery and advance our energy independence.”⁵⁰ Rich Boucher, the Democratic Representative of Virginia, supported the bill based upon recent changes was ultimately able to support the bill based upon these changes.⁵¹

Policy Recommendation

The House and Senate should pass the ACESA, which provides a comprehensive, cap-and-trade approach to regulating CO₂ emissions. The regulation of CO₂ is a key component to reducing America’s impact on the environment, and to reducing energy costs for consumers over time. Cap-and-trade schemes can create “green” jobs, ameliorate the impact of disastrous global warming effects as well as provide positive health benefits for Americans. The ACESA is based both upon

⁴⁹ Kate Sheppard, “Revamped House climate and energy bill has the votes to pass, says Waxman,” May 13th, 2009.

⁵⁰ Brian Walsh, TIME, “Greens Celebrate Cap-And-Trade Victory—Cautiously,” May 22nd, 2009.

⁵¹ Ibid.

the numbers and the science, however, the passage of the ACESA in the House Energy & Commerce Committee is evidence that compromises are necessary to secure passage in Congress and the Senate. Out of these compromises, a feasible approach to CO₂ regulation has emerged. The House and Senate should pass the ACESA as it stands and avoid further changes that might diminish the efficacy of the bill. The decision to distribute free permits during the initial phases of the ACESA's enactment will ensure economic stability, reduce costs to firms and consumers by helping companies better adjust to substantial change. However, it is essential the legislation require firms to purchase permits on a gradual basis in order to further incentivize program compliance since polluting over established targets takes on a direct cost to firms.

Section 2.0

Environmental Justice and Federal Environmental Policy

Alana Nelson, *The Yucca Mountain Nuclear Waste Repository: A Case Study on Environmental Justice*

Lauren Fink, *Coal Bed Methane on the Crow Reservation: Environmental Justice Concerns*

Melanie Kazenel, *Mountaintop Removal Coal Mining: A Question of Environmental Justice?*

May 22, 2009

U.S. Environmental Politics
Environmental Studies Program

Environmental Justice Section Executive Summary

The environmental justice movement emerged in the 1980s in response to growing concern about the inequitable exposure of minority communities to environmental harms. Studies documented a disproportionate exposure of minority populations to toxic pollution, hazardous waste, and poor air and water quality. Since then, local grassroots movements have emerged nationwide. In 1994, the federal government officially recognized environmental justice concerns through Executive Order 12898, signed by President Clinton. The Executive Order mandates that federal agencies address discrepancies in the distribution of “adverse human health or environmental effects” and take measures to reduce the burden on low-income and minority populations. However, federal consideration of environmental justice remains limited by vague definitions, few specific guidelines for addressing and correcting discrepancies, and weak implementation during the recent Bush administration.

Three current examples illustrate the challenging complexities of environmental justice issues and the regulatory process: first, the proposed nuclear waste repository on Western Shoshone land at Yucca Mountain; second, the development of coal bed methane extraction processes on the Crow Reservation; and finally, mountaintop removal coal mining in low-income communities of Appalachia. These three case studies exemplify the challenge of defining environmental justice. Environmental justice can be conceptualized in a number of different ways; creating a practical working definition for use in policymaking is difficult. The three case studies raise a number of related questions. What definition of environmental justice is most appropriate? Which is most politically feasible? Where should the lines be drawn between environmental justice and social justice? As federal agencies create and revise regulations, how much weight should be placed on environmental justice concerns?

The three examples demonstrate that diversity exists in the conceptualization and application of environmental justice. First, while the case studies regarding Yucca Mountain and the Crow Reservation address environmental justice concerns pertaining to racial minorities, the issue of mountaintop coal removal in Appalachia broadens the spectrum of environmental justice to focus on socioeconomic class. Additionally, individuals within communities respond differently to the issues at hand, complicating the creation any universal formula for addressing environmental justice concerns. While the Crow population is divided on the development of coal-bed methane on their land, the people surrounding Yucca Mountain express near-unanimous opposition to the nuclear waste repository.

Considered together, the three case studies especially illuminate the failure of federal agencies to fully integrate environmental justice into their decision-making and regulatory action. In many cases, EO 12898 has been implemented only to a very limited and arguably insufficient degree. The three case studies point toward the need for further consideration of the role of environmental justice in the environmental policy forum.

Section 2.1

Environmental Justice and Federal Environmental Policy

Alana Nelson, *The Yucca Mountain Nuclear Waste Repository: A Case Study on Environmental Justice*

May 22, 2009

U.S. Environmental Politics
Environmental Studies Program

Summary

The 1982 proposal of the high-level nuclear waste repository at Yucca Mountain on the historically legal lands of the Western Shoshone Native American tribes of Nevada presents a prime example of an environmental justice issue pertaining to the health, environmental and cultural threats that disproportionately affect minority and low-income populations. Despite legal land rights to an area stretching from Southern Idaho, through Nevada and into California ratified in the Treaty of Ruby Valley of 1863,¹ Congress proposed Yucca Mountain as the site for a nuclear waste repository in the Nuclear Waste Policy Act of 1982.² Supporting Yucca Mountain in 2003, Bush pushed for the legal transfer of ownership into governmental hands with the Western Shoshone Claims Distribution Bill,³ violating the rights of the Western Shoshone people. Signed by President Clinton, E.O 12898 narrowly requires governmental agencies and departments to address environmental justice in the event that human and environmental health is adversely and jointly affected.⁴ However, in addition to health violations, Yucca Mountain clearly breaches other key components of internationally proposed aspects of the grassroots environmental justice movement including abuse of land rights. With support from the Bush administration, 23 years of research, and \$10.4 billion invested funds the Yucca Mountain repository seemed inevitable, but President Obama's temporary decision to cut funding through the 2010 fiscal year appropriations bill reopened the issue for debate.⁵

Proponents such as the Nuclear Energy Institute highlight the low greenhouse gas emissions of nuclear energy,⁶ the danger of the temporary Dry Cask Storage systems that must be resealed every twenty years.⁷ Opponents advocate the rights of the Western Shoshone peoples and the scientific uncertainty surrounding the geological safety of the location. National traditional environmental interest groups such as Environment America protest dumping of the nation's radioactive waste at Yucca Mountain because it intrudes on the Shoshones' spiritual ties to the land,

¹ <http://www.h-o-m-e.org/Shoshone/index.htm>

² Nuclear Waste Policy Act (NWPA) of 1963. <http://www.nrc.gov/about-nrc/governing-laws.html>

³ Western Shoshone Claims Distribution Bill (H.R. 884/S.618) of 2003. Retrieved April 2009.

<http://thomas.loc.gov/cgi-bin/cp>

[query/?&sid=cp108Y3U6l&refer=&r_n=hr299.108&db_id=108&item=&sel=TOC_18067&](http://thomas.loc.gov/cgi-bin/cp?&sid=cp108Y3U6l&refer=&r_n=hr299.108&db_id=108&item=&sel=TOC_18067&)

⁴ Executive Order 12898 of February 11, 1994. Retrieved April 2009.

<http://www.hud.gov/offices/fheo/FHLaws/EXO12898.cfm>

⁵ New York Times:

<http://topics.nytimes.com/top/news/national/usstatesterritoriesandpossessions/nevada/yucca-mountain/index.html?scp=1-spot&sq=yucca%20mountain&st=cse>

⁶ Nuclear Energy Institute (NEI). Retrieved April 2009.

http://www.nei.org/resourcesandstats/nuclear_statistics/usnuclearpowerplants/

⁷ NRC. <http://www.nrc.gov/waste/spent-fuel-storage/dry-cask-storage.html>

and could threaten the quality of their water, agriculture, and health in the event of any slight or major malfunction of the facility during the 100,000 proposed years of its operation.⁸

Fundamentally, the Yucca Mountain nuclear waste repository case study persuasively presents the need to address environmental justice issues at the federal level in attempts to avoid unequally distributing the burdens of our growing society. Despite the tragic loss of the land to the Western Shoshone people, the amount of federal funding and the urgency of the need for high-level nuclear waste repository augment the complexity of the situation. Ultimately, the fiscal year 2010 appropriations bill only represents a temporary solution. I propose a solution established within the executive branch in which Yucca Mountain is encouraged through an executive order until otherwise proven flawed through continued scientific research, in conjunction with an enhanced EO 12898 based on the cultural and spiritual factors outlined by the UN so as to avoid comparable problems in the future. Importantly, the federal government shall justly compensate the Western Shoshone Nation with full entitlement to their remaining undeveloped land and allow them unrestricted access to Yucca Mountain as deemed reasonably safe.

Introduction

The 1982 proposal of the high-level nuclear waste repository at Yucca Mountain on the historically legal lands of the Western Shoshone Native American tribes of Nevada presents a prime example of an environmental justice issue pertaining to the health, environmental and cultural threats that disproportionately affect minority populations. The proposed dumping of the nation's radioactive waste at Yucca Mountain intrudes on the Shoshones' spiritual ties to the land and could threaten the quality of their water, agriculture, and health in the event of any slight or major malfunction of the facility during the 100,000 proposed years of its operation. According to the US governmental Center for Disease Control (CDC), the repository will pose minimal health risks far below the average national exposure to natural radiation sources. If correct, the claims of the CDC align Yucca Mountain with the goals of the federal government's attempt at recognizing environmental justice issues in the form of Executive Order (E.O.) 12898. Signed by President Clinton, E.O 12898 narrowly requires governmental agencies and departments to address environmental justice in the event that human and environmental health is adversely and jointly

⁸ Linder, Josh. Environment America. Retrieved May 2009.
http://www.rw.doe.gov/ym_repository/seis/comments/FSEIS-ORG_Comm_A_thru_W.htm

affected. However, Yucca Mountain clearly violates other key components of internationally proposed aspects of the grassroots environmental justice movement including abuse of land rights. With support from the Bush administration, 23 years of research, and \$10.4 billion invested funds the Yucca Mountain repository seemed inevitable. Thus, President Obama's temporary decision to cut funding through the 2010 fiscal year appropriations bill reopened the issue for debate. Interest groups, industry representatives, states, and the Department of Energy now work to persuade the Obama administration on whether or not to complete the project in the face of clear violations of key environmental justice principles.

Background

The United States' increasing use of nuclear materials necessitates a secure disposal option for the resulting hazardous waste. Second only to coal in usage, 103 nuclear power generation sites currently supply 20% of American energy.⁹ In addition, the National Nuclear Security Administration (NNSA), a subcommittee under the DOE, continues testing and storing military nuclear weapons at eight US locations.¹⁰ The US has produced approximately 60,000 metric tons of high-level waste and spent nuclear fuel.¹¹ The process of splitting uranium atoms creates heat for electricity generation and radionuclides, the solid form of radioactive waste, which take hundreds of thousands of years to fully decay. Once removed from the power plant, radionuclides present a danger to human health by emitting up to 100,000 rem/hour for decades into the future, whereas a single dose of 500 rem proves fatal to humans.¹² Currently, 131 temporary aboveground Dry Cask storage systems contain the nation's nuclear waste. The NRC licensed the first Dry Cask storage system in 1986, but the steel containers require close management and remain effective for only 20 years until they must be resealed to avoid leaking and deterioration.¹³ Because high-level waste and spent nuclear fuel decompose so slowly, the insufficient temporary facilities endanger

⁹Nuclear Energy Institute (NEI). Retrieved April 2009.

http://www.nei.org/resourcesandstats/nuclear_statistics/usnuclearpowerplants/

¹⁰ National Nuclear Security Administration (NNSA). Retrieved May 2009.

http://nnsa.energy.gov/nuclear_security/index.htm

¹¹ Lacy, Darrell. Press Release Nye County. (December 19, 2008). Retrieved April 2009.

www.nyecounty.com/documents/Contentions/Press_Release_Nye_Co_Contentions.pdf

¹² US Nuclear Regulatory Commission (NRC). Retrieved May 2009. <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/radwaste.html>

¹³ NRC. <http://www.nrc.gov/waste/spent-fuel-storage/dry-cask-storage.html>

approximately 161 million of Americans living within 75 miles to these systems.¹⁴ In 1987, pressured by an obvious need for a long-term system to handle the nation's increasing supply of radioactive waste, Congress proposed Yucca Mountain in Nye County, Nevada, as the site for a nuclear waste repository that could withstand 100,000 years of use to allow the uranium to fully decay.

Scientists chose Yucca Mountain because of the area's geological composition, but support remains divided. Guided by the scientific integrity of deep geological disposal and the fear of nuclear terrorism with alternative aboveground options, the government chose Yucca Mountain because of three key factors. First, the water table lies 1,000 feet below the site with modest water flow through the mountain, expectedly decreasing the risk of water contamination by the radionuclides. Second, the compact geological composition of the volcanic rock bed contains few fractures, further limiting the migration of potentially contaminated water. Lastly, the presence of highly absorbing minerals within the fractures would further slow the transport of radionuclides¹⁵. But the feasibility of the project remains uncertain because of the extremely long time scale, and other scientists scrutinize the location choice based on the area's dormant volcanoes, underlying fault lines, and the inability to test the durability of the waste storage containers on the time scale of their expected use, gridlocking scientific support for the project.¹⁶

Scientists also disagree on the long-term health risks near the repository, acknowledging unquestionable adverse effects of radioactive exposure. Radioactive material has a no-threshold level (NTL) dose-response curve, implying that any exposure to nuclear radiation increases cancer risks. Studies show that high radiation exposure levels correlate with leukemia, breast, bladder, colon, liver, lung, esophagus, ovarian, multiple myeloma, and stomach cancers¹⁷, as well as mental retardation and genetic birth defects.¹⁸ Radiation does occur naturally from cosmic sources in the atmosphere and the decomposition of the element radon, which can be found in the majority of rocks and soils. In fact, the average US citizen receives 360 millirems of radiation annually, 80% of

¹⁴ Barret, Lake H. (February 19, 2002). Retrieved April 2009. <http://www.epa.gov/EPA-IMPACT/2002/February/Day-27/i4440.htm>

¹⁵ DOE. Why Yucca Mountain? Brochure. www.rw.doe.gov/ym_repository/sr/brochure.pdf

¹⁶ Linder, Josh. Environment America. Retrieved May 2009.

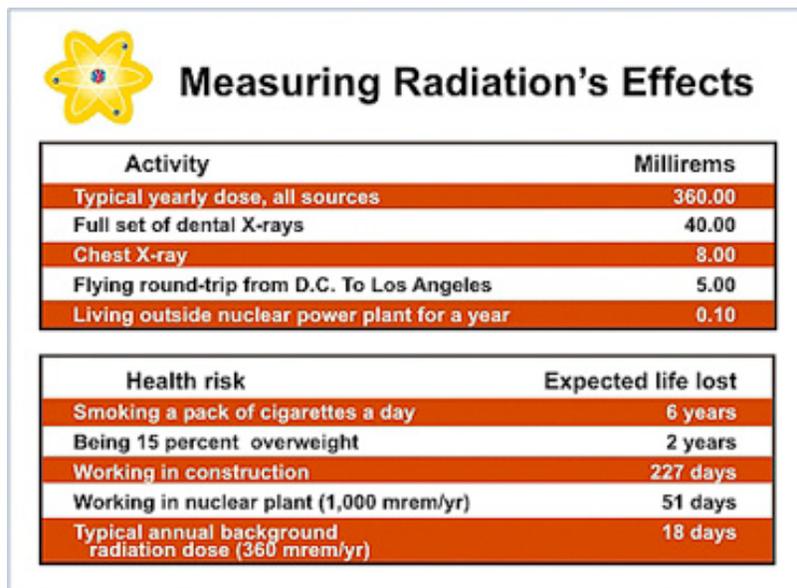
http://www.rw.doe.gov/ym_repository/seis/comments/FSEIS-ORG_Comm_A_thru_W.htm

¹⁷ NRC. Retrieved April 2009. <http://www.nrc.gov/about-nrc/radiation/health-effects/high-rad-doses.html>

¹⁸ Environmental Protection Agency (EPA). Radiation Risks and Realities. (May 2007). Retrieved May 2009. www.epa.gov/rpdweb00/docs/402-k-07-006.pdf

which comes from atmospheric and geologic sources, and the remainder from airplane travel and medical practices such as x-rays. According to the EPA, radiation from nuclear power plants is “less than one-hundredth (1/100) of a percent of the average American’s total radiation exposure,”¹⁹ though this data does not specify close proximity to a nuclear power plant or waste site that may result in greater health hazards. Studies conducted by the Center for Disease Control (CDC) reveal that the exposure level of a 70-year continuous resident downwind of the proposed repository would only receive 6.8 millirems of radiation each year, signifying a very low risk for Nye County’s citizens, including the Western Shoshone.²⁰ 6.8 millirems is by far lower than normal atmospheric exposure, and by far less harmful than a full set of dental x-rays at 40 millirems.

Common Radiation Exposure Rates and Subsequent Health Effects



EPA²¹

On the other hand, scientists funded by Nye County and the EPA argue that the DOE has “failed to fully identify, examine, and evaluate the effect of construction and operational activities upon air quality and personnel in the general environment around Yucca Mountain, as required by

¹⁹ EPA. www.epa.gov/rpdweb00/docs/402-k-07-006.pdf

²⁰ Center for Disease Control and Prevention, Dept. of Health & Human Services, Agency for Toxic Substances and Disease Registry. Retrieved April 2009. http://www.rw.doe.gov/ym_repository/seis/comments/FSEIS-ORG_Comm_A_thru_W.htm

²¹ EPA. www.epa.gov/rpdweb00/docs/402-k-07-006.pdf

regulation.”²² In spite of average radiation exposure from natural and manmade sources, some scientists insist that long-term residents surrounding the Yucca Mountain repository are at risk of increased exposure rates and the severely dangerous, widespread outcomes of a myriad of potential accidents not possibly accounted for in the next 100,000 years. Although the CDC analyzed 14 worst-case scenarios, scientists cannot realistically account for all possibilities. The harmful and potentially fatal impact of radionuclides contaminating water sources and subsequently the agriculture, dairy and meat industries would prove disastrous and widespread. As minority populations likely lack the funds, or in the case of the Western Shoshone the desire to relocate, these peoples will be most affected.^{23 24}

Environmental justice addresses the correlation between the impacts of environmental degradation and the marginalization of minority populations. In the 1980’s, official studies linked minority neighborhoods with a disproportionate number of hazardous waste sites.²⁵ Only recently did the movement present an organized platform. During October 24-27, 1991, delegates to the First National People of Color Environmental Leadership Summit adopted the Principles of Environmental Justice (hereby referred to as the Principles) – a set of seventeen standards demanding affected minority population participation in all levels of political decision-making and establishing “mutual respect and justice for all peoples”²⁶ in conjunction with environmental preservation. The Principles in effect serve as the “defining document”²⁷ for the grassroots movement, presenting its purpose as one of social justice with the incorporation of environmental concerns. Of importance to this case study, the Principles include: stopping the demolition and seizure of minority property and lands, and a definitive stance against all “extraction, production and disposal of toxic/hazardous wastes and poisons and nuclear testing that threaten the fundamental right”²⁸ to a clean and safe environment. The Principles notably incorporate economic, cultural, and spiritual factors, creating more a holistically ethical document.²⁹

²² Lacy, Darrell.

²³ EPA. www.epa.gov/rpdweb00/docs/402-k-07-006.pdf

²⁴ CDC.

²⁵ Vig, N. J., & Kraft, M. E. (2006). *Environmental Policy: New Directions for the Twenty-First Century*. Washington, D.C.: Congressional Quarterly. pp 239-245.

²⁶ Principles of Environmental Justice. Retrieved May 2009. <http://www.ejnet.org/ej/principles.html>

²⁷ Principles

²⁸ Principles

²⁹ Principles

Advocates for a more comprehensive definition of environmental justice believe that the Yucca Mountain repository clearly violates the rights of the Western Shoshone people. The Western Shoshone, traditionally known as the Newe, living near Yucca Mountain have maintained spiritual and ceremonial connections to the sacred ancestral lands upon which they have thrived for thousands of years. The 220 families living in proximity to Yucca Mountain have an average income of just \$15,000, placing them below poverty level and effectively limiting their power in court in the absence of *pro bono* legal aid.³⁰ Lacking the standing to effectively defend themselves, the UN Committee for the Elimination of Racial Discrimination specifically identified the Western Shoshone's struggle in challenging political actions in national courts and in obtaining adjudication on the merits of their claims.³¹ Dedicated to the preservation of the natural world, the Western Shoshone uniformly fight against the proposed site, but despite their protesting cries, the government has silenced their voices and continued forward with the project.

