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TECH CENTRAL STATION
Clear Skies, Hazy Logic
By Joel Schwartz 04/23/2003

The Bush administration contends coal-fired power plants kill tens of thousands of Americans each year. The administration claims its Clear Skies Initiative, which would cut power plant emissions by about 70 percent, will reduce this toll by 12,000 per year and eliminate 370,000 asthma attacks, conferring more than \$90 billion worth of health benefits on the American public. Environmental groups counter that Clear Skies will kill tens of thousands by not reducing emissions faster and further. All of these claims are false. Clear Skies will raise electricity prices while providing few or no health benefits to the breathing public. Even more draconian approaches, like Sen. Jeffords's (I-VT) "Clean Power Act" would be an even worse deal for American consumers.

Coal plants produce much of the electricity in the eastern half of the United States. Unfortunately, they also produce much of the east's air pollution - about one-fourth of nitrogen oxides (NOx) and two-thirds of sulfur dioxide (SO2), as well as one-third of national mercury emissions. NOx helps form ozone smog, and some SO2 gets converted into sulfate particles, contributing about 25 to 40 percent of fine particulate matter (PM2.5) across the eastern U.S. Burning coal also releases mercury, which environmentalists and regulators have blamed for high mercury levels in some freshwater fish.

Clear Skies is intended to reduce ozone smog by reducing power plant NOx emissions by 60 percent in 2008, and 67 percent in 2018. But EPA's NOx "SIP call" regulation already requires a 60 percent reduction in power plant NOx from May to September - the "ozone season" - starting in 2004. Clear Skies would just extend those reductions to the colder months of the year, when they would do little or nothing to improve human health. Yet according the federal Energy Information Administration (EIA), these additional NOx reductions would cost a few billion dollars per year.

All of the mortality benefits and more than 90 percent of the monetary benefits claimed for Clear Skies come from reductions in PM2.5. Yet the claim that PM at current levels is causing increased mortality is implausible. EPA based its benefit estimate, as well as its stringent new PM2.5 health standard, on the American Cancer Society (ACS) study of PM and mortality.

The ACS study reported that a 10 microgram per cubic meter increase in PM2.5 was associated with a four percent increase in the risk of death

during the 16-year study period. But some odd features of the study suggest that PM is unlikely to be responsible. According to the ACS results, PM increased mortality in men, but not women; in those with no more than a high school degree, but not those with at least some college; in former-smokers, but not current- or never-smokers; and in those who said they were moderately active, but not the very active or the sedentary.

These odd variations in the relationship between PM_{2.5} and mortality seem biologically implausible. Even more surprising, the ACS study reported that higher PM_{2.5} levels were not associated with an increased risk of mortality due to respiratory disease; a surprising finding, given that PM would be expected to exert its effects through the respiratory system.

EPA also ignored the results of another epidemiologic study that found no effect of PM_{2.5} on mortality in veterans with high blood pressure, even though this relatively unhealthy group should have been more susceptible to the effects of air pollution than the general population.

Sulfate PM - the type of PM caused by coal power plant emissions - is a particularly implausible culprit. Ammonium sulfate, the main form of sulfate PM, is used as an inactive control in human studies assessing the health effects of inhaling acidic aerosols. Inhaled magnesium sulfate is used therapeutically to reduce airway constriction in asthmatics. Sulfate is also naturally present in bodily fluids at levels many times the amount that could be inhaled from air pollution. These factors suggest sulfate PM shouldn't be expected to have detrimental effects on health.

Mercury on Earth

Clear Skies would reduce mercury emissions by 70 percent, at a cost of about \$4 billion per year. Most mercury exposure is believed to result from eating non-commercial freshwater fish from contaminated lakes and rivers, but the mercury ultimately comes from air emissions. Bacteria convert some of the mercury to methylmercury, which is the form that can concentrate in animals. A recent study by the Centers for Disease Control reported that eight percent of women of childbearing age have blood mercury levels greater than EPA's "reference dose" - a safety limit set at one-tenth the level believed to cause subtle neurological impairment in children.

No one knows whether current mercury levels in fish are caused by current U.S. mercury emissions. In its "Mercury Report to Congress," EPA concluded, "it is not possible to quantify the contribution of U.S. anthropogenic emissions relative to other sources of mercury, including natural sources and re-emissions from the global pool, on methylmercury levels in seafood and freshwater fish consumed by the U.S. population. Consequently, the U.S. EPA is unable to predict at this time how much, and over what time period, methylmercury concentrations in fish would decline as a result of actions to control U.S. anthropogenic emissions."

Given the uncertainties, it's quite possible we could spend \$4 billion per year reducing mercury and end up with nothing to show for it but higher electricity bills. Fortunately, there's a less expensive and more certain way to reduce fish mercury levels. Methylmercury is produced more rapidly in lakes that are more acidic, and sulfate increases lakes' acidity. In recent field experiments, scientists have shown that reducing sulfate in lakes reduces mercury in fish by about the same amount as reducing mercury levels in the lake. Thus, with sulfate reductions, the uncertainty in whether current fish mercury levels are due to current U.S. mercury emissions, transported emissions from other regions, or accumulated past

emissions is irrelevant. Sulfate reductions will reduce mercury in fish regardless of where the mercury comes from.

EIA estimated a 75 percent reduction in coal plant SO2 would cost about \$1.4 billion per year, and that the measures necessary to control SO2 would reduce mercury emissions by 25 percent as well. And although sulfate PM likely isn't harming human health, reducing SO2 emissions would have the aesthetic benefit of improving visibility in eastern national parks.

The Bush administration should abandon the NOx and mercury portions of Clear Skies and focus on SO2 reductions. The result would be lower mercury levels in fish, greater visibility in national parks, and at least the potential for net benefits in human welfare. In its current form, the only thing clear about Clear Skies is that it's a bad deal for the American public.

Joel Schwartz is the author of the forthcoming policy studies "Understanding Air Pollution: Trends Health Effects and Current Issues" (Cato), "Particulate Air Pollution: Weighing the Risks" (CEI), and "No Way Back: Why Air Pollution Will Continue to Decline" (AEI)