Date: **November 22, 2014**

Docket ID number: **EPA-HQ-OAR-2013-0602**

Re: Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, Also known as the Clean Power Plan

Submitted by: Physicians for Social Responsibility, 1111 14th St, NW, Suite 700 Washington, D.C., 20005

Introduction

We submit these comments on behalf of Physicians for Social Responsibility (PSR), a 501 (c) (3) scientific and educational organization with approximately 40,000 members and e-supporters in chapters in major cities and medical schools throughout the United States. Our mission is to protect human life from the gravest threats to health and survival. On the basis of the scientific evidence as put forth in the peer-reviewed medical and scientific literature, the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, and the National Climate Assessment, and other documents, such as the World Bank Group's Publication *Turn Down the Heat: Why a 4EC Warmer World Must be Avoided* we are convinced that climate change caused by unbridled emissions of carbon dioxide and other greenhouse gasses is the gravest public health threat we face today.[1-3]

Therefore, Physicians for Social Responsibility strongly supports the regulations proposed by the United States Environmental Protection Agency that will limit carbon dioxide emissions by existing power plants, i.e., The Clean Power Plan as complemented by its earlier rules proposed for new power plants, i.e., Standards of Performance for Greenhouse Gas Emissions From New Stationary Sources: Electric Utility Generating Units, as the Agency seeks to fulfill its mission to protect human health. We further recognize that the proposed regulations are but a small initial step in the right direction that will not be sufficient to avoid the dire consequences of climate change.

Comments on Specific Aspects of the Proposed Protections

The proposed 30% reduction from 2005 emissions

We recognize that there must be a numeric value chosen for any regulatory action. The adverse effects of climate change are occurring already. Although PSR believes that a 30% reduction in carbon dioxide emissions is not adequate to prevent the worst consequences of the changes in the Earth's climate due to the effects of this potent greenhouse gas (GHG), the process must start somewhere, and the state-by-state reductions called for in the Plan represent such a start. We further believe that a 30% reduction, even if applied worldwide to all emissions by existing stationary electrical generating units would not be adequate. However, as the world's most technologically advanced nation, it is incumbent on the United States to lead the way and to demonstrate that reducing carbon emissions and economic advancement and prosperity are not mutually exclusive. We hope that the anticipated success of the Clean Power Plan will show those who are willing to make evidence-based decisions that the additional reductions in GHG

emissions needed to make the Earth hospitable for all can be achieved and that the economies of the world's nations can thrive in an environment that depends on sustainable energy sources.

We base our comments on the basis of information in the IPCC 5th Assessment Report and information in the peer-reviewed scientific literature, particularly the Representative Concentration Pathway summaries by van Vuuren and Meinshausen et al [4, 5] and medical literature that global carbon dioxide emissions should target the Representative Concentration Pathway 2.6 scenario RCP2.6 and must be kept below the RCP4.5 to avoid unacceptable impacts on health and the environment. RCP2.6 and RPC4.5 describes a set of characteristics that result in radiative forcing values of 2.6 and 4.5 W/m^2, respectively, at the end of this century.[5] The RCP2.6 scenario envisions total carbon dioxide emissions rising to approximately 11 Gt (gigatonnes) above the baseline (circa 1850) before mid-century, then falling below the baseline around the end of the century. The RCP4.5 scenario envisions total carbon dioxide emissions rising from approximately 9 Gt above baseline in 2010 to 11-12 Gt by mid-century, then falling to around 4 Gt above baseline by 2080. The atmospheric carbon dioxide concentrations (in ppm) in these two scenarios are shown in the table. The Geophysical Fluid Dynamics Laboratory of the National Oceanic and Atmospheric Administrations reports that the RCP2.6 would lead to an increase in the average global temperature of approximately 2 degrees C, compared to historical data with the RCP4.5 scenario predicting an increase of about 2.5 degrees with continued rises thereafter (Accessed August 22, 2014, http://www.gfdl.noaa.gov/coupled-physical-model-cm3). Although not optimal, the RCP4.5 outcome is below the four degree threshold called for by the World Bank Group.[3]

We recognize that drastic action would be called for by all nations to make the RCP2.6 scenario a reality. This is the very best that can be hoped for and would require the US to take an important leadership role. As emissions and other factors affect global climate change, we believe that the RCP4.5 scenario must be avoided. At the present time, we appear to be headed toward endpoints included in RCP6.0 and RCP8.6 scenarios. These predict temperature increases of over 3 and 5 degrees respectively by the end of the century, with no end to the increases in sight.