Political History

Ethical controversy concerning the Yucca Mountain repository resulted from conflicting political commitments between the federal government's official recognition of the Western Shoshone's land and its legal responsibility to securely manage nuclear waste disposal. In 1863, the US Treaty of Ruby Valley documented the extent of the Shoshone people's land as stretching from Idaho through most of Nevada and into parts of Southern California – including the site for the proposed Yucca Mountain repository.³²

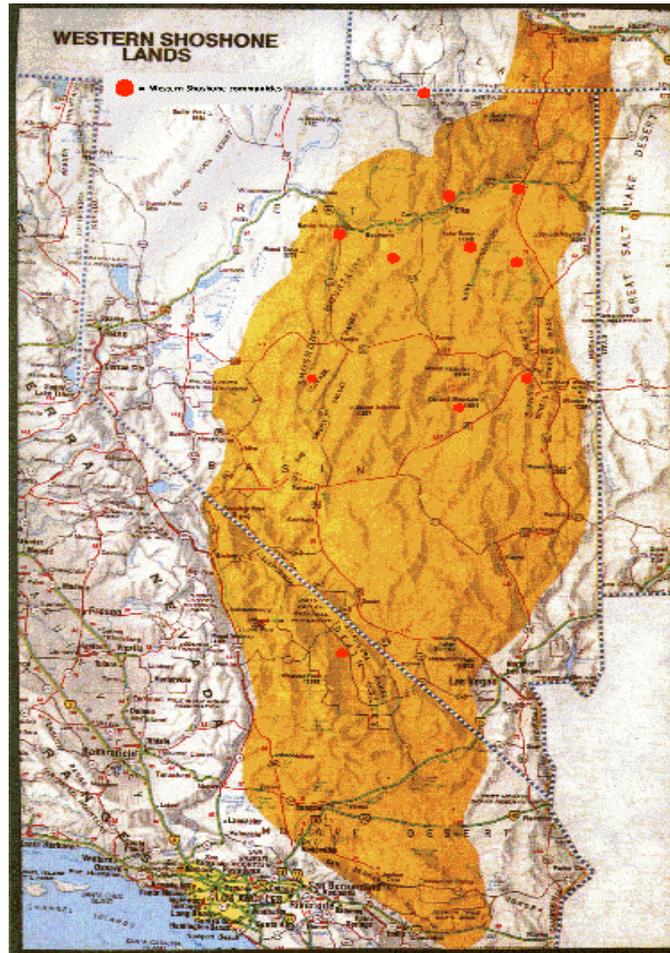
³⁰ University of Michigan. "Environmental Justice Case Study: The Yucca Mountain High-Level Nuclear Waste Repository and the Western Shoshone." Retrieved May 2009. <http://www.umich.edu/~snre492/kendziuk.html>

³¹ Western Shoshone Defense Project (WSDP). Retrieved April 2009.

http://www.rw.doe.gov/ym_repository/seis/comments/FSEIS-ORG_Comm_A_thru_W.htm

³² <http://www.h-o-m-e.org/Shoshone/index.htm>

Western Shoshone Lands as Legalized by the Treaty of Ruby Valley, 1863.



The Treaty legally recognizes valid use of the land as pertains to “spiritual, ceremonial, food, medicinal, shelter, hunting, gathering, watering, and cemetery and burial site”³³ purposes, and any violation goes against Article VI of the US constitution which provides Treaties with the “supreme law of the land”³⁴ should questions of legality arise. While the Treaty allots Presidential power to relocate the Shoshone tribes to reservations if the federal government deems “it expedient for them

³³ Moss, Allen. Western Shoshone National Council. Retrieved April 2009.
http://www.rw.doe.gov/ym_repository/seis/comments/FSEIS-ORG_Comm_A_thru_W.htm

³⁴ Moss, Allen.

to abandon the roaming life”³⁵ and specifically become “herdsmen or agriculturalists,”³⁶ it makes no reference to the legal transfer of land into government possession during this or any other process. Almost 120 years later, the Nuclear Waste Policy Act of 1982 (NWPAA) assigned responsibility for establishing a long-term option for the disposal of high-level radioactive waste and spent nuclear fuel to the Department of Energy (DOE). In light of the Treaty of Ruby Valley, the 1987 amendment to the NWPAA concluding Yucca Mountain as the sole site under consideration for a high level nuclear waste repository infringes upon the rights of the Western Shoshone tribes. It wasn’t until 2008 that the DOE submit an incomplete application for review of the site to the U.S. Nuclear Regulatory Commission (NRC), where it currently awaits final authorization. The advanced state of the Yucca Mountain repository plan presents the complexity of environmental justice concerns in the face of arguably necessary development for the safety and betterment of American society.^{37 38 39}

In the 1990’s, the environmental justice movement received federal level recognition, but combative action against injustices remains limited in part because of the narrow legal classification. In 1994, President Bill Clinton established federal level acknowledgement of environmental justice through the Executive Order (EO) 12898. EO 12898 requires all federal agencies and departments to equally and consistently address “disproportionately high and adverse human health or environmental effects”⁴⁰ in rulemaking and legal action regarding minority and low-income populations. Furthermore, the application of the EO is to ensure participation in the political process by these groups through disclosed information and appropriate public hearings. The EO requires that such actions be carried out in a practical manner – implying the necessary accountability for economic and feasibility factors when considering the implications. It should be noted, however, that only human health effects are accounted for in EO 12898, clearly composing a very basic level of environmental justice when compared to the extensive rights outlined by the seventeen Principles proposed at the People of Color Environmental Leadership Summit.

³⁵ Moss Allen

³⁶ Moss, Allen

³⁷ Nuclear Waste Policy Act (NWPAA) of 1963. <http://www.nrc.gov/about-nrc/governing-laws.html>

³⁸ Nuclear Waste Policy act 1982 <http://www.nrc.gov/about-nrc/governing-laws.html>

³⁹ White House. Retrieved May 2009. http://www.whitehouse.gov/issues/energy_and_environment/

⁴⁰ Executive Order 12898 of February 11, 1994. Retrieved April 2009.

<http://www.hud.gov/offices/fheo/FHLaws/EXO12898.cfm>

It wasn't until 2006 that the discrimination against the Western Shoshone people received international attention. In April of 2006 the 80-page report published by the United Nations Committee to Eliminate Racial Discrimination to uphold the Western Shoshone claims to their land and to U.S. human rights abuses. The document states that the U.S. must “freeze, desist and stop”⁴¹ actions against the Western Shoshone Nation, including the Yucca Mountain project. Nevertheless, the DOE finally submit their application to the NRC in June of 2008,⁴² and the NRC came close to finalizing the process under the completion of a few requests.

George W. Bush used political power to push the repository plan forward during his presidency in three significant ways. First, in February 2003, the Bush administration attempted to manipulate the Shoshone people into transferring ownership of the Yucca Mountain land to the government through the Western Shoshone Claims Distribution Bill (H.R. 884/S.618). Ratified by Congress under the power to “regulate commerce with the Indian Tribes,”⁴³ the bill attempted to complete the land transfer process begun in 1979 under the Indian Claims Commission (ICC). Back in 1853, the US government decidedly nullified the Treaty of Ruby Valley due to “gradual encroachment of settlers and others and by acquisition, disposition, or taking of said lands by the United States for its own use and benefit or that of its citizens.”⁴⁴ In 1979, the ICC thus chose to retroactively pay for the land at 15 cents per acre in a legal manner so as to comply with the Treaty of Ruby Valley, forcing the people to recognize the transfer by placing the money in a trust fund under their name. The Shoshone denied the money and it remains in the Treasury because acceptance finalizes the process and legally acknowledges US ownership of the land. Manipulating the Western Shoshone tribes into legally forfeiting their land rights denied them the ability to participate in the political process, clearly breaching both the EO 12898 and the Principles that command the involvement of the affected populations. Additionally, after the submission of the proposal application to the NRC, the DOE neglected the NWPA by submitting revisions with “significant changes,”⁴⁵ making public participation “extraordinarily difficult and burdensome”⁴⁶ as

⁴¹ WSDP

⁴² White House.

⁴³ Western Shoshone Claims Distribution Bill (H.R. 884/S.618) of 2003. Retrieved April 2009.
http://thomas.loc.gov/cgi-bin/cpquery/?&sid=cp108Y3U6l&refer=&r_n=hr299.108&db_id=108&item=&sel=TOC_18067&

⁴⁴ Indian claims commissions – ICCV 29. Retrieved April 2009.

<http://digital.library.okstate.edu/icc/v29/v29toc.html>

⁴⁵ <http://www.nirs.org/press/11-21-2008/1>

⁴⁶ <http://www.nirs.org/press/11-21-2008/1>

interest groups attempt to understand the 8,000 page document. In a final move to encourage the implementation of the project, the Bush administration re-released health risk levels for citizens near the proposed site. At the last minute, the expected cancer rate changed from 1:70 to 1:125 – a significant improvement as it placed the site in line with other functioning nuclear energy and military testing sites. Bush admitted that the move was an attempt to keep the repository from being a ballot issue by releasing information that made it seem safer, effectively drawing less attention to the scientific uncertainty and hoping to keep the DOE application legitimate in the NRC office despite its incomplete and publicly confusing state.^{47 48 49}

However, whether or not the current seven tribal governments of the Western Shoshone recognize and accept the money, their land has already been publicly stolen from them and irreversible societal development remains. The Western Shoshone appeared to have lost their fight until the Obama administration brought a temporary halt to the project by limiting funding through the 2009 budget to research necessary to further examine safety precautions in the area as proposed by the NRC, truly hoping for an alternative option for nuclear waste disposal.⁵⁰

Stakeholders

Despite the responsibility of the Department of Energy (DOE) to successfully contain nuclear waste, the level of support for the project has ultimately fluctuated between the different presidential administrations. Under the Bush administration, the DOE strongly pushed for the success of the repository as viewed by the political action taken to expedite the plan. Lake H. Barret, a representative of the DOE under the Bush administration, seemingly ignored the rights of the local people in claiming the land to be federal property, “far from population centers.”⁵¹ He further claims that not moving forward with the project would be: an “irresponsible dereliction of duty,”⁵² especially since investment in the project totals an approximate 10.4 billion dollars.⁵³ While

⁴⁷ ICCV 29

⁴⁸ <http://www.h-o-m-e.org/Shoshone/index.htm>

⁴⁹ “EPA offers a bit of comfort on cancer risk.” Las Vegas Sun Online. Retrieved May 2009.

<http://www.lasvegassun.com/news/2008/oct/02/epa-offers-bit-comfort-cancer-risk/>

⁵⁰ Times Wire Reports Online. National Desk; Part A; Pg. 16. Retrieved May 2009.

<http://0->

www.lexisnexis.com.luna.wellesley.edu/us/lacademic/results/docview/docview.do?docLinkInd=true&risb=21_T6599648394&format=GNBFI&sort=RELEVANCE&startDocNo=1&resultsUrlKey=29_T6599648398&cisb=22_T6599648397&treeMax=true&treeWidth=0&csi=306910&docNo=1

⁵¹ Barret, Lake.

⁵² Barret, Lake.

the Obama administration also supports the use of nuclear energy in an attempt to move the nation closer to domestic dependency and renewable energy sources, the new Chairman of the DOE, Steven Chu, instead advocates for improved on-site storage facilities in the place of Yucca Mountain. Despite warning messages from GOP representatives, Chu places his faith in future technology, believing that the nation has a couple of decades to figure things out.⁵⁴

Proponents of the repository's construction endorse the benefits to society that the repository would provide. The Nuclear Energy Institute (NEI), representing the nuclear energy industry, emphasizes the low contributions to climate change and the move away from foreign fossil fuels to meet growing domestic demands. In addition, the nuclear industry highlights the cheaper production cost of nuclear energy production in comparison to coal-fired power plants – a difference of only 2 cents in 2001, but enough for the industry to establish a political advantage. Nye County itself neither supports nor rallies against the project, placing importance instead on the need to store the growing amount of highly toxic waste and recognizing Yucca Mountain as the only option being considered. Nye County agrees that the project is possible, but more importantly that any legal battles would be won by the nuclear industry.⁵⁵

The Western Shoshone Defense Project (WSDP) represents the universal fight of the Western Shoshone Native American tribes. WSDP “protect[s], preserv[es], and restore[s] Newe rights and lands for present and future generations based on cultural and spiritual traditions,”⁵⁶ clearly focusing on social factors not recognized by the government under the definition of environmental justice. According to the Western Shoshone Nation, storing such toxic waste in the “breast of Mother Earth at Yucca Mountain,” would “desecrate our sacred lands,”⁵⁷ highlighting the peoples ingrained dedication to the natural world and the vulnerable position of their culture.

In addition to the Western Shoshone tribes of Nevada, traditional environmental groups such as branches of the Sierra Club, Environment America, and the Rainforest Action Network oppose

⁵³ New York Times:

<http://topics.nytimes.com/top/news/national/usstatesterritoriesandpossessions/nevada/yucca-mountain/index.html?scp=1-spot&sq=yucca%20mountain&st=cse>

⁵⁴ White House. Retrieved May 2009. http://www.whitehouse.gov/issues/energy_and_environment/

⁵⁵ Nye County, Nevada. Retrieved April 2009.

<http://www.nyecounty.com/index.htm>

⁵⁶ <http://www.wsdp.org/>

⁵⁷ http://www.wsdp.org/yucca_mountain/yucca_mountain.htm

the construction of the repository on four platforms ranging from ethical to environmental stances. First, these groups believe that the establishment clearly violates the rights of the people as delineated in the Treaty of Ruby Valley regardless of the US government's decision to abolish its legal standing. Secondly, they collectively fear the scientific uncertainty regarding weather fluctuations and geological stability, which in the words of a California MiWok representative could result in an: "extremely high likelihood that there will be adverse impacts to the drinking water supply, impacts from truck transportation of nuclear waste, [and] socio-economic impacts to cultural resources."⁵⁸ Third, they propose that a nuclear waste repository will provide the nation with a "false sense of security"⁵⁹ in the use of nuclear energy, encouraging increased production despite the dangers of uranium's high toxicity. Lastly, while proponents of nuclear waste look to the low pollution levels of the production and storage of nuclear waste, nuclear waste still poses environmental threats. Nuclear energy currently represents the nation's largest source of emissions-free energy,⁶⁰ making it an environmentally valuable energy source compared to fossil fuel use. Despite the expected durable waste containers, the large interest groups dismally highlight the probability that radioactive particles could still leech into the water flow at expectedly low levels, contaminating water sources and threatening the aquatic ecosystems of the aquifers and rivers.^{61 62 63}

The position taken by other states remains divided, with the State of Nevada vehemently opposing the project because of scarce natural resources. California notably opposes the project in fear of the resulting transportation of nuclear waste from current temporary facilities to Yucca Mountain – a concern shared amongst many states.⁶⁴ The State of California estimated 45% of the material will be transported via railroads, endangering the 7.5 million people living within a mile of the potential routes. While the Dry Casks are only temporary, many concerned citizens question the feasibility of transporting the highly dangerous waste across the nation in trucks, boats, and trains, where the risk of terrorist activity and accidents increases exponentially. From a different perspective, the State of Nevada has opposed the project from the beginning because of the amount

⁵⁸ California Valley Miwok Tribe. Retrieved April 2009. http://www.rw.doe.gov/ym_repository/seis/comments/FSEIS-ORG_Comm_A_thru_W.htm

⁵⁹ Rainforest Action Network. http://www.rw.doe.gov/ym_repository/seis/comments/FSEIS-ORG_Comm_A_thru_W.htm

⁶⁰ DOE.

⁶¹ RAN

⁶² Blumensadt, E. C.. Nevada Group Sierra Club, http://www.rw.doe.gov/ym_repository/seis/comments/FSEIS-ORG_Comm_A_thru_W.htm

⁶³ Linder, Josh

⁶⁴ California. http://www.rw.doe.gov/ym_repository/seis/comments/FSEIS-ORG_Comm_A_thru_W.htm

of water that has been used in the research process, and approaches the problem from a purely environmental perspective to protect the states precious resource.^{65 66}

Conclusive Analysis

The construction of the Yucca Mountain high-level waste repository brings to question the definition of environmental justice and the stipulations of the movement – has the federal government sufficiently addressed environmental justice in implementing EO 12898? The case study of the Yucca Mountain repository highlights the detrimentally limiting statute of the EO 12898 through its sole focus on health. According to the CDC, the Yucca Mountain repository project legally complies with EO 12898 from the perspective of health, but ignores any economic, cultural, or spiritual violations of the people’s livelihoods. Consequentially, the EO 12898 should follow the lead of the UN and uniformly recognize property rights and economic impacts, as well as careful evaluation of the spiritual, religious and cultural impacts of federal actions with regard to an environment’s value.

Despite the tragic loss of the land to the Western Shoshone people, the amount of federal funding and the urgency of the need for high-level nuclear waste repository augment the complexity of the situation. Notwithstanding the legal status of tribal land ownership, much of the Western Shoshone’s land has already been taken and developed in the shadow of societal expansion. Should scientific research conclude complete safety of the repository both now and after 100,000 years, the repository may infringe on the rights of the Western Shoshone, but it will also help alleviate the violation of the 161 million people currently living in proximity to the temporary Dry Cask storage facilities. It should be noted that these facilities likely exist in low-socioeconomic neighborhoods around the country, bringing to light another factor of environmental injustice attached to nuclear waste. Alternatively, transporting the toxic material across the nation to lay it safely in the ground also poses serious risks to the population, weighing against the repository’s construction and complicating the ethics of the issue.

The toxicity of nuclear waste inherently poses a risk to America’s citizens, necessitating compromise in designing a long-term storage facility between the factors brought to attention by the Yucca Mountain case study. Because of the amount of research and money that Yucca Mountain

⁶⁵ California.

⁶⁶ Nevada <http://www.lvrj.com/news/8804552.html>

has received, following through with the plan would prove economically sound. Ultimately, the fiscal year 2010 appropriations bill only represents a temporary solution, requiring administrative support that it currently lacks. I propose a solution established within the executive branch in which Yucca Mountain is encouraged through an executive order until otherwise proven flawed through continued scientific research, in conjunction with an enhanced EO 12898 based on the cultural and spiritual factors outlined by the UN so as to avoid comparable problems in the future. Importantly, the federal government shall justly compensate the Western Shoshone Nation with full entitlement to their remaining undeveloped land and allow them unrestricted access to Yucca Mountain as deemed reasonably safe.

Section 2.2

Environmental Justice and Federal Environmental Policy

Lauren Fink, *Coal Bed Methane on the Crow Reservation: Environmental Justice Concerns*

May 20, 2009

U.S. Environmental Politics
Environmental Studies Program

Summary

About 25 years ago, technology was developed that allows the extraction of methane from coal beds to be used for energy production. There is much concern about the environmental impacts of CBM development, including: water pollution and aquifer changes, methane seeping and air quality, and effects on local species.¹ The Crow tribe, located in south-central Montana, lives above this unique source of energy known as coal bed methane (CBM). The Crow reservation is home to 7,739 tribal members, 31% of whom live below the poverty line.² To allow extraction of this resources could devastate the environment, and possibly the natural and cultural heritage of the Crow, but could also yield income that could potentially rescue some members of the tribe from poverty. This paper addresses this decision in the context of the environmental justice movement, which seeks to address the disproportionate burden placed on minority and low-income communities in dealing with higher levels of pollution and other forms of environmental harm.³

Stakeholders include the Crow tribe, the federal government, and the oil and gas industry. The Crow tribe is torn about whether or not to allow development of CBM on the reservation. Many tribal members believe that the protection of sacred human remains is crucial to the cultural heritage of the Crow, and fear that digging and contamination could lead to unearthing and disturbance of their ancestors' bodies.⁴ Some environmental advocates join these individuals in opposing CBM development and add that natural gas is a nonrenewable fossil fuel that contributes to global warming. In contrast, many members of the Crow tribe are also in favor of CBM development, believing that "mineral development" on the reservation is the best chance to "achieve a better standard of living for the Crow people."⁵ The federal government has created incentives for industry to develop CBM in order to encourage domestic energy production, placate important industry interests with powerful lobbying forces, and reduce dependence on foreign oil.⁶

Although some proponents of environmental justice may feel compelled to recommend that the government prevent all development of CBM on the reservation, it is even more important and "just" to allow the Crow to make their own decisions about how to handle their reservations'

¹ Montana Wildlife Federation. (2002) "Coal Bed Methane: Short-Term Boom, Long-Term Bust." *Issues and Answers*, vol. 25.

² From <http://www.city-data.com/poverty/poverty-Crow-Reservation-Montana.html>

³ Ringquist (2006). "Environmental Justice" *Environmental Policy: New Directions for the Twenty-First Century* (sixth ed.). Editors Norman Vig & Michael Kraft. Washington, DC: CQ Press.

⁴ Crow Indian Tribe. CROW-66.

⁵ EIS. CROW-16.

⁶ Lowry, W. (2006) "A Return to Traditional Priorities in Natural Resource Politics," *Environmental Policy*. (6th edition). Washington, DC: CQ Press.

resources. As companies go forward with CBM development in the Powder River Basin and in particular on the Crow Reservation it is crucial that environmental justice be taken into serious consideration. All local opinions, including those of Crow members who are not active in the tribal government, should be not only heard but sought out if they are silent. The Crow tribe should be educated on the issue, but ultimately allowed to make an informed decision weighing the costs and benefits for themselves.

Background

American Indian Reservations have a particular history of being victims of injustice, poverty, and environmental devastation. Indian Reservations are also some of the poorest areas of this country,⁷ even though they contain 20 percent of U.S. oil and gas natural reserves, as well as one-third of the western states' low-sulfur coal reserves.⁸ Unique resources combined with desperate poverty and a lack of political power make these sites appealing to dirty industries and toxic waste managers. In the 1980s, studies came out recognizing that minority communities in general and Native Americans in particular faced disproportionate amounts of environmental harms including poor air and water quality, dangerous industrial emissions, and toxic waste. The environmental justice movement emerged with the goals of addressing these discrepancies and seeking just distribution of environmental harms.⁹ These concerns are complicated by the fact that many minority communities find themselves stuck choosing between a clean environment and a source of income and jobs that a dirty industry might bring. The Crow Indian Reservation is one example of a historically oppressed community faced with this decision. The poverty-ridden tribe lives above a source of energy known as coal bed methane. To allow extraction of this resources could devastate the environment, as well as the natural and cultural heritage of the Crow, but could also yield income that could potentially rescue some members of the tribe from poverty.

The Crow Indian Reservation, home to about 8,000 registered tribe members, is located in south-central Montana in a basin with vast coal resources. No coal mining has yet begun on the reservation itself, but the tribe already raises a large amount of money from coal extraction just off

⁷ Anderson, T. and Parker, D. (2008) "Sovereignty, Credible Commitments, and Economic Prosperity on American Indian Reservations." *Journal of Law and Economics*, vol. 51.

⁸ Merchant, Carolyn. (2002) *The Columbia Guide to American Environmental History*. New York, NY: Columbia University Press. 155.

