Nuclear Energy Caucus: June 19th
Testimony of Rama Zakaria
Environmental Defense Fund

Good morning, and thank you very much to the Chairs – Senators Aument and Yudichak, and Representatives Corbin and Matzie as well as the other members of the nuclear caucus. It is a pleasure to be able to speak to the caucus today.

My name is Rama Zakaria, I am a Senior Manager for Regulatory Policy and Analysis at the Environmental Defense Fund (EDF), and I am here today representing our approximately 75,000 members across Pennsylvania. EDF is an international environmental advocacy organization with more than one million members nationwide. We are dedicated to finding innovative approaches to solving some of the most difficult environmental challenges. Whenever possible, we aim to collaborate with private-sector partners, state and federal leaders, and other environmental organizations interested in capitalizing on market-based solutions to cost-effectively tackle environmental problems.

I have over 20 years of experience as an engineer, energy analyst, consultant, and policy expert in power markets and clean energy. I've been invited today to provide EDF's perspective on the role that Pennsylvania's nuclear generation plays in achieving air quality and climate objectives—and the impact that the potential retirement of existing nuclear power plants might have on these objectives. I am going to confine my remarks to discussion of the emissions associated with nuclear generation – and other forms of electricity production—but want to acknowledge that there are additional environmental issues, including waste management, worker and community safety, security of radioactive materials, and the impacts associated with the mining and milling of uranium that are worth exploration by this committee.

I would first like to discuss the importance of air quality and climate objectives for the Commonwealth, second talk about the attributes that are valuable for electric generation in today's dynamic energy landscape, and finally outline a path forward for Pennsylvania.

Pennsylvania's Air Quality and Climate Objectives

This year, 14 counties in Pennsylvania received a failing grade for ozone pollution from the American Lung Association. Four counties received an "F" for particulate matter pollution—and Allegheny, Lancaster, Delaware, and Philadelphia ranked in the top 25 counties most polluted by year-round PM2.5 *nationwide*. Eleven counties are also in nonattainment for one or more of ozone, PM2.5, and sulfur dioxide pollution. Pennsylvania's fossil-fuel fired power plants play a significant role in contributing to these air pollution concerns.

Pennsylvania is also the country's third largest emitter of greenhouse gases. While emissions have been falling in the power sector, they are not falling fast enough. Power sector CO2 emissions in Pennsylvania were at 85 million metric tons in 2016 –still more than one-third of the state's total energy-related CO2 emissions *and the fourth most dirty power sector in the country*.

Pennsylvania is already feeling the impacts of climate change. Temperatures have increased by 2 degrees Fahrenheit since the beginning of the 20th century, leading to an increase in dangerous nor'easters and cyclones; extreme heat especially in urban areas; and coastal flooding as sea levels rise, including in Philadelphia. Increased warming is likely to adversely impact agriculture, the state's number one industry, further deteriorate air quality, and threaten outdoor recreation, including winter sports. Pennsylvania has the opportunity to be a leader in addressing these issues.

In order to achieve climate objectives, Pennsylvania needs to first commit to ambitious greenhouse gas emission reduction goals; then ensure that there is a plan in place to accelerate the decarbonization underway in the power sector – which means both preventing any *increases* in carbon emissions from the power sector as well transitioning carbon-intensive fossil generation to zero-emission renewable energy, and finally leverage that cleaner electricity to help decarbonize the rest of the state's economy. These steps will also ensure the state makes meaningful progress tackling the air pollution challenges outlined above.

To understand the importance of the role that specific generation assets play in achieving air quality and climate goals, Pennsylvania must first clearly understand the problem and articulate meaningful goals.

The Evolving Electricity Resource Mix

Pennsylvania has five nuclear facilities that currently make up roughly 40% of the total generation in the state. These nuclear facilities are also a source of carbon-free and particulate-free generation for Pennsylvania. Meanwhile the availability of cheap natural gas has increased natural gas generation in Pennsylvania to nearly one-third of total generation in 2016, while coal generation has declined to one-fourth of total generation. At the same time, rapidly declining renewable technology costs are driving increased wind and solar deployment. In 2016, renewable energy accounted for 4% of Pennsylvania's total generation with wind surpassing hydropower to become Pennsylvania's largest source of renewable energy. When considering the optimal approach to securing critical reductions in carbon pollution, and achieving air quality objectives, it is important not to look at any one technology in a vacuum but to consider the full range of attributes that matter when thinking about transitioning to the cleanest possible electric mix at the lowest possible cost.

We are currently in the midst of a significant transformation of our electric grid. The growing threat of climate change, the persistent need for energy security, the increased demand for clean energy, and advances in technology are fundamentally changing how we produce and consume electricity. As demand is becoming more dynamic and variable renewable energy penetration is growing, power system *flexibility* is becoming increasing valuable for facilitating the transition to a low-carbon 21st century electric grid.

As our electric grid continues to evolve, it is important to develop policies that promote further development of a secure, smart, affordable, clean and reliable power system, one in which innovation and efficient, cost-effective delivery of services, and clean energy are rewarded—and air quality objectives can be achieved at the lowest possible cost.

Pennsylvania can Provide Leadership

It's time for Pennsylvania to articulate clear, measurable, and enforceable public policy objectives around particulate and climate pollution associated with its electric power sector. By

developing a clear trajectory to ambitious reductions of these critical pollutants, Pennsylvania can do its part to increase regulatory certainty for electricity producers and consumers by clearly enumerating the rules under which  sources will be operating.

Pennsylvania is well-positioned to provide leadership for the region, first by setting a carbon reduction target that is consistent with the ambition required from the power sector to achieve near complete decarbonization by mid-century, and also by demonstrating that states can tackle climate and clean air challenges by focusing on emission outcomes and putting in place clear regulatory requirements to ensure those outcomes are met. This will then give the *market* the ability to decide how best to achieve those environmental goals in the most cost-effective manner for the state's consumers and businesses.

To conclude my remarks today, EDF commends the committee for highlighting the importance of electric generating assets that have zero-emissions, and suggests that Pennsylvania should FIRST, clarify the emission goals it is trying to achieve, and SECOND put in place a regulatory program that ensures the outcome —for example, by setting a binding limit on carbon pollution in the power sector. Under such a framework, if nuclear assets are needed to achieve the emission outcomes, the "value" associated with the zero-carbon generation will help ensure those generators continue to recover their costs in the energy market. By adopting a technology-neutral and outcomes-oriented approach, Pennsylvania can secure the emission reduction goals necessary at the lowest possible cost. Placing a firm limit on carbon pollution – and then letting that carbon pollution "limit" drive a price in the energy market can help ensure the most cost-effective deployment of zero-emission resources and energy efficiency.

Thank you very much for the time to speak with you today.