Global warming is already having substantial impacts on human health. A failure to curb carbon dioxide emissions will worsen these impacts to an unacceptable degree. Here is a partial list of what must be avoided:

- Heat-related illnesses such as heat stroke and heat exhaustion, already the leading cause of weather-related deaths in the US (http://www.nws.noaa.gov/om/hazstats.shtml, accessed April 22, 2014), will become even more common.[6] This is particularly true in our large heat island cities where children, the poor, elderly, and those with chronic diseases are increasingly vulnerable to the heat.[7-9]
- Increases in rainfall will raise the risk for serious floods in North America, particularly in the Northeast.[10]
- Droughts, and megadroughts such as the one that gripped most of the nation in 2012 and currently affects large parts of the Southwest, will also become more common, more severe, and last longer.[11]
- Yields of food crops, including corn, soybeans and rice, that are already depressed by climate change will fall even more.[12] Crop failures will drive up prices beyond the 10%

spike seen in July 2012 due to the Midwestern drought (per World Bank Report).

- Food shortages will exacerbate under-nutrition everywhere. In the U.S. more than 40 million citizens rely on the Supplemental Nutrition Assistance Program. In some nations, under-nutrition affects almost half of those less than 5 years of age.
- Further weakened by starvation, children will fail to grow normally and they will be more susceptible to diseases. Mosquito-borne illnesses such as malaria, dengue, and viral encephalitis will become even greater problems. Some predict that almost half of the world's inhabitants, including those along the Gulf Coast and Southern US will be at risk for dengue by 2085.[13]
- Water-borne diarrheal illness will pose additional risks in flooded areas.
- Storms, such as Superstorm Sandy and other forms of more localized severe weather, will become more common damaging property and killing and injuring those unable to flee.[10] These impacts will have disproportionate effects on vulnerable populations for years after the event.
- Sea levels will continue to rise due to thermal expansion of the oceans and melting ice. Inhabitants of major river deltas will become environmental refugees due to flooding. Rising oceans, combined with storm surges, already threaten areas that were previously safe.[2]
- "Unstoppable", a term that was recently applied to melting Antarctic ice, will apply to other threats to human health and the environment without vigorous action.[14, 15]

We recognize that some of the adverse effects due to climate change have already started and would continue even if carbon dioxide emissions were miraculously curtailed immediately. This is due to the extraordinarily long half-life of this GHG which has been calculated to be on the order of 30,000 to 35,000 years.[16] The more severe effects of climate change expected after a 4 degree Celsius temperature rise, as described by the World Bank *Turn Down the Heat* report and confirmed by the IPCC 5th Assessment Report must be avoided.[2, 3]

PSR recognizes the fact that there are those who will challenge the 30% target for reducing carbon dioxide emissions and will lobby Congress to deprive the Agency of its authority to regulate this GHG. It would be a public health disaster if those efforts were successful. Everyone, not just the citizens of the US, would pay an unacceptable price.

In addition, defined targets by 2020 should be maintained as a requirement of the rule as well as interim targets for 2025 without allowance for averaging.

Therefore, PSR supports the agency's proposed rule to limit carbon dioxide emissions as described in the Clean Power Plan. However, on the basis of the peer-reviewed science, as summarized by the IPCC 5th Assessment Report, and others, this reduction must be regarded only as an initial step toward an energy future that is sustainable.

Alternate Energy Sources on a State-by-State Basis

Energy Conservation

Improving the efficiency with which we use energy already being produced, is, in our judgment, the strategy by which the greatest gains can be achieved with the smallest expenditure of funds. The state-by-state targets for improved energy conservation are very modest.

According to 2012 data from the Lawrence Livermore Laboratory and the Department of Energy, approximately 61% of all energy produced in the US is wasted. (https://flowcharts.llnl.gov/content/energy/energy_archive/energy_flow_2012/2012new2012newUSEnergy.png, accessed August 25, 2014). Residential energy use was reported as 10.6 quads, including 4.69 from electricity. Residences wasted approximately 35% of the energy delivered. Commercial energy use was 8.29 quads, of which 4.52 came from electricity. The commercial sector also wasted 35% of its energy. Finally, industry consumed 23.9 quads of energy of which 3.35 came from electricity. Industry wasted 20% of its energy. A recent report from a panel of National Academy of Science estimates that cost-effective energy use reductions in buildings of 10% by 2020 and 14.7% by 2030 are achievable. [17] The Panel further reported that a 7.7% reduction by the industrial sector was possible. Clearly there are opportunities for enormous gains in efficiency. As the Agency works with the states to develop their individual plans to reach established goals, we strongly encourage the use of this modality as the prime building block given its lowest cost strategy.