⁹ Ringquist (2006). "Environmental Justice" *Environmental Policy: New Directions for the Twenty-First Century* (sixth ed.). Editors Norman Vig & Michael Kraft. Washington, DC: CQ Press.

the reservation – in 2006, royalties and taxes paid to the tribe totaled \$16.6 million.¹⁰ Expansion to include extraction of natural gas located within the coal seams known as coal bed methane (CBM) or coal bed natural gas (CBNG) could increase revenue and provide jobs for the Crow people. However, it could also lead to vast environmental damage; furthermore, as CBM is a newer technology, the long-term harms are not yet fully understood. The issue is not as simple as it seems – some members of the Crow Tribe want to expand exploitation of the mineral deposits upon which their reservation sits in order to increase revenue.

Formerly a dangerous byproduct of coal extraction leading to explosions, in the past 25 years, industry scientists have developed processes to turn methane found in coal deposits into usable natural gas for energy production. As energy prices continue to soar, this new form of energy production may bring increased revenue to the Crow Reservation – but with it, increased environmental and health problems. This issue brief will address whether coal bed mining should be permitted on the Crow Reservation, and whether doing so is environmentally just.

What is Environmental Justice?

In the 1980s, several studies verified what many living in minority communities already knew: the distribution of environmental hazards such as toxic waste, air and water pollution is not equal. Minority and low-income communities face worse air and water quality, more hazardous waste, greater risks from environmental health concerns at work, compounded by (or perhaps created by) a lack of political power to address these issues.¹¹ These communities often have less political power than their wealthy white neighbors and little leisure time to spend organizing for their rights. As facts about the connection between minority status, income, and environmental hazard exposure came to light, a relationship began to develop between environmental and civil rights advocates, ultimately giving birth to the environmental justice movement.

In 1994, the environmental justice movement experienced a national victory when Bill Clinton signed Executive Order 12898, which requires every federal agency to “make achieving environmental justice part of its mission.” An accompanying memorandum regarding EO 12898 outlines the steps that should be taken when a new project is assumed, including “the analysis of environmental and health effects on poor and minority communities whenever and Environmental

¹⁰ Gallagher, S. (April 2008) “Proposal would move mining onto Crow Reservation.” *News from Indian Country*.

¹¹ Ringquist. 239.

Impact Statement [EIS] is required under the National Environmental Policy Act.”¹² The language of the executive order is vague, and the stipulations about how exactly the analysis should be including in an EIS are not particularly specific. These leave many loopholes preventing comprehensive and effective implementation of the executive order. These loopholes were taken advantage of with particular vigor during the Bush administration, which marked a stagnant period at the executive level for the environmental justice movement.¹³

Addressing environmental inequity requires comfort with complexity: the issues are rarely perfectly clear. For example, a community may choose out of economic desperation to allow its land to be used for industry or waste disposal that brings environmental harm if it also brings jobs and revenue. One tragic example is that of the Navajo Nation. In the 1950s the Navajo Nation opened its land to uranium mining, and many of the men were grateful to have jobs, completely unaware of the devastating health consequences they would later face due to radiation exposure.¹⁴ Although the full effects of radiation poisoning were not completely understood by anyone in the 1950s, there was at least a rudimentary understanding in the scientific community that radiation wasn’t good for you. However, few Navajo spoke English at the time, and there is no word in the Navajo language for “radiation.” Nuclear developers took advantage of the fact that the Navajo had practically no understanding of the risks they were taking on when mining uranium.¹⁵

Environmental justice issues are particularly pertinent to Native Americans living on Indian Reservations. As the Navajo example above illustrates, the United States has a history of exploiting the people and resources located on poverty-ridden reservations. Tribal culture and land tenure create a permanence that is more deeply rooted than other communities. Furthermore, as Shashone-Bannock tribal lawyer Jeannette Wolfley explains, “tribes cannot simply relocate to new areas when their lands become contaminated, their water polluted, or their wildlife resources decimated.”¹⁶ If CBM development leads to disastrous environmental harm, the Crow could be compensated monetarily, but it would be much harder for them to relocate the way another community could. Their cultural heritage is tied to the land they live on and the resources that land provides.

¹² Ringquist (2006). “Environmental Justice” *Environmental Policy: New Directions for the Twenty-First Century* (sixth ed.). Editors Norman Vig & Michael Kraft. Washington, DC: CQ Press.

¹³ Ringquist.

¹⁴ Brugge, D. & Goble, R. (2002) “The History of Uranium Mining and the Navajo People.” *American Journal of Public Health*. Vol. 92, No. 9: 1410-1419.

¹⁵ Brugge, D. & Goble, R. 1410-1419.

¹⁶ Merchant. 155.

The Facts

Location, Location, Location

The Crow Reservation, located on 2,296,000 acres in south-central Montana, overlies a section of the 32,000 square mile Powder River Basin located in Wyoming and Montana. The Powder River Basin is the single largest source of coal mined in the United States.¹⁷ The Crow Indian Reservation is located in south-central Montana, bordering Wyoming to the south and the Northern Cheyenne Indian Reservation to the east (see map). It is the largest reservation in the state, approximately 60 miles wide and 40 miles in length. The landscape of the reservation includes three mountain ranges – Bighorn Mountains, the Pryor Mountains, and the Wolf/Rosebud Mountains – as well as flat plains and several rivers.¹⁸ The area with greatest potential for CBM development is in the southeastern corner of the reservation, which contains the northwest corner of the Powder River Basin.¹⁹ The land contains six fields that have produced oil and gas on or near the reservation.²⁰ The Crow also overlay vast coal resources. On lands whose mineral rights are controlled by the tribe (on the reservation and ceded land), there is an estimated 700-800 million tons or 17 billion short tons of coal.²¹ Of the coal deposits on the Crow Reservation, 16.1 billion may be prospective for CBM development.²² Although no coalmines currently operate on the reservation, there are six surface coal mines and four coal-fired power plants operating within 5 to 20 miles of the reservation’s boundaries.²³

The resources on the Crow Reservation are a “split estate” in which mineral ownership and surface ownership are not necessarily the same. The surface land itself is also split, with the Crow Tribe owner about 20% of the total surface, individually allotted trusts representing 45% of the total, and private fee acreage owning the final 35%.²⁴ Below ground, the Crow Tribe owns 20% of

¹⁷ U.S. Energy Information Administration. “Coal Production and Number of Mines by State and Mine Type.” <<http://www.eia.doe.gov/cneaf/coal/page/acr/table1.html>>

¹⁸ Crow Indian Tribe. (April 2002) “Crow Natural, Socio-Economic Cultural Resources Assessment and Conditions Report.” Submitted as part of the *Statewide Oil and Gas Final Environmental Impact Statement*. 67.

¹⁹ Bureau of Land Management and the State of Montana. (2008) *Final Supplemental Environmental Impact Statement (SEIS) to the Final Statewide Oil and Gas Environmental Impact Statement and Proposed Amendment of the Powder River and Billings Resource Management Plan*. SUM-8.

²⁰ Crow Indian Tribe (April 2002) “Crow Natural, Socio-Economic and Cultural Resources Assessment and Conditions Report.” *Statewide Oil and Gas Environmental Impact Statement and Proposed Amendment of the Powder River and Billings Resource Management Plan*. CROW-70.

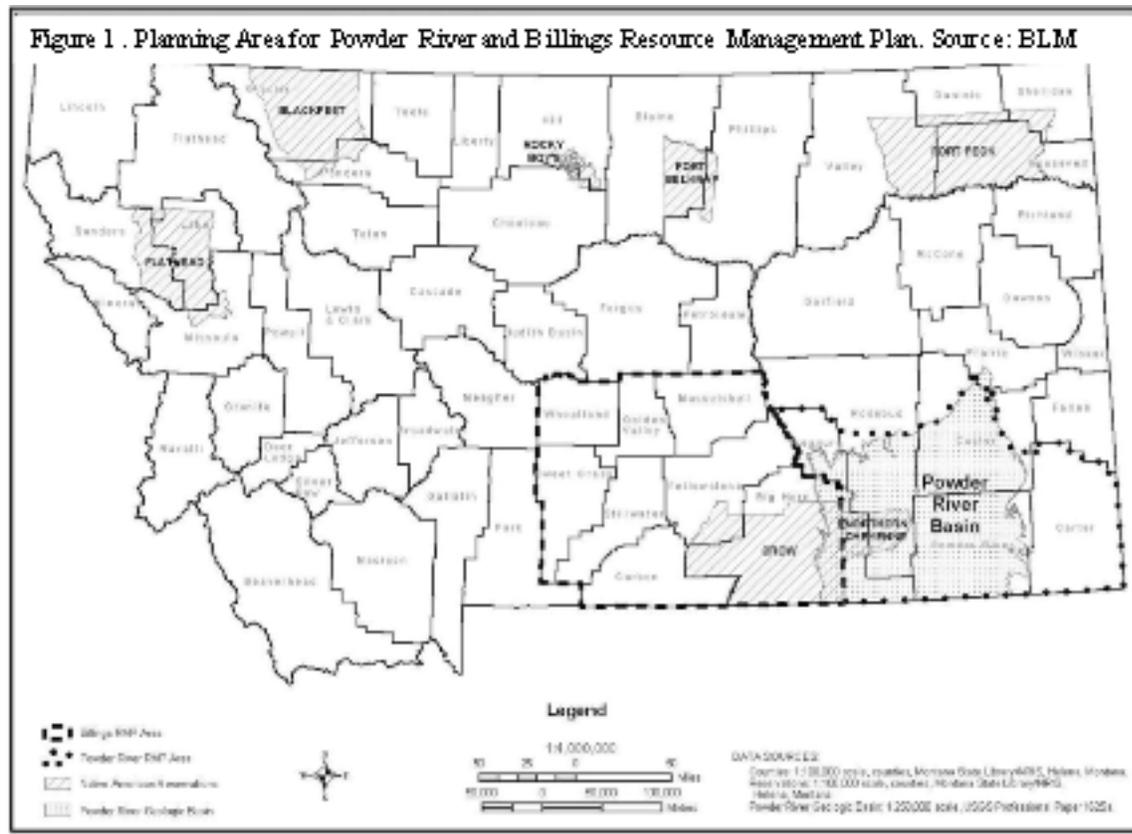
²¹ EIS. CROW-70.

²² EIS. CROW-38.

²³ EIS. CROW-38.

²⁴ EIS. CROW-20.

minerals, individually allotted trust accounts for 41%, and private acreage 39%.²⁵ Most of the land on the reservation is used for agricultural and timber development, with about 68% used as grazing rangeland and only 1% of the land classified as “developed” areas.²⁶



The Crow Tribe: History and Demographics

History

The Crow Tribe of Indians gained its American name from a misinterpretation of the name “Apsaalooke,” which means “children of the large-beaked bird.”²⁷ The tribe has a long, tragic and rich history. In 1848 they were hit hard by the smallpox epidemic, compounded by a flu outbreak in 1849. By 1850, the majority of the Crow were dead. The land that would become the current Crow Reservation was first negotiated in the Fort Laramie Treaty of 1851. Through a series of later treaties and agreements up until 1905, the reservation lands were decreased considerable. These treaties also defined the tribe’s rights as a sovereign government and established the boundaries of the Crow Indian Reservation. The tribal government has jurisdiction within the external boundaries

²⁵ EIS. CROW-20.

²⁶ EIS. CROW-20.

²⁷ Crow Tribe of Indians. “About the Apsaalooke.” Accessed 18 May 2009. <<http://www.crowtribe.com/about.htm>>

of the reservation lands.²⁸ The executive branch, under the 2001 constitution, has the responsibility to “protect and preserve the property, wildlife, and natural resources including air and water of the Tribe in accordance with ordinances adopted by the Legislative Branch.”²⁹

Mining has been a concern for the Crow for over a hundred years. In 1891, Congress passed an act that ceded the western third of the Crow Reservation to miners. In 1919, they faced a serious economic blow when a policy began that involved removing Indian horses from reservations. In the wake of World War II and partly in gratitude for their service, the 1920 Crow Act conferred rights of the mountains and minerals to the tribe, and the Snider Act of 1924 granted all Native Americans full citizenship.³⁰

Demographics and Economy

Tribal enrollment data put the reservation population at 7,739 tribal members in 2003.³¹ The population is young and growing, with 37.7% of the total population under 18 years of age in 2000.³² There is vast poverty on the reservation. In 2007, 31% of residents of the Crow Reservation lived below the poverty line, compared to 14.1% in the state of Montana.³³ The poverty rate on the Crow Reservation is up 10% since 1990, perhaps in part due to the rising prices of energy and increased royalties from mineral deposits owned by the tribe and mined by an outside company.³⁴

The economy of the Crow is historically based on agriculture, including livestock, wheat, barley, oats, corn, sugar beets, alfalfa, and hay. Increasingly, the Crow economy is becoming dependant on the production and exploitation of natural resources including land, water, coal, oil and gas, timber, sand and gravel. The Absaloka Mine located within five miles of the reservation employs between 40 and 75 Crow tribal members each year. The mineral rights to this land are owned in trust by the federal government. The largest employers are tribal and federal governments including the Bureau of Indian Affairs and the Indian Health Service.³⁵

What is Coal Bed Methane?

²⁸ Crow Tribe, CROW-7

²⁹ Constitution of the Crow Tribe of Indians.

³⁰ Crow Tribe of Indians. (2002) “Culture and History,” *Environmental Impact Statement*.

³¹ Crow Tribe of Indians (2007). “Crow Reservation PDM Plan.” Section 1 – pg 7.

³² Crow Tribe of Indians (2007). “Crow Reservation PDM Plan.” Section 1 – pg 7.

³³ <http://www.city-data.com/poverty/poverty-Crow-Reservation-Montana.html>

³⁴ Brown, Matthew. “Crow tribe wants to exploit coal,” *Indian Country News*. 17 July 2008.

³⁵ Crow Tribe of Indians (2002), CROW-38.

Methane (CH₄) is a major component of natural gas. Traditional natural gas contains about 85% methane along with carbon dioxide, hydrogen sulfide, helium, nitrogen, and several heavy hydrocarbons. In contrast, the methane found in coal seams (coal bed methane or CBM) contains roughly 95% methane.³⁶ CBM is considered a “cleaner” natural gas because it contains less carbon dioxide and hydrocarbons requiring additional processing. CBM gas was produced during the coalification process thousands of years ago either through microbial action or as a result of thermal processes that caused the creation of coal from dead plant matter.³⁷ This gas is structurally identical to other forms of natural gas, but involves a much different production and extraction processes. As of 2000, CBM accounted for 7% of the country’s natural gas resources.³⁸

Before the 1980s, the gas posed a serious risk to coal miners as it occasionally caused dangerous explosions.³⁹ In an attempt to mitigate these problems, strategies were developed to extract methane gas from the mines. About 25 years ago, technology was developed that allowed the extracted methane to be used for energy production.⁴⁰ Extraction of coal bed methane began in the Powder River Basin in 1999 from private and state wells and in 2003 from federal wells.⁴¹ As of August 2008, the Bureau of Land Management (BLM) reports approximately 850 wells producing coal bed methane in the Powder River Basin from federal, state and private leases.⁴²

Environmental Impacts

There is much concern about the environmental impacts of CBM development, especially because as a relatively new technology there is still no long-term impact data available. As was seen in the aftermath of the Navajo experience with uranium mining, an economic boom can become an environmental and medical disaster years later when the full effects of a project are finally understood. The major effects of coal bed methane development that are currently known and will likely affect the Crow include: water pollution and aquifer changes, methane seeping and air quality, and effects on local species.

³⁶ Bryner, Gary (July 2002) “Coalbed Methane Development in the Intermountain West: Primer.” National Resources Law Center: University of Colorado. 1.

³⁷ Bryner, Gary (July 2002) “Coalbed Methane Development in the Intermountain West: Primer.” National Resources Law Center: University of Colorado. 1.

³⁸ Bryner, G. 2.

³⁹ Bryner, G. 2.

⁴⁰ Montana Wildlife Federation. (2002) “Coal Bed Methane: Short-Term Boom, Long-Term Bust.” *Issues and Answers*, vol. 25.

⁴¹ Bureau of Land Management. (August 2008) Press Release: “Coal Bed Natural Gas Development.”

⁴² Bureau of Land Management. (August 2008) Press Release: “Coal Bed Natural Gas Development.”

A major concern for communities living near CBM development facilities is water management. Methane extraction affects water supplies in 3 important ways: through the production of large amounts of excess run-off water, the possibility that the resulting water will be polluted or otherwise unusable, and the drawdown of aquifers. Because the methane is found within the cracks of porous coal, removing it is a complicated procedure that results in the production of large amounts of water.⁴³ This water may be safe and useful for beneficial purposes, but more often it contains high levels of undesirable minerals and chemicals including ammonia, selenium, boron, iron, radium, fluoride, and sodium salts. These substances render discharged water unsuitable for irrigation and lethal to local fish.⁴⁴ The produced water is either discharged on the surface or re-injected into the ground. Even if the water contains a safe amount of minerals, it may cause ecological devastation when released into an area unaccustomed to such a volume of water.⁴⁵ By decreasing the pressure within coal aquifers, the extraction process could also negatively impact existing sources of groundwater through a process known as “drawdown.”⁴⁶ Water extraction also allows oxygen to get into the coal tunnels, which increases the risk of underground fires that are a common plague of coal-rich areas.⁴⁷ There have already been several cases of fires in coal bed methane extraction sites.⁴⁸ Coal bed fires can lead to serious wildfires that last for months, causing serious damage of private property.⁴⁹

Although methane is considered by gas companies to be a “clean burning fuel,” it comes with a set of air pollutant emissions concerns including methane seeping and dangerous chemical release. Methane seeping is a process that leads to “dead zones” of soil that is starved and vegetation destroyed, as well as causing asphyxiation of local rodents. Since the advent of coal bed methane development, methane seeps appear to be more frequent and severe.⁵⁰ Methane seeping into drinking water wells and homes caused such a health hazard that residents near Bayfield, Colorado were bought out and relocated.⁵¹ The development of coal bed methane is also directly responsible for the emission of greenhouse gasses including carbon dioxide, and methane itself. A

⁴³ Bryner, G. 3

⁴⁴ Montana Wildlife Federation (August 2002). “Coal Bed Methane: Short-Term Boom, Long-Term Bust.” *Issues & Answers* (newsletter).

⁴⁵ Bryner, G. 14

⁴⁶ SEIS. SUM-10.

⁴⁷ Western Organization of Resource Councils (WORC) (2003) “Coalbed Methane Development: Boon or Bane for Rural Residents?” 4.

⁴⁸ WORC. 4.

⁴⁹ WORC. 4.

⁵⁰ WORC. 4.

⁵¹ WORC, 4.

wide variety of other hazardous or potentially hazardous substances, including formaldehyde and hydrogen sulfide gas, are used and produced during the development processes.⁵² The vehicles used in production also emit carbon dioxide and other pollutants and cause particulate matter to enter the air from driving on unpaved land.⁵³

Finally, CBM development leads to destruction of land and fragmentation of wildlife habitat, leading to serious disruption of migration corridors.⁵⁴ The wildlife that may be affected includes species listed under the endangered species act, such as bald eagles, grizzly bears, and the Canada lynx.⁵⁵ The BLM predicts in the EIS compiled to address environmental impacts of CBM development in the Powder River Basin that “virtually all” species of wildlife will be impacted by CBM development with sensitive species impacted the most.⁵⁶ The Montana Wildlife Federation predicts that seven species of big game, 34 species of small mammals, 17 species of predators, 50 species of fish, and 250 species of birds will be affected.

Current Laws and Policies

The Crow, through a series of treaties, court cases, and federal laws, retains “attributes of sovereignty” over its land and people on the reservation.⁵⁷ What exactly “sovereignty” means in the context of Native American tribes is beyond the scope of this paper. However, it is relevant to note that, although the tribe retains its own constitution and governing structure, its laws must comply with applicable federal law.⁵⁸ All actions undertaken in the development of CBM on the Crow Reservation will have to follow a wide variety of federal laws including the Mineral Leasing Act, the Clean Water Act (CWA), the Clean Air Act (CAA), the National Environmental Protection Act (NEPA), the Endangered Species Act (ESA) and the National Historic Preservation Act. In addition, the Crow has its own set of codes and standards regulating water and air quality as well as specific codes related to coal exploration and mining.⁵⁹ Most of these laws set regulations and standards regarding emissions and land use that will compel companies wishing to explore CBM development on the Crow reservation to do so in a somewhat environmentally sound manner.

⁵² WORC, 4.

⁵³ SEIS, Chapter 4 – 22.

⁵⁴ WORC, 4.

⁵⁵ EIS, SUM-5.

⁵⁶ SEIS, Chap 4 - 274.

⁵⁷ Crow Tribe of Indians (2002), CROW-11.

⁵⁸ Crow Tribe of Indians (2002), CROW-11

⁵⁹ Crow Tribe of Indians (2002), CROW-11

However, the bureaucratic processes required are extensive and slow, and not necessarily effective in preventing environmental degradation.

In 2000, the Bureau of Land Management issued three coal bed methane leases in Wyoming in the Powder River Basin Region (not on the Crow Reservation). The Powder River Basin Resource Council sued the BLM for not complying NEPA – federal legislation passed in the 1970s that requires all federal agencies to prepare Environmental Assessments (EAs) and Environmental Impacts Statements (EISs) to address the environmental effects of proposed federal agency actions. After a two-year legal battle, the courts decided that specific EIS related to CBM development were required, and the existing reports regarding conventional deep natural gas were not sufficient. The resulting EIS was finally submitted in 2003 and recommended a preferred alternative that would “allow the BLM and State to review and approve CBM activities in a manner that facilitates efficient and orderly CBM activities while providing the appropriate type of resource protection on a site specific basis as well as an ecosystem basis.” In 2005, a court order was issued for a supplemental EIS because the original did not consider a phased-in exploration and development alternative.⁶⁰ The supplemental EIS (SEIS), completed in October of 2008, recommended a preferred alternative that would allow “exploration and development coupled with a monitoring feedback loop that would provide information for adaptive management decisions.”⁶¹

In accordance with the stipulations of Executive Order 12898, the environmental impact statements and supplements related to the issue of coal bed methane development each contain short sections on environmental justice – all of which conclude that “with mitigation, no adverse health or environmental effects would be expected to fall disproportionately on minority or low-income populations” resulting from the preferred alternatives. Mitigation in this sense means resource screens, watershed-level analysis, and “consultation with tribes and ongoing monitoring for development within a 5-mile radius of all Reservations to protect Indian Trust Assets.”⁶² According to the BLM’s record of decision from 2008, under the preferred “Alternative H” approach leases will be granted for projects that will proceed in a phased development manner under specific restrictions meant to reduce overall cumulative impacts of the following environmental concerns. Due to all of the bureaucratic and legal proceedings, no CBM development has yet begun on or

⁶⁰ Oyan, Katie. (Sept 2007) “Panel upholds judge’s ruling in coal-bed methane case.” *Indian Country News*.

