COMMONWEALTH OF PENNSYLVANIA
HOUSE OF REPRESENTATIVES

ENVIRONMENTAL RESOURCES AND ENERGY COMMITTEE
PUBLIC HEARING

STATE CAPITOL
HARRISBURG, PA

IRVIS OFFICE BUILDING
ROOM G-50

MONDAY, OCTOBER 28, 2019
8:00 A.M.

PRESENTATION ON
CARBON EMISSIONS AND CLIMATE

BEFORE:

HONORABLE DARYL METCALFE, MAJORITY CHAIRMAN
HONORABLE CRIS DUSH
HONORABLE JONATHAN FRITZ
HONORABLE R. LEE JAMES
HONORABLE KATHY RAPP
HONORABLE PAUL SCHEMEL
HONORABLE GREG VITALI, DEMOCRATIC CHAIRMAN
HONORABLE CAROLYN COMITTA
HONORABLE MARY JO DALEY
HONORABLE MARY ISAACSON
HONORABLE DANIELLE FRIEL OTTEN
HONORABLE PERRY WARREN
HONORABLE MIKE ZABEL

* * * * *
Pennsylvania House of Representatives
Commonwealth of Pennsylvania
ALSO PRESENT:
  REPRESENTATIVE ERIC NELSON
  REPRESENTATIVE STEVE MCCARTER

STAFF PRESENT:
  GLENDON KING
   MAJORITY EXECUTIVE DIRECTOR
  GRIFFIN CARUSO
   MAJORITY RESEARCH ANALYST
  ALEX SLOAD
   MAJORITY RESEARCH ANALYST
  PAM NEUGARD
   MAJORITY ADMINISTRATIVE ASSISTANT

  RICHARD FOX
   DEMOCRATIC EXECUTIVE DIRECTOR
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SUBMITTED WRITTEN TESTIMONY

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(See submitted written testimony and handouts online.)
MAJORITY CHAIRMAN METCALFE: The Environmental Resources and Energy Committee is called to order.

Before we get started with the attendance, if everyone could please rise and if I could ask Representative Rapp, would you lead us in the Pledge, ma'am?

(The Pledge of Allegiance was recited.)

MAJORITY CHAIRMAN METCALFE: Thank you. Thank you, Representative Rapp.

If I could ask our Member Secretary, Representative Dush, to call the attendance, please?

(Roll was taken.)

MAJORITY CHAIRMAN METCALFE: Thank you, Representative Dush.

This morning's public hearing that we're having is on Pennsylvania's CO2 and the climate, and we have a number of guests with us today. I was talking with our House security, and if anybody's going to be staying in attendance, unless you're the press, if you could please
take one of the seats that are available. We still have some seats left, but they are going to ask that everybody's seated today.

And I would also like to remind the Members of the Committee that all the folks that we'll be talking with here today and questioning and hearing testimony from are all our guests and that we want to make sure that their time is respected and their presentation is respected. This isn't time for us to debate with our guests, so they're here to provide information. We'll debate amongst each other on this issue, I know, later at other meetings, but today is not an opportunity for us to debate with our guests; it's an opportunity for us to receive testimony from our guests. And then we'll digest that and debate that amongst ourselves at a future meeting.

So while we're doing the Q&A, we ask Members to hold their questions to one question per Member, and if we have time to go back for a second question with any one of the Members that might have had a second question, then we'll do a second round of questions if we still have time with that guest. But we're going to attempt to stay with the timings that are outlined in today's schedule so that we respect both the time of our guests and the time of the Members that are here participating today.

We did start a little earlier than normal for a
Monday morning for receiving testimony, so the Members will be coming and going today for other meetings also.

And we are joined by Representative Nelson also, who is with the Republican Caucus and one of the Chairs of the Oil and Gas Caucus, so has an interest in the issue. I appreciate him being with us this morning also --

REPRESENTATIVE NELSON: Thank you.

MAJORITY CHAIRMAN METCALFE: -- especially early in the morning on a Monday.

Our first testifier is the Secretary of the DEP, Secretary Patrick McDonnell, and I would ask the Secretary to join us at the microphone and share with us what he came to share today, and then we look forward to a bit of a Q&A with him also. Thank you, sir.

SECRETARY MCDONNELL: Thank you very much. Thank you, Chairman Metcalfe, Chairman Vitali, Members, a pleasure to be here with you bright and early on a Monday morning to talk about climate change.

First, and I think most of you remember a month ago I was here testifying on a lot of the same subjects, so, one, I would encourage you to go back and reference that testimony. There's additional testimony we're providing here this morning as well. I'll briefly summarize and then open for questions.

The first thing, and I think it's the obvious
thing to state, but climate change is real, and we're seeing the impacts of that here within the Commonwealth of Pennsylvania. Predictions from 10, 20, even 40 years ago are things we are now seeing come to pass. We've seen 10 percent increase in precipitation in the State with modeling suggesting an additional 8 percent increase in that precipitation by 2050, 14 percent increase in our winter precipitation in that same time period. We've seen since 1900 a 1.8 degree Fahrenheit increase in our temperatures in the State. Again, the modeling suggests a 5.4 degree Fahrenheit increase in that temperature by 2050.

We're seeing impacts globally. We're seeing impacts within our State. We're seeing impacts on oceans, on sea levels, on floods, on heat, on disease within the State.

To put some of this in historical context, which was not something I'd addressed in the previous testimony, you know, there's been a lot of science over time around climate. The first real piece of it within the U.S. was in 1965 when Lyndon B. Johnson had a study done that showed a changing climate and that humans were likely the cause. In addition to that, in 1979 and again in 1982, ExxonMobil commissioned studies that showed the climate was predicted to change and that that change was based substantially on human-induced carbon emissions, as did Shell in 1988.
One thing about the science because I think, you know, oftentimes we talk about the 97 percent of scientists agree, and that I'll just say it sounds like or can be construed as people hear it as opinion and just, again, reminding that the nature of science itself is scientists can test information, scientists testing and replicating studies that other scientists do. It is something that builds upon one another, that they're constantly testing each other's theories and hypotheses in order to reach their conclusions. And in fact, as I said, a lot of what even going back to some of those memos and studies in the late '70s and '80s, it is exactly what we've seen come to pass here over the last 30 years.

In Pennsylvania our greenhouse gas emissions have decreased 12 percent between 2005 and 2015. That is a good start for us as a Commonwealth, but it's both not fast enough, and modeling that we've done as part of our climate assessment shows that that is projected to start going back up within the next few years.

You know, one of the critiques I've heard is why should Pennsylvania engage in this in terms of what our impact is. I'd say it's a valid thing maybe to point out if we were going at this alone. However, we are not. One hundred and eighty-seven countries have signed on to the Paris Agreement. The U.S. has committed to pull out of
that in 2020. But even within the U.S., now half of the States, 25 of the States have joined the U.S. Climate Alliance and have made commitments substantially similar to what can be found within the Paris Agreement. So we are not alone by any means, and it will in fact take the collective effort of nations and States in order to address the climate crisis.

The most recent action taken by the Administration was an executive order signed a few weeks ago now by Governor Wolf. That executive order directs the Department of Environmental Protection to propose a regulation by July of next year that would have the impact of including the Commonwealth of Pennsylvania in the Regional Greenhouse Gas Initiative.

For those who may not be aware, the Regional Greenhouse Gas Initiative is a regional cap-and-trade system that includes States in the Northeastern and mid-Atlantic sections of the U.S. That includes each State establishing its own individual State budget for carbon, adopting a model rule that then allows the linkage of those State programs so that credits, allowances can be traded across State boundaries, which has the impact of both reducing carbon but also reducing the relative cost of implementing those carbon reductions.

In terms of where we are as a State with clean
energy and jobs, I'll point out one out of every three of our jobs now comes from the clean energy sector. Again, within the energy sector, one out of every three jobs in Pennsylvania is in the clean energy sector. If you think about where we were even 10, 15 years ago, that has come a substantial way.

The RGGI States have -- you know, I mentioned the 12 percent overall reduction we've had. RGGI States have had a 45 percent reduction within their power sector since 2005. Two thousand fifteen investments in the RGGI States it's estimated will result in $2.3 billion in lifetime energy bill savings at 161,000 homes and 6,000 businesses. In addition to that, RGGI is estimated to produce $5.7 billion in health and productivity benefits since it was established.

One of the reasons that we are looking at -- you know, that the Governor is directing us to do the rule that would include us in RGGI is it is well-established, it is something with a track record, and we have a comfort level with that.

The last thing I'll say is this effectively puts a price on carbon, which, again, is something I know that there's been concern about. I would just point out there already is a price on carbon. We see -- and significantly, I think, Director Padfield from PEMA stood with me at the
microphone when we announced the Governor's executive order, and that's because of the impacts not just on people's lives but on people's pocketbooks that we are seeing across the Commonwealth from climate-related impacts. Over $100 million in transportation impacts, over $100 million in individual impacts in terms of just the flooding side of this.

So I will stop there. I again appreciate your time and attention this morning and open up for any questions.

MAJORITY CHAIRMAN METCALFE: Thank you, Secretary McDonnell.

Members with questions? Representative Dush.

REPRESENTATIVE DUSH: Thank you, Chairman.

We all know that in this business especially that surveys that produce things like 97 percent of scientists agree with global warming can be subjective, especially given the way that they're worded. When I look at things like the stuff that we've got here, this is about 1,000 pages of research, and it goes against the manmade climate change. Just in this one section, for example, there are six and three-quarters pages but 75 studies that are cited just on six and a half pages.

Now, I've looked at these things, and this stuff isn't taken out of context. And I have some serious
concerns with those type of blanket statements, especially
given the way that we know surveys can be manipulated.
This is just one volume. There are three volumes in this
series. How can you say that there is actually that kind
of a consensus where you have 97 percent in the face of the
thousands of studies that are referenced in something like
this?

SECRETARY MCDONNELL: Well, thank you for the
question. One, I haven't looked at whatever you're
specifically referencing there, so, you know, would
appreciate the opportunity to look at that in particular.
The 97 percent is something that came out of NOAA, has been
cited by Federal Government in terms of survey work.
There's a lot of science, and, as I said, there's a lot of
pushing and pulling on what that science is to make sure
that we're getting it right.

In fairness, I can't respond to the specifics
without seeing what you're referencing, but I think there's
substantially more than three volumes of research that go
in the opposite direction.

MAJORITY CHAIRMAN METCALFE: Thank you,
Representative Dush.

Representative Vitali.

DEMOCRATIC CHAIRMAN VITALI: Thank you,
Mr. Chairman.
Thank you, Secretary, for coming today. Let me acknowledge we have Mary Isaacson, Representative Mary Isaacson, as we do Representative Steve McCarter.

What I want to do is compliment you and the Governor and Representative Comitta and Zabel, the Governor on signing this executive order regarding RGGI. I think it's probably one of the most important steps we can take now in Pennsylvania to do that. And thank you for agreeing to participate in our November 1st House Democratic Policy Committee hearing on RGGI.

I would also encourage the Administration to move quickly with regard to methane regulations with regard to the oil and gas industry. Methane leakage is I think one of the second major things we can do in Pennsylvania to address climate change and there just encourage, you know, the Administration to keep moving forward with regard to moving to conservation and renewables because expanding natural gas infrastructure will not get us to carbon neutrality, which scientists tell us we need to do. So thank you again for being here.

SECRETARY MCDONNELL: No, thank you. And I'll just simply say, as with many issues that we face, it's not one thing, it's a lot of things that we need to do, so I appreciate it. Thank you.

MAJORITY CHAIRMAN METCALFE: Any other Members?
Representative Rapp?

REPRESENTATIVE RAPP: Thank you, Mr. Chairman.

Thank you, Secretary, for being here again. On page 9, and I heard you state -- you know, and I appreciate the fact that you didn't read this. It was a lengthy presentation, but thank you for taking the time to put it together.

SECRETARY MCDONNELL: Sure.

REPRESENTATIVE RAPP: Under your Regional Greenhouse Gas Initiative, you state, "Clean energy jobs now account for one out of three energy jobs in Pennsylvania and employs more than twice the number of workers as Pennsylvania's entire fossil fuel industry." Do you have a list somewhere, Labor and Industry have a list somewhere where we can see how you actually target what jobs -- I'm assuming you're saying solar and wind versus what -- how did you compile all the jobs in the fossil fuel industry? Is there somewhere that we can actually see a list of where you've listed one versus the other?

SECRETARY MCDONNELL: Sure. That comes out of actually Environmental Entrepreneurs report, and I believe it's clean energy jobs in terms of the renewables that you cited, as well as energy efficiency kinds of work as well.

REPRESENTATIVE RAPP: It didn't come from Labor and Industry here in Pennsylvania?
SECRETARY MCDONNELL: I don't know off the top of my head with the basis of the E2 report was, but that's information we can certainly get for you.

REPRESENTATIVE RAPP: And what was the name of the organization?

SECRETARY MCDONNELL: It's, I believe, Environmental Entrepreneurs. E2.org is the website.

REPRESENTATIVE RAPP: And that was just for Pennsylvania?

SECRETARY MCDONNELL: Yes. It's actually -- there's a footnote there that would take you right to the link for the report.

REPRESENTATIVE RAPP: And do they actually list in the report specific jobs in solar and wind versus specific jobs in fossil fuel?

SECRETARY MCDONNELL: I know they list the types of jobs. I'm not sure if it's exactly the exhaustive list you're talking about in terms of how they pull it out in terms of --

REPRESENTATIVE RAPP: That's what I would like to see is the exhaustive list --

SECRETARY MCDONNELL: Yes, we can get it.

REPRESENTATIVE RAPP: -- since you're stating one out of three.

SECRETARY MCDONNELL: Um-hum.
REPRESENTATIVE RAPP: All right. Thank you.
SECRETARY MCDONNELL: Thank you.

MAJORITY CHAIRMAN METCALFE: Yes, that really kind of jumps out at you, that clean energy jobs account for one out of three energy jobs in Pennsylvania but employs more than twice the number of workers in Pennsylvania as the entire fossil fuel industry, so two out of three jobs aren't clean energy, but, I mean, it just doesn't make sense how those numbers would work out, but I would like to see the data also that you're referencing for that because, I mean, it's certainly not any Federal numbers it doesn't seem to be or even State.

SECRETARY MCDONNELL: We can get --

MAJORITY CHAIRMAN METCALFE: State can get you the numbers.

SECRETARY MCDONNELL: No, we can get you the basis for those jobs. I will say we've seen, you know, two things, one with programs like Act 129 and some of the utility programs, we've seen significant uptake in energy efficiency, and then on the renewable side a few now of our service territories have seen a real cost competitiveness with solar panels compared to what their price to compare is, so we've seen more uptake in rooftop solar, for example, across the State and the pretty significant expansion of that over the last three years.
MAJORITY CHAIRMAN METCALFE: In western Pennsylvania I'm not seen too many people driving around in trucks with solar panels, but I've seen a lot of trucks driving around for the Marcellus Shale development and some of the activity going on with the cracker facility in our area.

The RGGI, as you and I talked about --

SECRETARY MCDONNELL: Um-hum.

MAJORITY CHAIRMAN METCALFE: -- previously, as I stressed to you in those previous discussions, with the Governor's executive order and ultimately what would occur as a result of being part of RGGI, which would be a new tax for Pennsylvania, a CO2 tax or fee, whatever somebody wants to call it, but ultimately it's going to effectively be a cap and tax plan that's going to cap the carbon emissions for certain businesses and tax them if they're going to generate any additional or have to buy somebody else's credits of sort.

But the executive branch of course is the branch that's supposed to enforce the law. Everybody learns that, you know, pretty much in grade school, the three branches of government, legislative executes the policy, drafts the policy, adopts policy, the chief executive signs off on that or vetoes it, it gets overridden, but the executive is supposed to enforce the law, not make the law, not make
policy. It's supposed to enforce the policy made by the legislative branch.

So the Governor in his announcement of his executive order certainly wasn't definitive in his own belief that he had the authority to actually implement the regulations ultimately that would adopt RGGI fully.

And there's many of us that are concerned that if the executive branch tries to move forward with joining RGGI that they would not do so without the approval of the legislature to actually provide the policy change that would allow a tax to be collected. Can you assure us of that today that you're going to be back to see us for whatever tax is going to be needed to implement the RGGI strategy?

SECRETARY MCDONNELL: Sure. So the two things I'd say are, one, I think the Governor and I have been very clear that one of the reasons, frankly, I want to be here at these kind of events is that we want to work with the Legislature as we implement and put the rule together. I will say I think -- you know, and it's not just the Air Pollution Control Act; it's many of our legislative authorities are written in ways that recognize that things change over time.

So carbon, again, according to Federal Government at this point, is a regulated pollutant. It's something
that we have an obligation to address. And the kind of trading program that RGGI would include is something that we have seen used for SO2 and NOx. We absolutely want to be working with the Legislature through this process, but, as I said, the last time I was before you, there's also an urgency, and I think providing a timeline around dealing with that urgency is equally important.

MAJORITY CHAIRMAN METCALFE: Representative Nelson, we have like a minute left if you can get your question in.

REPRESENTATIVE NELSON: Thank you, Mr. Chairman. I appreciate the opportunity to ask a question. Thank you for your testimony.

SECRETARY MCDONNELL: Absolutely.

REPRESENTATIVE NELSON: One of my primary concerns of RGGI is the potential impact on working families, on energy prices, and on jobs in the energy sector. We have, you know, thousands of tradespeople and non-tradespeople working in the energy space. And it seems that embracing energy innovation like Pennsylvania has done over these last 12 or 13 years has actually achieved significant reductions in emissions both in SO2, nitrogen dioxide, and almost that if we continue on the pace we're going, we will be able to meet those improved environmental quality standards without taxing the people in the energy.
I think in some RGGI States, you know, their energy costs have increased higher than nonenergy States. Can you touch on embracing innovation versus embracing taxation and the potential consequence as compared to other RGGI States who have now outsourced their energy?

SECRETARY MCDONNELL: Certainly. And there's a couple things in there, so I'll try to be quick in answering. But on the one hand I think one of the things we find attractive about RGGI is it encourages exactly the kind of innovation you're talking about. It is not a switch that gets thrown tomorrow that turns off a number of sources. It puts a price in, changes a cap over time, and you'll see innovation happen as part of that, as we frankly have seen in SO2 and other things with controls and other things that have been placed on that.

I'd say the jobs concern is one of the principal drivers for us thinking about this. We've seen the emissions go down predominantly because of switches from predominantly coal generation within the Commonwealth and located within the southwestern part of the State to gas plants in predominantly the north central, northeastern part of the State.

So looking at how we manage that, looking at how we manage to support those communities where they are losing jobs -- you know, Bruce Mansfield closing next
month, was supposed to be closing in two years, is now closing in November -- is one of the important factors within this is making sure that we're not seeing those kinds of disruptions but are creating a market-based process that, over time, reduces carbon while supporting those local communities.