Role of Natural Gas

PSR has grave concerns that the EPA's encouragement given to the natural gas industry is short-sighted at best. The rationale for the support for natural gas is, of course, that it produces less carbon dioxide per Btu of heat produced than coal. However, the evidence is that this is an oversimplification that ignores the total environmental impact of this fossil fuel industry. Our concerns arise from evidence that the process of hydraulic fracturing will lead to further contamination of groundwater supplies, and that fugitive leaks of methane on its journey from drill bit to burner tip will make unacceptable contributions to climate change. In addition, recent reports of earthquakes that appear to be triggered by the injection of hydraulic fracturing wastes into deep wells are troublesome.

There are numerous anecdotal reports claiming that groundwater has been contaminated by the process of hydraulic fracturing. In 2012 the EPA released the results of a systematic sampling of ground water from in and around Pavillion, Wyoming. The Agency reported that benzene, methane, and 2-butoxyethanol were present in ground water samples. On the basis of the findings, it seemed likely that these compounds arose from hydraulic fracturing. Two additional studies, published in the peer-reviewed and highly prestigious Proceedings of the National Academy of Sciences (PNAS) provided evidence for methane in groundwater samples in Pennsylvania.[18, 19] Varieties of techniques, including isotopic ratio analyses and hydrocarbon concentration profiles showed that the methane in the groundwater was characteristic of that from Marcellus and Utica shale deposits. In some samples the methane concentration was high enough to reach explosive levels. Leaks from gas wells are not rare. In a study of over 41,000 wells in Pennsylvania, the methane leakage was 9.84% among unconventional wells in Northeast Pennsylvania drilled after 2009.[20] Leakage rates in older wells were only somewhat better. Better inspections and drilling practices are in order.

Although the IPCC 5th Assessment Report indicates that the lifetime of methane is relatively short, 12.4 years, its global warming potential is substantially greater than that of carbon dioxide: 86 and 24 times greater at 20 and 100 years, respectively.[2] Because of these physical realities, and the fact that when burned, methane also produces carbon dioxide, there is

growing evidence that methane's contribution to global warming is as great, or greater, than the carbon dioxide from burning coal.[21, 22]

Atmospheric methane levels appeared to stabilize around 2006 but have risen since then. This recent rise has been attributed to emissions from the fossil fuel industry.[23] The plausibility of this hypotheses is strengthened by recent direct measurements of atmospheric methane plumes over gas fields. University and NOAA-sponsored airborne methane measurements made over a gas field in Utah showed that between 6.2% and 11.7% of the hourly production escaped into the atmosphere.[24] A complementary study, published this year, yielded several striking results. These investigators also used aircraft to sample air.[25] They studied a region near Washington, PA, where drilling into the Marcellus formation is very active. The detected emissions from wells in the active drilling phase that emitted amounts of methane that were 2 to 3 orders of magnitude greater than EPA estimates. On the ground, vehicles equipped with methane detectors cruised the streets of Boston and found 3,356 leaks with some air concentrations reaching 28.6 ppm, over 15 times greater than the global average.[26] Similar results were found in Washington, DC.[27] In some locations methane concentrations reached explosive levels. In both of these studies carbon isotope studies showed that the methane was from pipelines, i.e., natural gas leaks.

On the basis of these and other studies not cited, PSR concludes that substituting methane, i.e., natural gas, for coal in the production of energy will not mitigate global climate change. On the contrary, it is likely to make the problem worse.

In addition, construction of new gas fired plants and supporting infrastructure will lock us into continued fossil fuel combustion for another 40 years and divert capital investment away from long term solutions. We strongly advocate that a higher value should be placed on building blocks that improve public health by promoting energy efficiency and clean energy such as solar and wind, than the valuation of building blocks that have lesser or opposite effects.

