
Committee Meeting

of

SENATE ENVIRONMENT AND ENERGY COMMITTEE

ASSEMBLY ENVIRONMENT AND SOLID WASTE COMMITTEE

“The Committees will meet to hear testimony from invited experts and the public on the latest developments in climate science and the potential impacts of climate change in New Jersey”

LOCATION: Lavallette Municipal Building
Lavallette, New Jersey

DATE: August 10, 2017
10:00 a.m.

MEMBERS OF COMMITTEES PRESENT:

Senator Bob Smith, Chair
Senator Linda R. Greenstein, Vice Chair
Senator Samuel D. Thompson

Assemblyman Tim Eustace, Chair
Assemblyman Robert J. Karabinchak
Assemblyman John S. Wisniewski
Assemblyman Kevin J. Rooney



ALSO PRESENT:

Judith L. Horowitz
Matthew H. Peterson
*Office of Legislative Services
Committee Aides*

Kevil Duhon
Alison Accettola
*Senate Majority
Brian Quigley
Assembly Majority
Committee Aides*

Rebecca Panitch
*Senate Republican
Lauren Longfield
Assembly Republican
Committee Aides*

***Meeting Recorded and Transcribed by
The Office of Legislative Services, Public Information Office,
Hearing Unit, State House Annex, PO 068, Trenton, New Jersey***



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LINDA R. GREENSTEIN
Vice-Chairwoman

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New Jersey State Legislature

SENATE ENVIRONMENT
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STATE HOUSE ANNEX
PO BOX 068
TRENTON NJ 08625-0068

COMMITTEE NOTICE

TO: MEMBERS OF THE SENATE ENVIRONMENT AND ENERGY COMMITTEE

FROM: SENATOR BOB SMITH, CHAIRMAN

SUBJECT: COMMITTEE MEETING - AUGUST 10, 2017

The public may address comments and questions to Judith L. Horowitz or Matthew H. Peterson, Committee Aides, or make bill status and scheduling inquiries to Pamela Petrone, Secretary, at (609)847-3855, fax (609)292-0561, or e-mail: OLSAide.SEN@njleg.org. Written and electronic comments, questions and testimony submitted to the committee by the public, as well as recordings and transcripts, if any, of oral testimony, are government records and will be available to the public upon request.

The Senate Environment and Energy Committee and the Assembly Environment and Solid Waste Committee will meet jointly on Thursday, August 10, 2017 at 10:00 AM at the Lavallette Municipal Building, 1306 Grand Central Avenue, Lavallette, New Jersey.

The committees will meet to hear testimony from invited experts and the public on the latest developments in climate science and the potential impacts of climate change in New Jersey.

Issued 8/3/17

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FROM: ASSEMBLYMAN TIM EUSTACE, CHAIR

SUBJECT: COMMITTEE MEETING - AUGUST 10, 2017

The public may address comments and questions to Carrie Anne Calvo-Hahn, Committee Aide, or make bill status and scheduling inquiries to Christine L. Hamilton, Secretary, at (609)847-3855, fax (609)292-0561, or e-mail: OLSAideAEN@njleg.org. Written and electronic comments, questions and testimony submitted to the committee by the public, as well as recordings and transcripts, if any, of oral testimony, are government records and will be available to the public upon request.

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SENATOR BOB SMITH (Chair): Would everyone take a seat?

We are thrilled to be in one of the prettiest places in New Jersey -- Lavallette, New Jersey.

We have the Mayor of Lavallette, Mayor Walter LaCicero, here.

Mayor, would you like to come up and give us a welcome to Lavallette?

MAYOR WALTER G. LeCICERO, Esq.: (off mike) I thank you, Mr. Chairman, and I welcome the Committees to the Borough of Lavallette -- our new Borough Hall here that we built post-Sandy.

We appreciate you coming down, affording us the opportunity to highlight not only what we've done here, post-Sandy, but the Jersey Shore in general. And you certainly picked a perfect day to be here. I think it couldn't get any better outside.

I want to extend an invitation to the Committee to, again, use the facility anytime that you see fit in the future.