MAJORITY CHAIRMAN METCALFE: Thank you. Thank you, Secretary.

SECRETARY MCDONNELL: Thank you.

MAJORITY CHAIRMAN METCALFE: Our next presenters are Mr. Kevin Dayaratna, Senior Statistician and Research Programmer with the Heritage Foundation; and Dr. David Legates, Professor of Climatology at the University of Delaware. Thank you, gentlemen, for joining us.

Kevin, I don't know if you're going to lead off or Dr. Legates, whoever would like to start. I'm going to let you both present, and then we'll do a little Q&A with whatever time remains there if you don't mind. Thank you, gentlemen.

DR. DAYARATNA: Okay. You want to go ahead, David?

DR. LEGATES: No, you go ahead.

DR. DAYARATNA: I need the laptop then.

MAJORITY CHAIRMAN METCALFE: You can slide that microphone wherever you need it.
DR. DAYARATNA: Okay. Is this -- that's not exactly how we want it, right, from the beginning. It doesn't -- yes.

MALE SPEAKER: That's not how it appears up there.

DR. DAYARATNA: Well, it's on double right now.

MALE SPEAKER: Oh, is this --

MALE SPEAKER: Jim, do you want to get the projector? No? All right. Oh, we have it in front of us.

DR. DAYARATNA: Yes, okay. Well, there are some edits to it, so -- okay. But I'll do my best.

So, Mr. Chairman, Members of the Committee, thank you for the opportunity to talk about CO2, the economy, and the climate. My name is Kevin Dayaratna. I'm the Senior Statistician and Research Programmer at the Heritage Foundation in Washington, D.C. The views expressed in this testimony are my own and should not be construed as representing any official position of the Heritage Foundation.

Let me first talk about energy in and of itself. Energy is literally the fundamental building block of civilization. From enabling you to light up your home, from enabling you to drive your car, from enabling this very hearing to operate, energy is literally the basis of anything and everything we do. And unfortunately, many
people take energy for granted.

So regarding energy, what have we heard over the years? We've heard that the climate is changing. We've heard that carbon dioxide and other greenhouse gases contribute significantly to this problem, and we've heard that action must be taken.

So what solutions have been proposed? We've heard about cap-and-trade both at the Federal level, as well as the State levels. We've heard about the Clean Power Plan, an initiative issued by the Obama Administration. Subsequently, there was the Paris Agreement, an agreement amongst the nation-states to curb greenhouse gas emissions. Most recently, the Green New Deal and a lot of State-level initiatives, variance of, say, cap-and-trade carbon tax, even the Green New Deal, that a lot of State Governments, including yourselves, have been under pressure to implement.

So before we get into the economic impact of these policies, I want to talk about a general construct. What are these policies predicated on? And the answer is the so-called social cost of carbon. What is the social cost of carbon, a.k.a., the SCC? It is a class of models proposed as a basis for regulatory policy by the Obama Administration and has begun to be implemented by State Governments as well and is defined as the economic damages
per metric ton of carbon dioxide emissions summoned across
a particular time horizon.

So the general question becomes what is the long-
term economic impact of CO2 emissions across a time
horizon? And there are three main statistical models used
for getting at this question: The DICE model, the FUND
model, and the PAGE model. Each of these models represent
a complex series of equations that are estimated by what we
call Monte Carlo analysis, but just to start out, the
danger of using these models is the DICE model and the PAGE
model are completely disingenuous because they only include
costs. They specifically exclude benefits.

Now, speaking of that, let me present the next
slide, which illustrates the greening of the planet. This
is a recent study published in the journal Nature by Zhu et
al., 2016. The shades are trends and observed leaf area
index, and the dots are areas that are statistically
significant. As the image illustrates, between 1982 and
2009, the planet has been greening. The areas that have
been benefiting the most from CO2 emissions are the
tropics, and it is fundamentally important for any of these
models to take into account the benefits of these CO2
emissions, as well as the costs.

Now, moreover, as with any statistical model,
Foundation Center for Data Analysis, we took two of these three models in house and played with the assumptions and altered them in very reasonable ways, updating many of them, and we noticed -- I'm not going to go too much into the detail, but the papers were added for the record -- the social cost of carbon can drop by between 40 and 200 percent, and under very reasonable assumptions can be negative at times, which would suggest that CO2 is a positive externality for society.

Now, I don't take the position that it's either a positive or a negative externality, but the sheer fact that these models can be manipulated to get pretty much any result you want illustrates the danger of using them in regulatory policy.

So the bottom line is what exactly is the SCC? Well, no one knows, but policymakers insist on using these models anyway to justify policies such as the Green New Deal. Now, what is the Green New Deal? It was an initiative pursued by lawmakers at the Federal level to derive 100 percent of America's electricity from clean, renewable, and zero-emission energy sources, eliminating GHGs from pretty much every single sector of the economy, spending massively on clean and renewable energy manufacturing, and maximizing energy efficiency.

So the question is how can we model the economic
impact of the Green New Deal and related policies, which pertain to what you guys are looking at? Well, at the Heritage Foundation, we have the Heritage Energy Model, which is a clone of the Department of Energy's National Energy Modeling System, and we focus exclusively on the energy component of the Green New Deal and we model the carbon tax, regulations on manufacturing, and mandates on renewables. And this was quite a challenging exercise because any realistic model, including the Department of Energy's model, is grounded on reasonable assumptions. But when you try to model the Green New Deal at face value, it literally crashes this government model.

So what can we realistically model? Well, in your slides you should have this. This is an abatement curve. We altered the level of the carbon tax that we modeled. At a $35 carbon tax, you get about a 44 percent reduction. Ramping it up all the way to $300, you get a 58 percent reduction in CO2 emissions. And at $300 -- beyond $300, excuse me, the model crashes. So this is the best we could do.

And going back to what I talked about earlier with energy being the most fundamental building block of society, there are serious implications when you make this building block more expensive. In particular, overall employment plummets significantly. You have an average
employment shortfall of over 1.1 million lost jobs through 2040 and a peak employment shortfall of over 5 million lost jobs. Family income drops, another consequence, a loss annually of over $8,000 for a family of four, amounting to $160,000 in lost income over a 20-year time horizon, more than enough to send several kids to college. Electricity prices, not surprisingly, they increase. Electricity expenditures increased by over 30 percent for households all across the Nation on average through 2040.

So, economically, the Green New Deal resulted in an average employment shortfall of over 1.1 million lost jobs, a loss of income of more than $160,000 for a family of four, and up to a 30 percent increase in household electricity expenditures, and an aggregate $15 trillion loss in GDP.

And this is not in your slides. I added this a couple of days ago, but I figured you guys might be interested in this. This is the economic impact in the mid-Atlantic region, which would include Pennsylvania. And you can see the consequences on fields like retail, trade, and transportation where you have, for example, with the retail trade an average employment shortfall through 2040 of over 170,000 lost jobs and a peak employment shortfall of over 250,000 lost jobs. And you can see the others as well.
Now, having said all this, what about the climate impact? Because the purpose of these policies is to mitigate the so-called problem of climate change. Well, at the Heritage Foundation Center for Data Analysis, we also have the model for the assessment of greenhouse gas-induced climate change, another model used by the government, and we assume commonly accepted projections regarding greenhouse gas trajectories by the IPCC and varied climate sensitivity and ranges recommended by the IPCC. And we simulated a society eliminating CO2 emissions from the United States completely.

So what do you have? Through 2100 you can see the grey curve is the current trajectory we are on, and the blue curve is the hypothetical scenario of eliminating CO2 completely. And you see that even under an overly sensitive climate of 4.5 degrees Celsius, you have less than .2 degrees Celsius temperature mitigation.

Now, specifically, you know, I've modeled these questions at the State level. How about for your State of Pennsylvania? Well, the State of Pennsylvania would incur -- suppose you were to eliminate CO2 emissions from the State entirely pursuing similar policies at the State level, .0041 degrees Celsius temperature mitigation by 2050 and .0083 degrees Celsius temperature mitigation by 2100.

What about sea-level rise? Well, my old
colleague Chip Knappenberger, who used to be at the Cato Institute, looked at this question and found that in the State of Pennsylvania by 2050 if you eliminated CO2 emissions completely, you would have 0.0273 centimeters sea-level rise reduction by 2050 and 0.0820 centimeter sea-level reduction by the end of the century.

So the bottom line is that we would urge policymakers to avoid policies of this nature, the Green New Deal, carbon-capture-related policies, and we also advise you guys to stop using the social cost of carbon for a cost-benefit analysis and don't begin using it if you haven't before, and employ cost-benefit analysis, as was done here.

The issue is when you make this fundamental building block of society more expensive, there are going to be consequences. What are the economic costs, and what are the climate benefits? And you should quantify both.

And I'm going to say one other thing because I still have a little bit of time left, regarding temperatures, a lot of people have a habit to discuss CO2 implications in terms of greenhouse gas reduction. It is fundamentally important to go a step further and look at the impact on the climate, as I have done here.

Thank you for your time. I'm happy to take any questions.
MAJORITY CHAIRMAN METCALFE: Thank you, sir.

Dr. Legates, thank you for joining us, sir.

DR. LEGATES: Thank you. You have my slides, so I'm going to go ahead and just let you read them rather than deal with this up here if that's okay with you.

MAJORITY CHAIRMAN METCALFE: Or you could give us a few words on your thoughts.

DR. LEGATES: Oh, I will give you thoughts. I mean, I'm just saying I will not go through the slides since they are difficult to read.

MAJORITY CHAIRMAN METCALFE: Okay, sure.

DR. LEGATES: My name is David Legates. I'm Professor of Climatology at the University of Delaware. And thank you for the opportunity to share my views with you today.

Let me first begin with a climate consensus. Nearly all climatologists agree that climate is much more than average weather. Climate is in fact changing because it always has changed and always will change. It is dynamic and variable. Humans can and do influence the Earth's climate. The urban heat island is a classic example of that influence.

Carbon dioxide and other trace gases in the atmosphere have increased due largely to human activity. Globally, air temperature has risen by about 2 degrees
Fahrenheit over the last century with about half of that warming occurring before 1940. A 97 consensus exists only for these very basic issues, as we talked about earlier.

The real climate change discussion focuses on to what extent are humans responsible for the recent climate change we see? What are the future consequences of climate change, both natural and anthropogenic? And what should our response strategies be?

I'm familiar with the Climate Change Action Plan for the State of Delaware, a State that is less open to discussing facts on both sides of the issue than Pennsylvania is. But what underlies all attempts at climate stabilization is a belief that carbon dioxide is a magical control knob for the Earth's climate, thus draconian measures are being suggested to achieve greenhouse gas reductions in a vain attempt to alleviate future disastrous weather events.

As a climatologist who's studied the Earth's climate for nearly 40 years, I have learned that carbon dioxide does not dictate the climate. It is merely a minor player in climate change. Water vapor is the most important greenhouse gas and accounts for nearly 90 percent of the net warming of the planet due to the radiative impact of the Earth's atmosphere. Moreover, estimates of the effect of a doubling of carbon dioxide on mean global
air temperature have been adjusted steadily downward in recent years. Current scientific understanding has reduced that estimate such as the doubling of carbon dioxide should yield warming of only about 2 degrees Fahrenheit.

So why is that? Because although carbon dioxide will absorb outgoing longwave energy, what we refer to as heat, its absorption bands are nearly saturated, and, moreover, the climate system is extremely intricate. It is a very marvelous system in beauty and complexity, exceeded only by life itself. A change to one component necessarily results in a change to many other components such as feedbacks in the system serve to regulate the climate. As we learn more about the climate system, we understand just what we do not know and see how everything in the climate system is in fact linked together.

Warmer conditions such as what we are currently experiencing exhibit less climate variability than colder conditions. The equator-to-pole temperature gradient drives the polar transport of energy in the climate system. Under a warmer world, the tropics warm but the poles will warm even more. Consequently, the equator-to-pole temperature gradient lessens, and the outbreak of much severe weather, driven by the interaction of cold polar air and with warm tropical air diminishes. Hurricane land falls, for example, were much more frequent in South
Carolina, New England, and China during colder periods.

Now, historically, civilization has thrived under warmer conditions and struggled when global temperatures plummeted. More vegetation and longer growing seasons are partly responsible, but, simply put, colder temperatures kill more people than warmer temperatures. We have currently entered a warmer period in human history, but I do not believe humans are responsible for most of this warming as many other factors exist that cause climate to change.

So to create a Climate Change Action Plan to stabilize the Earth's climate is like trying to keep the sun from shining. We cannot halt something that for all history has been variable and thus all such attempts at climate stabilization are in fact doomed to failure. A mean global temperature is not that which is most important. Weather events that create the most damage and cause the most deaths are.

So let's look at the data. First, consider daily high temperature records in the United States. Are daily high air temperatures becoming more frequent? The answer is no. Compared to the heat waves of the 1930s, our summers are not the worst heat we've ever experienced. Moreover, 10 of the 11 hottest years occurred before 1960.

The daily maximum air temperature is connected
directly to greenhouse gas warming. During hot afternoons, the atmosphere should be well mixed, and warming is physically connected with levels in the atmosphere that are associated with enhanced greenhouse effect. By contrast, low temperatures at night are indeed showing a warming trend, but nighttime temperatures are associated with a shallow inversion layer and affected less by greenhouse gases and more by land-use impacts such as the urban heat island. Thus, the observed warming is not largely attributable to carbon dioxide concentrations but rather to changing land-use patterns.

Extreme precipitation in the United States has also exhibited a significant increase over the past decades with the largest upward trend in the Northeastern States. However, this trend is not tied to rising greenhouse gas concentrations but rather to a change in the way in which we measure precipitation.

In the early 1990s the National Weather Service adopted the Automated Surface Observing System, or ASOS, as its replacement for its manual measurements of precipitation at first-order weather stations. The newer precipitation gauges are more efficient in measuring precipitation, which causes a jump in discontinuity in the precipitation record. The extensive ASOS network in the Northeast provides the strongest signal there, and the
Midwest and Western States Cooperative Observer Network data, which have always been manual observations and still are, are used to enhance the data coverage, which consequently reduces the effect of ASOS stations there. Thus, no real trend exists that can be tied to changing concentrations of greenhouse gases.

Next, consider hurricanes. The global number of tropical storms and hurricanes shows no net change since the satellite era began in the early 1970s. Neither is there a significant change in the number of major hurricanes -- that is categories 3, 4, and 5 -- or in the number of hurricanes making landfall. Indeed, in the United States we see that the central pressure of the most extreme storms making landfall has not been decreasing. Only two of the top 25 storms for central pressured landfall occurred in the last 30 years. Moreover, the accumulated energy of all tropical storms has not changed over the past half-century.

Consider also tornadoes. The annual number of tornadoes since the advent of the next generation of NOAA weather radars has not changed. And, in fact, the number of strong tornadoes in the United States has actually decreased over the past 50 years. In addition, the lengths of time between the strongest tornadoes -- those are E5s and EF5s -- has steadily increased over the same time.
period. Again, much of this can be explained by the reduction of the equator-to-pole temperature gradient and the reduced contrast between warm, moist tropical air and cold, dry polar air that feeds tornadic activity.

Sea level, while important areas in southeastern Pennsylvania along the Delaware River has risen steadily over the past 120 years, which shows no correlation with increasing carbon dioxide concentrations. As the U.S. Coast Guard station in Philadelphia, sea level is likely to rise another 9.5 inches by 2100, but half of that rise in sea level is due not to sea-level rise but to coastal subsidence due to glacial isostatic adjustment from the unloading of glacial ice since the last Ice Age some 22,000 years ago.

Floods and droughts, there's no trends there either. I could go on with climate statistics, but these tell the story. Carbon dioxide concentrations have not led to increase weather extremes. By contrast, climate models suggest a dramatic warming in response to an increase in carbon dioxide. However, that warming has always exceeded the observed trend in large part since models are tuned to yield a warming of about 6 degrees Fahrenheit, which, by most assessments, is extraordinarily high.

Regarding climate model trends relative to observations for the global troposphere, the level of the
atmosphere in which we find all weather, John Christy, the State climatologist for Alabama and Professor at the University of Alabama in Huntsville, commented, quote, "The climate model simulations used in the IPCC assessment indicate the response to carbon dioxide on average is two to five times greater than reality. In strict statistical testing we can say that the models on average fail a simple hypothesis test," unquote.

The unintended consequence of tuning climate models to a higher degree of climate sensitivity has been to make the models wrong. Thus, I have little faith in climate models to predict the future.

I have watched issues of climate stabilization play out in Delaware. I implore the Commonwealth of Pennsylvania to not make the same mistake. Let me provide you with an example from Delaware. As a result of our actions to mitigate greenhouse gas warming, the State of Delaware has given millions of dollars to Bloom Energy to create green energy jobs. We are on the hook for another 10 years of subsidies. This boondoggle is funded by Delmarva Power ratepayers through a feed-in tariff, which has made electricity in Delaware far more expensive.

Amazingly, Delaware declared natural gas as a renewable energy resource but only if consumed in a Bloom Energy fuel-cell. This aloud Bloom Energy to qualify for
subsidies under the Renewable Portfolio Standards Act. Less than 300 jobs were ultimately created, and the removable hazardous waste that Bloom claimed its fuel cells did not create has been an ongoing problem.

Presently, a consortium of both conservative and environmental groups is fighting to get the Bloom Energy deal repealed. Unfortunately, the State Legislature and the Governor have no spine and refuse to remedy this problem. And all of this has occurred as a direct result of our intent to lower greenhouse gas emissions according to Delaware's Climate Action Plan.

Let me conclude by saying that no one should vote to make electricity less affordable and more expensive, especially for the poor. High-cost electricity does not create jobs, and history has shown it destroys them as energy-intensive businesses will flee the State. And when all is said and done, as Dr. Dayaratna demonstrated, Pennsylvania's climate will be virtually unaffected for all the pain these policies will cause.

Thank you very much.

MAJORITY CHAIRMAN METCALFE: Thank you, gentlemen, for joining us today and traveling to be with us today, and thank you both for sharing your research and your expert opinions on that research and experience.

Representative Krueger. Representative Otten,
Thank you, Chairman.

Thank you, gentlemen, for your testimony. I'm particularly interested in the information that you shared about the Green New Deal. As somebody who has attended many, many workshops and conferences on the components of the Green New Deal, it seems to me that you only really reported on one aspect of the Green New Deal, and that is what happens in the extraction industry. But you haven't touched on things like investments --

DR. DAYARATNA: Sorry, the extraction industry?

REPRESENTATIVE OTTEN: Extraction industry, yes.

And so -- as in fossil fuels and shale and energy production.

DR. DAYARATNA: Okay, go ahead.

REPRESENTATIVE OTTEN: Just bear with me. Thank you.