⁶¹ SEIS, 2-7.

⁶² SEIS, 211.

around the Crow Reservation, but in the wake of the December 2008 report, exploration will likely begin shortly.

Stakeholder Opinions

Crow Tribe of Indians

Many tribal members believe that the protection of sacred human remains is crucial to the cultural heritage of the Crow, and fear that digging and contamination could lead to unearthing and disturbance of their ancestors' bodies.⁶³ The Crow's cultural heritage could also be compromised by coal bed methane development due to increase in noise and particulate matter release in areas used for religious and spiritual practices.⁶⁴ Furthermore, plant populations and other resources used for spiritual and religious purposes may be destroyed.⁶⁵ According to studies of the local populations compiled for the EIS, many Native Americans "wish to preserve their heritage and do not wish to become homogenized into and by the non-Indian culture."⁶⁶

However, there is also a large group of powerful tribal members who believe that social and economic betterment may be sought in the long-run through the development of energy resources.⁶⁷ According to the Resources Report compiled by Crow officials for the 2003 EIS, the official opinion of the Crow government is: "Presently, mineral development on the Crow Reservation provides the best opportunity for the Crow Tribe to achieve a better standard of living for the Crow people."⁶⁸ Many tribal members also believe that coal development would lead to increased sovereignty by fomenting self-sufficiency and decreasing the tribe's dependence on the federal government. According to the Socioeconomic Appendix of the 2002 EIS, "Tribal coal leasing was seen by some members as a way for the tribe to raise money to save its land base and to enhance the tribe's ability to govern itself."⁶⁹

However, these beliefs are balanced with those who believe that no revenue is enough to account for the destruction of culture and Native American values that could result from industrialization and exposure to non-Native American culture.⁷⁰ In deciding whether to encourage

⁶³ Crow Indian Tribe. CROW-66.

⁶⁴ SEIS. Chapter 5 – 214.

⁶⁵ SEIS. Chapter 5 – 214.

⁶⁶ BLM (2002) EIS "Socioeconomics Appendix," SEA-1

⁶⁷ EIS. SEA-1.

⁶⁸ EIS. CROW-16.

⁶⁹ EIS. SEA- 4.

⁷⁰ EIS. SEA-4.

and seek leasing agreements for prospective coal bed methane sites on and around the reservation, the Crow are internally conflicted between concerns for the preservation of cultural heritage and the need to address desperate poverty.

Oil and Gas Industry

The oil and gas industry is interested in exploring all of the Powder River Basin for possible CBM development sites. The largest incentive for oil and gas companies to invest in coal bed methane development in the Powder River Basin is the large amount of tax breaks and subsidies. The largest direct subsidy related to coal bed methane is the “Section 29” tax credit for alternative fuels. This tax credit, which originated in 1980 with the Crude oil Windfall Profits Act, was aimed at spurring development of fuels that at the time were considered alternative, experimental, and uneconomical in the short-run. The tax credit continues to this day, even though many of the recipients are no longer engaged in what could be termed “experimental.” This tax credit only applies to wells drilled before 1993.⁷¹ A second category of tax breaks for coal bed methane development is the use of the “percentage depletion” rather than “cost depletion” method to calculate deduction from taxable income. It is estimated that between 1999 and 2004, the costs to the federal government of allowing independent producers to use percentage depletion was between \$200 million and \$700 million a year.⁷² Finally, oil and gas industries are allowed to count all of their passive losses in a year, compared to the normal policy of only allowing deduction up to net income.⁷³ This allows firms to receive tax bonuses earlier than normal.

Coal bed methane is the fastest growing domestic source of natural gas, and many companies want to be a part of the exciting new industry. An article from the “Science and Environmental Health Network” published in 2004 identified over 70 energy companies that are “gearing up to exploit CBM resources.”⁷⁴ In association with these companies are powerful lobbying associations such as the American Petroleum Institute, the Montana Petroleum Association, and the Montana Coalbed Natural Gas Alliance. These companies lobby for

⁷¹ Skov, J. & Myers, N. (June 2004). “Easy Money, Hidden Costs: Applying Precautionary Economic Analysis to Coalbed Methane in the Powder River Basin” *Science and Environmental Health Network*. <www.sehn.org>

⁷² Skov, J. & Myers, N.

⁷³ Skov, J. & Myers, N.

⁷⁴ Skov, J. & Myers, N.

deregulation and access to leasing, drilling, development, in addition to maintaining and expanding current tax credits.⁷⁵

Environmentalists

Environmentalists are not in complete consensus, but most are against the development of coal bed methane, or believe that the development process should be more strictly regulated.⁷⁶ Grassroots organizations concerned with responsible development of coal bed methane include the Powder River Basin Resource Council (www.powderriverbasin.org/PowderRiverBasinrc/), the Oil and Gas Accountability Project (www.ogap.org) and the Powder River Coalbed Methane Information Council (www.cbmwyo.org). These local groups are not necessarily opposed to the development of coal bed methane, but are pushing for more accountability and regulation to protect the environment and human health in the process. In its response to the 2003 EIS, the Powder River Basin Resource Council wrote: “The analysis is flawed and fraught with errors, provides contradictory information and it especially fails to reveal or take the required “hard look” at the serious and long lasting impacts to the landowners living on top of these federal minerals.”⁷⁷

Nationally, environmentalists concerned about climate change are opposed to extensive domestic energy production that will further our nation’s dependence on greenhouse gas emitting fuel of any kind. Although methane natural gas is a cleaner burning energy source than coal, it still contributes to climate change. The extraction process will potentially yield disastrous environmental effects, and each new development project brings the United States further from a clean energy future and more dependent on nonrenewable resources. The development of renewable energy resources on Indian land is tricky. Because Indian tribes such as the Crow are tax-exempt, they are disqualified from receiving federal credits for renewable energy production. Environmental groups lament the fact that wind resources on Indian Reservations are not enticing to industry due to a lack of tax subsidies and propose reform to encourage development of cleaner energy.⁷⁸

⁷⁵ Skov, J. & Myers, N.

⁷⁶ Skov, J. & Myers, N.

⁷⁷ Powder River Basin Resource Council (February 2003) “PRBRC’s Protest and Comments on Final EIS.”

⁷⁸ <http://solveclimate.com/blog/20080325/native-americans-left-out-america-s-wind-power-boom>

Federal Agencies

Federal agencies are invested in the development of CBM through tax credits, regulation of the price of natural gas, subsidies, and funds for research. Policies are targeted at mineral and energy source protection. During the Bush administration, there was a push for opening up access to domestic energy resources and deregulating industry. Subsidized development and artificially low fees are one example of policies meant to encourage domestic energy production, placate important industry interests with powerful lobbying forces, and reduce dependence on foreign oil.⁷⁹

The federal government has been deeply involved in simplifying access to CBM resources and encouraging development directly. The Department of Interior conducted a study in 2004 that evaluated mineral resources through the U.S. and identified focus regions with “high potentials for mineral development.”⁸⁰ The Powder River Basin is, not surprisingly, one of those regions. The Bush administration set up the “Rocky Mountain Energy Council,” a committee aimed at making the permitting process easier. The group is made up of industry representatives and officials from various federal agencies involved in mineral development.⁸¹

Looking Forward: A Recommendation

As companies go forward with CBM development in the Powder River Basin and in particular on the Crow Reservation it is crucial that environmental justice be taken into serious consideration – much more serious than a single paragraph in an EIS. Especially for the undereducated population of the Crow Reservation, agencies and companies should not only allow but actively seek out local opinions and take very seriously the concerns of the Crow regarding protection of their cultural heritage and areas of spiritual importance. The internal politics of the Crow are such that a power dynamic exists between the more highly educated government officials, and the lesser educated tribal members. Tribal members not currently involved in the process may have serious concerns about CBM development, but without an understanding of the issue or a way to voice their concerns, they are silenced. These individuals should be sought out and their opinions seriously considered.

⁷⁹ Lowry, W. (2006) “A Return to Traditional Priorities in Natural Resource Politics,” *Environmental Policy*. (6th edition). WASHINGTON, DC: CQ Press.

⁸⁰ Lowry, W.

⁸¹ Lowry, W.

The federal agencies as well as environmentalists must avoid allowing their understandings of theoretical notions of “development” or “justice” prevent the Crow from retaining agency in this process. An example of what not to do comes from Noxubee County, Mississippi. In the early 1990s, Federated Technologies planned to build a hazardous waste facility in the largely African American community. Public opposition, mostly from out-of-state groups, was strong. This movement was actually in contrast to local groups, who largely supported the building of the facility. In response to out-of-state proponents of what they considered “justice,” a local African-American alderman explained: “the racism was in not allowing African-Americans in Noxubee County to make their own decisions and to try to improve their own welfare.”⁸²

The Noxubee County case should be a lesson: pushing an academic notion of justice on the economically depressed Crow is not necessarily going to help them – but the money from coal bed methane development might. The Crow must be given agency to make their own decisions. However, the precautionary principle should be taken into account and cleaner, safer alternatives examined seriously. The federal government should also take steps to ensure that the Crow are not taken advantage of by greedy firms seeking to use tribal sovereignty to exploit or avoid conforming to federal environmental regulation. This can be achieved by ensuring that the Crow are making an informed decision and have access to the resources they need to make that decision.

⁸² Ringquist.

Section 2.3

Environmental Justice and Federal Environmental Policy

Melanie KazeneI, Mountaintop Removal Coal Mining: A Question of
Environmental Justice?

May 20, 2009

U.S. Environmental Politics
Environmental Studies Program

Summary

The environmental justice movement emerged in the 1980s in response to growing concern regarding the disproportionate exposure of minority and low-income populations to environmental harm. One example of current environmental justice concern relates to the practice of mountaintop removal coal-mining in the Appalachian states of Kentucky, West Virginia, Virginia, and Tennessee. The practice, which literally involves blasting off the tops of mountains to expose coal contained underneath, has a number of serious environmental and social consequences, many of which are disproportionately felt by the low-income people of the region. This fact poses several key questions. To what extent has environmental justice played a role in federal level decision-making and action regarding mountaintop coal mining? Is the federal government sufficiently considering environmental justice concerns in its actions? Based on environmental justice concerns, how should the federal government regulate mountaintop removal coal mining?

A complex regulatory system currently governs mountaintop removal coal-mining in Appalachia; through this system, permits are issued under the Surface Mining Control and Reclamation Act and the Clean Water Act. To obtain a permit, mining companies must demonstrate compliance with certain environmental standards. Much policy debate throughout the past several decades has focused upon under what conditions the issuing of permits is appropriate and justified. While environmental organizations point toward the environmentally harmful impacts of mountaintop removal coal-mining, calling for strict regulation and control of the practice, the mining industry and other stakeholders assert that mining is an economically-beneficial activity that should be permitted with less stringency.

In February 1994, President Clinton issued Executive Order 12898, calling for federal agencies to address the issue of environmental justice in minority and low-income populations. However, federal level consideration of mountaintop removal coal mining has focused largely on the environmental impacts of the practice and has failed to take environmental justice concerns into account. For example, in the completion of environmental impact statements evaluating mountaintop removal coal mining, federal agencies gave very little attention to environmental justice issues. And the review of mining permits that is currently being undertaken by the Obama administration seems to similarly be evaluating mountaintop mining based upon solely environmental criteria.

Past and recent policy action therefore corroborate the assertion that agency implementation of E.O. 12898 has been extremely limited. While federal agencies have begun to consider environmental justice concerns, many seem to be doing so largely out of mere obligation, making requisite mention of environmental justice concerns without truly considering the issue to a full and in-depth degree. As a result, environmental justice, an issue of significant and established concern in Appalachia, seems to have remained largely unaccounted for in federal action. Environmental justice concerns further serve to provide increased evidence for the need to stop current destructive practices, serving as further reason that mountaintop removal coal mining should be more stringently regulated. To promote the health of Appalachia's precious ecosystems and the well-being of its people, the practice of mountaintop removal coal-mining should be strictly regulated if not eventually banned completely.

Introduction

The environmental justice movement emerged in the 1980s in response to growing concern regarding the disproportionate exposure of minority and low-income populations to environmental harm. These populations are often inequitably burdened with the consequences of environmental degradation and disproportionately feel the effects of issue such as toxic pollution, hazardous waste, and poor water quality.

In the United States, numerous examples of environmental justice concerns have been identified within the past several decades. One such concern relates to mountaintop removal coal-mining, a destructive mining practice employed in the Appalachian states of Kentucky, West Virginia, Virginia, and Tennessee. The practice, which literally involves blasting off the tops of mountains to expose coal contained underneath, has a number of serious environmental and social consequences, many of which are disproportionately felt by the low-income people of the region. In response, a vibrant and dynamic environmental justice movement has emerged in Appalachian communities.

In February 1994, President Clinton issued Executive Order 12898, calling for federal agencies to address the issue of environmental justice in minority and low-income populations. However, federal agencies have since been accused of failing to sufficiently integrate the executive order's mandates into their actions; many agencies have given only limited attention to environmental justice concerns. Despite local-level action in Appalachia, federal level consideration of mountaintop removal coal mining has focused largely on the environmental impacts of the

practice. This fact poses several key questions. To what extent has environmental justice played a role in federal level decision-making and action regarding mountaintop coal mining? Is the federal government sufficiently considering environmental justice concerns in its actions? Based on environmental justice concerns, how should the federal government regulate mountaintop removal coal mining?

Coal in Appalachia: History and Background

In Appalachia, coal mining holds a fundamental place as a historically important economic activity. Mining activities have been carried out in the region for the past 150 years and have been of particular importance since the beginning of the 20th century. Although employment in the coal industry has decreased in recent years, many people depend upon mining as a source of income, and families have been involved in the coal industry for generations (Reece, 2005, p. 41-43).

Traditionally, coal-mining activities in Appalachia were carried out through the technique of strip-mining. This practice involves excavating through the ridge side of a mountain to access coal (Reece, 2005, p. 42). However, more recently, mountaintop removal, a surface mining technique, has gained increased prevalence. Through the technique, explosives are used to literally blast away the tops of mountains so as to expose the coal seams contained underneath. Large-scale equipment is then used to remove “spoil,” the resulting dirt and rock that must be moved aside to expose the coal (“Learn More”).

Mountaintop mining is practiced largely because it represents an economically efficient means of obtaining coal. As coal supplies near the surface have become increasingly depleted, incentive has increased to access coal reserves located deeper in the earth. Increased demand for electricity has also translated into increased demand for the relatively clean-burning coal of Appalachia, and improved technology has made the technique easier and more economically attractive. Mining operators in Appalachia have therefore shifted away from the use of older techniques and toward mountaintop removal. This type of mining operation currently occupies over 12 million acres of land in the region (Copeland, 2008, p. 1).

Mountaintop removal coal mining has drawn a great deal of criticism because of its environmental consequences. Under the 1977 Surface Mining Control and Reclamation Act, mined land must be returned to its “approximate original contour” (AOC) after mining operations are completed. However, in the case of mountaintop removal mining, meeting this stipulation is often

impossible, as mining rubble often cannot be placed back in its original location. Excess spoil is therefore placed in “valley fills” – mining wastes are essentially dumped on the sides of mountains or in the valleys below. These valley fills, which may be over 1,000 feet wide a mile long, further alter the local landscape and can have serious environmental implications. Most significantly, valley fills have often impacted stream environments. One study estimated that valley fills buried 724 stream miles in West Virginia, Kentucky, and parts of Virginia and Tennessee between 1985 and 2001. The volume of a single stream fill can be as large as 250 million cubic yards; such fills therefore can eliminate entire streams, add toxic pollutants to stream water, alter water chemistry, and damage aquatic ecosystems (Copeland, 2008, p. 2). As river flow is altered, valley fills can increase the likelihood and severity of floods. Additionally, mining can affect not only surface but also groundwater quality and can pollute drinking water supplies (Kleinmann, 2004, 476-477). Mountaintop removal coal mining also has a number of biological implications. Appalachia is home to some of the country’s oldest and most biologically diverse forests. Mountaintop mining techniques can therefore significantly damage valuable terrestrial ecosystems (Reece, 2005, 43).

Concerns exist regarding not only the effects of mountaintop removal coal mining on the environment but also its impacts on local communities. In particular, the practice poses a number of environmental justice concerns. Mining communities in Appalachia are largely characterized as low-income and predominantly white. Census data indicate that the mountaintop removal coal-mining region has a significantly lower income than do the individual states in which such mining activities occur. The environmental impact statement (EIS) completed in 2005 to evaluate the practice states that census data “starkly depict a poverty problem throughout the region” (US EPA, 2003, III P-1). Only four of the sixty-nine study areas considered in the EIS had a lower poverty rate than their respective state. And the EIS states that “in twenty-four of the study area counties, over one in every three residents is estimated to live below the poverty level” (US EPA, 2003, III P-8). The people in these counties are those who are disproportionately impacted by the practice of mountaintop removal coal mining. The EIS and other studies therefore conclusively point toward and specifically identify the presence of an environmental justice problem based upon statistical evidence.

In this context, mountaintop removal mining has been identified to impact local people (environmental justice populations) in a number of detrimental ways. Explosive blasting techniques used in mountaintop removal ruin local homes, cracking foundations and walls. This blasting often takes place up to 300 feet from homes and can occur twenty-four hours a day. Mining dries up an

average of 100 wells per year, and water contamination and availability currently present serious issues to many communities. Studies suggest that the creation of valley fills can also impact streams by causing less surface flow detention and greater runoff production, leading to increased flooding. Sludge dams often represent the greatest threat to local people. Impoundments used to store mining waste are often leaky and can contaminate drinking water supplies (“Mountaintop Removal Mining”).

Within the context of these numerous environmental and environmental justice concerns, the question emerges: how and on what criteria should mountaintop removal coal-mining be regulated?

Stakeholders

Local communities

Sentiments within local communities regarding mountaintop removal coal mining are often mixed. A great deal of negative sentiment undoubtedly exists; many local community members are strongly opposed to the practice because of its effects and are actively involved in opposition groups. These community members oppose the practice based both on environmental concerns and on issues of cultural heritage, public health, and environmental justice (Ward, 2009, March 14)

However, some community members are more complacent with the practice, viewing mining activities as an integral part of their lives and as an important economic activity. Many of the region’s people who are affected by the negative consequences of mountaintop removal coal mining are also those who are most financially attached to the practice. While many of the area’s people are strongly opposed to the mountaintop removal coal mining, there is by no means a consensus regarding whether or not mining activities should be allowed to proceed (Ward, 2009, March 14).

Environmental organizations

Environmental organizations point toward the destructive nature of mountaintop removal coal mining and highlight its harms to both the environment and the people. Environmentalists form a part of an active, largely grassroots-driven movement involving a number of organizations, ranging from the Sierra Club to smaller groups such as Appalachian Voice and Coal River Mountain Watch. These organizations have played a significant role in fighting against the practice, providing the impetus for court cases and legislative consideration. Using often dramatic rhetoric, environmental organizations contend that the current mining regulatory framework is unjust,

favoring industries to the detriment of the environment and the people. They stress that mountaintop removal coal mining should be strictly regulated (Ward, 2009, March 14).

The Mining Industry

The coal mining industry, a strong and historic presence in Appalachia, is staunchly in favor of mountaintop removal coal mining as a practice. The industry, a hugely significant and powerful lobbying force in the region, actively uses its influence to oppose of increased regulation of mining. The mining industry contends that permits, as they are issued currently, already require coal companies to take environmental factors into account. The industry contends that it already takes significant and more than sufficient measures to account for the environmental consequences of its actions. Citing the fundamental importance of coal to Appalachia's economy, the mining industry argues that more strictly regulating mountaintop removal coal mining could have drastically negative impacts on the economic livelihoods of the region's people (Ward, 2009, March 14).

Mountaintop removal coal-mining: the policy debate

Mountaintop removal coal-mining is currently regulated under several key pieces of federal-level environmental legislation. A first piece of relevant policy is the Surface Mining Control and Reclamation Act of 1977 (SMCRA). Under the act, mining operators must obtain necessary approval in order to carry out surface mining operations. SMCRA mining permits are issued by the Office of Surface Mining, the U.S. Department of the Interior, and by certain states; in order to obtain a permit, operators must prove that they will meet particular performance standards. These include ensuring the quality of affected bodies of water both during and after the completion of surface mining operations (Copeland, 2008, p. 2).

Of particular importance in regulating mountaintop removal coal mining is the Clean Water Act (CWA). Under the CWA, discharge into water of any pollutant from a point source is prohibited unless a permit authorizes it. Such permits are currently issued under two different systems. The first permitting system is the National Pollutant Discharge Elimination System (NPDES) program, which is administered by the Environmental Protection Agency (EPA) in accordance with Section 402 of the CWA. Permits issued under the NPDES program must include specific limitations regarding the amount of a particular pollutant that can be released; such permits are issued according to relatively stringent environmental standards (Copeland, 2008, p. 3).

The second permitting system relevant to mountaintop mining relates to Section 404 of the CWA. This permitting program relates specifically to the “discharge of dredged or fill material.” Such permits are issued by the U.S. Army Corps of Engineers in conjunction with the EPA and are granted based upon a specific set of established environmental guidelines. These guidelines are considered in order to assess whether or not dumping or fill will have adverse environmental impacts (Copeland, 2008, p. 3).

