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NEAR-TERM EMISSIONS REDUCTIONS AND HEALTH BENEFITS

FROM EPA'S PROPOSED REGULATIONS ON WISCONSIN-BASED POWER PLANTS

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BENEFITS OF EPA'S PROPOSED REGULATIONS ON WISCONSIN-BASED POWER PLANTS

Introduction

The proposed greenhouse gas (GHG) regulations for new and existing power plants under Clean Air Act Section 111 will reduce climate change-causing GHG emissions as well as health-harming air pollutants. A significant element of the proposed regulations is the mandate that coal power plants reduce GHG emissions by almost 90% by 2030, or close before 2040. If operating beyond 2032, coal power plants must reduce emissions by 16% in 2030. Climate policies can also yield immediate and local health benefits. Fossil fuel power plants emit fine particulate matter (PM2.5) directly as well as nitrogen oxides (NOx) and sulfur dioxide (SO2), both of which form secondary PM2.5. Fine particulate matter has well established connections to respiratory and cardiovascular health impacts, including premature death **[1]**. Recent research estimates over 300,000 people die prematurely every year in the United States from electricity sector pollution alone **[2]**.

Methods

The EPA's Regulatory Impact Analysis (RIA) deploys a state-of-the-science chemical transport air quality model integrated with a sophisticated health model. Their analysis finds that the largest health benefit from reduced air pollution would occur in 2030. In that year alone, the proposed rules would prevent 1,300 premature deaths, 800 hospital and ER visits, more than 300,000 asthma attacks, and 66,000 lost workdays days across the United States **[3]**.

To contextualize the proposed regulations' near-term impact on Wisconsin, we estimate the monetized health impacts using EPA modeling and methods. We use the EPA's power sector modeling results for the proposed regulations and baseline, which report emissions at the state-level in 2028 and 2030 **[4]**. The coarse spatial aggregation limits the air quality models we can use to quantify the proposed regulations' impact on Wisconsin. Instead, we apply the EPA's sector-based benefit per ton estimates for electricity generating units **[5]**. As these methods are different from the EPA's RIA, they also yield different type of results (morbidity/mortality incidences versus an economic value of health impacts).

We also quantified the social benefit of avoided greenhouse gas emissions from Wisconsin power plants by applying the social cost of carbon (SCC) metric $51/ton of CO2e avoided. This is the current metric used by the federal government.

[1] BRUNEKREEF, B., & HOLGATE, S. T. (2002). AIR POLLUTION AND HEALTH. LANCET, 360(9341), 1233–1242. HTTPS://DOI.ORG/10.1016/S0140-6736(02)11274-8
[2] VOHRA, K., VODONOS, A., SCHWARTZ, J., MARAIS, E. A., SULPRIZIO, M. P., & MICKLEY, L. J. (2021). GLOBAL MORTALITY FROM OUTDOOR FINE PARTICLE POLLUTION GENERATED BY FOSSIL FUEL COMBUSTION: RESULTS FROM GEOS-CHEM. ENVIRONMENTAL RESEARCH, 195(110754). HTTPS://DOI.ORG/10.1016/J.ENVRES.2021.110754
[3] U.S. EPA (2023). REGULATORY IMPACT ANALYSIS FOR THE PROPOSED NEW SOURCE PERFORMANCE STANDARDS FOR GREENHOUSE GAS EMISSIONS FROM NEW, MODIFIED, AND RECONSTRUCTED FOSSIL FUEL-FIRED ELECTRIC GENERATING UNITS; EMISSION GUIDELINES FOR GREENHOUSE GAS EMISSIONS FROM EXISTING FOSSIL FUEL-FIRED ELECTRIC GENERATING UNITS; AND REPEAL OF THE AFFORDABLE CLEAN ENERGY RULE. RESEARCH PARK TRIANGLE, NC: OFFICE OF AIR QUALITY PLANNING AND STANDARDS.
[4] U.S. EPA (2023). ANALYSIS OF THE PROPOSED GREENHOUSE GAS STANDARDS AND GUIDELINES: POWER SECTOR MODELING, FROM HTTPS://WWW.EPA.GOV/POWER-SECTOR-MODELING/ANALYSIS-PROPOSED-GREENHOUSE-GAS-STANDARDS-AND-GUIDELINES/.
[5] U.S. EPA (2023). SECTOR-BASED PM2.5 BENEFIT PER TON ESTIMATES, FROM HTTPS://WWW.EPA.GOV/BENMAP/SECTOR-BASED-PM25-BENEFIT-TON-ESTIMATES/.