So some of the other things that you haven't talked about are the investments in agriculture and local economies that would bring back local agriculture here in Pennsylvania. It's not only so that our local economies might be stronger but also so that our communities be healthier. Studies show that local food --

MAJORITY CHAIRMAN METCALFE: Representative Otten, we're not receiving testimony from you today --
REPRESENTATIVE OTTEN: Okay.

MAJORITY CHAIRMAN METCALFE: -- but we are receiving questions from you if you have one.

REPRESENTATIVE OTTEN: Great, thanks.

MAJORITY CHAIRMAN METCALFE: Thank you.

REPRESENTATIVE OTTEN: So I'd just like to hear a little bit more about how much research you've done into investments in community resiliency, vulnerability scales, cumulative impact models, how we help communities to be more resilient to our climate changes, and also how that might impact the workforce and our economy.

DR. DAYARATNA: Okay. So let me just emphasize that I did not just focus in our paperwork on the Green New Deal. You guys have copies of this.

Is this on? I'm sorry.

You guys have copies of the paper for the record. We did not focus specifically on the extraction industry. We focused on the entire economy. And this is a dynamic model that looks into the impacts on all sectors of the economy. And you could actually see a sector-by-sector breakdown on employment impacts of the Green New Deal because there's a serious consequence of making this fundamental building block of society more expensive.

Having said that, you know, I talked about the social cost of carbon, and obviously under very reasonable
assumptions, the social cost of carbon can be negative, and this illustrates that, you know, regardless of whether you believe it is positive or negative, there are benefits of CO2 emissions regarding, say, agriculture, longer growing seasons and so forth. So these also need to be taken into account. So it is a very complex phenomenon, and I think it's a complete mischaracterization to say that we only focused on extraction and the impact on fossil fuels.

MAJORITY CHAIRMAN METCALFE: Thank you.

Representative Dush.

REPRESENTATIVE DUSH: Thank you. I'll be quick. Dr. Legates, I'll go back to Delaware. In 1983 I was standing on the tarmac at Dover Air Force Base and watching the wax literally melt off of my boots. In that time one of the things that I learned early on is that the heatsinks that you were talking about, back in the 1930s, '40s, '50s when aircraft was really getting off, we still had grass airstrips. And the pilots were the ones that were intimately concerned with what the weather was at a given place. So we had these sensors all over the place.

My question to you is there are thousands of other impacts on sensors and our collection of the data. How distorted do things like the heatsinks compared to what we've gotten now compared to what we had even as late as the '50s? How does that impact the modeling?
DR. LEGATES: A lot of that was my dissertation, so I could go on until noon with this, but to put it all down in a nutshell, the issue has been that we have moved stations quite a bit. And, as you mentioned, back in the '30s, the weather stations were all downtown stations and center cities, and then we had these newfangled airplanes come along that needed weather information, so we moved them out to the airports.

And like Dulles, for example, was located literally -- at the time it was in the middle of nowhere, so it was cheap land, you know, nobody was living around it so it was a wide-open area. And now, as the city of Washington, D.C. and all the surrounding cities in Virginia have grown, you've got an urban heat island effect associated with it.

We had a lot of our stations in the former Soviet Union disappear right as the Soviet Union collapsed, so a lot of those stations were the more remote stations measuring things away from where we have observations. They disappear from the records. All of a sudden, the remaining records show a discontinuity. This goes on and on and on. And so without going on, I'll just say there's lots more where that came from.

REPRESENTATIVE DUSH: Thanks. I just wanted that point made.
MAJORITY CHAIRMAN METCALFE: Thank you, Representative Dush.

Representative Zabel?

REPRESENTATIVE ZABEL: Thank you. Thank you for your testimony, both gentlemen, today.

I have a question with regards to the measurable effects of what's happening on the Earth right now. We were talking about mean temperature not necessarily being an indication of human-caused climate change. So I want to ask about a couple of other data measure phenomenon that are happening, including, let's say, the decrease in Arctic sea ice, the decrease in northern hemisphere snow cover, our net loss of glacier ice, a rise in specific humidity, the rise in sea level, which we did acknowledge today, rise in ocean heat content, a rise not just in mean temperature but land surface air temperature, sea surface temperature, air temperature over oceans. I'd like to know from you gentlemen, do you take issue with that data or is it just that these all happen to be a string of coincidences that human beings have had no influence on?

DR. LEGATES: Well, they're not a string of coincidences, but we do know that there was a period in the 1600s to 1800s known as the Little Ice Age. Temperatures were notably cooler during that period. We came out at about 1850, 1880, which was when we started to make
measurements. Temperature began to rise from then on out. We did see a drop in the 1940s, and then the 1970s showed an increase again. We also have seen the sun go from a rather minimum period of activity in the mid-1800s to a much more active period that we've seen now.

There's a lot of other issues associated with changes in particular with the demise of the Little Ice Age we -- or, excuse me, the demise of the last Ice Age, not the Little Ice Age, the last Ice Age. We've seen sea levels rising for about 22,000 years, sometimes rising even more dramatically. I don't think we've reached the end yet, and the endgame will either be when we've lost all the ice on the planet and reached equilibrium, which we're not at equilibrium yet, or we head into the next Ice Age and we start to build the next ice sheet.

So the idea is we've seen rising sea levels as a result of melting ice caps. We've seen glacial melt. The glacial melt has been documented back in 1670 to 1800s to have occurred, so it's not necessarily something that has just recently happened. So I don't think we've reached equilibrium, and I don't think we probably will reach equilibrium until the -- certainly the northern hemisphere sheet is almost completely gone.

REPRESENTATIVE ZABEL: And you've testified in front of Congress on this, right?
DR. LEGATES: Yes.

REPRESENTATIVE ZABEL: Now, at the time a couple years ago I wanted to give you an --

MAJORITY CHAIRMAN METCALFE: Representative Zabel, we started off with one question. If we have time for a second we'll get back around, which we won't have.

But Mr. Dayaratna, did you have input on that question, sir?

DR. DAYARATNA: Yes, I'd just like to say that there's no doubt that the climate is changing. It has been changing since the Earth was formed over 4.5 billion years ago. But the question is to what degree, no pun intended.

I included this in my slides on the last page. This is the chart that -- and this is what John Christy -- Dr. Legates had touched on this where he juxtaposed IPCC climate models against actual satellite and weather balloon data. These models are tuned to mimic the temperatures of the 20th century so they could supposedly forecast the 21st century, but when you try to get them to mimic more recent years, they fail miserably. And it's quite clear that they've been beefed up to satisfy a particular agenda.

So there's no doubt that the climate is changing. The question is, again, to what degree. And the adjective I like to use here is "lukewarming." The planet is warming, but it is not warming nearly at the rate the
people claim it is. It is lukewarming.

Let me just say also, so over the 20th century, you know, given the temperature changes, so life expectancies in industrialized countries over the course of the 20th century doubled, and per capita wealth in the United States increased by about 11-fold over the 20th century. I'm not saying that, you know, the 1 degree or so Celsius of temperature change has actually caused this, but it definitely didn't stop it, okay? And to believe that if we hit another half degree of global warming that all these things are going to reverse is completely ludicrous.

MAJORITY CHAIRMAN METCALFE: Thank you, gentlemen. We have one minute left. We're not have time for another question before -- we're not accepting statements from Members now. At the beginning of the meeting I explained what we're doing during this hearing.

But the social cost that you had touched on in your testimony for the -- and you said the class of models proposed is basis for regulatory policy by the Obama Administration, that that's the current social cost that's being used in many States as we're looking at these different proposals that are being proffered by different Governors and such across the country. They're using the Obama social cost information?

DR. DAYARATNA: So it depends on what the State
is doing. They are all entitled to use their own assumptions, but the point I've made is that lawmakers in the past have had a habit to beef up -- to use particular assumptions to beef up the results, which is what exactly happened under the Obama Administration. And I'm not going to be surprised if State lawmakers and regulators try to do this as well.

MAJORITY CHAIRMAN METCALFE: Thank you. And, Dr. Legates, do you know, did Delaware use the Obama social cost information?

DR. LEGATES: I believe we did.

MAJORITY CHAIRMAN METCALFE: Thank you. Thank you, gentlemen. We appreciate you joining us today.

Our next panel is going to be Mr. Tom Schuster, Senior Campaign Representative for the Sierra Club Beyond Coal Campaign; Mr. Rob Altenburg, Esquire, Director of Energy Center, PennFuture; and Mr. David Masur, Executive Director for PennEnvironment. Thank you, gentlemen.

Thank you, Representative James. And you're right, if you came in in a clown outfit, I'd throw you out, referencing some of the people that were trying to -- I think thought they could keep information out of their heads today with putting aluminum foil hats on here in the audience, so little interesting costume effect from some of our attendees this morning, not as creative as past ones
when we had a unicorn and other individuals.

But thank you, gentlemen, for joining us, and you can start with whoever would like to start and we'll kind of run through the panel, and then we'll do some Q&A with whatever time is left if that's okay with you gentlemen.

Thank you.

MR. ALTENBURG: Good morning, Chairman Metcalfe, Chairman Vitali, Members of the Committee. My name is Rob Altenburg. I'm the Director of the Energy Center at Citizens for Pennsylvania's Future. We're a statewide environmental nonprofit with offices in Harrisburg, Pittsburgh, Philadelphia, and Mount Pocono. And since our founding in 1998, we have promoted clean energy and energy efficiency across Pennsylvania. And we think it's more important now than ever.

You know, our families and small businesses understand that when they need to dispose of garbage or sewage, they don't just open the window and toss it out, and they don't just take it down to the stream and dump it. Instead, they paid to ensure that their waste is either properly recycled or disposed of. We call this the "polluter-pays principle," and for most families and businesses, it's just common sense.

But currently, our electric generation industry is creating more carbon pollution than any other source in
the region. But Pennsylvania's polluting generators get to
dump this pollution into our air for free. In a report
from last April, the Pennsylvania Department of
Environmental Protection estimated the cost of this
pollution would be as high as $95 per ton of emissions by
2050.

And who pays for the damage if the polluters
don't? We do as a hidden tax on our medical bills, higher
insurance, lower productivity, and lost wages. This isn't
only unfair; it represents a market failure.

In testimony before a State Senate last April,
Kathleen Barrón, the Senior Vice President for Exelon
Corporation, said that, "Because fossil fuel generators
have the luxury of having the cost of their pollution borne
by society and not having to factor that into the price,
that means the market offer from a fossil generator appears
artificially lower than it should be and offers from non-
emitting generators appear more expensive even though they
aren't." In other words, coal and natural gas plants are
implicitly subsidized by Pennsylvanians because they don't
have to pay for their environmental damage from carbon
pollution.

The recent closure of Three Mile Island and the
pending closure of the Beaver Valley plant are symptoms of
this, but fossil fuel subsidies also make it challenging
for clean alternatives like solar, wind, and efficiency to compete. By signing Executive Order 2019-07, Governor Wolf has taken a first step towards correcting this by pricing carbon pollution to correct the market failure.

   Admittedly, the current cost of the Regional Greenhouse Gas Initiative allowances are a far cry from the $95 per ton that polluters will cause in damages, but the proposal is a whole lot better than the zero dollars per time that they currently pay. The RGGI program can also generate revenue that, if invested wisely, will bring additional benefits like clean energy, energy efficiency, more jobs for displaced workers, and lower electric bills.

   Now, we know that RGGI alone isn't going to solve the climate crisis, but that's no excuse for doing the right thing. It's hard to imagine someone coming into this building arguing that they should have a free pass to dump trash in public because other people will still litter even if they stop. Sadly, though, that's essentially the argument that we just heard.

   Ms. Barrón in her testimony had said, you know, when the rules allow you to pollute for free, of course you like the rules. Now, several Members of the Legislature have challenged Governor Wolf on his authority to take this action, but Pennsylvania's Air Pollution Control Act clearly gives the Environmental Quality Board the authority
to establish maximum quantities of air pollution from any point source in the State. And, at its core, that's all the Governor's executive order is doing.

The fact that it's modeled as a trading program gives more flexibility, and it will likely lower the cost of compliance, but it doesn't require separate legislative action. And, in fact, the DEP has already implemented trading programs to the Acid Rain Program, the NOx Budget Trading Rule, the Clean Air Interstate Rule, and the Cross-State Air Pollution Control Rule.

It's also important to realize that RGGI isn't an interstate compact. Pennsylvania doesn't delegate rulemaking authority to any other State in the program. DEP will propose a rule to regulate emissions of pollutants in Pennsylvania. And the rule could function perfectly well without any interstate component at all. The ability to trade these allowances to other States, though, again, lowers the cost of compliance.

Now, the Legislature does have a significant input in this process, certainly hearings like this but also through appointees on the Environmental Quality Board, various advisory committee meetings, the ability to submit comments, statutory review through the Regulatory Review Act. The Legislature doesn't have the power to block executive action without bicameralism and presentment, but
a lot can be gained by cooperating in the development of
this program.

Now, the Legislature has a responsibility to act
to support this program. As Representatives, you've all
taken a solemn oath to defend our State's Constitution.
That includes Article 1, our declaration of rights, much
like the Federal Bill of Rights. That contains guarantees
to the right to life, liberty, and the pursuit of
happiness, the freedom of speech, the freedom of press,
trial by jury, and the right to bear arms in our own
defense.

But our Constitution goes further than that.
That very same Article 1 also says that Pennsylvania's
natural resources are the common property of the people,
including generations yet to come, and as trustee of these
resources, the Commonwealth shall conserve and maintain
them for our benefit. That's a very powerful statement.
It's saying that a healthy environment aren't just our
rights, they're literally our property. By naming the
Commonwealth as a trustee, it gives you each an individual
fiduciary duty to act solely and impartially in the
interest of the beneficiaries, that is, we the people.

The need for climate action is becoming even more
urgent. Last year, the Global Change Research Program
reported that the climate is now changing faster than any
point in modern history, and in spite of decades of well-funded opposition from professional climate deniers, over 97 percent of the scientists endorse the consensus on manmade global warming. That consensus is our window of opportunity to avoid the worst effect of climate change is closing, and we have a role to play in addressing that crisis.

As trustees, you must act with prudence and caution, and rather than risk our health and welfare on a long shot bet the problem will go away on its own, you have a responsibility to take the climate crisis seriously and use the tools we have to limit carbon pollution. Supporting the Governor’s plan to cap carbon emissions is a start, but it also means investing in clean energy efficiency and clean renewable energy.

Pennsylvania has a history of being the leader in every field from oil to coal mining to hydraulic fracking, but today, we have the unique opportunity to continue that leadership in clean renewable energy development. If we choose to, we can inspire the innovation that will have a positive impact well beyond our borders. Thank you very much.

MAJORITY CHAIRMAN METCALFE: Are you winking at me? Are you next?

MR. SCHUSTER: I'm going to go next. Good
morning, Chair Metcalfe, Chair Vitali, Members of the Committee. My name is Tom Schuster. I'm Senior Campaign Representative for the Sierra Club in Pennsylvania.

Sierra Club is the oldest and largest grassroots nonprofit environmental organization in the country, and we have over 30,000 members across every county in Pennsylvania. And these members have a strong interest in protecting the stability of our climate by reducing and ultimately eliminating greenhouse gas emissions, including carbon dioxide and methane that are released during the extraction and combustion of fossil fuels.

Our Commonwealth is a significant emitter of climate-disrupting carbon pollution. We rank second in the Nation in fracked gas production and third in coal production. We are also globally significant polluters. As a Commonwealth, we emitted more energy-related carbon pollution in 2015 than 172 of the 194 nations that signed on to the Paris Climate Agreement. Therefore, we have a moral imperative, particularly in the absence of meaningful Federal action, to do our fair share to significantly reduce greenhouse gas emissions within our borders and add to multistate and international efforts already underway to avoid potentially catastrophic levels of climate disruption.

Recent scientific assessments have been published
that detail the urgency of our call to action. In October 2018 the Intergovernmental Panel on Climate Change released a special report on the impacts of global warming. This report highlights the projected differences in planetary impacts between a 1.5 degrees Celsius and 2 degrees Celsius of warming. And the differences are stark, including the complete loss of coral reefs and the fisheries they support, and additional sea-level rise that threatens many millions of coastal residents, as well as the very existence of many island nations. Avoiding the 2 degrees scenario will require rapid and far-reaching efforts to reduce emissions by 45 percent by 2030 and achieved net-zero emissions by 2050.

Because emissions to date have already saddled us with 1 degree of warming, the Co-Chair of the IPCC working group that authored the report went so far as to say that the next few years are probably the most important in our history.

The next month, the United States Global Change Research Program released the Fourth National Climate Assessment. This report finds that climate change is no longer a future threat, but that we are already dealing with its impact as a Nation. These impacts range from more extreme wildfires; more frequent, intense, and damaging storms exemplified by reason catastrophic hurricanes; and
changes in temperature and rainfall patterns that caused significant agricultural losses. The report begins with this statement: "Earth's climate is now changing faster than at any point in the history of modern civilization primarily as a result of human activities. The impacts of global climate change are already being felt in the United States and are projected to intensify in the future, but the severity of future impacts will depend largely on actions taken to reduce greenhouse gas emissions and to adapt to the changes that will occur."

So what do these changes look like in Pennsylvania? The National Weather Service declared 2018 the wettest year on record across Pennsylvania with the previous record set just seven years before, and this has had some disastrous consequences, including widespread flash flooding and landslides. One landslide caused a gas pipeline explosion in Beaver County. What happened just a couple blocks from my house in Johnstown and knocked two homes off their foundations with people inside. They were able to escape, but the homes had to be demolished, and landslide damage is not typically covered by homeowners insurance. Unfortunately, these events will become more common if we fail to indicate climate disruption.

Pennsylvania's agriculture is in the crosshairs of climate change. Increased flooding and extreme heat
threaten to increase agricultural disaster declarations and reduce yields. Our dairy industry is already struggling mightily and is projected to be among the hardest hit by hotter summers. Our ski resorts will be gone. In the summer, we'll have more Lyme disease, likely new tropical diseases, and toxic algal blooms on Lake Erie will limit swimming and threaten water intakes more frequently. Philadelphia airport and nearby neighborhoods are projected to be underwater.

The consequences are scary, but there are solutions. The Regional Greenhouse Gas Initiative, or RGGI, currently has nine participating States with New Jersey set to rejoin in 2020 and Virginia expected to link to RGGI in 2021. Participating RGGI States set limits of comparable stringency on carbon dioxide pollution from power plants, and those limits decline over time. Generators must hold and retire one allowance for each ton of CO2 emitted. If allowances are auctioned or sold to generators, the proceeds can be reinvested in beneficial ways.