Much of the political controversy that has recently emerged with regards to mountaintop removal coal mining relates to the fact that two distinct types of permits may be issued by the Army Corps of Engineers under Section 404 of the CWA. Firstly, the Corps can issue individual permits to authorize mining at particular sites. Secondly, nationwide general permits are issued for “categories of discharges that have no more than minimal adverse impacts.” Disposal of mountaintop mining rubble has typically been authorized by this second type of permit, under Nationwide Permit 21. However, many environmental organizations argue that the impacts of valley fills are often far more than minimal. Many contend that mountaintop mining operations should instead be regulated under the individual permitting system, as mining spoil constitutes a waste material that seriously pollutes waterways. According to environmental groups, permits should therefore instead be issued only on an individual basis or, preferably, under Section 402 of the CWA, which would much more significantly limit mining activities in Appalachia (Copeland, 2008, p. 3-4).

Also of particular policy relevance in the case of mountaintop removal coal mining is the National Environmental Policy Act (NEPA). Under NEPA, all federal agencies are required to complete Environmental Impact Statements (EIS) “for all major federal actions significantly affecting the quality of the human environment.” This stipulation has important implications in the case of mountaintop removal coal mining, as it requires relevant agencies to complete an EIS and assess relevant environmental concerns in the authorization of mining activities (US EPA, 2003, III).

Policy Controversy

With this regulatory system in place, a great deal of controversy has arisen in the past decade regarding how mountaintop removal coal mining should be regulated and to what extent the practice should be employed. Since the late 1990s, mountaintop removal critics have instigated legal proceedings to challenge the practice (Copeland, 2008, p. 4). In 1998, a West Virginia citizen

group filed a lawsuit against the state and the Army Corps of Engineers, principally accusing them under the SMCRA of violating the OSM's buffer zone rule, which "protects intermittent and perennial streams from coal mining activities" (Copeland, 2008, p. 4). The instigators also claimed that the Corps had been violating the CWA in their issuing of nationwide permits, asserting that disposal of waste from mining projects has greater than simply "minimal adverse effects, individually and cumulatively" on US waters and should therefore be regulated under a more stringent permitting system. In the settlement of the case, the involved federal agencies agreed to collectively complete a programmatic Environmental Impact Statement (PEIS) to assess the impacts of mountaintop removal coal mining, and the Corp agreed that "proposed valley fills in West Virginia in watersheds of at least 250 acres must be permitted by individual, not nationwide, permits" (Copeland, 2008, p. 4).

Subsequently, the October 1999 ruling *Bragg v. Robertson* specifically addressed an issue that has since been of key debate in the policy forum. The ruling reclassified mining spoil from "dredge and fill material" requiring only a CWA Section 404 permit to "waste material" requiring a Section 404 permit, "raising the regulatory hurdles for disposing of mining waste" (Copeland, 2008, p. 5). However, this decision was overturned upon appeal, and completion of the formerly promised PEIS was included in the partial settlement of the case. A draft PEIS was released in 2003, and a final PEIS in 2005.

Additional lawsuits have since been filed in multiple states to challenge the disposal of mining waste under both Section 404 of the CWA and under Nationwide Permit 21. Several decisions have ruled against current procedures but have later been overturned upon appeal, and legal proceedings are still underway in several cases (Copeland 2008, p. 5-6).

Two additional pieces of contentious Bush-era rulemaking remain prominently controversial. In the interest of clarifying regulatory definitions for the purpose of issuing Section 404 permits or more stringent Section 402 permits as appropriate, rule changes finalized in 2002 redefined the terms "fill material" and "discharge of fill material" in the CWA. Effectively "adding mining waste to the list of materials that can be used to fill in streams for development and other purposes," the rule, according to environmentalists, authorizes the insufficient regulation of dumping and allows the permitting of harmful mining practices (Copeland, 2008, p. 6).

An additional rule change pertains to SMCRA buffer zone rule. In order to improve consistency with the CWA, the draft PEIS called on the OSM to revise the buffer zone rule, which prohibits mining activities within 100 feet of streams. Rule changes were proposed in 2004, and,

after the completion of an additional EIS that specifically evaluated excess spoil minimization in stream buffer zones, a final rule was released in 2008. This rule, establishing new guidelines requiring companies to abide by the buffer zone rule “to the extent practicable,” has been seen by environmentalists as “specifically [authorizing] the disposal of excess spoil fills in hollows and streams” (Copeland, 2008, p. 5), giving mining companies the ability to dump spoil in close proximity to streams.

Obama Administration Action

Following such a richly contentious regulatory history, the Obama administration has already taken numerous steps to address the issue of mountaintop removal coalmining. During his campaign, Obama spoke critically of the practice, leaving many in the environmental community with hopes of reform. However, since taking office, the administration has sent mixed signals, “vacillating,” according to some observers, with regards to the practice. Obama administration action is currently proceeding along several different pathways.

EPA Action

On Tuesday, March 24, the EPA announced its intent to review pending mountaintop removal coal-mining permits for their environmental impacts (MSNBC, 2009). Particularly aiming to evaluate the effects of potential mining operations on streams and wetlands, the EPA called for review of 250 permit proposals (Guerrero, 2009). Under the CWA, the EPA has the authority to review and veto any permit issued by the Corps; however, the agency largely did not exercise this power under the Bush administration. The move to review new permits has therefore been seen by environmental groups as a significant reassertion of the EPA’s authority (Guerrero, 2004). Thus far, the EPA has denied approval of several permits, most notably in Virginia and West Virginia. However, as of May 15, 2009, the EPA had cleared for approval nearly all permits under consideration (Biggers, 2009).

Rulemaking

Other Obama administration officials have also expressed their intent to reconsider mountaintop removal mining practices. Secretary of the Interior Ken Salazar recently announced plans to reverse the Bush administration’s changes to the stream buffer zone rule (???). However, as he acknowledged the need to more strictly regulate the dumping of waste in streams, Salazar

additionally “reassured the coal industry that the President didn’t want to hamper [coal] production,” sending mixed signals in the eyes of environmentalists (Stone, 2009).

Legislative Action

Action on mountaintop removal coal mining is also currently proceeding in Congress. On March 4, 2009, the Clean Water Protection Act was introduced in the House of Representatives (Kohm, 2009). A bipartisan bill with 138 cosponsors as of April 2, the legislation would effectively limit the dumping of mining waste in streams. In particular, the Appalachia Restoration Act, an additional piece of bipartisan legislation introduced in the Senate on March 25 as a companion bill to the Clean Water Protection Act, would effectively reverse the Bush administration’s 2002 amendments to the CWA and return regulations to their previous status. The passage of such a bill would prevent the dumping of mining waste into streams and would deny a large number of permits to mining operations (Stone, 2009). Hailing the virtues of the bill, environmentalists note that it could have the potential effect of helping to ultimately ban the practice of mountaintop removal coal mining (Guerrero, 2009). However, similar legislation has been introduced in Congress numerous times since 2002 and has not been enacted; the future of the Appalachia Restoration Act therefore remains to be seen.

Litigation

In February 2009, for the fourth time in eight years, a federal appeals court overturned a ruling that would have more strictly regulated mountaintop removal coal mining (Ward, 2009). This ruling would have required the Corps to undertake more substantial reviews in the issuing of CWA permits (MSNBC, 2009).

Environmental Justice and Federal Environmental Policy

On February 11, 1994, President Bill Clinton issued Executive Order 12898, calling on federal agencies to identify and address “to the greatest extent practicable and permitted by law...disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States” (E.O. 12899). Requiring each federal agency to develop an agency-wide environmental justice strategy, the executive order mandates that each agency take environmental justice concerns into account in its decision-making when such concerns are present.

However, despite the stipulations of E.O. 12898, many federal agencies have failed to take environmental justice concerns into account in their decision-making and action. While agencies have made certain efforts to comply with E.O. 12898, many have been accused of implementing the executive order to an insufficient and severely limited degree, only taking environmental justice concerns into minimal consideration. The EPA in particular has met with significant criticism in recent years with regards to its implementation (“Policy and Legislation”).

On this note, federal agency consideration of environmental justice concerns in the case of mountaintop removal coal mining in Appalachia has varied in extent. Examples from both Bush administration and Obama administration action point toward the role that environmental justice concerns have thus far played in the regulatory arena for mountaintop removal coal mining.

Bush Administration Consideration of Environmental Justice Concerns

Environmental impact statements completed on mountaintop removal coal mining largely indicate the extent of the Bush administration’s consideration of environmental justice concerns with regards to the practice. The multi-agency PEIS completed in 2005 is particularly demonstrative of the role that environmental justice has played in federal action on mountaintop removal coal mining. The PEIS makes reference to environmental justice in several of its sections, stating that, in completing the impact statement, agencies evaluated their programs, policies, and activities with regards to environmental justice concerns and found that “these issues are significant as they contribute to the impacts associated with the proposal and are therefore important in agency decisions” (US EPA, 2003, II. A-8). In accordance with NEPA, after identifying environmental justice concerns as present, the PEIS attempts to give “appropriate consideration” to such concerns. Describing the demographic and economic conditions of the Appalachian region, the PEIS recognizes the role of these aspects in the context of the broader issue.

However, environmental justice is only directly addressed in the very last section of the 661-page PEIS report. In the PEIS, considerations of environmental impacts are fairly detailed; the section on Appalachian Forest Communities, for instance, spans 6 pages. In contrast, discussion of environmental justice takes up 2 and a half pages. The PEIS identifies that “the impacts of mountaintop mining are felt disproportionately by...environmental justice populations,” in particular noting that operational disturbances such as blasting place particular harms upon low-income people. However, the PEIS states that blasting regulations provide for performance standards “to account for these circumstances” (US EPA, 2003, IV. K-1). Consideration of other

environmental justice concerns, such as drinking water contamination, are notably absent from the document. Additionally stating agency efforts to make communities aware of proposed mining projects and noting the vast amount of public participation involved in the regulatory process, the PEIS states that “federal action agencies comply with the requirements and the spirit of the EJ executive order both in the development of this EIS and in the implementation of the federal programs to regulate mountaintop mining activities” (US EPA, 2003 IV. K-3).

However, despite the agencies’ assertions, numerous individuals who commented on the draft EIS voiced concern about the document’s coverage of environmental justice issues. One commenter stated, “the 2003 DPEIS fails to comply with Executive Order 12898...and did discuss environmental justice concerns sufficiently” (US EPA, 2005, p. 59); agency response was that a significant effort had been made to “identify and reach out to EJ communities” (US EPA, 2005, p. 59). Comments requesting that more information be provided on “the actual costs to the communities and people that suffer the effects of MTM/VF” were responded to with assertions that “the information requested was...more specific than appropriate for a programmatic document” and that concerns about problem remediation are “outside the scope of this PEIS” (US EPA, 2009, p. 61). Criticism points toward the fact that agencies have simply acknowledged the presence of environmental justice concerns without specifically evaluating their impacts, truly accounting for their implications, or using them as a basis for decision-making and regulation.

The EIS completed in September 2008 with regards to stream buffer zones demonstrates a similar consideration of environmental justice issues. Covered in a just over two-page section within an exhaustively long document, the agencies identify their obligation to address environmental justice concerns in the document and proceed to detail how they have sufficiently complied with E.O. 12989. Briefly stating in little detail that “coal mining activities may...temporarily and possibly permanently degrade the quality of life in the human environment for people living and working adjacent to the mines or along the coal transportation corridors by increasing noise, dust traffic, and degradation of surface and groundwater and visual aesthetics” (US OSM, 2008, IV-167), the EIS quickly moves on to point out the benefits that coal mining provides to local people. Identifying that environmental justice concerns may be present in the issuing of permits, the agencies assert that “all impacted persons, whatever their status under the EO, are afforded many protections and mitigation measures under the regulatory program” (US OSM, 2008, IV-168). Again in largely unspecific terms, the EIS states that “selection of any of the

action alternatives would result in no additional impacts to populations referenced in the EJ order” (US OSM, 2008, IV-168).

Obama Administration Consideration of Environmental Justice Concerns

Obama administration consideration of environmental justice concerns seems thus far to be similarly limited in scope. For example, on March 23, 2009, in its process of permit review, the EPA issued two letters to the Corps to urge the *agency* not to issue permits for two mining projects. Both letters are very detailed in their enumeration of the environmental concerns of the projects under consideration. In detailing specific concerns, the EPA notes “the cumulative impacts on the watershed, forest and habitat destruction and fragmentation within a globally significant and biologically diverse forest system, and the impairment of downstream water quality” (Pompino, 2009, p. 1) as significant reasons for which the project should not be permitted. In the discussion of toxic pollution and degraded water quality, effects on humans are mentioned only briefly with reference to Kentucky state water quality standards: “surface waters shall not be degraded...by substances that: injure, or are chronically or acutely toxic to...humans, animals, fish, and other aquatic life” (Giattina, 2009, p. 2). To justify its recommendation that permits not be issued, the EPA seems to be drawing only upon specifically environmental evidence without taking social or environmental justice questions into account. This fact suggests that the EPA’s review of permits is proceeding largely based upon environmental concerns, with little consideration of environmental justice impacts.

Consideration of environmental justice issues seems to be similarly limited or conspicuously absent in the legislative arena. Language used to describe the need for the changes represented by the Appalachia Restoration Act, for instance, cites only the purely environmental concerns of the issue – that the current system pollutes streams and destroys ecosystems – without considering how these impacts affect people.

Analysis

In the debate over mountaintop removal coal mining, the question of environmental justice brings to the forefront key regulatory issues and highlights certain trends in past and present federal action. Firstly, the issue corroborates the assertion that agency implementation of E.O. 12898 has been extremely limited. While federal agencies have begun to consider environmental justice concerns, many seem to be doing so largely out of mere obligation, making requisite mention of

environmental justice concerns without truly considering the issue to a full and in-depth degree. As a result, environmental justice, an issue of significant and established concern in Appalachia, seems to have remained largely unaccounted for in federal action. Both Bush and Obama administration action indicate that, to date, environmental agencies have not sufficiently considered environmental justice concerns in their decision-making regarding mountaintop removal coal-mining. Relatively little assessment of the EJ issue at hand has been completed. In the completion of environmental impact statements and in the issuing of permits, environmental justice concerns should be further taken into account.

Environmental justice concerns additionally have further implications in terms of how mountaintop removal coal mining should be regulated. Environmental justice concerns provide increased evidence for the need to stop current destructive practices, serving as further reason that mountaintop removal coal mining should be more stringently regulated. The Obama administration should proceed with current efforts to reverse Bush administration policy – fill material should be redefined as a pollutant, Bush's 2002 rule should be reversed, and other measures should be taken to permit mining operations to go forward only when truly minimal impacts are involved. To promote the health of Appalachia's precious ecosystems and the well-being of its people, the practice of mountaintop removal coal-mining should be strictly regulated if not eventually banned completely.

References

- Biggers, Jeff. (2009, May 15). EPA clears waterboarding for Appalachia 6. *Grist*. Retrieved from www.grist.org
- Copeland, C. (2008). Mountaintop Mining: Background on Current Controversies. *U.S. Congressional Research Service*. Washington, DC: U.S. Government Printing Office.
- Exec. Order No. 12898, 59 Fed. Reg. 32 (February 16, 1994).
- Giattina, J.D. (2009). Letter to Colonel Dana R. Hurst Re: DA Permit No. 2004-1400. Atlanta, GA: U.S. Environmental Protection Agency.
- Guerrero, J. (2009, April 10). EPA holds up more mountaintop mining permits. *Energy Examiner*. Retrieved from www.examiner.com
- Kohm, L. (2009, March 26). The Appalachia Restoration Act. *Appalachian Voices*. Retrieved from www.ilovemountains.org
- Kleinmann, R.L.P. (2004). Coal Mine Reclamation and Remediation. In C.J. Cleveland (Ed.), *Encyclopedia of Energy, Volume 1* (pp. 475-484). London: Elsevier Inc.
- Learn More About Mountaintop Removal Coal Mining. *End Mountaintop Removal Action and Resource Center*. Retrieved May 11, 2009, from <http://www.ilovemountains.org/resources>.
- Mountaintop Removal Mining: Stealing Appalachia. *Mountain Justice*. Retrieved May 5, 2009, from <http://www.mountainjusticesummer.org/facts/MJSnewsletter10.pdf>
- Msnbc.com staff. (2009, March 24). EPA to review mountaintop mine projects. *MSNBC*. Retrieved from www.msnbc.com
- Policy and Legislation: A Victory for Environmental Justice. (2005). *EarthJustice*. Retrieved from www.earthjustice.org
- Pompino, J.R. (2009). Letter to Colonel Dana R. Hurst Re: PN 2007-000099-GUY. Philadelphia, Pennsylvania: U.S. Environmental Protection Agency.
- Reece, R. (2005, April). Death of a Mountain. *Harper's Magazine*, 41-60.
- Stone, G.M. (2009, April 2). Senators Co-Sponsor Bill to Restore Clean Water Act. *The State Journal*. Retrieved from www.statejournal.com
- U.S. Environmental Protection Agency. (2003) *Draft Mountaintop Mining/Valley Fills in Appalachia Environmental Impact Statement*. Washington, DC: U.S. Government Printing Office.

U.S. Environmental Protection Agency. (2005). *Mountaintop Mining/Valley Fills in Appalachia Final Programmatic Environmental Impact Statement*. Washington, DC: U.S. Government Printing Office.

U.S. Office of Surface Mining Reclamation and Enforcement. (2008). *Final Environmental Impact Statement: Excess Spoil Minimization – Stream Buffer Zones*. Washington, DC: U.S. Government Printing Office.

Ward, K.W. (2009, March 14). Reactions to mountaintop removal crackdown. *The Charleston Gazette*. Retrieved from www.wvgazette.co

Ward, K.W. (2009, February 14). Court denies reviews of mine permits. *The Charleston Gazette*. Retrieved from www.wvgazette.com

Section 3.0

Additional Issue Briefs: Subsidies and Water Distribution

Jessie Cherofsky, *Should the Obama Administration Enact Farm Subsidy Reforms?: An Analysis of Current Subsidy Programs and Their Implications*

Devaja Shafer, *A Problem of Allocation: Imperial Valley Water Rights and Urban Southern Californian Water Needs*

May 22, 2009

U.S. Environmental Politics
Environmental Studies Program

Section 3.1

Additional Issue Briefs: Subsidies and Water Distribution

Jessie Cherofsky, *Should the Obama Administration Enact Farm Subsidy Reforms?: An Analysis of Current Subsidy Programs and Their Implications*

May 22, 2009

U.S. Environmental Politics
Environmental Studies Program

Summary

Presidents Hoover and Roosevelt first established farm subsidies in the 1930s as a response to poverty-induced lack of demand for overproduced food crops. Their goal was to stabilize farmers' income amidst economic volatility by loaning farmers the target value of overproduced crops during periods of low market prices or by paying farmers not to produce and flood the market further. Subsidies functioned to stabilize markets until farm technology increased efficiency such that once again overproduction became a significant problem, at which point the Nixon administration added yet another layer of policy to address the issue. Over the decades, farm policy has built up and become convoluted such that it no longer benefits either the small farmers' whose incomes it meant to bolster nor the consumers whom it meant to provide with a consistent, fairly priced supply of food.

The 2008 Farm Bill passed just last year, which many took as a sign that farm policy would not be reevaluated until 2012. Farm policy has, however, unexpectedly returned to the table. As part of his agenda to terminate programs that have become obsolete, President Obama recommended far-reaching and controversial reforms in his initial budget proposal. These reforms would eliminate direct subsidy payments from farmers earning over \$500,000 annually and would cap all commodity-based payments at \$250,000 annually. The budget resolution subsequently signed by the legislature includes no mention of Obama's proposed reforms, but Obama's final budget retains its original language, signifying that the government is sharply divided over how to handle this high-stakes issue.

Impassioned controversy reigns over the issue of farm subsidies and over Obama's proposed reforms specifically. Subsidy proponents, including farmers, economists, politicians and others, argue that farmers in the US depend heavily on subsidies and that the government should not pull the safety net out from under them so abruptly, especially in the midst of an economic crisis. Even some individuals who generally oppose subsidies have spoken out against Obama's plan, saying it risks endangering the livelihoods of small farmers whom it is not intended to target.

Many opponents of subsidies, including environmentalists, libertarians, public health and consumer advocates and others, enthusiastically support Obama's proposal, believing it is a crucial first step toward a drastic overhaul of overall farm policy. They believe that currently subsidies are mainly channeled toward large farms and agribusiness, failing to provide support to the farmers who would most benefit. They also claim that current farm policy subsidizes environmental

degradation and unhealthy foods rather than productive agriculture, which they see as a mismanagement of American tax dollars.

The most powerful evidence with respect to agricultural subsidies supports subsidy opponents' arguments. Although Obama's proposed reforms leave much to be desired in terms of truly restructuring how and to whom payments are made, they are certainly an important first step and at least a sign that the Obama administration will be proactive in responding to the evolving needs of the American economy and the American public. This brief will analyze current subsidy policy in the context of farm policy history, examine the various debates that surround the issue and ultimately conclude that Obama's reforms should be enacted.

Introduction

Farm subsidies, which have existed as part of United States agricultural policy since the 1930s, have forced themselves into large-scale public debate approximately every five years for over seventy years as Congress and the President have taken up the question of renewing and revamping the Farm Bill. Subsidy supporters, a group in large part comprised of the farming industry, believed they were safe for the next five years when the 2008 Farm Bill passed in Congress and the Senate last May despite President Bush's veto.¹ Yet farm subsidies are once again at the forefront of policy debate as President Obama's administration attempts to evaluate the importance and effectiveness of these programs considering the escalating economic crisis and Obama's agenda to support those who have historically had less power in the US. The US government is trying to decide whether American tax dollars are being put to worthy use or whether farm policy should be reformed. In his preliminary budget proposal, Obama recommended large-scale rollbacks of federal agricultural subsidies. Despite sharing many values with the president, both Congress and the Senate have expressed an unwillingness to accede to his request. The United States farm lobby has tremendous power in Washington and because subsidy programs are so deeply entrenched in US agricultural policy, the idea of drastically reforming them is controversial and daunting.² Activists, politicians, economists, interest group organizations and companies are

¹ David Stout, "Farm Bill, in Part and in Full, Wins Passage," 23 May 2008, *The New York Times*, <http://www.nytimes.com/2008/05/23/washington/23farm.html?scp=8&sq=2008%20farm%20bill%20bush&st=cse>.