Results

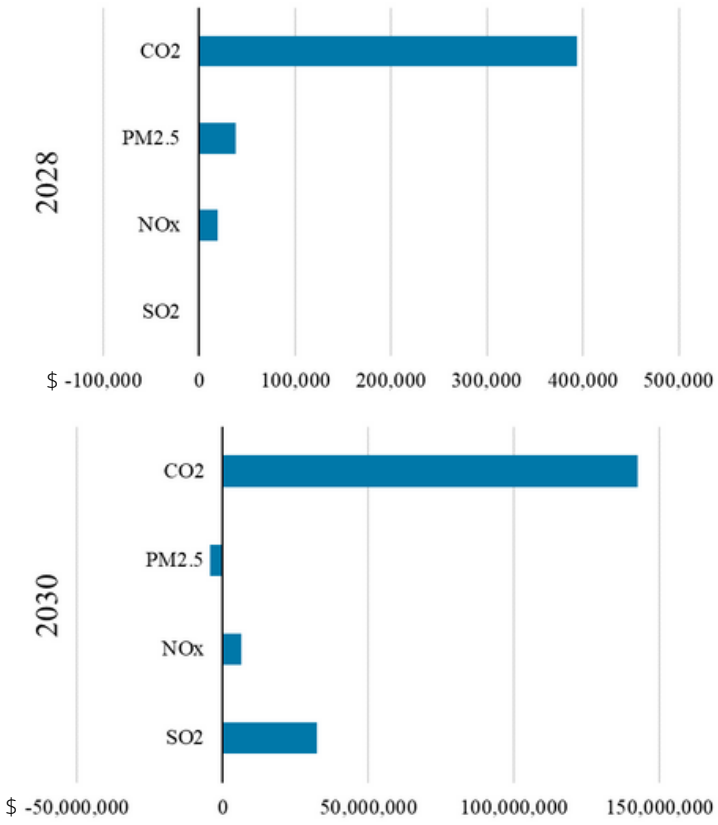
We find that the proposed regulations on Wisconsin-based power plants yield considerable health benefits in 2030. This is the same year as when the EPA reported the most health benefits across the country in the RIA. The health benefits in that year are primarily caused by a sharp decrease in SO2 emissions, which are 442 tons lower under the proposal scenario compared to the reference case. Since SO2 emissions are associated with coal combustion **[6]**, we can infer that a decrease in coal-fired electricity occurs in 2030. The proposed regulations on existing coal-fired power plants require plants to reduce GHG emissions in 2030 or retire before 2032. EPA's modeling likely assumed that utilities will close coal-fired power plants rather than investing in technology to preserve a fuel source that is increasingly not cost-competitive.

In 2030 alone, the proposed regulations will result in nearly $50 million in health benefits from Wisconsin-based power plants **[Figure 1]**. While we do not quantify the mortality and morbidity incidences, avoided premature deaths drive the majority of monetized health impacts of power plant pollution **[7]**. The 2030 air pollution and public health co-benefits are accompanied by the reduction of 2.8 million metrics tons of CO2 pollution, valued at $140 million.

We quantify smaller, yet still positive, health benefits in 2028 totaling $400,000 from reduced NOx and PM2.5 emissions. The proposal's impact on Wisconsin-based power plants in 2028 includes a decrease in CO2 emissions by 8,000 metric tons. The small benefit in 2028 demonstrates that much of the power plant closures or emissions reduction technology adoption will not occur until near the 2030 enforcement date.

FIGURE 1

Monetized health benefit from avoided SO2, NOx, and PM2.5 emissions and social benefit from avoided CO2 emissions in 2028 and 2030.



[6] BARBOSE, G., WISER, R., HEETER, J., MAI, T., BIRD, L., BOLINGER, M., ET AL. (2016). A RETROSPECTIVE ANALYSIS OF BENEFITS AND IMPACTS OF U.S. RENEWABLE PORTFOLIO STANDARDS. ENERGY POLICY, 96, 645–660. HTTPS://DOI.ORG/10.1016/J.ENPOL.2016.06.035
[7] GALLAGHER, C. L., & HOLLOWAY, T. (2020). INTEGRATING AIR QUALITY AND PUBLIC HEALTH BENEFITS IN U.S. DECARBONIZATION STRATEGIES. FRONTIERS OF PUBLIC HEALTH. HTTPS://DOI.ORG/10.3389/FPUBH.2020.563358