RGGI has been in effect since 2008, and a recent review of the program's first 10 years found that CO2 emissions from RGGI-covered power plants have fallen by 47 percent, outpacing the rest of the country by 90 percent. Electricity prices in RGGI States have actually fallen by
5.7 percent, while prices have increased in the rest of the country by 8.6 percent. GDP of RGGI States have grown by 47 percent, outpacing growth in the rest of the country by 31 percent. RGGI States have generated $3.2 billion in allowance auction proceeds, the majority of which have been invested in energy efficiency and renewable energy programs.

Sierra Club recently asked Resources for the Future to analyze a number of different scenarios in which Pennsylvania limits carbon emissions in its power generation sector and links to RGGI. The summary of that research is attached to my written testimony. Some of the key findings through 2026 include the following:

First, all scenarios produce significant carbon dioxide pollution reductions relative to business as usual. Many have noted that Pennsylvania's power sector carbon emissions have declined in recent years as power from fracked gas replaces power from coal. However, this analysis indicates that, going forward, gas is projected to replace most of our existing nuclear generation in the absence of any carbon limits. This would lead to significant carbon emissions increases. A carbon limit effectively prevents the retirement and replacement by gas of most of our nuclear fleet and also stimulates modest additional investment in renewable energy.
Second, electricity cost increases are minimal, and in some scenarios costs go down. The worst-case scenario from a cost perspective increases the average residential electric bill by about 32 cents per month or about $3.80 a year. This is about a tenth of the estimated cost of House Bill 11, which is intended to prevent nuclear plant retirements. And that scenario assumes that allowance proceeds are directed to the General Fund or otherwise spend on projects that are unrelated to energy. If instead the proceeds are invested in a combination of energy efficiency projects and consumer bill rebates, the average residential bill is projected to decrease by about $1.45 percent or over $17 per year.

Third, Pennsylvania remains a major electricity exporter in all scenarios, and exports may increase under certain circumstances. If the allowance proceeds go to the General Fund, exports are predicted to decrease by about 17 percent relative to the baseline, but we would still retain one of the highest export levels in the country. On the other hand, if allowances are allocated directly to in-state generators based on their percentage of statewide generation, exports are projected to increase by nearly 9 percent as the allocation serves as an incentive for low and zero-emission generation in Pennsylvania relative to neighboring States.
And fourth, the carbon cap increases the effect of the Alternative Energy Portfolio Standard, or AEPS, but cannot replace it. In most scenarios new in-state clean energy generation increases in the range of 16 to 23 percent above baseline, while total regional clean energy is not significantly impacted. However, if the AEPS were to be repealed, in combination with a carbon cap, as some have suggested, in-state clean energy generation is expected to decline slightly while regional clean energy would decline more significantly.

The AEPS and the carbon cap are complementary policies. The AEPS drives clean energy development but does not necessarily reduce carbon emissions in the near-term while the carbon cap reduces emissions but does not necessarily drive clean energy development in the near-term. When the policies are combined, we can achieve both objectives, and the compliance cost for each policy is reduced.

So, in conclusion, climate change is here today, and we're already feeling its effects. And as with many social problems, the negative impacts of climate change are and will continue to be disproportionately felt by lower-income and marginalized communities, as well as those who rely on the land to make a living. The cost of inaction in Pennsylvania is high, over $10.6 billion in 2015 from
Pennsylvania emissions alone based on a very conservative estimate of the social cost of carbon and increasing every year.

Fortunately, we have the policy tools to cut carbon pollution in a very cost-effective way, and complementary investments in clean energy efficiency and economic diversification and transition have the potential to create hundreds of thousands of jobs in the Commonwealth if we decide to chart that course.

MR. MASUR: Good morning. My name is David Masur, and I'm the Executive Director for PennEnvironment. PennEnvironment is a statewide citizen-based nonprofit environmental advocacy group. I'd like to thank you, Mr. Chairman, and your staff for inviting me to testify today and for all the Members of the Committee for coming out this morning to discuss this important issue of climate change.

As you heard from other testifiers today, climate change is real, it is predominantly caused by human activity, and the effects will be disastrous. The negative effects that we will see from climate change are a regular topic of conversation in the media and with the public. I don't think I need to beat people over the head with the threats posed by climate change at today's hearing, but to quickly summarize, here in Pennsylvania the negative
impacts include extreme weather, more severe downpours, hotter days that can trigger asthma attacks and heat-related deaths, and increased prevalence of invasive species, pests, viruses, and disease.

Besides the predicted effects of climate change on our health, there are also dire predictions for our economy. The National Bureau of Economic Research recently released a study showing that if we do not dramatically reduce our global warming pollution, the Nation could see more than a 10 percent cut in GDP by 2100. This is in line with the study recently released by the Trump Administration that also predicted that climate change could cost the Nation a 10 percent cut in its GDP.

Our business community is predicting similar economic effects due to climate change. Tyson Foods, which recently acquired Keystone Foods, a global food provider with 25 manufacturing facilities worldwide and headquartered in West Chester, Pennsylvania, that employs 11,000 people and generates 2.7 billion in annual sales, has warned its investors that, quote, "Climate change could affect our ability to procure needed commodities at costs and in quantities we currently experience and may require us to make additional unplanned capital expenditures," unquote.

Kraft Heinz has given similar warnings to its
investors, and Coca-Cola, which operates 14 facilities in the Commonwealth, reports that, quote, "Climate change may have long-term direct and indirect implications for our business and supply chain," unquote. Its official statement explains that, "The consensus on climate science is increasingly unequivocal. Global climate change is happening, and manmade greenhouse gas emissions are a crucial factor."

Erie Insurance Group warned, "Changing climate conditions have added to the unpredictability, frequency, and severity of natural disasters and have created additional uncertainty as to future trends and exposures."

PNC Financial Services based in Pittsburgh reports a similar concern. "Climate change may be increasing the frequency or severity of adverse weather conditions, making the impacts from these types of natural disasters on us or our customers worse," unquote.

Pennsylvanians share these same concerns raised by our business leaders. A recent poll showed that Pennsylvanians overwhelmingly believe in climate change and overwhelmingly support commonsense clean energy solutions. Most register voters believe that climate change is currently causing problems, 67 percent, and most, 68 percent, believe that the State should do more to address these problems. Only 4 percent of Pennsylvanians polled
don't believe in climate change.

I'd like to address the elephant in the room head on. Certainly at PennEnvironment we're disappointed that time and again Committees in the General Assembly have held hearings on the topic of climate change that include testifiers who don't agree with the overwhelming consensus on climate change. This has been a tried and true strategy of opponents to strong environmental policies for decades, sow seeds of doubt, and trot out dueling scientists in an effort to show that, quote, "The debate is still out on the topic." This implies there's a serious debate within the scientific community on the fact that our climate is changing rapidly, and it's predominantly caused by human activity.

And if the criteria for proving that the sciences is still out on a topic is that one or a handful of dissenters who have the letters Ph.D. behind their name or "doctor of" in front of it, we would still be questioning if smoking is good for us, if a black people are inferior to white people, if the Holocaust happened, if homosexuality is a choice, and if the world is flat.

Just two weeks ago, a professor from the University of Minnesota Duluth published his -- excuse me, which had published his book entitled Nobody Died at Sandy Hook and, as the title notes, argued that the school
massacre at Sandy Hook was a farce. But we are not having a serious debate about whether Sandy Hook occurred because someone can trot out one academic with a Ph.D. This is not how science works in the United States. The time for these types of debates has long passed. The scientific consensus regarding climate change is overwhelming, so let's talk about the solutions.

This should be an appropriate conversation for the majority caucus given the leadership on clean energy policies past and present have been driven by Republican Senators and House Members alike. This includes being the lead sponsors to the Pennsylvania Alternative Energy Portfolio Standard, which was introduced by Senator Ted Erickson and Representative of Chris Ross; closing solar borders legislation introduced by Republican State Senator Mario Scavello; improvements and expansions on the Commonwealth's energy conservation law Act 129 currently being proposed by State Senator Tom Killion; wind energy policies introduced by State Representative Curt Sonney; solar legislation introduced by Representative Kuafer; energy efficiency standards legislation being introduced by Representative Wendi Thomas; and electric vehicle legislation introduced by Senators Mensch and Tomlinson.

I hope that the leadership in the House and Senate will bring up these proposals and move them through
the chambers and past these bipartisan clean energy
policies that will help us reduce climate pollution, among
other pollutants.

Given what other organizations have said about
RGGI and other policies and in order to be cognizant of
time today, Mr. Chairman, I won't go into detail about
these particular policy handles other than to say that
PennEnvironment strongly supports them. And certainly at
the close of our panel I would be willing to answer any
questions on these topics or our position on them.

With that, I will wrap up, Mr. Chairman and
Members of the Committee and staff. Again, let me thank
you for having me today and participating in today's
hearing. Thank you.

MAJORITY CHAIRMAN METCALFE: Representative Rapp.

REPRESENTATIVE RAPP: Thank you, Mr. Chairman.

Thank you, gentlemen, for being here. And I'd
like to go on record saying that I strongly object to some
of the comments made about the people who oppose your
opinions.

That being said, gentlemen, you are all here
advocating for solar, wind, electric cars. I've read just
recently about the expense of recycling wind turbines out
West. And the article that I read said that for each
turbine it can cost approximately $200-300,000 to recycle.
And from what I understand, the lifecycle of a solar panel or a wind turbine is approximately 20 years. So in all of your planning for wind and solar energy and knowing that not only do we have a problem with pollutants in the air but we also are struggling here in Pennsylvania with some landfill issues.

So since you're really big into this clean energy, what are your plans for the State in recycling any wind turbines when the blades, which are also, you know, covered in resin, which is also an oil product, and the turbines themselves contain oil, solar panels are manufactured with a lot of toxic chemicals and that there's also a lot of hazardous waste in fuel cells. So I'm wondering what your organizations are doing looking down the road in the recycling issue of wind, solar, and hazardous fuel cells.

MR. ALTENBURG: Yes, I can take a first opportunity to answer that. Thank you very much for the question. Yes, it is very important to address recycling. We don't see a huge recycling industry around solar and wind right now primarily because just the whole there aren't a lot of them retiring. Especially when we come to solar, they will talk about a lifecycle being 20, 30 years for solar panels, but that lifecycle, it's an engineering lifecycle. It's defined when their output reduces by a
certain percentage. It doesn't mean that they stop generating after 20 or 30 years.

So what we're seeing is there's just not a lot of them are coming out. For a lot of these, the solar panels, for example, well over 90 percent of the products are recycled. We're seeing companies, Community Energy of Pennsylvania Company has a project in southeast Pennsylvania where, as part of their project to install the system, they've bonded the removal, so they've already taken care -- they've already worked the removal and disposal into their pricing. And we expect to see more of that.

Just like, you know, any other company expects when they pull out their system, they're going to have to pay for the proper disposal of the waste. What I point out in my testimony is the fossil fuel industry is one where they don't pay for the proper disposal of their waste. They get to just open the window and dump it.

MAJORITY CHAIRMAN METCALFE: Thank you for your attempt to answer that.

REPRESENTATIVE RAPP: I would like a response on recycling the turbine blades and the hazardous fuel cells, but I guess I'm out of time. Thank you, Mr. Chairman.

MAJORITY CHAIRMAN METCALFE: Thank you, Representative Rapp.
Representative Comitta.

REPRESENTATIVE COMITTA: Thank you, Mr. Chairman, and thank you to our panelists for your testimonies today. And also thank you for focusing on solutions. This is why the people of Pennsylvania have sent us to the Legislature, to work together to find solutions to improve the health, safety, and welfare of the people.

So to that point, I'm wondering -- I introduced House Bill 1195, the modernization of the Alternative Energy Portfolio Standards, and I'm wondering if you could talk a little bit more about that and --

MAJORITY CHAIRMAN METCALFE: Representative Comitta, if you could --

REPRESENTATIVE COMITTA: -- any changes --

MAJORITY CHAIRMAN METCALFE: -- ask a question --

REPRESENTATIVE COMITTA: Yes.

MAJORITY CHAIRMAN METCALFE: -- just -- if you could ask a question. We don't want them just to talk and give testimony about a bill now. We'd like to stick to what the topic of the conversation was, and if you could just ask them a question, they can respond to the question, that would be really appreciated. Thank you.

DEMOCRATIC CHAIRMAN VITALI: But in all fairness --

MAJORITY CHAIRMAN METCALFE: Thank you,
Representative Vitali.

DEMOCRATIC CHAIRMAN VITALI: -- Rapp's question was much longer than that. I think she should have a little bit of leeway to --

MAJORITY CHAIRMAN METCALFE: You can think what you think.

DEMOCRATIC CHAIRMAN VITALI: -- get out her thoughts --

MAJORITY CHAIRMAN METCALFE: Thank you, Representative Vitali.

DEMOCRATIC CHAIRMAN VITALI: -- more than just my thoughts --

REPRESENTATIVE COMITTA: Let me get right to the point.

MAJORITY CHAIRMAN METCALFE: Mr. Vitali, you're out of order.

REPRESENTATIVE COMITTA: Fair enough. Panelists, what changes do you recommend to Pennsylvania's AEPS standards and legislation that will further increase the use of renewable energy and reduce carbon emissions?

MR. SCHUSTER: I can take a first crack at that. Certainly, our AEPS is out of date. I mean, at the time that it was adopted in 2004 it was in line with what a lot of other States were doing, and the industry was much less mature then. There are now many States that are greatly
exceeding us, particularly our neighboring States. And what we're finding is that more investment from the clean energy industry is happening in those States. And so, I mean, ultimately what we need to do is cut carbon pollution in line with what the best consensus science tells us is necessary to address the issue. I cited the IPCC in saying 45 percent by 2030 and cut it to zero by 2050. In order to do that, having clean energy policies, clean energy targets in addition to carbon caps is necessary, and so I think -- you know, I think, as much as we can get in Pennsylvania is what we need, but I think we need to be shooting much higher than we are right now. And I think, you know, a 50 percent target by 2030, a 100 percent target by 2050, you know, at the end of the day, it's about what you can get consensus around.

MAJORITY CHAIRMAN METCALFE: So are all three of your groups for us doing zero percent carbon emissions from Pennsylvania and for eliminating the use of fossil fuels in Pennsylvania?

MR. ALTENBURG: Chairman, the -- I --

MAJORITY CHAIRMAN METCALFE: PennFuture is nodding his head yes.

MR. MASUR: I'm PennEnvironment and --

MAJORITY CHAIRMAN METCALFE: PennEnvironment.

MR. MASUR: -- and I am nodding yes, yes.
MAJORITY CHAIRMAN METCALFE: PennFuture.

MR. ALTENBURG: I would like to clarify that the Intergovernmental Panel on Climate Change does not say zero fossil fuel use by 2050.

MAJORITY CHAIRMAN METCALFE: I recognize that.

MR. ALTENBURG: It says net zero carbon emissions by 2050. And that is the target that the best science currently suggests that we need to be striving for.

MAJORITY CHAIRMAN METCALFE: So are all three of your groups for eliminating the use of fossil fuels and going to zero carbon dioxide emissions in Pennsylvania?

MR. ALTENBURG: We don't believe we're going to eliminate all fossil fuels in that time frame, no.

MAJORITY CHAIRMAN METCALFE: Do you believe that we should ultimately eliminate all fossil fuels?

MR. ALTENBURG: I don't -- no, I don't think it's necessary that we do eliminate all fossil fuels.

MAJORITY CHAIRMAN METCALFE: Does your group?

MR. MASUR: Yes.

MAJORITY CHAIRMAN METCALFE: Your group does. Does your group, Sierra Club?

MR. SCHUSTER: Yes.

MAJORITY CHAIRMAN METCALFE: Thank you.

Representative Fritz.

REPRESENTATIVE FRITZ: Thank you, Mr. Chairman.
Gentlemen, thank you for your testimony this morning.

My curiosity initially here is in regards to funding. We see the Sierra Club has 30,000 members. I believe those members pay a fee.

MR. SCHUSTER: That is true.

REPRESENTATIVE FRITZ: Okay. PennFuture and PennEnvironment, you're both listed here as statewide environmental nonprofits. Can I ask where you get your funds from?

MR. MASUR: Sure. Like the Sierra Club model, we're a citizen donor model. It's mostly small donors.

REPRESENTATIVE FRITZ: Do you have private funders? Can you name your top three?

MR. MASUR: We don't take -- you mean private like corporate money or --

REPRESENTATIVE FRITZ: Like William Penn Foundation just for an example.

MR. MASUR: At PennEnvironment Incorporated we don't take grant money. We have a sister organization that does. PennEnvironment only takes citizen contributions.

REPRESENTATIVE FRITZ: Okay.

MR. ALTENBURG: Yes, all of our information is available on our 990 forms. I don't know the -- our donors names off the top of my head.

REPRESENTATIVE FRITZ: Okay. Thank you for that.
And I just will mention that there is a theme consistent in all three of your testimony, and I'll just cite here catastrophic -- well, I have the form, thank you. Catastrophic levels of climate disruption and pollution of water and dumping your trash in public and seriously like egregious reference to Sandy Hook. I just really think it does a disservice for anyone that wants to have a calm, logical, reasonable conversation and debate when you exert such extreme thoughts and models.

MAJORITY CHAIRMAN METCALFE: Okay. Thank you.

REPRESENTATIVE FRITZ: I'll close it there.

MAJORITY CHAIRMAN METCALFE: Thank you, Representative Fritz.

Representative Otten.

REPRESENTATIVE OTTEN: Thank you, Chairman.

Thank you, gentlemen, for your testimony.

I wanted to dig a little bit deeper into Pennsylvania's adoption of the RGGI policy. And I wanted to get some feedback from you all about cumulative impact models and vulnerability scales and how we can use programs like RGGI to help communities that are disproportionately burdened by and vulnerable to multiple sources of pollution. And, you know, how can we focus that funding to help to alleviate some of the stresses that we've caused through industry and through extraction to vulnerable
communities, primarily our poor, our communities of color? How can we use RGGI? Are there ways through RGGI that we could maybe lower caps or increase costs in these vulnerable communities so that we can start to make really impactful changes for these communities like Pittsburgh and Philadelphia where their asthma rates are 30 percent higher than the rest of the country?

MR. SCHUSTER: There's a number of ways you can do that. One is through the investment of proceeds option, which there's a whole range of possibilities there. But another way to address that is through how you structure the rules for who has to comply and how trading can take place.

So, you know, RGGI has a model rule, which is kind of like the floor that everybody has to comply with. It has a minimum size of compliance entity, in other words, a generator that has to hold and retire allowances of 25 megawatts. One issue that's been cited is that generators below that threshold could see a benefit and operate more because they're not subject to the cap. And sometimes those generators are in environmental justice communities. Sometimes they're in urban areas. Sometimes they're -- oftentimes, they're more polluting because they don't have pollution control equipment. And so one way to deal with that is through where you set that limit for compliance.
There's also the possibility that I think should be explored about restricting trading so that areas that, say, are out of compliance with clean-air standards perhaps generators in those areas would be restricted from purchasing allowances to the degree that would cause them to increase emissions. There's a lot of different ways you can structure the rule to try to protect communities like that. But also the investment in clean energy and, say, electrification of vehicles, and things like that in those communities is also a way to have complementary policies that also reduce the burden.