Role of Clean, Renewable Energy

The Clean Power Plan's goals for states underestimate the capacity to expand clean energy. These goals are, in many cases, lower than pre-existing targets of state renewable portfolios, equal to what seven states have already achieved, and only minimally higher than U.S. Energy Information Administration (EIA) projections under a "business as usual" scenario.[28] We agree with the UCS and Sierra Club recommendations for inclusion of current state Renewable Energy and Efficiency Standards, which are set by law, and determination of future goals based on more recent growth rates of renewable energy (2009 to 2013).

In fact, utilization of alternative energy that emits little if any greenhouse gas (unlike natural gas or incineration) should have higher weighting as a building block as it also produces the least harm of other direct pollution from mining, burning or management of waste products.

Role of Nuclear Power

PSR has a long-standing objection to the use of nuclear reactors to generate electricity. There are many reasons for our position. Chief among these is the link between so-called peaceful use of nuclear reactors and nuclear weapons production and proliferation. PSR was founded on the principle that nuclear war must be avoided, as there would be no effective medical response to such a war. Although dangers of a massive thermonuclear exchange between nuclear weapons

states have been mitigated by a variety of arms control treaties in recent decades, the threat of a terrorist nuclear explosion or a so-called limited nuclear war between, for example, Pakistan and India, remains.

In addition, there is no safe method for storage of the tons of highly radioactive spent nuclear reactor fuel rods. These are vulnerable to accidents or terrorist attack that could disperse radionuclides over a vast area.

Finally, nuclear reactors are horrendously expensive. We oppose any Federal program to guarantee loans to finance nuclear reactors. We simply can't afford to utilize increasingly scarce Federal resources for this purpose and rate-payers should not be asked to subsidize reactors. This is particularly true since alternate, renewable and sustainable energy sources are available.

We note that the Regulatory Impact Analysis, published in conjunction with the Clean Power Plan, anticipates completion of reactors currently under construction and maintaining most of the current fleet. The 2012 EPA data enumerate 104 reactors with a generating capacity of 817 GWh and projects a very slight reduction under Option 1 to 101 units with a capacity of 797 GWh by 2030. We oppose any action by the Agency that encourages or provides support for new nuclear power plants or expands the output by current reactors.

Option 1 versus Option 2

Consistent with our positions stated above, PSR favors Option 1 over Option 2. Even at the 2025 time point, Option 1 calls for a larger reduction in carbon dioxide emissions than Option 2. As we note, even those reductions anticipated under Option 1, will not be sufficient to provide adequate protection of human health and the environment. Additional reductions will be needed. Option 1 has additional benefits that also protect health in that the reductions in the emission of SO_2, NO_x, and $PM_{2.5}$ will be greater than achieved under Option 2. The health benefits associated with these reductions are described in PSR Senior Scientist Alan Lockwood's recent book, *The Silent Epidemic: Coal and the Hidden Threat to Health*.[29]

Toward a Sustainable Energy Future

We regard it as a fundamental part of our professional responsibility as healthcare providers to be advocates for health. This is the basis for our positions stated above. To make a medical analogy, it is the responsibility of physicians to present alternate therapies for a given medical condition, to minimize harm to a patient in treating illness efficaciously. One such alternate plan has been outlined in detail for New York State.[30] Even though New York is distant from the U.S. sites that are the most advantageous for harnessing wind and solar energy, a peer-reviewed report by scientists from leading universities have described and justified a plan that fulfills the State's energy needs, virtually without exception, by 2020 (the exception being air transport). The plan relies on solar energy, wind energy, and energy derived from a small number of water turbines. It reduces demand by about 37% through various efficiencies, creates more jobs than jobs lost (aided by the fact that most energy will be produced in-state), improves price stability since energy costs from wind and the sun will be virtually zero, and decreases the number of deaths per year due to air pollution by 4,000.

Summary

Physicians for Social Responsibility supports EPA's efforts to protect human health and the environment via the protections called for in its proposed rule: Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, also known as the Clean Power Plan. However, we recognize that these steps will not be sufficient to provide the protections from climate change that current and future generations deserve. We recognize that other stakeholders will have conflicting positions. We are concerned that those who oppose the rule and any effort to regulate carbon dioxide emissions have not heeded the abundant evidence presented in the scientific and medical literature for the public health impact of climate change. The science is solidly in support of our call for reductions in carbon dioxide emissions.

Table Atmospheric Carbon Dioxide Levels Predicted by RCP2.6 and RCP4.5[4]

Scenario/Year	2005	2050	2100	2150
RCP2.6	379	443	421	399
RCP4.5	379	487	538	543

On behalf of Physicians for Social Responsibility

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