Testimony submitted to the
Joint Committee on Telecommunications, Utilities and Energy

Concerning S.1821: An Act combating climate change and H.1726: An Act to promote green infrastructure, reduce greenhouse gas emissions, and create jobs

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Thank you for providing me with the opportunity to comment on the legislative proposal to establish a carbon fee in Massachusetts. I am primarily a macroeconomist and econometrician, although most of my current research is in energy-environmental economics. In 2013-2014, I was a Member of President Obama's Council of Economic Advisers, where my portfolio included macroeconomics and climate/energy policy.

Let me preface my remarks by underscoring the importance of taking action to reduce emissions of greenhouse gases. Climate change is real and it is anthropogenic in origin. Although Massachusetts and the United States have reduced its carbon emissions, we continue to emit large amounts of carbon dioxide into the atmosphere, and each additional ton we emit contributes to rising global temperatures and to climate change now and in the future. Of the many ways that public policy can help to reduce carbon emissions, a carbon fee is the single most desirable because of its broad scope and cost effectiveness. This view that a carbon fee is the most efficient tool for reducing emissions of greenhouse gases is widely shared among economists.

In this context, I will make three points. First, a Massachusetts carbon fee would result in meaningful emissions reductions and would not harm, and probably would modestly help, the Massachusetts economy.

Second, a carbon fee has important virtues over its main competitor, an economy-wide cap-and-trade system. A carbon fee provides a stable price on carbon, whereas a cap-and-trade system typically does not. The price stability afforded by a carbon fee allows businesses and consumers to plan investments and purchases so that they reduce their consumption of fossil fuels over time.

Third, my experience with national climate policy leads me to think about how state and local policies fit into a broader national context. Eventually, the United States will need to impose a price on carbon emissions. The Trump administration's dismantling of national climate policy

provides a unique opportunity for Massachusetts to show the nation that an efficient and effective carbon fee can reduce emissions, be politically viable, and is compatible with strong economic growth.

A Massachusetts carbon fee will reduce Massachusetts greenhouse gas emissions.

In 2014, the Department of Energy Resources released a study of the effects of a carbon fee on the Massachusetts economy.[1] I have reviewed that study, with an eye towards recent developments in energy markets and in the academic literature that might affect the study's conclusions. Most importantly, the study assumes higher oil prices than we now have. In addition, the carbon fee in the study differed somewhat from those in S.1821 and H.1726, including in the timing of the phase-in and the long-term level and scope of the fee. I therefore did some calculations to estimate the effect of the carbon fees under consideration today, compared with the estimates in the report.

My conclusion from this analysis is that the report's findings remain valid estimates for the fees under consideration today. There are two offsetting effects. On the one hand, lower oil prices, and thus lower gasoline prices, mean that Massachusetts emissions from the transportation and home heating sectors will be higher, relative to those projected in the study. Nationally, gasoline consumption is already 6 percent above 2014 forecasts by the Energy Information Administration. With lower prices and higher consumption, a carbon fee is likely to result in somewhat greater emissions reductions than estimated in the DOER study. On the other hand, the carbon fees examined in the study were higher after 2030 than the proposals being discussed today, resulting in less emissions reduction under the current proposals than in the DOER study. These two effects are small and largely offset each other. The net result is that the bottom-line projections in the study, specifically for the "Low" fee scenario, are in my view plausible estimates of the effects of the carbon fee under consideration today.

Under the fees under discussion today, most of the emissions reductions would come from the transportation sector. The assumptions in the study for that sector are conservative. In particular, if moderately priced electric vehicles become available with batteries that alleviate the "range anxiety" of most currently available electric vehicles, then the fee could incentivize shifts to electric vehicles and have a larger effect than the study estimates.

A Massachusetts carbon fee will have a small, most likely positive effect on the Massachusetts economy.

The DOER study also finds that a carbon fee will have a small effect on economic growth, in fact, this small effect would be positive for employment and (for the fees closest to those being discussed today) for Gross State Product. The reason for this surprising result is that Massachusetts gets all its fossil fuels from other states. So spending less on fossil fuels means

[1] Marc Breslow, Sonia Hamel, Patrick Luckow, and Scott Nystrom, "Analysis of a Carbon Fee or Tax as a Mechanism to Reduce GHG Emissions in Massachusetts," December 2014.

less fossil fuel imports – and less money shipped out of state for those fuels. Because the money from the fee is rebated, the consumer now has more to spend. Some of that extra spending will be on Massachusetts goods and services, such as restaurants and retail trade, which tend to be more labor-intensive than fossil fuel distribution. This is not a big effect, but there likely would be a small employment bump from the carbon fee. I find these study results for state economic activity plausible and applicable to the proposals under discussion today.

One question is whether a carbon fee only in Massachusetts would provide an incentive, on the margin, for some companies to ship jobs out of state. There are two main reasons why this is unlikely to be a significant problem for Massachusetts. First, many of the jobs in Massachusetts are not mobile and are rooted to the Commonwealth, such as those in our large health care and education industries. Second, S.1821 rebates fee collections from institutions back to employers in proportion to the number of their employees. As a result, fossil fuels become more expensive and employees become cheaper. Thus Massachusetts employers would have an incentive to use less fossil fuels, and to hire more employees, while leaving their bottom lines unchanged on average. The net result is a reduction in greenhouse gas emissions, a small bump to employment, and an approximately neutral effect on the economy.