MAJORITY CHAIRMAN METCALFE: Thank you. Representative Vitali for a quick question, and we're kind of coming to the end of the time here if you have a question still or --

DEMOCRATIC CHAIRMAN VITALI: I do not.

MAJORITY CHAIRMAN METCALFE: Representative Vitali does not. Who else do we have on the list there? Griffin.

Representative Dush for a quick question.

REPRESENTATIVE DUSH: Thank you, Mr. Chairman.

Mr. Altenburg, you had said that people don't have to pay for their pollution. It's interesting. The social cost in China for the recycling, because of what happened with Japan being an early adopter, China's birth
defects and everything else that are going on over there, they finally ended up stopping taking solar panels for recycling. Japan's got them stacking up, and yet none of you seem to take into account the lead cadmium that leak out of the solar panels --

MAJORITY CHAIRMAN METCALFE: Representative Dush, you are going into ultimately have a question?

REPRESENTATIVE DUSH: -- what is the cost? Are you figuring in the cost? Because I haven't heard any from any of you.

MR. ALTENBURG: There have been studies that talked about the recyclability of solar panels and the amount that can be recycled. We are not actively extracting a lot of materials from those solar panels right now in Pennsylvania because we don't have a huge stream of panels going into disposal facilities. It's the very beginning of the industry. There just aren't that many solar panels --

REPRESENTATIVE DUSH: But you're not considering --

MR. ALTENBURG: -- that are being taken off-line.

REPRESENTATIVE DUSH: -- what's happening in China and Japan. Why are you not using those costs?

MAJORITY CHAIRMAN METCALFE: Thank you, Representative Dush. I think it's obvious from your
question and Representative Rapp's question that these
gentlemen haven't factored in the cost of recycling or how
to deal with the types of energy that they're actually
promoting. I mean, your organizations really don't seem,
from the way that you haven't provided answers to those two
series of questions, you haven't actually looked at the
cost associated with using the types of technology that
you're advocating for versus the types that you're
criticizing, is that correct?

MR. ALTENBURG: We'll make studies available to
you, Representative.

MAJORITY CHAIRMAN METCALFE: What's that?

MR. ALTENBURG: We'll make studies available to
you.

MAJORITY CHAIRMAN METCALFE: Thank you. Thank
you, gentlemen. Have a good day.

And just as we're changing panels, Representative
Rapp touched on it, Representative Fritz touched on it. If
the testimony wouldn't have come in late last night, we
would have caught that there was such disparaging remarks
that were put in the testimony from Mr. Masur with
PennEnvironment to make the types of comparisons he did and
try and disparage people on the other side of the argument
ultimately I think shows the type of argument that he's
proffering but wouldn't have been allowed if they would
have been seen prior to this morning by myself.

And, as I said, my research analyst said he received that last night, and we certainly would have nipped that one in the bud to let the testifier know that that would not be an acceptable type of testimony to this Committee of the House of Representatives to put in such disparaging remarks just going on the attack on people that oppose your ideas. This is supposed to be for exchange of information and will hopefully lend itself to policy considerations that are going to benefit the people of Pennsylvania, and disparaging remarks such as those don't lend itself to that at all.

DEMOCRATIC CHAIRMAN VITALI: For the record, Mr. Masur's remarks were not disparaging in my opinion and in fact were very compelling.

MAJORITY CHAIRMAN METCALFE: Representative Vitali, you are out of order, and your opinion wasn't asked for, but I think that any citizen reading that would recognize those types of remarks are disparaging, trying to make that type of an alignment with people that oppose your ideas, so please shut your microphone off, sir. You're not recognized at this time. We're moving on to our next panel. Thank you, Representative Vitali.

DEMOCRATIC CHAIRMAN VITALI: Well, I'll just respectfully disagree with you.
MAJORITY CHAIRMAN METCALFE: Our next panel is
Mr. Gregory Wrightstone, a geologist, author, and expert
reviewer of the Intergovernmental Panel on Climate Change,
the 6th Assessment Report. Mr. Gordon Tomb is our other
panelists, Senior Fellow, Commonwealth Foundation.
Gentlemen, thank you for joining us, and you can begin when
you're ready.

MR. WRIGHTSTONE: Yes, thank you. I want to
thank the Chairman of the Committee for the opportunity to
provide my science and fact-based analysis on Governor
Wolf's proposal to add the Keystone State to the Regional
Greenhouse Gas Initiative. My qualifications include
degrees in geology from Waynesburg University and West
Virginia University. I'm an expert reviewer for the
Intergovernmental Panel on Climate Change.

I also write significant commentaries exposing
the many climate change hoaxes that are presented to the
public as fact. Most recently, the national climate
assessments stated fact of increasing fires when in fact I
showed that the number of fires in the United States and
even in California are in decline, also the recent U.N.
report on the looming mass extinction event. According to
this, 1 million species would go extinct over the next
several decades, requiring 30,000 species to go extinct a
year, when in fact the reality is only two species have
gone extinct on average per year over the last 40 years
just as two examples.

Governor Wolf's proposal to abate greenhouse
gases in the State, as described in his executive order,
would have serious ramifications for the State and its
citizens. Because of this, the Governor and the Committee
should make recommendations that are based on science and
facts, not on a politically and media-driven narrative of
the Keystone State facing imminent and catastrophic
consequences from our actions.

I'm going to focus today on just two factors
here. One will be the justification that was presented in
the executive order and by the Governor himself and also,
secondly, on the effects of temperature and the proposed
reductions of carbon dioxide.

Before I get started on my prepared remarks, I
want to deal with some things that were stated before. I
was called a professional science denier earlier and worse,
so maybe we should go over what actually I believe. I
believe CO2 is increasing. It is, and it's mainly due to
man's burning of fossil fuels. That's a fact. I also
believe CO2 is a greenhouse gas and contributes some
warming to the atmosphere. It is. It just does.

The big difference that we have here -- and yes,
Virginia, there is a debate. The debate is is the
temperature rise of a degree-plus that we've seen over the last 100-plus years, is it mostly anthropogenic, manmade warming due to CO2 or is it from the same natural forces that have been driving temperature up and down since the dawn of time?

Secondly, one of the really key takeaways here is what we don't hear too much about. We only hear from the media and some of the other presenters of the catastrophic consequences of our changing climate. What I talk a lot about and present as facts is the overwhelming evidence of rising temperature and increasing CO2 having tremendously beneficial aspects to the Earth. I'm not going to get into all that this morning. The science that's behind that is stark and overwhelming. What we're seeing is an Earth and its ecosystems that are thriving and prospering and humanity is benefiting. And it's not even close.

The other thing we heard about today was the 97 percent consensus. The DEP Secretary must have misstated. He got information wrong. That was not from NOAA. It was from a study by John Cook. David Legates, Dr. Legates spoke earlier. He wrote the peer-reviewed study that completely disputed that showing that actually the same studies review by the Cook study showed that less than 1 percent of the scientists actually agree with catastrophic manmade warming.
Also, we've heard that CO2 is a pollutant. That was based on the Obama Administration endangerment studies. I expect that to be overturned. CO2 is not a pollutant. It's a miracle molecule that we should appreciate. We're at about 410 parts per million. We've added 130 parts per million to the atmosphere of CO2 since the Industrial Revolution, 130.

I'm not going to do a lot of numbers. In the last 140 million years we've gone from 2,500 parts per million, six and a half times what we are today, almost levels of CO2. Looking in the geologic context, Earth has averaged 2,600 parts per million. We are actually today -- we don't have too much CO2; we don't have enough. We're actually CO2-impoverished if you look at the geologic picture.

To get into my remarks, several negative impacts on the Commonwealth were listed in the executive order as justification for the increases of electricity costs that are proposed. The first claim is that current warming trends are expected to accelerate by 2050 and increase by 5.4 degrees. The fact is we have seen about a degree and a half of warming since the early 20th century.

The other facts that's not mentioned is that that warming trend that we're in started 200 years before that. We know that it started in the late 17th century. And we
also know that at least 200 to 250 years of that warming trend was entirely naturally driven; it just had to be. So we're being asked to believe that, well, yes, we had 200 or 250 years of warming that was naturally driven, but now we're the reason.

We also know looking back through geologic history if we look at the four and a half billion years we see that the Earth's temperature has not been driven by CO2. We see times when CO2 levels were 10 times what they are today, and we were in icehouse conditions. We also see times when CO2 levels were very low, and there was no ice on either pole. We also know if we look at the ice core data from Antarctica we know and it's a consensus of this that for 800,000 years from the ice core data from Antarctica, temperature changed and then CO2 changed, so temperature was driving CO2 for the last 800,000 years.

So we're being asked to believe, think about this -- and there's a consensus on that. There's really no disputing that. We are being asked to believe that for 799,900 years CO2 didn't drive temperatures, oh, but it just changed in the last 100 years. That's not how geology and science works.

So the other thing we look at here, so we're being told of catastrophic levels of warming. If we look at -- let's go to the next one -- the United States climate
reference network, we heard about Dr. Legates talking about
the heat island effect of thermometers. We look at this,
and this was established -- a network that was established
in 2003 to remedy that urban heat island effect. And this
is U.S. data only, surface thermometer data. We see that
in fact there has been close to zero warming since that
time for the last 16 years. Bear in mind none of the
models that have been so prominently touted here this
morning predicted that. Now, this pause in warming, it may
end next month or next year. It may get cooler. We don't
know that. But we know that for at least 16 years there
has been no warming.

The other claim that's touted by the Governor and
the RGGI, the executive order is that increasing
precipitation due to manmade warming is leading to an
increase in extreme weather events and flooding. Governor
Wolf referenced heavy flooding in 2018. It is a fact that
2018 saw the highest amount of precipitation on record in
Pennsylvania, but there is no long-term -- looking at the
data from 1970 on, we've seen no long-term increase. So I
think the Governor was confusing weather events with
climate.

In fact, if we look at the NOAA data, when I just
this week looked at the NOAA data, I look for the big rain
events, the all-time longest streaks of heavy weather, and
we find that those events actually piqued in the '40s and '50s. So we note zero increase in wet conditions. Also the EPA's National Drought Severity Index, which is figure 3, shows no increase in wet conditions in the lower 48 States.

We also see that perhaps the Governor was looking out his window in 2018 and remembered the flooding of the Susquehanna here in Harrisburg. And it did flood in 2018, but perhaps the Governor is not aware that there were 28 higher floods that dwarfed this. This was the 29th highest flood in 2018. And to conflate that and say we need to take dramatic and harmful economic actions to solve this, what I believe is a nonexistent problem, needs to be rethought.

Also, we've been told that deaths will increase due to manmade warming, due to heat-related illness, and increasing air and water pollution. The fact is that's not supported by the data. It just is not. Numerous studies confirm significantly more people die due to cold-related deaths as from heat-related deaths. The largest study of its kind was a Dr. Antonio Gasparrini, looked at 74 million heat-related or temperature-related deaths and found that 20 times as many people die due to cold as due to heat. Another similar study dealing with United Kingdom and Australia, their conclusion was that it was 15 times as
many people died due to cold as due to heat. So the fact that -- actually, I think we could actually make the statement rather than the alarmist scenario as proposed to today, I think we can all agree looking at this data that global warming would save lives.

Allegations of increasing pollution are not supported by the facts. In fact, the EPA just released a report just a couple weeks ago reviewing the data in 2018 and stated that there's been a long-term improvement in unhealthy air days. And by every metric, pollution has been in significant and continuing decline.

The most important thing I would ask for you to remember today is what we're about to talk about, and that is what if we imposed RGGI, and what if we were able in Pennsylvania to reduce 100 percent of the carbon dioxide emitted by electricity? That should be maybe the most important thing considered by the Committee here. So what is that? So the primary goal of Pennsylvania's participation in RGGI is to alter the Earth's temperature by removing CO2 emissions.

Likely, again, today, the most important factor in our discussion is just this: According to the latest U.S. Energy Information Administration, Pennsylvania emissions account for 217 million metric tons or 4.2 percent of the United States' output. Of that amount, 37
percent or 80 million metric tons were generated by the electricity sector.

Estimates of how much future warming will be averted can be calculated using the model for the assessment of greenhouse gas-induced climate change developed by the National Center for Atmospheric Research. And according to this model, assuming that 100 percent of the State's electricity generation of CO2 emissions were eliminated, if we eliminated all the electricity-generated CO2, it would avert 1/1000 of a degree Fahrenheit in warming. Let me repeat that. If we reduced all of our CO2, we would avert 1/1000 of a degree Fahrenheit in warming by the year 2050, and it gets better, 3/1000 by the year 2100.

There's no disputing the incredibly small temperature rise that would be averted by a reduction in carbon dioxide and emissions from Pennsylvania. This infinitesimally small change in temperature is well below our ability to actually measure changes in global temperature. In defense of enacting economically harmful regulations and energy cost increases, proponents tell us that the world countries must act in concert in order to meet any meaningful changes. That, however, is definitely not occurring. The world's top two consuming countries, China and India, are instead steeply increasing both their
coal consumption, their coal mine openings, and also their
clean-fired generation. And we've seen that just last week
the newly appointed Deputy of Energy by Donald Trump stated
that our 14 percent reduction in CO2 emissions from the
United States will be replaced in less than a month and a
half by increases in CO2 emissions from China.

And with that, I'll just conclude that we've seen
the justifications stated for joining the RGGI are not
supported by the facts and the science. Any reductions in
Pennsylvania's carbon dioxide emissions are so small as to
be indistinguishable from zero. This proposal would
infringe on the freedoms of people, make them significantly
poorer for virtually no advancement of the stated intention
to avert global warming. The Legislature, the business
community, and all right-thinking citizens should stand
against this economically crippling and unneeded proposal.
In short, it's a solution in search of a problem. Thank
you.

MAJORITY CHAIRMAN METCALFE: Thank you.

MR. TOMB: Good morning. My name is Gordon Tomb.
I'm with the Commonwealth Foundation, a Senior Fellow with
the Commonwealth Foundation. I've been writing and
speaking about energy issues for more than 30 years now. I
rely on the expertise and research of scientists,
When we first heard of Governor Wolf's idea to replicate the Northeast RGGI program, we turned to the work of David Stevenson. He is Director of the Delaware-based Caesar Rodney Institute Center for Energy Competitiveness. Mr. Stevenson has written more than 100 analytical studies. He would be here today but for a prior commitment in Colorado. Of all of Mr. Stevenson's writings, most relevant to today's proceeding is his peer-reviewed critique of the decade-old RGGI program that covers 10 Northeast and mid-Atlantic States. We've made copies of Mr. Stevenson's report and a supplemental work of his available to the Committee.

What RGGI has produced for its member States is what we think Pennsylvania can expect to get from the Governor's proposal, and it's not good. According to the Stevenson research, RGGI has resulted in higher energy costs, reduced industrial activity, and no, zero, no environmental benefits. In short, RGGI has hurt its region. RGGI basically seeks to increase the cost of fossil fuels and make them less attractive. The revenue gained from these fuels then becomes property of the State.

Although the RGGI program administrator has claimed significant benefits from the initiative, Mr. Stevenson's research says otherwise. For the purpose of
comparing apples to apples, the Stevenson report refers to five non-RGGI States: Illinois, Oregon, Ohio, Pennsylvania, and Texas. These States have deregulated electricity supplies and programs for promoting renewable energy similar to those in the RGGI States. The paper examines the period between 2007 and 2015.

Here's Mr. Stevenson's key findings: There were no added emission reductions or associated health benefits in the RGGI States. Spending of RGGI revenue on energy efficiency, wind, and solar power and low-income fuel assistance had minimal impact. RGGI allowance cost added to already high regional electric bills. RGGI pricing of electricity contributed to a 12 percent drop in production of goods and a 34 percent drop in the manufacturing of energy-intensive goods.

How about carbon dioxide reductions? RGGI had no effect on them, nor of any of the supposed health benefits when you consider other factors, those factors, including the effects of regulatory and market forces and the quantity of emissions exported to other States by the importation of power into RGGI States.

Of the 57 million tons of carbon dioxide removed from RGGI emissions, 11 million tons were exported to other States by importing more electricity and exporting from those RGGI States energy-intensive industries. The
remaining 46 million tons of reduction are more than
accounted for through the reduction of coal and petroleum-
fired generation resulting from illegal Obama-era Federal
clean air regulations, which were later overturned by the
courts. And the increased use of relatively low-emission
natural gas-fired power plants, in other words, the
expanded use of natural gas occurred because of free
market-driven innovation in natural gas drilling practices
that lead to dramatically lower fuel prices and supplanted
some other fossil fuels.

Energy efficiency, as measured by the ratio
between energy demand and the growth of gross domestic
product improved more in non-RGGI States than in the RGGI
States. In other words, the former, the non-RGGI States,
are getting more economic growth out of the electricity
they use than are the RGGI States.

Renewable energy promotion, non-RGGI States added
more wind and solar than did the RGGI States, 5.5
percentage points versus 2.3 percentage points. RGGI
electricity prices rose 64 percent more than in the
comparison States between 2007 and 2015. The price
difference appears to be split between the additional cost
of electricity imposed by emission allowances and indirect
costs. As an example, an earlier paper co-authored by Mr.
Stevenson showed that emission allowances added $11 million
to Delaware electric bills in 2015, and indirect costs added another $28.5 million because the State, Delaware, had to import more expensive electricity from out of State to replace power lost through the RGGI program.

Although Stevenson says it's difficult to measure the effect of RGGI on economic growth, the fact is that the economies of non-RGGI States grew 2.5 times faster between 2007 and 2015 than did those of RGGI States. RGGI States lost 34 percent of energy-intensive industry while non-RGGI States lost only 5 percent.

With respect to overall goods production, RGGI States lost 12 percent while non-RGGI States grew more than 20 percent. The effects are reflected in demand for industrial electricity, which dropped by 18 percent in RGGI States compared to only 4 percent in both non-RGGI States and the overall U.S.

RGGI's net contribution to low-income consumers is $5 a year when RGGI's effect of increases in electricity prices is included. Stevenson concludes that this amounts to an increase of only 1.6 percent to the assistance already received through the Federal Low-Income Home Energy Assistance Program.

Stevenson uses Delaware as an example to suggest that RGGI States may not be effectively spending emission allowance revenues. He says that Delaware has received
$100 million in RGGI revenue, $55 million of it remains unspent, $22 million has gone to administrative overhead and fuel assistance with just $23 million going to energy efficiency programs.