² Dan Morgan, Gilbert M. Gaul and Sarah Cohen, "Farm Program Pays \$1.3 Billion to People Who Don't Farm," *The Washington Post*, 2 July 2006, <http://www.washingtonpost.com/wp-dyn/content/article/2006/07/01/AR2006070100962.html>, p. 3.

making their voices heard in the debate. Evidence on current farm subsidies' effectiveness at stabilizing and supporting family farmers and on the economic, environmental and health impacts of subsidies on the United States will provide sufficient grounds on which to develop a solid recommendation as to whether or not the Obama administration's proposed agricultural policy reforms should be enacted.

Background

Understanding the history of US farm policy is essential to comprehension of current subsidy policy and the issues that surround it. First, it is necessary to understand what values guided subsidy policy when it was first established. Second, it must become clear how and why subsidies have changed over time. Third, it is essential to examine what values guide current farm policy.

Why Were Farm Subsidies Established?

President Hoover first established farm subsidies in an attempt to alleviate the devastating impacts of the Great Depression on American farmers.³ Subsidies were intended to stabilize the agricultural sector during the volatile economic and environmental climates of the Dust Bowl and the Great Depression, when “an extended bout of overproduction led to falling prices and a severe farm crisis. While millions of Americans went hungry due to lack of funds, farmers were stuck with huge food surpluses” because people could not afford the food.⁴ The idea, as Michael Pollan explains it, was to loan farmers the difference between the set target price of an agricultural commodity and the current market price at a time when production was excessive and demand was low due to economic crisis in the 1930s. That way, farmers could avoid selling their commodities at a low market price and could later sell them and reimburse the government when the market price rose again. If prices did not recover, farmers could keep the loan and give their products to the government.⁵ As part of the New Deal, Roosevelt instituted the Agricultural Adjustment Act, under which the federal government, in addition to providing loans to farmers for what they produced,

³ Burton Fulsom, Jr., “The Origin of American Farm Subsidies,” *Our Economic Past*, April 2006, p. 35.

⁴ Tom Philpott, “Where farm subsidies came from, and why they're still here,” *Grist.org*, 20 January 2007, http://www.grist.org/article/farm_bill2/.

⁵ Michael Pollan, *The Omnivore's Dilemma: A Natural History of Four Meals*, (Penguin Group, 2006), *Google Books*, <http://books.google.com/books?id=Qh7dkdVsbDkC&client=safari>, p. 49-50.

paid farmers to produce less and let land lie fallow so as not to flood the market.⁶ Thus, farm subsidies were initially based on the value of protecting, first and foremost, the farmer. Their goals were to stabilize farmers' income by stabilizing levels of production and ensuring income even when crops were over- or under-produced.

From Supporting Farmers to Supporting Commodities

In the latter part of the twentieth century, technological progress meant even federal manipulation of the agricultural sector could not sufficiently control production. The onset of heavy machinery, new planting techniques, large-scale fertilizer and pesticide use and genetic modification of seeds led to excessive farming efficiency.⁷ Philpott notes, "In 1935, US farmers devoted 100 million acres to corn, yielding 2 billion bushels. By 1975, farmers were squeezing 5.8 billion bushels out of just 78 million acres."⁸ Due to this explosion of efficiency, the government lost much of its control, since production no longer depended on traditional understandings of land and crop potential but rather on new technologies.

In the 1970s, government efforts to raise commodity prices resulted in policy changes that shifted from supporting farmers to "supporting corn at the expense of farmers."⁹ Agriculture Secretary Earl Butz had attempted to deal with the problem of overproduction by arranging to sell a quarter of the 1972 US wheat crop to the Soviet Union, which he hoped would reduce the supply enough to raise prices. The sale backfired. Combined with a devastating drought in the Midwest, it resulted in a food shortage; prices skyrocketed beyond what American consumers could afford. Butz then orchestrated policy such that it encouraged maximum crop production regardless of demand. This spiraled into a vicious cycle of overproduction and low prices, which stimulated farmers to increase production to try and sell more to compensate for their losses.¹⁰ Today United States agricultural policy remains dictated, in large part, by 1970s decisions. The problem with current policy, as Philpott interprets it, is that "what Butz saw as a short-term solution, direct payments to farmers, has morphed into an institution" which guides today's vastly different economic and political landscape.

⁶ Fulsom, p. 35.

⁷ Philpott, "Where farm subsidies came from..."

⁸ Philpott, "Where farm subsidies came from..."

⁹ Michael Pollan, *The Omnivore's Dilemma*, p. 48.

¹⁰ Philpott, "Where farm subsidies came from..."

Thus, the 1970s saw a sea change in the guiding values behind farm subsidies. Terrified by the political implications of governing during a food shortage it had caused, the Nixon administration directed its policies toward stimulating an ever-increasing supply of cheap crops instead of aiming to support farmers as US governments had in the past. These new policies could not but result in a flooded market, plummeting prices and the triumph of large commercial farmers who could afford to produce enough to compete and continue bringing in income.

Why Do We Have The Subsidies We Have Today?

Subsidies in the form of the direct and countercyclical payments we recognize today were established in the 1996 Farm Bill, which the Republicans dubbed “Freedom to Farm.” Direct payments were meant to wean farmers off of subsidies and to allow them more flexibility in planting. As described in detail below, direct payments were based not on current production but rather on acreage, historical production and historical prices. Barring developing, farmers could do almost anything with their land, including letting it lie fallow, which they did and continue to do. Instead of providing the transition away from subsidies that Congress had hoped for in enacting the 1996 bill, direct payments became permanent and even expanded to include countercyclical payments when crop prices dropped in 1998. Farmers became even more dependent on subsidies as a result.¹¹

A lot has changed since Presidents Hoover and Roosevelt introduced the first farm subsidies to the American agricultural scene. The most important change to understand is that farm policy’s guiding principle is no longer concern for the producer’s welfare. It now favors the constant and consistent production of vast quantities of cheap commodities, regardless of demand or the economic welfare of the producer and the consumer.

Current Policy

Types of Payments

As of the 2008 Farm Bill, there are five main types of subsidy payments available to farmers in the United States. Some programs relate to revenue while others relate to crop yield, and still others provide incentive for farmers to engage in environmentally sound agricultural practices. For

¹¹ Morgan, Gaul, Cohen, p. 2-3.

the purposes of this brief, the relevant subsidies are commodity-based direct and countercyclical payments. The Agriculture Department's Economic Research Service categorizes farms according to the following criteria: Small family farms earn less than \$250,000 annually and comprise 90.5% of farms and 22.8% of production; large family farms earn over \$250,000 annually and comprise 7.5% of farms and 62.7% of production; and non-family corporate or cooperative farms comprise 2% of farms and 14.6% of production.¹²

Direct Payments:

The USDA's Economic Research Service explains that direct payments are based on historical crop yield, crop acreage, and payment rates according to the 2008 Farm Bill.¹³ Farmers are eligible to receive payments for historical production of wheat, corn, grain sorghum, barley, oats, upland cotton, medium-grain rice, long-grain rice, soybeans, other oilseeds, and peanuts. Each member of a farm can receive up to \$40,000 per crop year unless she is enrolled in the new Average Crop Revenue Election Program (ACRE), in which case direct payments are reduced by 20 percent. According to the USDA, "Producers with adjusted nonfarm gross income of over \$500,000 averaged over 3 years or with adjusted farm gross income of over \$750,000 averaged over 3 years are not eligible for direct payments."¹⁴ Farmers enroll in the program annually and once enrolled receive payments regardless of what, or if, they produce. While receiving direct payments, farmers must put their land to agricultural use, which includes letting it lie fallow. If they plant, there is no requirement that they plant the crop for which they are being paid; that is, they receive payments based on past crop prices and may adjust current production to whichever crop might be most lucrative based on current market prices. One exception is that farmers receiving direct or countercyclical payments may not produce fruits or vegetables, except under very specific circumstances, in which case payments are frequently reduced.¹⁵

¹² Robert A. Hoppe, "The Importance of Farm Program Payments to Farm Households," *Amber Waves*, Vol. 5, No. 3, USDA Economic Research Service, June 2007, p. 20.

¹³ "Farm and Commodity Policy: Program Provisions: Direct Payments," *USDA Economic Research Service*, <http://www.ers.usda.gov/Briefing/FarmPolicy/DirectPayments.htm>.

¹⁴ *Ibid.*

¹⁵ Farm Service Agency, "Upland Cotton and Countercyclical Payment Program and Marketing Assistance Loans," *United States Department of Agriculture*, March 2006, http://www.fsa.usda.gov/FSA/printapp?fileName=pf_20060301_insup_en_cottdcp06.html&newsType=prfactsheet. Farmers may plant fruits or vegetables on Direct or Countercyclical Payment Program land "[i]n any region with a history of double-cropping contract commodities with fruits and vegetables; [o]n a farm with a history of planting fruits or vegetables, except that FSA will reduce the contract payment by an acre for each acre planted to a fruit or vegetable on the farm; or "[b]y a producer with an established history of planting a specific fruit or vegetable, except that the area

Countercyclical Payments

Countercyclical payments are based on direct payment rate, payment acres and payment yield. Farmers enroll annually in the program and are eligible for payments when current market prices fall below target prices for a given commodity as established in the 2002 Farm Act. Any farmer growing an eligible crop can enroll unless the farmer chooses to enroll in the Average Crop Revenue Election program established by the 2008 Farm Act or unless the farmer's gross non-farm income averages over \$500,000 over three years or her gross farm income averages over \$750,000. Countercyclical payments are made to individuals, not to farms, and each individual may receive up to \$65,000 per crop year.¹⁶

2008 Farm Bill

Aside from retaining the provisions described above, which carry over from the 2002 Farm Bill, the 2008 Farm Bill establishes about \$7.6 billion in cuts to the subsidy program.¹⁷ Farmers will now receive direct payments based on 83.3 percent of their base acreage instead of the previously used 85 percent formula; however, countercyclical payments remain based on 85 percent of acreage.¹⁸ While retaining the provision against planting fruits, vegetables and wild rice on program acres, it includes an experimental program to expand planting flexibility, pending fulfillment of specific requirements and a proportional reduction of payments, "to allow production of cucumbers, green peas, lima beans, pumpkins, snap beans, sweet corn, and tomatoes for processing on up to 9,000 base acres in Illinois; 9,000 base acres in Indiana; 1,000 base acres in Iowa; 9,000 base acres in Michigan; 34,000 base acres in Minnesota; 4,000 base acres in Ohio; and 9,000 base acres in Wisconsin."¹⁹

planted may not exceed the producer's average annual plantings in the 1991-1995 crop years...and that FSA will reduce the contract payment by an acre for each acre planted to a fruit or vegetable on the farm."

¹⁶ "Farm and Commodity Policy: Program Provisions: Counter-Cyclical Payments," *USDA Economic Research Service*, <http://www.ers.usda.gov/Briefing/FarmPolicy/countercyclicalpay.htm>.

¹⁷ Farm Lobby to Chairmen Conrad, Harkin, Peterson and Spratt, Senators Gregg and Chambliss, and Congressmen Lucas and Ryan, 11 March 2009.

¹⁸ "2008 Farm Bill Side-By-Side: Title I: Commodity Program," *USDA Economic Research Service*, 11 December 2008, <http://www.ers.usda.gov/FarmBill/2008/titles/#direct>.

¹⁹ *Ibid.*

Now in Congress and the White House

Currently, the executive branch of the Obama administration is trying to limit farm subsidies by cutting federal budget allocations to subsidy programs and by placing limits on recipient eligibility. The final proposed budget limits direct subsidy payments to farms whose incomes do not exceed \$500,000 per year and further limits all commodity-based payments to \$250,000.²⁰ This could save \$100-\$200 million annually;²¹ Obama's goal is to save \$9.8 billion over the next ten years.²² The budget illuminates the administration's dedication to using farm programs to target farm families specifically as opposed to wealthier farmers.²³ President Obama remarked, "[T]here is a lot of money being spent inefficiently [and] ineffectively. Some programs may have made sense in the past—but are no longer needed in the present. Other programs never made any sense; the end result of a special interest's successful lobbying campaign [*sic*]." ²⁴ Although he does not discuss farm subsidies here, his comments may be applicable to their current status.

With respect to the proposed reforms, Secretary of Agriculture Thomas Vilsack explains that the USDA hopes to expand market-based subsidy programs to allow farmers to collect financial compensation for reducing greenhouse gas emissions by sequestering carbon and through other measures.²⁵ The implication is that by eliminating inefficient direct subsidy payments to farmers with large incomes and by capping subsidies to all eligible farmers, the USDA can incentivize environmentally friendlier agricultural practices. Vilsack hopes that when farmers stop receiving payments regardless of whether their activities are productive, unproductive or counterproductive, they will be more inclined to engage in practices that fit in with the new administration's environmental values.

The House and Senate budget outlines signed on 2 April 2009 demonstrate the controversy surrounding agricultural subsidies and are evidence of the American farm lobby's power over legislators. Both houses excluded provisions to reduce subsidy payments, and the Senate included

²⁰ FY2010 Presidential Budget, *Office of Management and Budget*, 11 May 2009, <http://www.whitehouse.gov/omb/blog/09/05/11/LastbutNotLeastTheFinalInstallmentoftheFY2010Budget/>.

²¹ "Presidential Transition Briefing Papers on Urgent Sustainable Food & Farming Priorities," *Sustainable Agriculture Coalition*, December 2008, www.sustainableagriculturecoalition.org.

²² Henry J. Pulizzi and Corey Boles, "Farm-Subsidy Cuts Highlight Political Challenge," *The Wall Street Journal*, 7 May 2009, <http://online.wsj.com/article/SB124170947406396379.html>.

²³ FY2010 Presidential Budget.

²⁴ "Remarks of President Barack Obama on FY 2010 Budget Proposals," *The Washington Post*, 7 May 2009, <http://www.washingtonpost.com/wp-dyn/content/article/2009/05/07/AR2009050702016.html>.

²⁵ Thomas Vilsack, "[Excerpt] Statement by Thomas Vilsack Secretary of Agriculture Before the Subcommittee on Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Committee on Appropriations, U.S. House of Representatives," 31 March 2009.

massive cuts to the EQIP, which is the USDA's largest working-lands conservation program, showing that the legislature's values are at odds with those of the executive branch with respect to both subsidizing commodity production and conserving the environment.²⁶ Instead of supporting the executive branch's attempted subsidy cutbacks, the legislature eliminated these provisions from the final budget resolution altogether.²⁷

Clearly, the fact that Obama's political party dominates both the House of Representatives and the Senate did not result in strong Congressional support for his plan. What, then, dictated legislative decision-making in this case? The New York Times cites strong pressure from the farm lobby, specifically the National Farmers Union, as an important factor leading to the legislature's decision to reject Obama's proposal.²⁸ Another essential factor are regional loyalties. The political facet of farm subsidy issue draws its complexity from varying importance of agriculture in different regions of the US.²⁹ It is difficult to gauge how individual legislators feel about farm subsidy cuts based on the budget resolution vote because the resolution is a comprehensive document containing funding provisions for a multitude of different programs, not just farm subsidies. However, Democrats, Republicans, and even long-time supporters of subsidy reform in general have voiced their opposition to the proposed reforms, suggesting that many legislators do feel strongly about the specific subsidy issue and the overwhelming consensus among those who have spoken is that Obama's proposed reforms are inappropriate.³⁰ Farm subsidies are an issue that encourages bipartisanship in their favor, which will make it difficult for Obama to garner support for his initiative.

Arguments Against Reform

The loudest voices against subsidy reform originate, logically, with farmers. Three main arguments dominate the side of the debate in favor of current agricultural policy and thus against subsidy reform. One argument is that subsidies are necessary to support the agricultural sector

²⁶ Allison Winter, "Senate Budget Spares Crop Subsidies, Cuts Conservation Payments," *Environmental Working Group*, 26 March 2009, <http://www.ewg.org/node/27743>; "The Federal FY 2010 Budget Resolution," *Meridian Growth Strategy*, Session 111.1, No. 7, 6 April 2009.

²⁷ "The Federal FY 2010 Budget Resolution," *Meridian Growth Strategy*, Session 111.1, No. 7, 6 April 2009.

²⁸ David M. Herszenhorn, "Obama's Farm Subsidy Cuts Meet Stiff Resistance," *The New York Times*, 3 April 2009, http://www.nytimes.com/2009/04/04/us/politics/04farm.html?_r=1&scp=3&sq=farm%20subsidies&st=cse.

²⁹ Ibid.

³⁰ Charles Abbott, "Criticism rains on Obama's farm subsidy cut idea," *Reuters*, 1 March 2009, <http://www.reuters.com/article/domesticNews/idUSTRE52023Z20090301?pageNumber=1&virtualBrandChannel=0p.2>; Pulizzi and Boles.

because farmers depend on them. The second is that is time is not right, for various reasons, for changes to a deeply entrenched support system. The third argument is that although reforms should be made, Obama’s proposal is too drastic and could result in unintended negative consequences to farmers who truly depend on subsidies for their survival.

Argument #1: Farmers Would Flounder Without Subsidies

Many farmers and farm organizations argue that current subsidy policy is crucial because farmers depend on it. Farm programs are not meant “to make farmers rich,” said John Thaemert, a Kansas wheat farmer and a past president of the National Association of Wheat Growers. “They are meant, instead, to ensure the US’s access to an abundant, affordable, convenient and safe supply of food.”³¹ This claim implies that subsidies are not a luxury for a small number of stakeholders but rather a national necessity. The Alabama Farmers Federation cites various reasons for maintaining subsidies as they are, including defense against the consequences of natural disasters, maintaining national security through independence from foreign food commodities, and the claim that subsidies lead to cheaper production costs throughout the food production industry, which benefits not only farmers but processors, packagers, and ultimately consumers.³² Farm economist Dr. Robert Goodman asserts that “subsidies are critical to the future of farming.”³³ The Corn Farmers Coalition (CFC) argues that reform was already enacted with the establishment of the Average Crop Revenue Election (ACRE). It claims it supported reforms that would better direct funds to farmers who truly need it and praises Secretary Tom Vilsack in advance for being unlikely to amend the 2008 Farm Bill and break the “contract” the US government made with farmers.³⁴ This logic implies that while the CFC claims to reject subsidies for farmers who do not need them, the organization does see subsidies as vital to the survival of those who do need them.

Argument #2: Now is Not the Time

A second argument asserts that now is not a moment conducive to making monumental changes to an age-old and complex support system. For one thing, the economic crisis has left the agriculture industry in a precarious position, with market prices for commodities falling and

³¹ Roberta Rampton, “Obama reignites fight over U.S. farm subsidies,” *Reuters*, 25 February 2009, <http://www.reuters.com/article/politicsNews/idUSTRE51O7HN20090225>, p. 1.

³² Dr. Robert Goodman, “A Five-Point Defense of Farm Subsidies,” *Alabama Farmers Federation*, http://www.alfafarmers.org/issues/farm_programs.phtml.

³³ *Ibid.*

³⁴ “Chapter Five: The Politics of Corn,” *Corn Farmers Coalition: Corn Fact Book*, p. 35-36.

production costs projected to decrease disproportionately little.³⁵ Senate Budget Committee Chairman Kent Conrad, a Democrat from North Dakota, spoke out against cuts in the midst of such a weak economic climate.³⁶ For another, that the 2008 Farm Bill passed only a year ago has led many farmers to believe they can count on their usual supports for at least another four years. A farm lobby coalition wrote to Congress claiming that farmers have already made investments based on funds promised by the 2008 Farm Bill and it would be unfair to change the rules mid-game.³⁷ The Corn Farmers Coalition assures readers that “some experts say it’s unlikely Congress will revisit it until 2012—at least the provisions on farm supports” and suggests that amending the Farm Bill before then would have “serious financial consequences.”³⁸ Farmers view the Farm Bill as a contract and are angered by the idea that the Obama administration might try to weaken their support system by using alternative political pathways like budgeting even if it does not attack the Farm Bill itself.

Argument #3: Reform, But Not Like This

A third argument stems from an unlikely pair of stakeholders: groups opposed to reforms and groups in favor of reforms in general but opposed to Obama’s particular plan. The agricultural interest group coalition that wrote to Congress claimed, “Most troubling, far from targeting large agribusinesses that do not need assistance, the proposed cuts would strike at the economic heart of full-time farm families, of every sized operation...”³⁹ Despite the Obama budget’s provisions to cut 100 percent of direct payments only from farms earning over \$500,000 annually, this coalition believes the cuts could damage smaller farms as well. In Congress, even “[fierce] critics of farm subsidy programs say the new administration overreached in offering a proposal that could have cut off payment not just to large corporate agribusinesses, but also to medium-sized family farms that might not even be profitable.” One concern is that the \$500,000 cap did not account for the fact that much of that sum might be eaten up by production costs and might not yield much actual profit.⁴⁰ According to Congressman Jerry Moran of Kansas, “Farmers may post high sales, but they spend a lot to produce those crops, and margins can be thin, especially in light of high fertilizer and other

³⁵ Farm Lobby to Chairmen Conrad, Harkin, Peterson and Spratt, Senators Gregg and Chambliss, and Congressmen Lucas and Ryan, 11 March 2009.

³⁶ Abbott.

³⁷ Farm Lobby to Chairmen Conrad...

³⁸ “Chapter Five: The Politics of Corn, p. 36, 37.

³⁹ Farm Lobby to Chairmen Conrad...