And I want to thank you, on behalf of the Council and the residents of the Borough of Lavallette, for the work that you put in. I know these environmental issues are very difficult to deal with -- a lot of proposals have a huge impact on the communities. Our residents are particularly sensitive to those issues, due to the fact that we have the Bay here and the Atlantic Ocean on the other side of us. We are hugely impacted by events that occur in the middle of the state because of the runoff that eventually ends up here in our Barnegat Bay. We trust that you will do what's in the

best interest of our residents here, as well as the residents of the State of New Jersey.

I'm not going to hold you up any more. I want you to get out there and enjoy this beautiful day; see our beach, see our waters.

Thank you for coming.

SENATOR SMITH: Thank you, Mayor.

ASSEMBLYMAN TIM EUSTACE (Chair): Thank you, Mayor. (applause)

SENATOR SMITH: And let me recognize the presence of the Council President, Anita Zalom, in the back.

COUNCILWOMAN ANITA F. ZALOM: (off mike)
Hi; nice to be here.

SENATOR SMITH: Anita, give everybody a wave.

COUNCILWOMAN ZALOM: I'm enjoying it very much.

SENATOR SMITH: And then, let me mention one other thing about Lavallette. Lavallette, I believe, still has, as its Business Administrator, former Senator John Bennett--

MAYOR LeCICERO: (off mike) That is correct.

SENATOR SMITH: --who is one of the great environmental leaders of our Legislature in the last 25 years. So I'm sure that he gets his licks in there and influences policies. But you're very lucky to have him.

MAYOR LeCICERO: He sends his regrets for not being able to attend today's meeting. We gave him one day off this week. (laughter)

SENATOR SMITH: That's good.

MAYOR LeCICERO: He picked the right one.

SENATOR SMITH: Thank you, Mayor.

A couple of ground rules: Chairman Eustace and I have invited four experts to provide policy guidance. You know, we've had five years -- five years? Is it five years, already, with Sandy? We've had--

UNIDENTIFIED MEMBER OF COMMITTEE: Five, and (indiscernible).

SENATOR SMITH: We've had five, and maybe more; and all the misery you can handle from Superstorm Sandy. If there are any global climate deniers in the room, shame on you, you know? (laughter) Something is missing up there, and it's accelerating; and the people in New Jersey are at terrible risk. So we have these four super experts; people who have been studying the problem, especially as it impacts New Jersey.

The Chairman and I will ask them to come forward and give their testimony; and then anyone else who wants to testify -- if you haven't done a legislative hearing, you need to turn in a slip (indicates), where you identify yourself and your organization. And just make sure you get it over to our staff here, and we'll try to recognize you. However, we do have time limits. We will stop the hearing at 12:30, because other business has to go on today.

So we'll probably get a whole bunch of the non-invited witnesses to speak. But when we get to 12:30, and we say, "The clock has stopped," it's not personal, all right? There's other business that has to be done today.

I have a few members on their way; Jersey Shore traffic. (laughter) Senator Sam Thompson is on his way; I believe Senator Linda Greenstein is on her way; and we're hoping -- we believe that Senator Codey will not make it today, but on the Republican side of the aisle we're

hoping that Senator Kip Bateman makes it. He was coming back from Maine; it all depends on when he gets back in town.

Let me turn the meeting over to Chairman Eustace, who may want to introduce his members and say a couple of opening comments.

Chairman.

ASSEMBLYMAN EUSTACE: Thank you, Chairman.

And thank you, Mayor, and the Borough of Lavallette, for having us down here. I appreciate it; it's a beautiful day.

We are waiting for Assemblyman Wisniewski, and we will proceed. And when he gets here, we'll just seat him.

We have with us Assemblyman Karabinchak and Assemblyman Rooney. And I appreciate the staffers for coming out for this day at the beach, to be here.

My brief statement on what we're here for today is simply about climate science -- is, science doesn't care what our opinion is. What will happen is going to happen, so our opinions are almost irrelevant. That's why the experts are here to tell us about what's going on.

Two years ago I had the opportunity to spend time in Antarctica and speak with scientists about the ice shelf. We were, at that time, on the largest ice shelf, but the thinnest ice shelf in history. And there is no doubt about what's going on; we experience it every day. Unfortunately, people conflate global warming with climate change. And it's not personal or local climate change; it's world climate change, and we need to pay attention. And the horse is out of the barn, so it's time to stand up and represent the planet.

Thank you.

SENATOR SMITH: All right, Chairman; with your indulgence, we'll call our first witness.