As far as we can tell, carbon tax revenues provide little more than multibillion-dollar slush funds for Governors. According to Stevenson, between 2007 and 2017 per capita emissions from Pennsylvania electric power plants fell 40 percent. RGGI States fell 41 percent after adjusting for the emissions RGGI States shifted elsewhere by importing electricity from other States. So largely through the advent of cheap natural gas, Pennsylvania emissions dropped nearly as much as RGGI States without the pain of the RGGI costs. If generation capacity from gas, wind, and solar increases, as predicted by the Pennsylvania Public Utility Commission, Mr. Stevenson says the 2030 RGGI goal will be met without joining RGGI and adding billions of dollars in allowance fees to electric bills.

How about the Governor's plan? Mr. Stevenson estimates the direct cost of meeting Governor Wolf's 2030 goal would be as much as $29 billion and as much as $89 billion of indirect costs are included. Assuming the Wolf program would seek further reductions after 2030 to achieve zero emissions -- and we don't have any doubt that that would likely happen -- direct and indirect costs would add
up to $147 billion, according to Stevenson.

So to close, I just want to note this: It's important for this legislative body to note that all the RGGI States joined RGGI with explicit approval of their legislators. When the Virginia Governor attempted a unilateral action to join RGGI, a state legislature defunded the effort. We urge this legislature save Pennsylvanians from the ill-considered action of Governor Wolf, whose plan promises much harm and no benefit.

MAJORITY CHAIRMAN METCALFE: Thank you both.

Representative Comitta.

REPRESENTATIVE COMITTA: Thank you, Mr. Chairman. Thank you for your testimony today, gentlemen.

A question for each of you. Would you be so kind and tell us who your top three financial contributors are, Commonwealth Foundation and our geologist.

MR. WRIGHTSTONE: That's easy for me. I get no funding from anybody, but I do see you accept contributions significant from the groups that are supporting this legislation, so I think that should be pointed out rather than -- so I get no funding from anybody.

MR. TOMB: Yes, I don't have the names of the donors, but I can tell you they are individuals like myself and others AND businesses. We do have businesses supporting the Commonwealth Foundation. I just don't have
a list of the donors.

MAJORITY CHAIRMAN METCALFE: Thank you.

Representative Dush.

REPRESENTATIVE DUSKH: Thank you, Chairman.

Al Gore became a billionaire off of Professor Mann's "hockey stick" graph, the things that actually drove that thing to really start. And yet, just recently, in British Columbia Professor Mann lost his court case because he refused to show in open court his R2 regression numbers, the working out of his models. Now, scientific studies and models, you have to put it out there so it can be peer-reviewed and decide whether or not it actually works. Professor Mann's refusing to do this. Again, Vice President Gore is now a billionaire as a result of his action with the carbon exchange similar to the RGGI.

Is this example something that seems to be replete throughout the studies that are driving this?

MR. WRIGHTSTONE: There's probably no other study that you could point to that has such horrible ramifications, just reflects badly on the scientific process as does the hockey stick, for example. He was the lead author of the IPCC chapter on paleoclimate. On his own study that was later proved to be completely -- he -- there were a lot -- I've got to be careful what I say because he's very litigious, as you know. But it's been
stated that his hockey stick was a reconstruction using proxy data with two big problems: the proxy data and the reconstruction. Dr. Legates can go on in detail. We talked at length about the many problems with that.

He's still at Penn State and very proud of what he's done, but his work particularly using tree ring data when the authors of the study that he used drove his hockey stick, they stated categorically don't use our data for temperature reconstructions because they believed that the growth of the trees was due to CO2. Well, that doesn't jive very well with this catastrophic warming when the CO2 is driving the tree ring data that he misinterpreted as being temperature-driven. So that's just the tip of the iceberg.

Yes, one of the things that irritates me is just the biggest loser in this debate -- and there is a debate -- is the diminution and destruction of the scientific process. Thank you.

MAJORITY CHAIRMAN METCALFE: Representative Vitali.

DEMOCRATIC CHAIRMAN VITALI: Okay. Thank you. You gentlemen certainly are entitled to your opinions, and it seems like your overarching conclusion is that we should be doing nothing to reduce CO2. I just want to state for the record that that conclusion is disagreed with by the
almost 200 countries that signed on to the Paris Accords, the almost 1,000 of the world's most respected atmospheric scientists of the International Governmental Panel on Climate Change, the national science academies of over 20 countries, including the United States, the World Health Organization, the World Meteorological Association, on and on and on and on. You are not in the majority view.

The second point I want to make is that --

MAJORITY CHAIRMAN METCALFE: Representative Vitali, you're going to get to a question here?

DEMOCRATIC CHAIRMAN VITALI: Right. The second point I want to make -- and I'll ask you to comment on it as my question, we will never get to carbon neutrality, as the overwhelming majority of world scientists tell us, by gas drilling. It's just impossible. Thank you.

MR. TOMB: I'd like to respond to that if I could.

MAJORITY CHAIRMAN METCALFE: Well, I'll give you both a quick response because we're running out of time.

MR. TOMB: Got you. I would just refer the Representative to something called the Petition Project. It's a petition signed by Edward Teller, a noted physicist, the late Edward Teller, and 31,487 other scientists, including 9,000 Ph.D.'s, who disagree with the so-called consensus you referenced.
MR. WRIGHTSTONE: And if I could address your concerns, we're not going to get to carbon neutrality, I'm going to offer you a suggestion right here that hasn't been considered yet. And I think perhaps Governor Wolf could propose the Pine Creek watershed or Pine Creek Gorge hydroelectric project. Let's turn the Grand Canyon of Pennsylvania into a big hydroelectric project. It's completely carbon dioxide-emission-free. It would provide abundant, reliable, huge amounts of electricity to the State and can replace those coal-fired plants.

So if you're not willing to do that, I mean, we're told we're in a climate change crisis. This is a great solution to provide electricity to the State of Pennsylvania for reliable, abundant energy and electricity. If you're not willing to do something like that, maybe there's really not a crisis because if it is a crisis, we should do things like that.

MAJORITY CHAIRMAN METCALFE: Thank you, gentlemen. Thank you for joining us and making the trip in today. We appreciate it.

Our next testifier is Dr. Irina Marinov, Climate Scientist, University of Pennsylvania. And we have our IT man. And we have also with her Mr. John Walliser, Esquire, Senior Vice President of Legal and Government Affairs, Pennsylvania Environmental Council and DEP Citizens.
Advisory Council.

And we don't have a lot of time to transition here, gentlemen, or gentleman -- at the computer. Well, we can't have silent communications. Are we going to be able to get it up on the screen or not? Not able to get it up on the screen, but we do have the written testimony.

DR. MARINOV: It's here if you can just -- no?

What? It's not working? It's on the screen? Can't we just --

MAJORITY CHAIRMAN METCALFE: We're going to need to start because we're going to be out of time shortly.

DR. MARINOV: I think it's going to work. I think it should work. I think it needs to work.

MAJORITY CHAIRMAN METCALFE: It's probably an effect of CO2.

DR. MARINOV: I can start while he's making this work. Okay.

MAJORITY CHAIRMAN METCALFE: Well, we don't want to have you having an interruption right next to you. I don't think that -- are we almost ready to go there?

DR. MARINOV: This is it. This is it. This is it. This is it. We just need to connect it on the screen. Connection -- um-hum, um-hum, um-hum, um-hum, you're getting there.

MAJORITY CHAIRMAN METCALFE: Maybe we should just
move forward if we can't get it there.

DR. MARINOV: No, no, no.

MAJORITY CHAIRMAN METCALFE: So close but yet so far.

Mr. Walliser, do you need any PowerPoint presentation available?

MR. WALLISER: I do not.

MAJORITY CHAIRMAN METCALFE: Could you start for us while they play around with that if you don't mind?

MR. WALLISER: Okay, sure. I'd be happy to.

MAJORITY CHAIRMAN METCALFE: Thank you, sir.

MR. WALLISER: Yes, absolutely. So, Chairman Metcalfe, Chairman Vitali, Members of the Committee, I want to thank you for inviting me to join this discussion today. My name is John Walliser, and I'm a Vice President with the Pennsylvania Environmental Council, a statewide organization that for nearly 50 years has worked with public and private partners to advance meaningful and collaborative solutions for Pennsylvania. This includes the issues of energy policy and climate change where, over the past several years, we've examined decarbonization of electricity production.

I would like to discuss how Pennsylvania can begin moving toward a net-zero carbon electricity sector. We believe this is essential due to the clear fact that
climate change is already occurring and the cost and consequences will only magnify from inaction.

While climate change is a global issue, Pennsylvania has an essential role to play, and it is in our own best interest to do so. This isn't just the viewpoint of environmental organizations. Interests from the U.S. military to financial institutions to utilities and energy companies themselves understand what is at stake and the need to decarbonize our broader economy.

For example, a Royal Dutch Shell Sky Scenario report identifies pathways to achieve the emission reduction targets of the Paris Agreement calling that agreement a "pragmatic blueprint for resolving one of the toughest issues society faces." And in just the past two weeks collective reports from the Federal Reserve Bank and Goldman Sachs detailed the drastic economic and societal costs of climate change and how those costs will be amplified by failure of action. Now, addressing climate change is a challenging undertaking, but we believe it can be accomplished if we work together.

Earlier this year, PEC issued an energy and climate pathways report, which contains two primary policy recommendations that are based on mechanisms that are proven, in place in neighboring States, generate economic benefits and job growth, advance new technologies and
businesses, and achieve significant emission reductions.

Equally important in Pennsylvania's energy landscape, our recommendations allow multiple resources to be part of the solution.

Our first recommendation is for Pennsylvania to develop a State program that can link with the Regional Greenhouse Gas Initiative, a multistate market-driven platform. Since we've talked about it already, I'll just try to hit some highlights that I'd like to underscore.

With RGGI, each State develops its own program. These programs can then link to the RGGI market platform. RGGI is not an intervening compact, nor does it dictate which plants operate and which ones don't. The platforms design is similar to air pollution control programs, as has been mentioned before, that Pennsylvania has already participated in for decades, an alliance with our restructured market in operation today. It also includes cost safeguards that provide for release of additional allowances if certain predetermined price thresholds are met. This mitigates against higher-than-expected allowance prices.

Almost all of the more than $3 billion in proceeds that have been generated from RGGI auctions has gone back to the States to be used for energy efficiency programs, renewable energy projects, consumer assistance,
and more. In Pennsylvania, in addition to those objectives, we could utilize these revenues for infrastructure resiliency, investment in carbon capture and utilization technologies, assistance to nuclear generation assets, and support for communities and workers facing the transition away from coal generation, a transition that has been happening for some time and will continue to occur, irrespective of our involvement with RGGI.

With respect to how RGGI could impact electricity prices, research has shown that prices in RGGI States have fallen by almost 6 percent, outperforming price levels in non-RGGI States, and modeling performed by multiple researchers has indicated that electricity prices in Pennsylvania could be unaffected or even decrease with our participation.

Now, findings and projections on electricity prices are of course dependent on multiple factors, including use of RGGI auction revenues, commodity prices, and other influences. Without question, utilizing revenue for energy efficiency programs that reduce consumer's bills and overall demand would provide both immediate and long-term cost savings and further reduce emission levels. While it's too early for anyone to definitively declare what effect RGGI might have, there appears to be significant opportunity to make this a win-win scenario for
the Commonwealth.

So, in summary, RGGI is not an untested concept. It is thoughtfully designed to allow flexibility in compliance and to prevent unanticipated price impacts. It has spurred emission reductions while providing for significant economic revenues and consumer benefits in participating States. Careful consideration will be required as to how Pennsylvania designs its program, but the issues to address are not dissimilar to what we have faced in the past and what other States have encountered. It is achievable and the right step for Pennsylvania to take.

Our second recommendation is for Pennsylvania to adopt a clean energy standard that would build on the success of the Alternative Energy Portfolio Standards and to establish an all-in approach to carbon reduction goals. The AEPS requires energy utilities to purchase a set amount of power from specific generation technologies, some of which provide no carbon reductions. What we are proposing is to restructure the AEPS into a clean energy standard that would be centered on emission-based outcomes with an overall goal of achieving net-zero electricity generation in Pennsylvania by 2050. This will allow existing firm generation assets, as well as new technologies as they develop, to participate.
Firm assets are those that are available on demand any time of the year. They are and will continue to be for the foreseeable future a critical part of our generation mix and a necessary complement to variable renewables like wind and solar.

Without question, we must remain committed, though, to preserving and growing the substantial investments made by the renewable energy sector in Pennsylvania under the AEPS. The economic and employment benefits of clean and renewable energy technologies ranging from construction to manufacturing to professional services extended to every corner of our State, urban and rural, and have provided true cost savings to consumers.

The current framework of AEPS extends only to 2021, so it makes sense now to consider how we can improve on this model in a way that works for Pennsylvania. The CES approach is being adopted by a growing number of States and works in tandem with carbon reduction commitments being made by major utilities across the country. In very broad brush strokes, the CES for Pennsylvania could potentially be structured as follows: A redesigned and expanded tier 1 or zero carbon standard that maintains a dedicated allocation for renewables but also allows for other assets like nuclear generation and fossil fuels with carbon capture. As new technologies are developed and deployed,
they, too, can qualify. As part of that CES design, this zero carbon standard or tier would increase over time.

A completely redesigned tier 2 or low-carbon standard that includes any generation source that meets an emissions-per-megawatt-hour threshold. Over time, this standard could either become more stringent or phased out in conjunction with increases in the zero carbon standard and, as has been done in other States, as well as in the current design of the AEPS, allowance for alternative compliance measures that are verified and quantifiable.

This is an all-in technology and generation-inclusive approach that works with Pennsylvania's current portfolio. There are a number of issues to consider, of course, but we believe the CES is a workable strategy for the Commonwealth, and we would welcome the opportunity to work with you on this concept.

Beyond those two primary recommendations, our energy pathways report identifies additional opportunities with respect to carbon capture research and development, community solar, energy storage, and other options that will further drive emission reductions and energy cost savings.

Again, in conclusion, I want to thank you for the opportunity to participate in this important discussion and thank you for having this discussion. We look forward to
working with you on advancing sound energy and climate policies for the Commonwealth.

MAJORITY CHAIRMAN METCALFE: Thank you.

DR. MARINOV: Thank you. So I am an Associate Professor and Climate Scientist at the University of Pennsylvania and a specialist in climate models and analyzing climate data. I'm here today as a scientist and as a teacher, as a resident of west Philadelphia, and as a mother of two young boys to tell you all that I am very concerned. I am concerned about the future of our planet and the future of our children.

I am here today to share not my own work but the opinion of that 97 percent majority of the climate scientist globally and in the U.S. While uncertainties in our science remain and our job as climate scientists is far from over, there are some very clear facts. I'm here to summarize findings from the following reports, as you can see here.

The Fourth National Climate Assessment 2018, which is a climate assessment mandated by the Global Change Research Act of 1990 and includes multiple volumes such as the science volume of 2017 and the impacts risk and assessment and adaptation in the U.S. of 2018, the Intergovernmental Panel of Climate Change reports of 2018, the special report of the global warming of 1.5 degrees
Celsius, as well as the IPCC report of 2013.

These reports represent the peer-reviewed summaries of the scientific literature and, by construction, they represent the conservative estimate of the state of the science. These reports tell us that climate change is real and is happening today, and we can ascribe with high certainty many of the changes we see around us to the addition of greenhouse gases such as CO2 to the atmosphere.

The science for our region is summarized in the National Climate Report of 2018. In summary, we see the following: Pennsylvania has undergone a long-term warming of more than 1 degree Celsius over the past 110 years. Under the business-as-usual and emissions scenario, it is projected that by 2050 Pennsylvania will be about 3 degrees warmer -- 3 Celsius warmer -- than it was at the end of the 20th century. Weather is changing in Pennsylvania starting with an increase in precipitation, more wet months, more frequent heavy rains, increased flooding. The current year is so far the wettest year on record in Philadelphia.

So you have this -- you can see some of the slides in your package. The Northeast in general is projected to experience some of the largest adverse health impacts from climate change, including damages shown here from the 2017 U.S. EPA, including damages from lost labor.
hours and death associated with increases in extreme
temperatures and worsened air quality.

All the major economic sectors of Pennsylvania,
just like more generally in the Northeast, will be affected
by climate change, including energy, water, transportation
infrastructure. Examples include increased energy demand
during summertime and severe negative impact on winter
recreation. Again, as an example, Pennsylvania has
downhill ski and snowboard resorts are not expected to
remain economically viable past midcentury. Also, climate
change will increase stress on Pennsylvania's tidal
wetlands and will worsen the currently substandard water
quality in the tidal freshwater of the Delaware Valley.

The global science is also clear. In summary,
human activities have caused approximately 1 degree Celsius
of global warming above preindustrial levels so far. At
the present rate of CO2 emissions, we will reach 1.5
degrees Celsius by late 2030s.

A few interesting facts: In 2018 alone, there
were 14 weather and climate events during the year that
caused over $1 billion in damages. The four warmest years
since records began in the 1800s have all occurred since
2015. The four warmest years have all occurred since 2015.
Global sea level in 2018 was the highest in the modern
record and continues to rise. We're currently moving
dangerously close to a path where the increasing
temperature by 2100, the red line, will be at 3 degrees to
6 degrees Celsius relative to preindustrial times. This is
worrisome as the science points to even an increase in
temperature of 2 degrees Celsius is very dangerous.

The general expectations under the current
pathway of change is that climate change will cause extreme
weather events like heat waves, heavy rainfalls, floods,
and droughts to become more frequent and more severe.
Under high levels of warming, very intense hurricanes are
expected to occur more frequently, although the total
number of hurricanes is expected to fall.

So can we now necessarily ask does Pennsylvania
matter for the global climate, and does it matter for net-
zero emissions? Pennsylvania is the sixth economy in the
U.S. by GDP. Pennsylvania is the second energy producer
and the fourth CO2 emitter in the U.S. Pennsylvania was
responsible for 4.2 percent of the U.S. energy-related
emissions of CO2 in 2016.

Because the U.S., as you see here of the 2017
numbers, represents 14.6 percent of the total CO2
emissions, this means that, depending on the calculation of
what you include in the CO2 emissions, Pennsylvania
represents .5 to 1 percent of the world's CO2 quota. There
are two calculations, and both are included. That's the
best range I'm coming up with.

Now, this graph shows and the listing of other countries shows that this puts Pennsylvania in the list of the top producers, and it's similar in terms of size CO2 emissions to some mid-sized European countries, maybe similar to central European countries. France is about 1 percent. Italy is about 1 percent. Greece represents .2 percent of the CO2 emissions. So Pennsylvania is at least three times the size of Greece, slightly lower than the net emissions of France.

Additionally, Pennsylvania has a very high CO2 per capita compared to the rest of the world. The global average CO2 emission per capita is 4.8 tons of CO2 per person. Pennsylvania averages 17 tons of CO2 per person. This means that a Pennsylvanian on average pollutes about three times more than the world's average citizen.