⁴⁰ Herszenhorn.

input costs.”⁴¹ Therefore, though an average farmer might bring in \$500,000, less than \$40,000 might be profit.⁴² These concerns have caused Obama’s dramatic proposed changes to stimulate groups with largely differing goals to join together and oppose what they believe to be a program that poses risks even for farmers who truly need subsidies for their survival.

Arguments In Favor of Reform

Opponents of farm subsidies are as numerous and as vociferous as subsidy advocates. An understanding of the basic complaints against the current subsidy system contextualizes and justifies many groups’ defense of Obama’s reform proposal. American farm policy has significant consequences for international trade and global agriculture, but for the purposes of this brief, the issues undertaken are domestic ones. Two of the most important arguments against current subsidy policy in the US are that it is not achieving its intended goals and that it has detrimental impacts on human health and the environment.

Allegation: Subsidies Are Not Accomplishing Goals

According to the USDA, current farm subsidies aim to “provide the stability and predictability” that family farmers need, as well as to protect them “from market disruptions and weather disasters.”⁴³ They are meant to target small family farms, which suffer disproportionately from such instability, as opposed to large corporate farms. Various interest groups, however, have raised their voices in protest against what they believe to be unfair agricultural policy. The libertarian CATO Institute, states, “The taxpayer-financed handouts [subsidies] go to only one-third of the nation’s farmers, mainly to large agribusinesses and the richest farmers... Many Fortune 500 companies also receive farm welfare checks.”⁴⁴ According to the Environmental Working Group (EWG), the two-thirds that are not subsidized do not receive payments due to the particular crops they grow.⁴⁵ The largest 20 percent of farms received almost 90 percent of the over \$160 billion worth of subsidy payments made between 1995 and 2005,⁴⁶ meaning that the small farmers the

⁴¹ Pulizzi and Boles.

⁴² Ibid.

⁴³ FY2010 Federal Budget Proposal, p. 46.

⁴⁴ Daniel Griswold, Stephen Slivinski, and Christopher Preble, “Ripe for Reform: Six Good Reasons to Reduce U.S. Farm Subsidies and Trade Barriers,” *CATO Institute Center for Trade Policy Studies*, No. 30, 14 Sept. 2005, p. 7.

⁴⁵ “What’s The Plan?: U.S. Farm Subsidies, 1995 through 2003,” *Environmental Working Group’s Farm Subsidy Database*, <http://farm.ewg.org/farm/whatstheplan.php>.

⁴⁶ Tom Philpott, “Bush’s farm bill “reform” proposal falls woefully short,” *Grist.org*, 6 February 2007, http://www.grist.org/article/farm_bill3/.

USDA purports to target benefit least from subsidy programs. Small farmers are further harmed by the farm consolidation that subsidies promote. Policy that promises payments based on acreage regardless of how much or whether they produce encourages farmers to obtain more land.⁴⁷ This land consolidation bullies out small farmers, who cannot afford to compete. Therefore, critics claim that not only do small farmers not specifically *benefit* from subsidies, they are often *harmed* or forced to sell out. For these reasons, the Environmental Working Group (EWG) praises Obama's proposed reforms, claiming, "Millionaires, wealthy landowners and large profitable farm operations do not need taxpayer funded support, while thousands of struggling family farmers do."⁴⁸

Allegation: Subsidies Are Degrading the Environment and Diminishing Human Health

Subsidy opponents cite environmental degradation as a pressing reason to seek reform. One major problem is that current subsidies incentivize crop monoculture. In 2007, a record year for high crop prices, 93 percent of the \$5 billion in direct payments allotted to farmers were for only five crops: wheat, corn, upland cotton, soybeans and rice.⁴⁹ Practices like this inevitably promote monoculture, since it is more efficient and profitable for farms receiving subsidies to densely plant their land with single crops than to diversify.⁵⁰ Intense monoculture degrades land by depleting it of nutrients, which forces farmers to increase fertilizer and pesticide use, resulting in a vicious cycle of land degradation and a need to degrade it further to keep it productive.⁵¹

Another problem that critics have identified is that current subsidy policy encourages production and consumption of cheap, unhealthy foods, which in turn lead to widespread health problems. The fact that fruits and vegetables are not federally subsidized means that the commodities that *are* subsidized, like corn and soy, can undersell fruits and vegetables. Subsidy critics claim this poses a threat to social justice, since the people whose eating habits are most dictated by food prices are those whose low incomes do not permit them to opt for more expensive

⁴⁷ Michael Pollan, "Michael Pollan Offers President Food for Thought," 16 February 2009, <http://www.npr.org/templates/player/mediaPlayer.html?action=1&t=1&islist=false&id=100755362&m=100754237>.

⁴⁸ Donald Carr, "Obama Stands Firm on Push for Farm Program Reform," 7 May 2009, *Environmental Working Group*, <http://www.ewg.org/node/27881>

⁴⁹ Kristie M. Engemann, "U.S. Farm Subsidies," *Liber8: Economic Information Newsletter*, September 2008, p. 1.

⁵⁰ Karel Mayrand, Stéphanie Dionne, Marc Paquin, Isaak Pageot-LeBel, "The Economic and Environmental Impacts of Agricultural Subsidies: An Assessment of the 2002 US Farm Bill & Doha Round," *Unisfera International Centre*, May 2003, p. 2.

⁵¹ *Ibid.*; Michael Pollan to Mr. President-Elect, "Farmer in Chief," 12 October 2008, *New York Times Magazine*, <http://www.michaelpollan.com/article.php?id=97>.

though healthier options.⁵² Moreover, “the government actively discourages [farmers] from growing healthful, fresh food,”⁵³ as it penalizes those growing fruits and vegetables⁵⁴ on subsidy program land by revoking their subsidies and forcing them to pay “the market value of the illicit crop.”⁵⁵ Thus, it is commonly argued that government policy provides disincentives for producing healthy crops and it encourages production of products that leads to obesity and other health problems. Michael Pollan links the US’s obesity epidemic to the “plague of cheap corn” that began in the 1970s with Secretary Butz’s overproduction-stimulating farm policies.⁵⁶ He claims the flood of corn led the industry to seek creative uses for it, which resulted in products like corn syrup being packed into as many processed foods as possible.

Analysis

Savings May Be Obama’s Goal, But They Do Not Matter

The Obama administration hopes to cut the budget to save almost \$10 billion over a decade.⁵⁷ The proposed farm subsidy cuts are part of this plan. Yet some critics of its proposed reforms imply that because limited amounts of money would be saved by capping farm subsidy payments as proposed, it might not be worth it in terms of savings. “[E]ven champions of change say that...the president’s plan...will have to be scaled back so significantly that the savings could amount to just several hundred million dollars.”⁵⁸ Opponents to reform also cite the economic downturn as a reason to maintain the status quo.⁵⁹ The administration argues the opposite, saying all sectors of

⁵² Libby Quaid, “Feds Subsidizing Obesity, Not Fruits and Vegetables,” *Organic Consumers Association*, 10 August 2005, <http://www.organicconsumers.org/ofgu/obesity081105.cfm>.

⁵³ Michael Pollan to Mr. President-Elect.

⁵⁴ According to the 2001 CRS Report entitled “What is a Farm Bill?” fruit and vegetable producers have “resisted, or at least not pushed for” subsidies for their products because they “were reluctant to tie themselves to the federal conditions” and restrictions. (Jean Yavis Jones, Charles E. Hanrahan, and Jasper Womach, “CRS Report for Congress: What is a Farm Bill?” *Congressional Research Service*, 5 May 2001, p. 13-14.) However, there is substantial debate over the true reason for these fruit- and veggie-discouraging provisions. Some critics attribute them to the powerful fruit and vegetable lobbies, which fear competition from small growers. For more information, see <http://www.nytimes.com/2008/03/01/opinion/01hedin.html> and <http://usfoodpolicy.blogspot.com/2007/10/wto-rules-against-us-policies-to.html>.

⁵⁵ Jack Hedin, “My Forbidden Fruits (and Vegetables),” *The New York Times*, 1 March 2008, <http://www.nytimes.com/2008/03/01/opinion/01hedin.html>. For planting crops that are not designated “commodity crops” in the 2008 Farm Bill, the farmer may also lose rights to subsidy payments permanently.

⁵⁶ Michael Pollan, *The Omnivore’s Dilemma*, p. 102-104.

⁵⁷ Herszenhorn.

⁵⁸ Herszenhorn.

⁵⁹ Farm Lobby to Chairmen Conrad...

society must make sacrifices in order to restore the economy.⁶⁰ While these arguments should be considered, they are less relevant than whether or not farm subsidies are necessary and/or effective. In other words, if subsidies are not efficiently serving the purpose for which they are intended, then any amount of money that can be saved by eliminating superfluous subsidies should be saved. There does not need to be an economic crisis to make farm subsidy reform a necessity; the economic crisis only provides further impetus. The crucial question to address is whether or not farms subsidies are having the intended beneficial effects on the agricultural sector.

Are Farm Subsidies Effecting Intended Benefits?

Evidence suggests that the farmers who benefit most from subsidies are not the family farmers for whom they are intended but rather large-scale farmers and agribusiness whose incomes exceed those of the taxpayers whose money finances subsidy programs.⁶¹ Furthermore, direct payments are based neither on farms' current production nor on farmers' financial need.⁶² Therefore, wealthy farmers and non-farming landowners can own land that was historically productive but can allow it to lie fallow and hold other jobs altogether. They may bring in any amount of farm- or non-farm income and still collect direct payments, regardless of need or their contribution to agriculture. According to the Washington Post, "[T]he federal government has paid at least \$1.3 billion in subsidies for rice and other crops since 2000 to individuals who do no farming at all."⁶³ Even some landowners who receive subsidy payments advocate for change. Donald Matthews of El Campo, Texas, who is not a farmer and who only bought his property in rice country because he liked the location, wanted to return his subsidy but realized it would be allocated to other landowners who might or might not merit it.⁶⁴ This perspective strengthens the argument that serious reform is necessary. Farm policy has gone far astray from its original motives to protect farmers. It now goes so far as to harm farmers by directing payments to a minority of wealthy recipients. As well, current policy contributes to obesity and other health problems in the US and encourages environmental degradation. Perhaps if the subsidy system were working, these factors alone would not be sufficient to counteract the arguments against reform. As that is not the case, these factors only add power to the argument for reform.

⁶⁰ "Remarks of President Barack Obama..."

⁶¹ Griswold, Slivinski, and Preble, p. 1, 7.

⁶² Annenberg Political Fact Check, 23 May 2008, http://www.factcheck.org/askfactcheck/in_the_farm_bill_how_much_money.html.

⁶³ Morgan, Gaul and Cohen.

⁶⁴ Ibid.

Responses to Anti-Reform Allegations

The anti-reform allegation that Obama's proposal does not account for farming's high overhead costs and marginal profits and that the proposal might harm small farmers is its strongest argument. Still, it does not undermine the argument in favor of his reforms for various reasons. First, the CATO Institute asserts that in 2001, average household income for family farms was over 10 percent higher than the average US household income.⁶⁵ It is illogical for the government to spend taxpayers' money subsidizing a sector of the economy whose members earn, on average, more than taxpayers themselves. The Washington Post relates that in 2005, amidst record-high farm profits, the federal government paid out \$25 billion worth of subsidies, which was near 50 percent more than it paid to families on welfare.⁶⁶ This shows that the government needs to seriously reconsider its priorities in deciding which sectors of society to subsidize. Obama's proposal represents a first step.

Second, according to the Office of Management and Budget, only two percent of individuals in the US work in farming.⁶⁷ As established in previous sections, it is widely accepted that only one-third of American farmers receive subsidy payments in the first place, and Secretary Vilsack estimates that the new program will only affect 3 percent of farmers in the US.⁶⁸ Therefore, the reforms will impact a relatively small percentage of people.

Third, the farming sector is not the only one that may need to make sacrifices in the coming years. The Office of Management and Budget notes that the federal budget proposal has includes language to eliminate or scale back 121 programs for a projected savings of about \$17 in the next year.⁶⁹ Energy producers, healthcare providers, and the Department of Defense appear among the

⁶⁵ Daniel Griswold, Stephen Slivinski, and Christopher Preble, "Ripe for Reform: Six Good Reasons to Reduce U.S. Farm Subsidies and Trade Barriers," *CATO Institute Center for Trade Policy Studies*, No. 30, 14 Sept. 2005, p. 7.

⁶⁶ Dan Morgan, Gilbert M. Gaul and Sarah Cohen, "Farm Program Pays \$1.3 Billion to People Who Don't Farm," *The Washington Post*, 2 July 2006, <http://www.washingtonpost.com/wp-dyn/content/article/2006/07/01/AR2006070100962.html>.

⁶⁷ "Department of Agriculture," *Office of Management and Budget*, <http://www.whitehouse.gov/omb/budget/fy2004/agriculture.html>.

⁶⁸ Daniel Greenstein, "Obama to Cut Farm Subsidies," *Stormwire*, 6 March 2009, <http://stormwire.stormexchange.com/2009/03/obama-to-cut-farm-subsidies.html>.

⁶⁹ "Terminations, Reductions, and Savings," *Office of Management and Budget*, <http://www.whitehouse.gov/omb/budget/TRS/>.

subjects of funding cuts, among many others.⁷⁰ The agricultural sector should not be exempt from budget reforms when sectors across the US are being forced to reorganize and readjust.

Policy Recommendation

Obama's proposed reforms are by no means a flawless solution. Merely establishing a payment cap and phasing out direct payments to large farmers would not, for example, address the misuse of funds that are paid to landowners who do not engage in agriculture. However, it is important to remember that Obama cannot legislate policy himself and must instead use alternative routes to impact existing policy. Cutting the budget for farm subsidies is an important first step toward what should become large-scale agricultural policy reform. Therefore, despite the controversial nature of Obama's proposed reforms and the fact that they are far from ideal, they should be implemented as a first step toward a drastic overhaul of the US's outdated and inefficient farm subsidy policy.

⁷⁰ "Terminations, Reductions, and Savings: Budget of the US Government Fiscal Year 2010," *Office of Management and Budget*, www.budget.gov, p. 2-3.

Section 3.2

Additional Issue Briefs: Subsidies and Water Distribution

Devaja Shafer, *A Problem of Allocation: Imperial Valley Water Rights and
Urban Southern Californian Water Needs*

May 22, 2009

U.S. Environmental Politics
Environmental Studies Program

Summary

Water diverted from the Colorado River irrigates the \$1.3 billion agricultural economy of California's Imperial Valley and supplies approximately 20% of urban water needs in the Metropolitan Water District (MWD). Population growth and drought in Southern California has increased water demand within these sectors, and over the last ten years California has consistently used more than its basic 4.4 million acre-feet per year (MAFY) allocation of Colorado River water to service these needs.

However, the supply of surplus water upon which California has become dependent is dwindling. Exponential population growth throughout the Colorado River Basin (Basin) means demand on water resources is higher than ever before, while drought, national stream flow variability and climate change are all reducing the total amount of water available to Basin states.

In 2002, the Department of the Interior responded to California's unsustainable water use by mandating that California institute plans to reduce its dependence on Colorado River water to 4.4 MAFY. Failure to implement irrigation-to-urban water transfer agreements and conservation measures as specified by the 2003 Quantitative Settlement Agreement (QSA) would allow the federal government to cut California's surplus water rights. The consequences of this scenario would most severely hurt the Imperial Valley's agricultural sector, which currently receives 87% of California's Colorado water allocation, and would have additional ramifications throughout the Metropolitan Water District (MWD) which services 40% of California's population.

Rapid population growth throughout the MWD's service area is driving urban water demand up. One of the primary intentions of the QSA's conservation and water transfer measures is to meet the MWD's long-term water needs. Because domestic water use is inflexible and has higher importance than agricultural water use by California Water Code, and because agriculture currently claims the majority of California's water, the underlying effect of these measures is to reduce agricultural water use in the Imperial Valley. However, the proposed measures have been met with a series of lawsuits from farmers, environmentalists and Imperial County who argue these measures are proceeding without adequate consideration for environmental and socio-economic implications. Nevertheless, failure to fully implement the proposed plans would drastically limit the amount of water reaching the MWD and impede its ability to supply the growing water needs to urban Southern California in the long-term.

Recognizing the importance of the QSA, the following report analyses the political debate surrounding its full implementation . It will make policy recommendations to ensure that the agreement is implemented fully, and with consideration for stakeholder concerns.

Introduction

The Problem: History, agriculture, urban water use

California's sizeable share of the Colorado River's water was determined by the Colorado River Compact (Compact) of 1922. Under the Compact, Upper Basin states (CO, NM, UT and WY) and the Lower Basin states (NV, AZ and CA) were each apportioned 7.5 million acre-feet per year (MAFY) of the Colorado River's water. State-level apportionment of these 7.5 MAFY shares was initiated by the Boulder Canyon Project Act (BPCA), effective in 1929. In addition to authorizing construction of the Hoover Dam and the All American Canal (AAC), [figure 1] the BPCA determined that water allocation be granted preferentially to those with existing claims. Through the U.S. Supreme Court decision *Arizona v. California*, California was allocated 4.4 MAFY of the Lower Basin's first 7.5MAFY, and was granted rights over up to 50% of all surplus water; more than any other state in the Basin.¹

To insure that California follow these allocation guidelines, the BPCA included a provision that California institute guidelines for apportionment and prioritization of Colorado River water resources. In 1931, the Seven Party Agreement was signed in response to this provision. The Agreement apportioned water throughout the lower Basin states and in California.² The Agreement further allocated Californian water between municipal and agricultural districts according to historic preference, ultimately giving agricultural use in Southern California 3.85 MAFY , or 87% of the state's total Colorado River apportionment of 4.4 MAFY. Urban uses were given last priority under this Agreement, as evident in Table 1. Proportions within agricultural use are not specified, but may not exceed the 3.85 MAFY cap. Furthermore, priorities 5-7 are dependent on surplus water being available or Arizona and Nevada not diverting their full apportionments.³

Table 1. Priority System of Water Allocation, as established by the Seven-Party Agreement.⁴

¹ Agency, R. (2002). California's Colorado River Water Use Plan. C. R. B. o. California, State of California.

² Imperial Irrigation District, "2005 Annual Water Report"

³ (2002). "Water Conservation and Transfer Project -- Final EIR/EIS ".

⁴ Project 1-32

Priority	Description	Annual AF
1	Palo Verde Irrigation District—gross area of 104,500 acres	
2	Yuma Project (Reservation District) – not exceeding a gross area of 25,000 acres	
3a	Imperial Irrigation District and lands in Imperial and Coachella Valleys to be served by AAC ²	3,850,000 ¹
3b	Palo Verde Irrigation District –16,000 acres of mesa lands	
4	Metropolitan Water District and/or City of Los Angeles	550,000
SUBTOTAL		4,400,000
5a	Metropolitan Water District and/or City of Los Angeles and/or others on coastal plain	550,000
5b	City and/or County of San Diego ³	112,000
6a	Imperial Irrigation District and lands in Imperial and Coachella Valleys	
6b	Palo Verde Irrigation District—16,000 acres of mesa lands	300,000 ⁴
7	Agricultural use	all remaining water
TOTAL		5,362,000⁵

Notes:

¹The total amount of water available to satisfy Priorities 1, 2, 3a, and 3b is 3.85 MAFY.

²CVWD's Priority 3 rights are secondary to IID's rights as a result of the 1934 Compromise Agreement between IID and CVWD.

³In 1946, the City of San Diego agreed to merge its rights with, and into, the rights of MWD.

⁴The total amount of water available to satisfy Priorities 6a and 6b is 300 KAFY.

⁵The California Plan describes the strategy to assist California to reduce its annual use to its legal apportionment of 4.4 MAF in normal years, or to meet its needs from sources that do not jeopardize the apportionments of others (see Section 1.5.1).

Due to the availability of surplus water, California's annual Colorado River water consumption has ranged between 4.5 and 5.2 MAFY since 1990⁵ and has thereby consistently exceeded its basic apportionment.