And we're particularly looking for policy guidance: what should we be doing in the future to make New Jersey more resilient to the impacts of climate change?

Our first witness is Professor Anthony Broccoli from Rutgers University.

Professor.

And his testimony is in the folder for our members.

Professor.

A N T H O N Y J. B R O C C O L I, Ph.D.: Good morning, and thank you very much for giving me the opportunity to talk today about the science of climate change and, more specifically, how the effects of climate change are being felt in New Jersey.

Just to tell you a little bit about myself -- I'm a Professor of Atmospheric Science at Rutgers, Chair of the Department of Environmental Sciences, and Co-Director of the Rutgers Climate Institute.

Global average temperature has risen by approximately 2 degrees Fahrenheit since the late 19th century. In each of the last four decades -- the 1970s, 1980s, 1990s, and 2000s -- temperatures at the Earth's surface have been warmer than the previous decade, and warmer than any decade since modern thermometer records began. And the 2010s are on track to continue this trend.

During the past 20 years, the great ice sheets that cover most of Greenland and Antarctica have been shrinking, as have almost all mountain glaciers throughout the world. Based on trends going back to 1880, global

sea level has been rising at an average of just under 7 inches per century; but sea level rise is accelerating. If we look at just the past 25 years, the global rate of sea level rise has almost doubled to about 13 inches per century.

The causes of these dramatic changes in global climate are well understood. Heat-trapping gases in the atmosphere have increased as a result of human activities. The most important of these gases is carbon dioxide, which is released into the atmosphere by the combustion of fossil fuels. The atmospheric concentration of carbon dioxide has reached levels that are unprecedented in at least the last 800,000 years, and its current concentration is about 45 percent higher than it was prior to the Industrial Revolution.

Carbon dioxide is being emitted into the atmosphere at a rate of nearly 40 billion tons per year.

The basic physics of how carbon dioxide and other heat-trapping gases affect climate have been understood for well over a century. To maintain a consistent global temperature, the Earth must send energy back to space in an amount that balances the energy it receives from the sun. Heat-trapping gases act as a blanket that makes it more difficult for the Earth to send energy back into space, thereby making the Earth warmer than it would be otherwise. The continued increase of these gases will lead to a continuation of the global warming trend that has been observed. Without a stabilization of the amount of heat-trapping gases in the atmosphere, the changes in climate that the world has experienced are expected to continue and intensify.

As might be expected in a warming world, future climate will feature more frequent and longer heat waves, and fewer cold temperature extremes. But other aspects of climate are also associated with rising temperatures. Heavy rain events over middle latitude continents, such as North America, are expected to become more intense and more frequent as the climate warms. Global wind patterns may change in ways that have the potential to affect air travel. And perhaps most important, the rate of global sea level rise will continue to increase during the 21st century.

What about climate change in New Jersey? Looking back, New Jersey's average temperature has risen at a rate of just under 3 degrees Fahrenheit per century, or somewhat faster than the global average. The six warmest calendar years on record have occurred since 1998, with 2012 being the warmest year. Summers have been unusually warm, with the seven warmest summers on record taking place since 1998.

Looking at extremes on a monthly basis, we can define an unusually warm month as one that is among the five warmest for that calendar month, and an unusually cold month as one that is among the five coldest. In recent years, unusually warm months have been far more prevalent than unusually cold months, outnumbering them by 35 to 0 since 2000.

The trend towards higher temperatures is expected to continue in the decades to come as the concentrations of heat-trapping gases continue to increase.

Annual precipitation in New Jersey has undergone an upward trend of just over 2 inches per century since statewide records began in 1895. This trend is small compared with the year-to-year variability of

precipitation. But increases in the amount of precipitation falling in heavy rain events have been noted throughout the northeastern United States, including New Jersey. By one measure, the frequency of these events has doubled over the past two decades. There is reason to expect this trend will continue as heavy precipitation events are anticipated to become more intense and more frequent as temperature increases, with implications for the frequency of inland flooding along New Jersey's rivers and streams.