One good news for all of us is that the U.S. CO2 emissions have decreased recently as coal has been replaced by natural gas. Natural gas is better than coal in that processing of natural gas combustion produces far less CO2. But let us be clear here. Fracking of natural gas also produces climate change. Taking natural gas out of the ground and combusting it causes climate change. With this in mind, the question for you is how much do you want to lock us into the future by building more plants that will
be around for the next 40 to 50 years?

As we proceed forward, we need to keep in mind that methane is a potent greenhouse gas, warming much more of our planet per unit molecule than CO2. There is discussion in the current literature and debates as to what the precise methane emissions from fracking are, whether the EPA estimates from recent years could be underestimates. Therefore, it is essential that any future Pennsylvania emission goals include also very clear plans for methane.

Because of its large share as an energy producer and a greenhouse gas producer, Pennsylvania can play a large role in reducing U.S. and global emissions. Because of its high CO2 per capita, it has a moral responsibility to do so.

So what does the world need to fix the climate change problem? The cumulative emissions of CO2 determine the long-term state of our climate. The future of the natural and human systems 50 years from now depend on the choices we here make today. The opinion of the climate science community collectively is that the only way forward towards a healthier environment is to deeply decarbonize our economy. We need collective action that is rapid, far-reaching, and unprecedented in terms of scale with transitions and deep emission reductions in energy, land,
urban, infrastructure, and industrial systems.

The goal of the Paris Agreement is to restrict warming to about 1.5 degrees Celsius, which is .5 degrees Celsius warmer than today. To keep warming within 1.5 Celsius we need to achieve CO2 cuts by 45 percent from 2010 levels by 2030, reaching net zero CO2 emissions around 2050.

Importantly, as you see on the right-hand side, gases such as methane on the top, black carbon in the middle, and nitrous oxide on the bottom also need to be cut in parallel with CO2 emissions even though not as aggressively.

I like to argue that Pennsylvania is ideally placed to become a leader in the U.S. in the reduction of greenhouse gas emissions.

My last slide, data from the U.S. Department of Energy -- I have attached for you two tables at the end -- suggest that Pennsylvania energy-related emissions fell drastically from 2005 to 2016. The numbers quoted by the U.S. Department of Energy table 2 are 22.8 percent for this amount. This is above the U.S. drop of 13.4 percent for the same 2005 to 2016 period. I have calculated, and this means that Pennsylvania contributed more than twice its emissions share to the drop in the U.S. CO2 emissions. We have been doing very, very well. In parallel, per capita
energy-related CO2 emissions in Pennsylvania fell by 24 percent, again, much more than the U.S. average.

And finally, here's my wish list for you. These numbers, these very impressive numbers, suggest to me that Pennsylvania can achieve more than the targets proposed by Governor Wolf. Pennsylvania can and should aspire for zero net greenhouse gas emissions by 2050. Pennsylvania needs to join the RGGI program and within the framework of RGGI work towards pushing for much more stringent limits on carbon and methane emissions that have been applied with the RGGI in the Northeast.

Pennsylvania needs to set aggressive quotas for renewables and nuclear energy. Pennsylvania needs a detailed plan for the use of CO2 removal mechanisms, including increased forest surfaces, ecosystem restoration, and energy crops. We want to see this discussion here.

Your jobs are much, much harder than mine, and I do not envy you. How to achieve such a large transition while balancing social well-being, economic prosperity, and environmental protection is an extremely complex juggling act. It is my hope that us, the concerned Pennsylvania citizens and parents, the scientists and academics alike can support you in this transformative time for our planet.

Thank you.

MAJORITY CHAIRMAN METCALFE: Thank you.
Representative Schemel.

REPRESENTATIVE SCHEMEL: Thank you, Mr. Chair.

I guess my question is probably most relevantly directed to Mr. Walliser. It strikes me thankfully -- I don't think this panel needs to determine, you know, what the impact of global warming is or its causes but really rather does RGGI work. And even if it does, is it necessarily the right move for Pennsylvania?

So both of your testimonies sort of fit well into my question. Mr. Walliser, you were talking about RGGI and the observations made from States that adopted it. It strikes me that maybe RGGI is the right move given certain models for some States, but Pennsylvania is an energy net exporter, as the other testifier noted. Wouldn't market-driven forces be preferable to changing our own energy export in Pennsylvania as other States adopt RGGI policies? In other words, other States will adopt RGGI policies, which may make carbon-based energy production less attractive. We are an exporter of that. Our own markets will adjust to producing the kind of energy that other States would seek to consume. So do you see that as a possible player in changing sort of our own energy portfolio?

MR. WALLISER: If I understand your question correctly -- and forgive me if I -- please re-ask if I
don't -- I do think actually Pennsylvania's generation portfolio is suitable for RGGI because RGGI is a market-based platform. The fact that we are a net energy exporter actually means the cost of reducing carbon would be spread not only among Pennsylvanians but would actually be borne by those who we export our electricity to, but Pennsylvania would still receive all the proceeds from participating in the RGGI, so it can actually be a net benefit for us.

MAJORITY CHAIRMAN METCALFE: Thank you. You keep saying market-based, but this is government-mandated when you opt in at RGGI, so it's not really market. It's more like a government-mandated, which isn't necessarily considered market-based. I think everybody -- like you keep trying to sell this and everybody keeps trying to sell it as market-based, market-based. The Secretary did when him and I talked about it. And for most of us and for most of the citizens at large when you hear market-based, it's not something you think as being forced by the government. It's like socialized medicine. You could say, well, it's market-based, but no, the government forces you to use certain doctors.

So, I mean, I think we need to talk with the same definitions of the words we're using because it is government forced, right? I mean, you buy into it. The government mandates that, and the States that are part of
RGGI, they mandate the caps and they allow them to be traded, but the government is the one controlling that, correct?

MR. WALLISER: The government does set the State program, and then it's up to the government whether they want to participate in the RGGI platform or not.

MAJORITY CHAIRMAN METCALFE: Thank you. Thank you.

DR. MARINOV: However, the cap-and-trade program is -- by definition, any economist would say it's a market mechanism the way -- right? Carbon will be traded, which is a market --

MAJORITY CHAIRMAN METCALFE: Well, it's operating in the market, but the market's being controlled by the government, so, typically, Americanism doesn't fit well with fascism or socialism where you have government controlling economies. When it's really market-based, we -- most of us talk about market-based, we talk about freedom in market not government controls of the market.

DR. MARINOV: We are conflating multiple things here. Participation --

MAJORITY CHAIRMAN METCALFE: Right. That's why I'm talking about using the same definitions, exactly.

DR. MARINOV: -- and RGGI would be the actual RGGI mechanism. The second is market-based.
MAJORITY CHAIRMAN METCALFE: Thank you.

Representative Comitta.

REPRESENTATIVE COMITTA: Thank you, Mr. Chairman.

And thank you both for your testimony.

Since Pennsylvania is the U.S.'s fourth largest emitter of CO2, could you underscore and specify a little bit about what is the cost to Pennsylvania if we do nothing to regulate carbon emissions in Pennsylvania, we just go ahead with the status quo, which is we charge and regulate nothing in carbon emissions today? What is the cost to Pennsylvania to not regulate carbon emissions?

DR. MARINOV: So the numbers are in the numbers. I don't have them on a board here. The numbers are in a different document that I cite that you should all have that's publicly available, so I don't know the numbers but in the Pennsylvania climate team assessment update May 2015. However, I can show you here the damages for the Northeast, right, generally, so assuming Pennsylvania goes like the Northeast would. Then the second number in your figure -- you'll have this as figure 1 -- shows the percent decrease in damages that would occur with mitigation as opposed to without mitigation.

So by year 2090, for example, the biggest red dot shows the extreme temperature mortality for the Northeast is projected to be $35 billion. By doing the proposed
mitigations relative to a business-as-usual scenario, those cuts would be 59 percent. So we would avoid 59 percent of the extreme mortality by 2090.

Similarly, among other impacts, 53 percent avoidance of air quality annual damages due to air quality, 15 percent coastal property. This in our case is related to ecosystems on the Delaware, labor of 5.7 percent. So I only have right now -- but these have been calculated for Pennsylvania, too.

MR. WALLISER: I don't have the information in front of me, but I can send it. I would refer you to both the State Climate Change Action Plan, as well as the periodically updated climate impacts assessment that is performed by the State that was mandated by the 2008 Climate Change Act, which is parenthetically sponsored by Representative Ted Erickson in the Senate and Representative Vitali in the House. They actually provide that information, and I'd be happy to send it to you.

MAJORITY CHAIRMAN METCALFE: Thank you. Doctor, in your testimony you referenced a per capita cost for CO2 when you were talking. And in the calculation of per capita costs for each individual for CO2, does that calculation include the individual's CO2 just coming from them breathing and their life? Does it include the types of -- or what their diet might consist of if they enjoy a
lot of meat in their diet?

I mean, we've got the Mayor of New York that started this meatless Mondays with his attack on global warming and stop schoolchildren from eating meat on Mondays to try and reduce the reliance on beef and cattle. You have Bernie Sanders who, answering a question, talked about how he believes we should have population controls in place because of the CO2 emitted by individual people.

Does that calculation per capita just include CO2 from energy production, or does it include the CO2 for those individuals also in including extrapolating out what those individuals consume in their diets?

DR. MARINOV: So the numbers that I showed you are -- you can also find them in your -- in table 6 that I have attached, which is a table from the energy-related carbon dioxide emissions by State released in February 2019. This is U.S. Energy Information Administration. The number includes per capita energy-related carbon dioxide emissions by State 2005 to 2016, so, no, it doesn't include those factors that you're talking about.

MAJORITY CHAIRMAN METCALFE: So it just includes the --

DR. MARINOV: Per capita energy-related --

MAJORITY CHAIRMAN METCALFE: Energy-related, great.
MAJORITY CHAIRMAN METCALFE: Thank you. And you mentioned China in one of your diagrams and the percentage that they're actually contributing to CO2 from energy production. I would assume that would just be energy production also. But with them --

DR. MARINOV: This is the total carbon emissions in China is number one as of 2006, right? Yes.

MAJORITY CHAIRMAN METCALFE: So with China on the move to create more coal-powered fire plants along with, I believe, India, other countries that aren't necessarily buying into this or believing they should play a part in it because they're trying to raise the level of wealth in their countries, they're trying to raise their people out of poverty, as we've seen done in the United States with our creation of more and more energy because there's a direct correlation.

Both of you as individuals with who you're representing and the work that you're representing here, how do you balance your call for the United States to go to zero CO2 emissions for energy production when China and India are not going to pay attention to it? I mean, if we did go to zero, we wouldn't offset all of what they're going to create and increase.

DR. MARINOV: Actually, both of these have signed
the Paris Agreement, and the call of the international community is for all countries to apply this reduction and going to zero net CO2 emissions by 2050.

MAJORITY CHAIRMAN METCALFE: So is China abiding by it, though? I mean, China is creating more coal-fired power plants, so how are they -- they're signing onto an agreement but not abiding by it, correct?

DR. MARINOV: Correct.

MAJORITY CHAIRMAN METCALFE: Mr. Walliser.

MR. WALLISER: I would just add that we can't control what China does, nor can I predict what China is going to do. Our focus is on what we can do here and --

MAJORITY CHAIRMAN METCALFE: Would you believe --

MR. WALLISER: -- that's better because every day that goes by that we don't act, we make the impacts worse.

MAJORITY CHAIRMAN METCALFE: But you believe that citizens of the United States of America should make sacrifices and increase energy costs that won't ultimately have an impact on the whole because of what China and India are going to choose to do with their own CO2 emissions?

MR. WALLISER: I would argue that --

MAJORITY CHAIRMAN METCALFE: We should just reduce ours even though they're going to increase theirs?

MR. WALLISER: I would argue that it does make a significant impact. We don't know if it's going to
increase costs or not. In fact, a lot of studies point that it actually could decrease costs. And we're talking about investment in the types of technologies that we're going to need in the decades to come, whether those be clean or renewable.

MAJORITY CHAIRMAN METCALFE: Thank you. Final question from Representative Dush.

REPRESENTATIVE DUSH: Thank you, Chairman.

Dr. Marinov, you said the Philadelphia airport was going to be underwater. It sounds remarkably like the predictions back in 1998 that Manhattan was going to be underwater by 2013. Here we are in 2019, and it's interesting that Lloyd's of London and others actually ensured and people constructed the replacement to the World Trade Center in New York City in spite of those alarmist predictions.

I want to go to the Climategate scandal where scientists were threatened with punishment or were punished for not falling in line with the IPCC. The University of East Anglia, the emails broke and it went worldwide, Germany, United States, Australia, Great Britain. Those scientists were openly talking within those emails about the threats for not falling in line. How does that impact the -- because it obviously impacted those scientists who were discussing it. How does that impact how the debate is
actually framed? Because it appears with the way they were
talking that if they didn't publicly fall in line, they
were threatened with cuts. And they had some skeptical
scientists at that time.

DR. MARINOV: I'm just going to respond by saying
that the -- you referred at some point to a figure by
Professor Mann, and that figure by Professor Mann is one of
the summary figures of the Fourth -- I'm just going to put
my first picture of my references. That figure is one of
the summary figures, and you can find it also in the
frequently asked questions of the Fourth National Climate
Assessment report, which is a summary which was presented
to us at the end of 2018. And it represents basically the
entire U.S. community led by DOE, NASA, all the government,
NOAA importantly. All the major government agencies and
scientists had an input on this.

This, just like the IPCC reports, is a statement
that is a peer-reviewed statement. By peer-review I mean
that, just as one example, every chapter of the IPCC report
2013 it has multiple, multiple chapters. Every single
chapter -- I know particularly about the ocean chapter that
I know more in details about. The ocean chapter had, for
example, 10,000 comments by scientists. And the IPCC
report by the specific working groups have to go through
every single one of those reports.
This is the most challenging, absolutely challenging publication. These are the most challenging publications that anybody in the history of science has ever put together, by definition, they are -- by construction because they include thousands of hours, thousands of people. They are extremely conservative.

And I'm not going to comment -- I don't even know too much about the scandal. I just know the science and the sciences here, so --

REPRESENTATIVE DUSH: Mr. Chairman --
DR. MARINOV: -- I can show you the figures that I refer to in this, and --
REPRESENTATIVE DUSH: After the end, I'd like a follow-up if we have time, Mr. Chairman.

MAJORITY CHAIRMAN METCALFE: Thank you, Representative Dush.

Thank you both for joining us today. I appreciate you traveling here today to be with us. Thank you.

Our next testifier is Mr. Marc Morano, Communications Director for the Committee for a Constructive Tomorrow and Founder, Climate Depot.

MR. MORANO: I have a PowerPoint if that's ready.

MAJORITY CHAIRMAN METCALFE: And he has a
PowerPoint also. We'll see if it can get --

MR. MORANO: They said it was preloaded.

MR. CARUSO: Okay. Let me get it for you.

MAJORITY CHAIRMAN METCALFE: Griffin will try and take care of that for you.

MR. MORANO: Well, if I have chance, my name is Marc Morano. I'm the author of the Politically Incorrect Guide to Climate Change and the publisher of CFACT Climate Depot. And just before I get started here with my presentation, I just wanted to say the previous speaker from the University of Pennsylvania was talking about the IPCC as though it's some sort of sacred scientific institution. This was an organization that has been accurately called a political body masquerading as a science institution. In fact, the Chairman of the IPCC Rajendra Pachauri actually wrote on the day of his resignation a few years back that "global warming is my religion," unquote. And this was the head of this alleged scientific panel.

And people like to say, well, it won a Nobel Prize. It won a Nobel Prize in peace. And the United Nations -- it's a campaign cause that they get it to set up the problem, say CO2 is a danger, and they get to do the solution. They have no incentive to go against that. And in my book I feature and in my research all these
scientists who say they'd sit around meetings saying, "We'll make the next report so alarming, the world will have to act." We have quotes from a top U.N. official saying exactly that years in advance of a report. It's a lobbying campaign organization.

And one other reference, the previous speaker mentioned the National Climate Assessment as though it's some esteemed scientific report. It was written by Andrew Light, Obama's former United Nations Paris investigator and the two lead authors were Union of Concerned Scientists left-wing activists Katherine Hayhoe and Don Wuebbles. In other words, if it read like a release from the Sierra Club or Greenpeace, that's because it was essentially written as one. And sadly, the Trump Administration, for fear of not wanting to look censorship, allowed this report to come out last year. But it's far from any kind of scientific report that you'd want to cite for non-bias.

So this is Marc Morano. The cap-and-trade carbon tax reality I would like to talk to you about today. CO2 is not the control knob of the climate. Now, I'm not a scientist, but have a background in political science, which is actually the perfect background to examine global warming claims and alleged solutions.

This is one of my favorite quotes I think for the layperson. "Climate change is governed by hundreds of
factors or variables. The idea we can manage it by
understanding and manipulating at the margins one
politically selected factor is as misguided as it gets."
This is from U.K. scientist Philip Stott. And he goes on
to say it's "scientific nonsense." And that unfortunately
is what the great State of Pennsylvania is now getting
involved in is scientific nonsense when it comes to the
RGGI program.

This is another scientist, prestigious scientist
Hendrik Tennekes, "I reject vigorously the idea that the
climate reacts like a home heating system to a changed
setting of the thermostat. Just turn the dial and the
desired temperature will be reached."

When we have these scientists come forward and we
have the activists forward, they act as though that we can
just, oh, we'll pass this and then this will happen to the
Earth. It doesn't work that way.

Governor Wolf, your Governor, on KDKA said the
Governor pointed out the recent weather is reason for us to
get involved in his executive order in the RGGI. Two
thousand eight was Pennsylvania's wettest year on record,
the storms that came brought pounding rain causing floods
in communities of all sizes. Well, it sounds like we need
to do something in Pennsylvania about emissions because the
floods are bad.
But wait a minute. Pennsylvania is -- you can't even measure it in terms on the surface of the Earth in terms of its size, but if you look at the global -- and if you quote the IPCC, the U.N. panel, floods are not increasing, flood disasters are sharply down. In fact, on every metric of extreme weather according to the peer-reviewed scientific literature and even acknowledged -- buried, of course -- in the United Nations reports is the fact that extreme weather is not bad.

In fact, in my written testimony I link to multiple testimony on floods globally showing no climate signal. So for the Governor to use one year in Pennsylvania or one flood as some kind of evidence of climate change goes against peer-reviewed science and even the vaunted United Nations, which so many of the speakers in favor of the Governor cited.

But I can understand why the Governor is confused because rain used to be caused by global cooling. Now, it's caused by global warming. Back when TIME magazine and the other scientists were hyping a coming Ice Age in the 1970s, guess what they used to say we needed to act on climate? Flooding, just like Governor Wolf today.