California is heavily reliant on the availability of surplus water to meet the rising municipal water needs caused by rapid population growth in Southern California. Currently, Colorado River water and hydroelectric energy supports approximately 17 million people for municipal, industrial and agricultural purposes in California.⁶ Colorado River water also has important recreational and ecosystem uses, and makes up 50% of southern California's total water supply.⁷ However, the long-term availability of this surplus water supply is uncertain. Rapid population growth in the lower Basin means that both Arizona and Nevada are closer to using their full allocations than ever before.⁸ Additionally, drought conditions and climate change mean that the predictability of the

⁵ California's Colorado River Water Use Plan, Department of Water Resources, last modified October 4, 2002. <http://www.dpla.water.ca.gov/sd/>

⁶ California Plan 24

⁷ California plan

⁸ California Department of Water Resources: Southern District Accessed at <http://www.dpla.water.ca.gov/sd/>

Colorado's River flow is uncertain. Recognizing the danger of relying upon uncertain surplus water supplies, California's Colorado River Water use Plan (the California Plan), drafted in 2002, outlines specific projects and programs to help the state stay within its apportioned 4.4 MAFY of Colorado River water.⁹

The intent of the California Plan is to achieve these levels through projects implemented according to the 2003 Quantitative Settlement Agreement (QSA).¹⁰ The QSA was signed by the Secretary of the Interior, Imperial Irrigation District (IID), Coachella Valley Water District (CVWD), Metropolitan Water District (MWD), and the San Diego County Water Association (SDCWA) to redefine allocation of Colorado River Water within the IID, MWD, and CVWD that will enable California to stay within its basis 4.4 MAFY annual water apportionment.¹¹ The QSA lays out a strict Colorado River water budget for these agencies. Because agricultural interests currently govern a disproportionate amount of California's water share, and because urban uses are inflexible, water transfers from agricultural to municipal use are an important component of the QSA. Other targeted areas include increasing efficiency in water conveyance and use, implementing drought and surplus water management plans and groundwater management.¹²

Profile of water claims

Agricultural: the IID

Large-scale agriculture in Southern California began when the California Development Company appropriated water from the Colorado River to the Imperial Valley in 1885.¹³ The Imperial Irrigation District (IID) was formed in 1911 and purchased the California Development Companies water rights in 1916.¹⁴ Today, the IID delivers up to 3.1 MAFY of Colorado River water to over 450,000 acres of farmland in the Imperial Valley [figure 1], making it the largest irrigation district in the nation.¹⁵

⁹ California Plan 16

¹⁰ Appendix G: MWD and LADWP Plans and Programs to Secure Future Water Supplies, Occidental College Specific Plan Draft EIR, September, 2008. P. 6

¹¹ Imperial Irrigation District, "2005 Annual Water Report"

¹² Hooton, LeRoy "Colorado River: Droughts and Deadlines" accessed at <http://www.ci.slc.ut.us/utilities/NewsEvents/news2002/news12232002.htm>

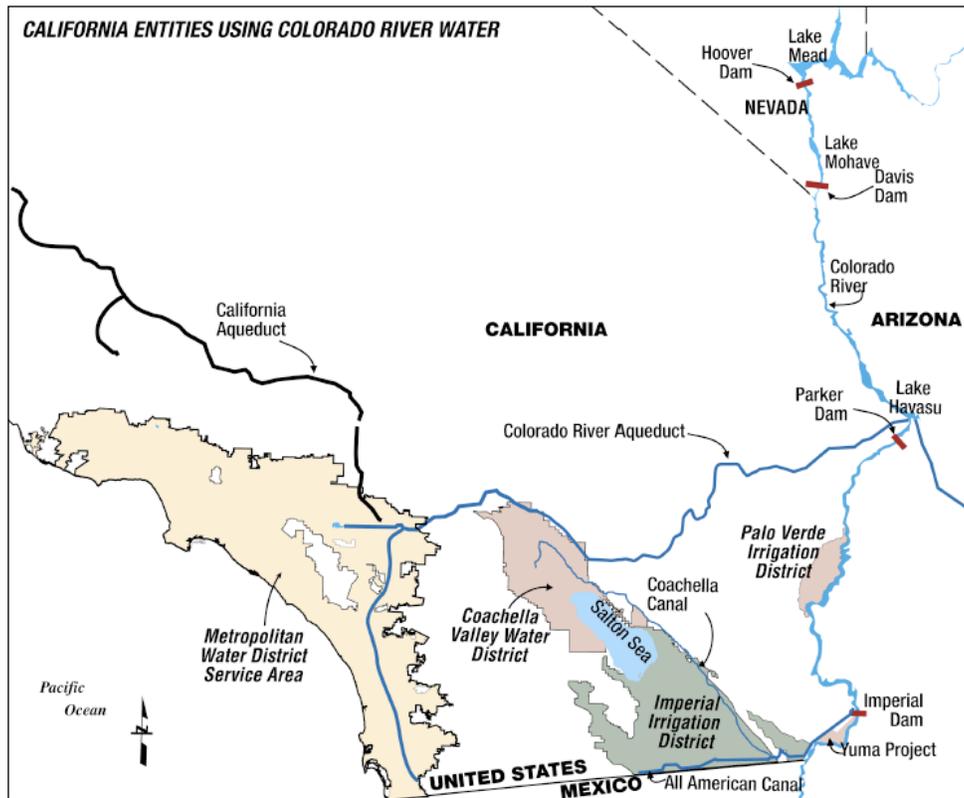
¹³ Imperial Irrigation District, "2005 Annual Water Report"

¹⁴ "Imperial Irrigation District: Water Rights". Accessed at <http://www.iid.com/Media/IID-Water-Rights1.pdf>

¹⁵ "Imperial Irrigation District: Water Department" accessed at <http://www.iid.com/Water>

The Coachella Valley Water District (CVWD) [figure 1] was formed in 1918 and irrigates approximately 60,000 acres of farmland. Unlike the IID, for which 98% of water is imported from the Colorado River for agricultural purposes, the CVWD is predominantly urban, and delivers only about 28 thousand acre feet per year (TAFY) of Colorado River water allocations to agriculture. The CVWD also services about one quarter of its agricultural land and its 100,000 homes and business with well water.¹⁶

Figure 1¹⁷



Both the Imperial and Coachella regions are desert, with high temperature and low rainfall of only three inches per year. With the aid of water imported from the Colorado River through the All-American Canal (AAC), the region is able to support two crop cycles per year, making it a major source of winter fruits and vegetables, as well as cotton, grain and alfalfa. The Imperial Valley's proximity to Mexico means that about 75% of its population is Hispanic¹⁸ and 15,000-18,000 seasonal farm workers are employed during the peak harvest season (January- February)

¹⁶ <http://www.cvwd.org/about/waterandcv.php>

¹⁷ Plan III-57

¹⁸ U.S. Census Bureau www.census.gov

from Mexicali, Mexico. As a consequence, only approximately 24% of the Imperial Valley population is permanently employed in agriculture, while 34% of the population is employed by the government.¹⁹ Imperial County has the highest unemployment rate in California, averaging 27% between 1983 and 1999, or four almost four times the state average of 7%. This unemployment rate is inflated because the majority of residents who work in a sector related to agriculture, are seasonal.²⁰ Nevertheless, poverty rates in the Imperial Valley are high, and very few farm workers are paid above minimum wage or are employed under union contracts. The Imperial Valley is economically dependent upon agriculture. Cropland worth a total \$1.8 billion generates total farms sales of \$1.3 billion per year.²¹ Tourism is the secondary industry in the Imperial Valley.

Urban: the Metropolitan Water District

Established in 1928, the MWD delivers water to 26 member agencies that collectively service to a varying degree: Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura counties.²² The MWD distributes water to over 16 million residents in Southern California, or 40% of California's total population. Since 2000, population in the MWD's service area has increased rapidly, by an average of 275,000 per year and the region's total population is expected to reach 22 million by 2030.²³ Although per-capita water use is now down from an average of 220 gallons per capita before 1990, to an average of 190 gallons per capita since water-use restrictions were enacted in response to drought conditions in 1991,²⁴ they are increasing with population growth at a rate of approximately 200,000 AFY.²⁵

¹⁹ Virsik, Thomas (2005) Re: Workshop on IID/SDCWA Transfer

²⁰ Martin, Philip (2003) "Impact on Farmworkers of Proposed Water Transfer from Imperial County," A memorandum to the Latino Legislative Causus of the California State Senate.

²¹ Martin

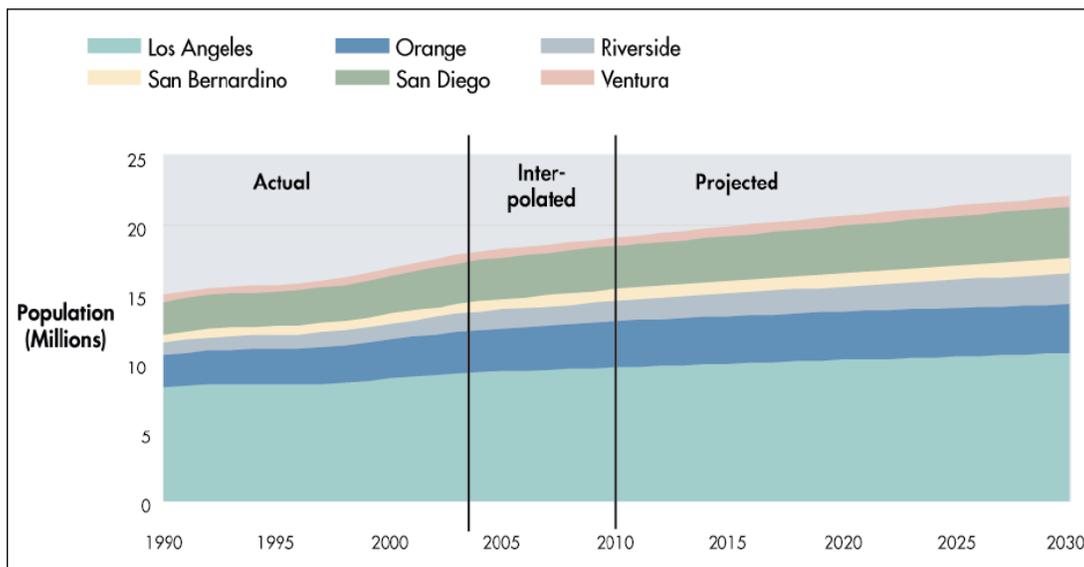
²² "About MWD", The Metropolitan Water District of Southern California. Accessed at <http://www.mwdh2o.com>

²³ The Regional Urban Water Management Plan: Metropolitan Water District of Southern California, November 2005 A.3-4

²⁴ Plan I-10

²⁵ Plan

Figure 2: Current and Projected Population in the MWD²⁶



In addition to a basic entitlement of 550,000 AFY of Colorado River Water, the MWD has priority over an additional 662,000 AFY of surplus water that goes unused by California holders of priority 1 through 3 [Table 1].²⁷ The MWD receives its water from a diverse range of sources. Currently, approximately 38% of its water is imported from Northern California through the State Water Project’s (SWP) California Aqueduct [figure 1] while local sources provide on average 42% of the MWD’s yearly water supply. The remaining 20% are imported from the Colorado River through the MWD’s Colorado River Aqueduct [figure 1].²⁸

QSA

The ultimate goal of the QSA is provide for the long-term water needs of California without relying upon an unsustainable amount of surplus water to do so. Satisfying these water needs is especially critical in the MWD, because the urban water use it supplies is inflexible. Due to rapid population growth, the MWD in many ways relies upon the full implementation of QSA’s water transfer agreements to satisfy these needs in periods of drought and decreased water supply.

²⁶ Plan I-10

²⁷ Plan III-56

²⁸ Plan

The MWD has stated repeatedly that its 550,000 AF of Colorado water allocations will be available every year for the next 20 years,²⁹ adding that the supply is “expected to be available during all year types, including wet, average, single dry-year, and multiple dry-year weather,” during this time. One of the reasons the MWD can make this claim with some confidence is that California’s 4.4 MAFY apportionment has the highest priority to water during drought conditions in the Basin.³⁰ Currently the biggest threat to the MWD’s long-term water supply is a storm of litigation threatening to stall, or even reverse³¹ QSA’s primary objective: the eventual transfer of 303,000 AFY of water from the Imperial Valley to urban users.

Sometimes referred to as the “corner stone” of the QSA, the IID-SDCWA Water Transfer Agreement will phase in long-term water transfers to the SDCWA. As specified in the QSA, failure to fully implement this agreement would allow the federal government to cut off California’s access to surplus water supplies from the Colorado River, about 700,000 AFY.³² The Transfer agreement had to be signed by IID, SDCWA, CVWA, and MWR for this to hold.

Under the agreement, annual water transfers of 10,000 AF in 2003, 20,000 AF in 2004, and 30,000 AF in 2005 have already occurred. Transfers are hoped to reach 100,000 AFY by 2020 and 200,000 AFY by 2023 to ultimately deliver 12.9 MAF of conserved water to San Diego. The agreement is structured so that the SDWA will pay farmers to implement a number of water conservation measures including: fallowing an average of 20,000 acres of land annually, implementing on-farm irrigation conservation measures. While the IID only pays \$17/AF for Colorado River water, The SDCWA would pay the IID \$68 per AF of water it receives, at a profit to the IID.³³ The profit from these water transfers, in addition to at least \$2 million from the MWD are intended to offset socio-economic impacts for the loss of farmland due to the transfer.³⁴

A number of additional conservation programs implemented under the QSA are already in effect. These programs include: the lining of the AAC to reduce water lost to seepage and urban drought management programs. Combined, QSA programs are intended to supplement MWD’s basic Colorado River water allocation of 550,000 AFY with an additional 300,000 AFY by 2020.³⁵

²⁹ Metropolitan Water District of Southern California, 2006 Integrated Water Resources Plan Implementation report 1-2.

³⁰ Oxnard 5.7-10

³¹ Oxnard 5.7-9

³² <http://www.allbusiness.com/legal/energy-utility-law/10602657-1.html>

³³ “City water could cost more” Imperial Valley Press Online, April 14, 2009

³⁴ Hoon, LeRoy “Colorado River: Drought and Deadlines,” accessed at <http://www.ci.slc.ut.us/utilities/NewsEvents/news2002/news12232002.htm>

³⁵ Occidental G-8

The Opposition

Litigation is one of the primary factors holding the back implementation of the QSA's transfer agreements. Although the series of lawsuits against the lining of the AAC have been resolved in favor of the QSA, there remain a series of unresolved lawsuits around the IID/SDCWA water transfer agreement.³⁶ By stalling and potentially voiding the terms to the biggest conservation/water transfer measure in the QSA, litigation has the potential to void the terms of the QSA altogether, thereby preventing the MWD from supplying the long-term water needs of urban water users at a significant economic price.

Primary stakeholders within this litigation are the Imperial Group, the County of Imperial, the IID and the MWD, who collectively represent the interests of Imperial Valley farmers, residents, and water supplying agencies.³⁷ In general, the opposition to proposed water transfer agreements and corresponding water conservation measures consists of environmental groups worried about the uncertain environmental consequences of reducing drainage to the Salton Sea, and farmers and government officials in the County of Imperial who are concerned that the socio-economic consequences of these transfers is not given adequate consideration.

Environmental Impacts

Opposition to the water transfer measures for environmental reasons is founded in concern that the current legislation does not adequately address detrimental affects to the Salton Sea. The Salton Sea was formed between 1905 and 1907 when an irrigation canal bringing water from the Colorado River to the Imperial Valley broke. Since then, the only source of water to the lake is agricultural runoff. This poor water supply has caused the lake to deteriorate and it currently has a salt content 25% higher than the ocean, making it largely unsuitable for fish.³⁸ However, the Salton Sea has become critical habitat for birds and is seen as important for tourism and recreation to Imperial County.³⁹

Conservation measures under the QSA would drastically reduce agricultural runoff to the Salton Sea. There is concern that reduced agricultural runoff will reduce the Salton Sea's water level and thereby expose a significant amount of currently submerged shoreline. This could present an urgent air quality concern as accumulated toxins and fine particulates from the exposed seabed

³⁶ Occidental G-8

³⁷ Oxnard

³⁸ Imperial Irrigation District "2005 Annual Report"

³⁹ Virsik

are mobilized by wind, and are inhaled.⁴⁰ Although the Environmental Impact Statement (EIR) identifies mitigation efforts to these air quality concerns, some consider these insufficient to address the magnitude of impending environmental degradation.⁴¹

The County of Imperial and the Imperial County Air Pollution Control District have actively pressed litigation against the QSA and its related agreements out of concern that landowners will end up bearing the high price of mitigation efforts. Current Air District rules puts landowners in charge if the costs associated with dust. Since IID is one of the primary landowners in the Imperial Valley, these costs, estimated to be as much as \$1 billion, will be paid by the IID ratepayers. Both Imperial County and the Air District propose that the QSA be renegotiated to ensure the beneficiaries of the contracts, the MWD and SDCWA be required to pay these costs instead.⁴²

Economic impacts

The water transfer agreement will ultimately reducing water availability to the Imperial Valley by 5-10% by requiring farmers to use water more efficiently, fallow some land, and/or switch to growing different, more water efficient crops.⁴³ One of the biggest concerns with the QSA's water transfer agreement and its corresponding conservation measures is that its regional economic impact remains largely uncertain, but is likely to be higher than recognized within the QSA.

The Imperial Valley is economically dependent on its \$1.3 Billion agricultural industry. Although the IID/SDWA water transfer mandates some land fallowing, regional employment will ultimately increase or decrease depending on the conservation measures that farmers favor. For example, the majority of current crops grown in the Imperial Valley are field crops like alfalfa; low value crops grown with very little physical labor but lots of water. Water shortage is likely to encourage a transition to higher-value, high labor crops (such as fruits and vegetables), which would actually increase the labor supply in some areas.⁴⁴

A study conducted by the UC Davis Department of Agriculture and Resource Economics expects a 10% reduction in water availability to reduce Imperial County's average employment by .5%, or 258 jobs, of which 202 are expected to be agricultural. This points to the fact that proposed QSA measures are expected to cause third party economic implications beyond agriculture,

⁴⁰ QSA Litigation Bulletin: Environmental Impact. Imperial County, CA, April, 2009

⁴¹ Heald, Patrick (2009) "QSA may allow more water to be transferred to MWD" *Imperial Valley Living*

⁴² Virsik

⁴³ Virsik

⁴⁴ Virsik

predominantly within the packing and processing industries that are related to agriculture, but elsewhere as well.⁴⁵

There is a lot of seasonality within non-farm business in the Imperial Valley, such as tourism, packing and processing jobs. Because of this, non-farm employers are often quick to lay off workers when work slows.⁴⁶ The concern is that higher unemployment will put downward pressure on wages and housing prices, and will further also require significant relocation assistance for anyone not benefiting from water-transfer proceeds.⁴⁷

Farmers

The Imperial Group, a group of Imperial Valley landowners who collectively own approximately 25% of irrigated agricultural land in the Imperial Valley, is perhaps the most threatening opposition to the QSA. It has filed numerous lawsuits against the IID as well as other signatory parties to the QSA questioning its validity and claiming that the IID mismanages water resources.⁴⁸ Specifically, the Imperial Group claims that the EIR made for the IID-SDWA water transfer ignores the growth-inducing impact the transfer may cause. The Imperial Group also believes that given the high value of water to San Diego, San Diego should provide more economic mitigation than it has offered.⁴⁹

The Imperial Group has enacted litigation against the IID out of concern that they had minimal say in the provisions of the QSA and especially its water transfer agreement. Although farmers are by far the biggest water users in the Imperial Valley, they do not represent a major voting block, since migrant workers do the majority of farm labor.⁵⁰ Furthermore, the majority of the IID's board members are not farmers and are considered to have little understanding of the farmer's basic needs. As it stands, the IID is criticized for not being transparent in the implementation of water transfers. So far, the IID has refused to provide any information pertaining to the allocation of the supposed \$3.8 billion income to the Imperial Valley (from water transfers), or what the outcomes of the IID's own socioeconomic analysis is. Providing more transparency around these issues would reduce a lot of the uncertainty for farmers around the perception of

⁴⁵ Martin

⁴⁶ Martin

⁴⁷ Martin

⁴⁸ Virsik

⁴⁹ Virsik

⁵⁰ Cline

inequity in the fallowing program as well as the apparent current absence of mitigation for third party impacts.⁵¹

The Imperial Group filed a lawsuit against the IID in 2008 due to perceived problems with its implementation of the water transfer agreements. The lawsuit claimed concern that the IID was not using its “best efforts” to administer a fallowing program or to minimize socio-economic impacts caused by the transfer, and was unaccountable to the needs of its water users. The IID currently mandates that farmers bid against each other for the right to fallow their land; farmers claim that the limited water supply is not allocated equitably as a result, making the adverse effects of fallowing larger than they might otherwise be.⁵² Another element of the lawsuit is that farmers consider the \$700/acre tax imposed on landowners to finance the restoration of the Salton Sea to be an unconstitutional burden. The lawsuit asks that landowners be compensated for their losses in the amount of \$25 million if the QSA is allowed to move forward.⁵³ In addition, the lawsuit asks that Imperial County, not the IID should be responsible mitigating the third party effects. They voice concern that the IID is too narrowly focused, and it structurally limited to properly mitigate socio-economic impacts.

Policy Recommendation

It is critical that the water transfer agreement be fully executed. Accomplishing this through the measures proposed by the QSA will lead to profound changes in how farming has historically been conducted in the West. Although California Water Code already does rank residential water needs over agricultural needs, this priority is not reflected in the appropriations determined by the Seven Party Agreement; agriculture in the Imperial Valley does, and will continue to receive more of the Colorado Rivers water supply than its urban neighbors in the MWD. The water transfer agreement mandated by the QSA represents a small, but critical step toward reallocating these excessive supplies to urban needs. For the coming decades, it represents a huge step in reducing California’s water use to a sustainable level. However, the water transfer agreement may never be fully executed if the environmental and economic concerns raised in the Imperial Valley are not accommodated.

⁵¹ Virsik

⁵² Vilsik

⁵³ Vilsik

Driving litigation is the concern that the financial burden underlying the water transfer not accounted for under the current agreement. This concern is driven largely by uncertainty of what these costs will be, and lack of transparency in attempts to accommodate them. What is certain is that the Imperial Valley, at the cost of its farmers, is accruing a deficit under the current agreement: the IID will be \$8.2 million short in 2009, and expects losses of \$116 by 2014 under current conditions.⁵⁴

Although water rates are intended to accommodate these costs, and although water rates are inherently flexible, there is currently no provision agreeing to adjust rates according to the variable costs of year-to-year water conservation in the Imperial Valley. Furthermore, a lack of transparency in how the profits are allocated has led farmers and environmentalists to conclude that the IID is mismanaging its income and is not adequately considering farmer's needs.

Farmers and environmentalists are widely opposed to the implementation, not the intent of the QSA. Concerns about socioeconomic and environmental impacts of the water transfer are generally financial. The state of California has agreed to front the costs of preserving the Salton Sea, but Imperial Valley residents with invested interests in the Salton Sea are skeptical of the state's ability to follow through on its promises under current economic conditions. Two adjustments to the current water transfer agreement would address many of the concerns discussed.

First, water rates that are deliberately and frequently adjusted to the economic needs of the Imperial Valley and the costs of preserving the Salton Sea would transfer the financial burden to those benefitting from the water transfers and able to pay; urban populations. The added financial burden to these populations would actually benefit the region, as it would provide an additional incentive for water conservation. Furthermore, it would guarantee a stable and appropriate income to the Imperial Valley.

Second, putting Imperial County in charge of implementing the agreement and allocating water rations, would allow for greater representation of farmers' needs and transparency in the water allocation process, and, by increasing the potential for public participation, would reduce the likelihood for continued litigation.

⁵⁴ "City water could cost more"