I would add that there are potential economic upsides of a climate fee that are difficult to quantify, and are excluded from the conservative assumptions of the study, but which could be important. By being on the forefront of states tackling climate change, new green technology firms could be drawn to Massachusetts. Enormous investments in low-carbon technologies will be made globally over the coming decades, and a Massachusetts carbon fee could help the Commonwealth be on the ground floor. And by learning to operate in an environment with a price on carbon, Massachusetts businesses will be ahead of their national competitors when national policy does, eventually, place a price on greenhouse gas emissions.

A carbon fee provides price certainty to businesses and consumers.

An alternative to a carbon fee is a cap-and-trade system. In a simple textbook model, the cap-and-trade system and a carbon fee yield the same amount of emissions when the fee and permit prices are the same. In practice, however, there are many differences between the two systems. I will focus on one of those differences: that carbon prices are stable under a tax, but they can be, and frequently are, highly volatile under a cap-and-trade system. For many reasons, stable and predictable prices are a good thing, and this price stability is an important real-world advantage of a carbon fee over a cap and trade system.

A cap-and-trade system places a cap on emissions. The cap is enforced by requiring that an emissions permit, or allowance, be handed in to the managing agency. A fixed number of those permits are available, and they are sold and traded, so the price of the permit becomes a price on carbon dioxide. The cap declines over the years so that emissions fall. Setting the cap schedule entails trading off the desire to reduce emissions with the concern that reductions occur at a manageable pace, given technology and economic conditions.

Because the cap schedule is set in advance, it is based on forecasts of overall economic conditions and technological developments. As members of the General Court know, economic forecasting is hard enough even over the relatively short time horizon of the Massachusetts budget cycle. Over the longer horizons associated with a path for a carbon cap, such forecasting is even harder.

One example, close to home, is the Regional Greenhouse Gas Initiative, or RGGI. RGGI is the multistate cap-and-trade system for the electricity sector in which Massachusetts participates. A recent report by the Congressional Research Service reviewed RGGI's progress.[2] The initial cap path was set using 2005 assumptions, and took effect by 2009. But between 2005 and 2009, the nation entered the financial-crisis recession and natural gas prices fell substantially as because of fracking. Both events were unexpected, and as a result, when the 2009 RGGI cap took effect, it was well above actual emissions. Consequently, the price of RGGI allowances was very low, at the reserve price of about \$2/ton CO_2, from 2010 to 2012. In 2012, the system was reviewed, a new lower cap path was set, RGGI allowance prices rose, and subsequently RGGI prices have fluctuated, briefly trading over \$7/ton but last month were down to \$3/ton.

In this case, the cap was initially set too high, so that RGGI had only a small direct effect on emissions. Of course, it could have been the opposite – the cap could have been set too low, in which case the tradable permit price under RGGI could have been quite high, leading to a subsequent upward adjustment of the path. An example of a high and volatile allowance price in a tradeable permit system is the Renewable Fuel Standard (RFS). The RFS is a national program to incentivize the use of biofuels in the fuel supply. Since 2013, allowance prices in that system, which are the credit price for blending a gallon of conventional renewable fuel into the fuel supply, have fluctuated from around \$0.30 to over \$1. These are large swings when compared with the price of a gallon of gasoline. Their high level and volatility has led to the program becoming politicized and subject to a great deal of industry pressure from both the petroleum and biofuels industries.

The problem with volatile and uncertain prices is that they make it tough for firms and consumers to plan, and to decide how much to invest in cleaner technologies or more fuel-efficient cars. In the case of the RFS, prices have been high on average, but their uncertainty has posed an impediment to the investments in second-generation fuels that the program was supposed to provide.

Because a carbon fee provides a predictable path of prices into the future, it provides a stable price that consumers and businesses can take count on when they make investments in energy technologies and major purchases like cars. This price certainty is a major advantage of a carbon fee.

[2] Jonathan L. Ramseur, "The Regional Greenhouse Gas Initiative: Lessons Learned and Issues for Congress," Congressional Research Service, May 16, 2017.

Now more than ever, the Nation needs leadership on climate change – leadership that Massachusetts can provide.

Although Massachusetts accounts for only a sliver of national and global emissions, Massachusetts has an opportunity to have outsized influence by showing the nation and the world that a carbon fee is viable and effective in a U.S. state.

An optimistic view of the Trump administration's dismantling of the regulatory framework for reducing greenhouse gas emissions is that doing so provides an opportunity to rebuild national climate policy going forward. The regulatory approach to climate change pursued in President Obama's second term was the only available path, given Congressional realities. But economists broadly agree that the regulatory approach has significant limitations, and a superior approach is a national carbon fee. I would wager that many of my fellow former Obama CEA members are, like myself, enthusiastic supporters of the Baker et. al. old-school Republican plan for a national carbon fee.[3] A carbon fee has support among an increasingly broad array of businesses, including in the fossil fuel industry. If carbon pricing will be – *must be* – in our future, the question is how to get there.

In my view, showing that a carbon fee can be implemented in a U.S. state, with the support of its voters, businesses, and legislature, would be a tremendously important step forward. Massachusetts has the opportunity to lead the nation by showing that economic growth and responsibility to future generations can go hand in hand.

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[3] James A. Baker III, Henry M. Paulson, Jr., Martin Feldstein, George P. Schultz, Ted Halstead, Thomas Stephenson, N. Gregory Mankiw, and Rob Walton, "The Conservative Case for Carbon Dividends." *Climate Leadership Council*, February 2017.