Carbon taxes, cap-and-trade, what Governor Wolf is going for here, the 2000 New York Times had said that a carbon tax brings about climate stability. Well, that's
pretty good. Climate stability in The New York Times. The problem is in 1976, some 35 years ago, The New York Times claimed that cool periods produce climate instability. So right now the carbon tax cap-and-trade is trying to lower the temperature to produce climate stability, but back in the 1970s, The New York Times was claiming that cool temperatures caused instability. They can't get their deal straight.

Even if you accept all the claims of the United Nations, of all the environmental activists here, the Green New Deal, which is obviously national in scope and not Pennsylvania, would not even have a measurable impact on temperature. This also includes the United Nations Paris Agreement using the U.N.'s own climate models.

The U.N., RGGI, it cannot control the climate. I know you had a speaker here for the University of Pennsylvania. Well, let me introduce you to Robert Giegengack. He is the emeritus professor now but he has 200 peer-reviewed studies, been on almost every continent studying the climate, a geologist at University of Pennsylvania, a chair of the department. None of the strategies that have been offered by the U.S. Government or the EPA -- and I may add Pennsylvania -- or anybody else has the remotest chance of altering the climate if it in fact is controlled by carbon dioxide.
But no wonder Governor Wolf is confused because the climate debate can be very confusing. And it's actually the climate advocates that are the ones confused. We heard all sorts of scary predictions about the future and storms that are going to happen. Well, let's take a look here how the settled climate science is. Climate change causes less rain according to a study in the journal *Nature*. But it also causes more rain but less water.

Climate change causes less snow according to an IPCC U.N. scientist, but it also means more snow. They changed that when we had record snow here on the East Coast within a couple years of -- after 2010, that decade became the snowiest on decade, and then suddenly everyone started talking about did we say less snow? No, climate change causes Antarctica to gain ice.

These are multiple studies predicting the opposite. Climate change causes duller autumn leaves; climate change causes more colorful autumn leaves. Climate change makes for saltier seas; climate change makes for less salty seas. Climate change increases the spread of malaria, but it also decreases the spread of malaria. Dengue fever outbreaks will increase with climate change, but it could also decrease with climate change. The U.S. will see more lightning strikes thanks to global warming, but actually lightning strikes could drop thanks to global
warming. San Francisco will get foggier summers, San Francisco will get more fog, San Francisco will get less fog all due to climate change. Hurricanes will increase due to climate change; hurricanes will be less according to climate change, opposite predictions. No wonder Governor Wolf is confused.

Energy Analyst Mark Mathis from the Clear Energy Alliance has said fossil fuels -- or get people to use less of them by making everything more expensive and giving money back through inefficient government programs, read RGGI, is a flawed premise from start to finish. What you need to know is carbon taxes, cap-and-trade, all these emission trading schemes actually end up raising the cost of energy ultimately, and this is the problem that people who have to pay higher energy, cold kills. Study after study shows it's not the heat waves. People die more in cold weather, and you want a cheap, abundant, available energy. Two thousand nine, Bureau of Economic Research, mortality peaks in the winter, and you don't want to make people pay more for home heating in the winter when they need it most.

Carbon tax also, cap-and-trade schemes increase global CO2 emissions. National Economics Report, adding carbon taxes in the West raise global emissions by offshoring it. We talked a lot about China, and I was
actually quite pleased with the previous two climate
activists' testimony admitting that China is going to do
what it wants. All we're doing in the U.S. is hamstringing
ourselves to China, India, the developed world, which does
not have the same environmental regulations we do, can
explode.

America's future, right now we're being told to
look to Europe. We heard comparisons about Pennsylvania
with other European countries. In Europe, the U.K. right
now, families have been warned that they have to get used
to power only when it's available. This is what the future
holds when you have government coming in. Europe is much
further advanced with these cap-and-trade carbon tax ideas
and emissions standards so to speak that the Governor's
executive order addressed. We're going to have to get used
to having power only when it's available rather than
constantly.

So my advice to Pennsylvanians is this: Keep
fossil fuels in the ground is not the advice. The idea is
keep RGGI's cap-and-trade carbon taxes in the ground. Keep
the executive order demanding renewable clean energy
portfolios in the ground. Permanently bury this regulation
because here's the bottom line. We heard multiple people
here testify today about solar energy and how it was
allegedly -- and wind, how it was going to allow so many
more jobs. I think Patrick McDonnell from your environment
department said one-third of the jobs are coming from clean
energy, twice the number of workers as the fossil fuel --
wow, it just sounds a clean energy is such a winner.

But wait a minute. According to the U.S. Energy
Information Agency, only 14.2 percent of the electricity
sold to Pennsylvania's retail customers was generated by
so-called clean energy. So, in other words, you have less
fossil fuel workers producing much more energy. And this
is true nationally. A 2017 AEI study found 79 solar
workers it takes to produce the same amount of electric
power as one coal worker.

I would argue in my closing here that
Pennsylvania should continue to be the leader when it comes
to energy. You don't want to be influenced by New York, by
Massachusetts. New York has banned fracking.

Pennsylvania's fracking boom has helped the United States
come up and actually lead all the European signatories in
terms of cutting CO2 emissions. Fracking, technological
innovation is what we want, not heavy-handed government.

And I'll close with what Chris Christie has said
when he pulled out of the State's RGGI many years ago when
he was Governor of New Jersey. He called RGGI "a failure
that does nothing more than tax electricity, tax our
citizens, tax our businesses with no discernible or
measurable impact upon the environment." And there's a Governor who actually went through it and was wise enough to pull out.

So with that, I guess my time is up, and I will take any questions that you have.

MAJORITY CHAIRMAN METCALFE: Thank you.

Representative Vitali.

DEMOCRATIC CHAIRMAN VITALI: I was just going to ask you a question. So Pope Francis in his encyclical letter said there's an urgent need to develop policies so that in the next few years the emissions of carbon dioxide and other highly polluting gases can be drastically reduced, for example, substituting fossil fuels and developing sources of renewable energy.

And the U.S. Conference of Catholic Bishops said that they stand united in the Holy Father in his call to protect creation. Do you think the Pope has been duped here?

MR. MORANO: I actually -- great question, and thank you. I actually attended the Vatican climate summit in 2015 where the Pope what I called an unholy alliance with the United Nations. Pope Francis -- I'm a Catholic. Pope Francis brought in individuals who were in direct opposition to Catholic teaching, and they came in basically supporting abortion, population planning, fertility
management in the words of Al Gore. And Pope Francis
aligned himself with extreme end of the climate movement,
including people like Naomi Klein, including Jeffrey Sachs.

So yes, I think Pope Francis is horribly misled.
I think the problem with Pope Francis not only the unholy
alliance, but he likes the solutions of climate change. So
if you look at his encyclical, which I've done a whole
report on a few years back on my website Climate Depot,
Pope Francis actually spends about lesson 2 percent on the
science because he comes from a poverty perspective in
Latin America. He essentially likes socialism, so he likes
the idea of a United Nations central planning coming in and
doing it. He doesn't really spend much time on the
science.

DEMOCRATIC CHAIRMAN VITALI: And just to be
clear, you're not a scientist; you're a congressional
staffer or formal congressional staffer?

MR. MORANO: A former -- absolutely, yes.

DEMOCRATIC CHAIRMAN VITALI: Thank you.

MR. MORANO: I like to say not a scientist, but I
play one on TV sometimes because my background, again, is
investigative journalism, and that's what the background of
my book is. And I interview and deal with scientists on a
daily basis.

MAJORITY CHAIRMAN METCALFE: Representative
MR. MORANO: It's a joke, by the way, that I play
one on TV.

MAJORITY CHAIRMAN METCALFE: Can you shut your
microphone off there, Representative Vitali? Thank you.
And I appreciated the headline that you were
showing with all the contradictions out of the --

MR. MORANO: Yes.

MAJORITY CHAIRMAN METCALFE: -- out of the --

MR. MORANO: It's settled science.

MAJORITY CHAIRMAN METCALFE: Right. Kind of all
of the fear mongering climate change crowd. I mean, I
think the majority of people do believe climate change
happens. It's called weather. I mean, that's why we get
up in the morning and we watch the weather for the day. I
mean, that's why I decide I'm wearing a jacket today
because I'm believing the weather is going to change today,
and I know it's going to change in a couple weeks and I'm
going to pull my winter coat out again.

MR. MORANO: Yes.

MAJORITY CHAIRMAN METCALFE: So I think the
majority of us are not deniers of climate change. We
believe the climate changes. We believe the weather
changes. But all of this fear mongering -- and as I've
been here in the Legislature, I remember back to those days
of being in elementary school in the '60s and '70s, and in
the '70s the coming Ice Age. I remember some of the --

MR. MORANO: Yes.

MAJORITY CHAIRMAN METCALFE: -- I don't know, cartoons or what it was. I forget how they were trying to market it to some of the young people at that time, but I remember being struck as a child by that thinking, oh, wow, there's an Ice Age coming? And it just seemed like science fiction the way it was presented at the time, as some of this does. I mean, if you watch a good science fiction movie, you'll watch some of the same things being said with the media rights that are heading for the Earth and going to destroy the whole Earth all of a sudden is what you're hearing coming out of some of these people that are claiming that, you know, the sky is falling, the sky is falling, like Chicken Little did.

But I appreciate your putting those headlines up because I think showing the contradiction amongst their own crowd -- and they're so quick to change those and to move on to a new prophecy, to a new fallacy to try and fool the public. I mean, and you went through them very fast. I don't know, for anybody watching the hearing, if they caught what you were doing, but it wasn't you claiming these things --

MR. MORANO: No, these were --
MAJORITY CHAIRMAN METCALFE: -- because you were showing headlines from some of these noted groups or individuals that were advocating that we have some, you know, huge crisis on the horizon that we have to deal with, whether it's global warming or a coming Ice Age.

MR. MORANO: It's an amazing thing because they can predict both outcomes. If you're betting on the Super Bowl and you bet both sides to win, you can go to the office the next day and say, hey, I predicted it. And what they've done here is over and over again on almost every issue with the climate debate they claim all these different scenarios, so no matter what happens, they have that basis.

But, interestingly enough, when the United Nations comes forward with all these, you know, outlandish predictions from their summary report -- the underlying reports the U.N. are actually sometimes very good and actually quote all the extreme weather. But it's all done as a lobbying campaign. And Al Gore was on I think it was CNN not too long ago and he said of course the IPCC reports are, quote "torqued up." That was his word.

This is a lobbying organization, and this is how they end up coming up with all of these scenarios, and this is why someone referenced the Climategate scandal earlier. This is why they were internally suppressing any scientist
who disagreed, threatening journal editors and telling them that if you publish this guy's work who dissents from our essentially campaign narrative, your career will be over.

But my main message is don't fall into this trap, Pennsylvania, because there's nothing that you can do to the climate. All you can do is ruin your State as one of the greatest energy successes in America through the fracking boom, and you can teach New York. New York has nothing to teach you about energy.

Majority Chairman Metcalfe: I agree that New York has nothing to teach us regarding energy. They just need to let our pipeline across so we don't have to see Russian gas brought in and sold to the folks of Massachusetts because we can't get our gas up there through Representative Fritz's area.

Representative Schemel.

Representative Schemel: Thank you. Mr. Morano, I'll ask you the same question I asked one of the last panelists. This time, you know, I think I'll try to be a little clearer. Since we're an exporter of energy, we export a product. The product is purchased by those who want the product. As other States adopt RGGI, the product that they are wanting to consume is one that meets other, you know, certain climate standards that they've contrived. Do we believe that the free marketplace, not the contrived
marketplace but the free marketplace will, therefore, you
know, really bring about the changes that maybe some of the
same individuals would seek here in Pennsylvania as our
energy producers adopt to produce the product that other
States are working? In other words, can Pennsylvania,
without adopting RGGI, end up with an energy portfolio that
more closely aligns with those of States which do just by
the nature of the fact that we are an energy exporter?

MR. MORANO: You don't need RGGI to adopt your
own internal policies of what you would like to see. But
the main thing here you need to understand is just because
Massachusetts and New York and Vermont are following some
dictate trying to get more and more solar and bragging
about how many solar workers or wind workers they have,
look at the end result in terms of energy export and in
terms of what your energy is producing. Fossil fuels are
actually powering so much of the energy economy, and a
fossil fuel worker is much more efficient. So you don't
need essentially what's a fakely called free market cap-
and-trade emissions standard. We reject it.

I worked in the United States Senate for the
Environment and Public Works Committee, and we had multiple
votes on this. It got to the point where even the
Democrats, Harry Reid realized that cap-and-trade was dead
by 2010, wouldn't even bring it up for a vote. And the
reason was I think it was nine Democratic Senators, including people like -- what's the Minnesota guy that just had to resign, Minnesota Senator -- Al Franken and others who you wouldn't expect signed a letter saying they would not support it because of the negative impacts on their States. So you don't need some RGGI program in order to, you know, have a prosperous and healthy and vibrant Pennsylvania.

And I want to make very clear I'm not against -- I don't think any of the speakers are against solar and wind power. They're fantastic if they can get their act together. What we are against are these executive orders like your Governor Wolf has done mandating certain percentages of so-called renewable energy by certain dates. What happens then is you end up banning energy that works in favor of mandating energy that's not ready. In other words, in my book I actually say when you can go to Walmart and buy a solar panel, put it on your roof, get off the grid, that's the day. If solar and wind are so moneymaking and all these entrepreneurs are out there like Al Gore claims, why don't they go out there and make the money and go out there and compete with fossil fuels?

You don't need to ban energy that works to mandate energy that's not ready and that is incredibly inefficient, as your own, you know, economics guy said. I
can't believe your EPA head actually is touting the jobs of renewable when, you know, fossil fuel workers are so much more productive, efficient, and benefit the State of Pennsylvania with much less employment.

And the idea is you don't want government make-work. That's essentially what you're describing when you brag about how many employees are in one sector, but you don't talk about how much energy they produce. There's something missing from that picture. And the media, any media here should not let Pennsylvania's EPA get away with such ridiculous claims.

MAJORITY CHAIRMAN METCALFE: Thank you.

Representative Comitta.

REPRESENTATIVE COMITTA: Thank you, Mr. Chairman.

And, Mr. Morano, thank you for a very entertaining and lively presentation --

MR. MORANO: Thank you.

REPRESENTATIVE COMITTA: -- and also for underscoring you're not a scientist. These are your opinions, and you did present pro and con and different, you know -- and so I get that. And can I just say I wish, I so wish that what you and each of the presenters today who deny that a climate crisis is happening, I wish you were right. As I've said before, I cannot bet my children's, my granddaughters', and all of our children's
future on 3 percent of the scientists and others like
yourself who don't believe what 97 percent of the
scientists in our country and the world have studied at
length.

And it was pointed out earlier that I am an
environmental champion, and I'm proud of that. And I'm a
champion of our children, our farmers, all of our
businesses. And I'm not anti-fossil fuels either. I'm
pro-carbon capture, but -- so it's clear where my, let's
say, loyalties lie is with our people and with a healthy
future for our children.

So from your perspective and in your world who
considers you a champion? Who are you fighting for?

MR. MORANO: I'm fighting for a rational energy
policy. And I have good news for you, a couple things.
First of all, the 97 percent, as was previously mentioned,
was pulled from thin air according to United Nations lead
author Dr. Richard Tol. So even the United Nations lead
author admits it was pulled from thin air. And multiple
studies, including by Dr. David Legates --

( Disturbance in hearing room. )

MAJORITY CHAIRMAN METCALFE: Excuse me. The
audience is not allowed --
MR. MORANO: Yes.

MAJORITY CHAIRMAN METCALFE: -- to interject when we have a testifier presenting. It's rude, unprofessional behavior, and you'll be removed from this room if it happens again.

MR. MORANO: Yes, and they're right. One of the protesters said there were multiple studies. I have a whole chapter in my book detailing the multiple studies. In the words of Lord Monckton from U.K., it was the talking point of 97 percent long before -- in fact, Al Gore in the '80s was claiming the science was settled and all scientists agreed. And it was a dopey -- a couple dopey studies came out that were easily debunked and they're embarrassing.

But here's the good news: You don't have to agree with -- you know, you don't have to worry if we're facing a catastrophe. In other words, us so-called climate deniers or some here today tried to compare us to Holocaust deniers, even if we faced a climate catastrophe, all of your solutions, the United Nations Paris treaty, the Green New Deal, the Pennsylvania's participation in RGGI or the Governor's executive order would have no impact on the climate if in fact we faced a climate catastrophe. So, in other words, if we actually faced one, which thank God we don't, we'd all be doomed if we had to rely on all these
solutions.

I will finally say this. If we actually faced a climate crisis, the last thing we would want to do is saddle ourselves with the United Nations' regulations, socialist-leaning Green New Deal proposals. You would actually want a free market, a vibrant energy economy to deal with solutions and to come forward and do it, the exact opposite of the way that you guys are doing it. In fact, the United Nations has admitted that their climate policies are not -- Dr. Otto Edenhofer, a Vice Chair of the IPCC said we will redistribute wealth by climate policy. This isn't even environmental policy anymore. And that's the same -- the architects of the Green New Deal said it's not a climate or energy thing. It's a change-the-economy kind of thing.

So we know that if we faced it, your solutions that you advocate would have no impact on the climate and would actually hinder us in the actual case if we actually did face a climate catastrophe because it would hamstring American innovation, competitiveness, and economic energy production.

MAJORITY CHAIRMAN METCALFE: Thank you, sir, for your testimony today, and thank you to all of our testifiers and to the Committee today for bearing with a longer hearing than normal.
MR. MORANO: Thank you.

MAJORITY CHAIRMAN METCALFE: Two hours is usually just the right time. Three hours is -- actually, we could've used more time because I think Dr. Legates had a dissertation that I would have enjoyed hearing more on, some more details of that.

So I appreciate all of our testifiers. Some of you spoke very fast to try and get the information in. I wish we would've had more time for all of you to have more Q&A and more time, but that's the way the schedule dictates at times. This room we have to give up at 11:30. That's why we started at 8:00 this morning because we could get in a little ahead of the clock instead of on the backend.

So thank you all. I do look forward to further debate on this. I've been hearing from some constituents on the issue over time. There's a lot of surveys that get talked about. But I think a lot of folks don't consider government mandates to be market-based initiatives. And a lot of folks see through the attempt to take more out of their pockets as consumers and more out of the pockets of companies when the Governor is not able to get his $4.5 billion severance tax increase. A lot of folks see through this as just another way for the Governor to try and extract, extract more out of the pockets of the hard-working people of Pennsylvania.
So we'll continue the debate, look forward to it.

Motion to adjourn by Representative Fritz,

seconded by Representative Vitali.

(The hearing concluded at 11:18 a.m.)
I hereby certify that the foregoing proceedings
are a true and accurate transcription produced from audio
on the said proceedings and that this is a correct
transcript of the same.

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