Sea level rise along the New Jersey coast has been more rapid than the global average because the land is sinking at the same time that water levels are rising. At Atlantic City, where records extend back to 1912, sea level has risen by an average rate of 1.5 inches per decade. As the ocean continues to warm and glaciers and ice sheets continue to melt, sea level rise is expected to accelerate. According to a recent report produced by a team of scientists under the auspices of the New Jersey Climate Adaptation Alliance, central or middle-of-the-road estimates of sea level rise on the New Jersey coast, relative to the year 2000, are 10 inches by 2030; 17 inches by 2050; and 28 to 41 inches by the end of this century, with the values in 2100 dependent on the magnitudes of future carbon dioxide emissions.

The evidence for changes in storm activity, including tropical storms and hurricanes, is mixed and remains an area of active research. Recent studies suggest that the global frequency of tropical cyclones will either decrease or change little in response to global warming. But their average intensity is likely to increase, in terms of both maximum wind speed and rainfall, and the frequency of the most intense hurricanes is expected to increase.

What we would really like to know is how the risks to New Jersey from hurricanes and other storms will change in the future. Unfortunately, we do not yet have great confidence in regional projections of future storm activity; but there is high confidence that the impacts of future storms in the form of coastal flooding are likely to be more frequent and more severe, as rising sea levels raise the baseline for coastal flooding events. For example, some of my colleagues at Rutgers have estimated that Hurricane Sandy flooded an area 27 square miles greater than it would have if it had occurred in 1880, increasing the number of people living in areas inundated by the storm tide by about 38,000 in New Jersey alone. The future rise in sea level will likewise increase the areas at risk of coastal flooding.

Many of our traditional strategies for planning for future weather and climate events assume that they will look a lot like the events that we have experienced in the past. Climate change invalidates this assumption, creating a need to prepare for and adapt to conditions that will likely be quite different than what we have seen in the past.

Because the primary driver of future climate change is the emission of carbon dioxide into the atmosphere, there is the potential to mitigate the impacts of future climate change through the development of alternative sources of energy and policies to discourage carbon dioxide emissions. But regardless of what policy direction we ultimately follow, we are already experiencing changes in climate, and there is no realistic scenario in which future changes can be completely avoided. Thus it will be necessary to adapt to the change in climate that are already wired in, even if mitigation policies are implemented to reduce carbon emissions. A

combination of mitigation and adaptation will be required; it is not an either-or proposition.

Finally, it is important that the decisions that we make, here in New Jersey and elsewhere, should be informed by the best available science. At Rutgers, faculty and students from many departments, schools, and campuses are engaged in research that will lead to a better understanding of climate change and the development of solutions for mitigating climate change and adapting to its unwanted effects.

The Rutgers Climate Institute was formed to facilitate collaboration among climate change scholars across a broad range of disciplines in the natural, social, and policy sciences. Rutgers scientists study the changes in climate and sea level that have occurred in the past in an effort to better understand the mechanisms that drive them. They use computer models to study the processes that drive changes in the atmosphere and ocean. They monitor conditions on land and in the coastal waters, using automated weather stations, ocean gliders, radar, and satellites. They study the effects of climate change on fisheries and on the forests of the Pinelands. Other research topics include the vulnerability of our residents to climate change and the impacts of climate change on agriculture here in the Garden State.

The Rutgers Energy Institute promotes research on the production, storage, and use of energy, including the development of alternative energy sources such bioenergy, solar, wind, and water. Rutgers is engaged in research on battery technology, green buildings, and energy-efficient transportation and supply chain management, to name but a few

examples. All of these efforts are motivated by a desire to address what is arguably the most important environmental issue of the 21st century.

You will hear from other expert witnesses today who will discuss in greater detail some of the topics I've mentioned.

To the Committee Chairs and to the Committee members, I thank you again for the opportunity to talk with you today and provide an overview of this important issue.

SENATOR SMITH: Professor, if you have the time, we might have a few questions for you.

DR. BROCCOLI: Sure.

SENATOR SMITH: Two or three weeks ago there was a front page story in the *Star-Ledger* about the ghost forests in the Pinelands -- that, apparently, the salinity from the higher sea levels has now affected, I think it was, the White Cedar.

DR. BROCCOLI: Yes.

SENATOR SMITH: And you mentioned that that was one of the projects that Rutgers was studying.

What do you see as the -- or what does Rutgers see as the succession -- the next plant that will either replace them; or is there a chance that the White Cedar can come back?

DR. BROCCOLI: Well, I think, first of all, a lot depends on how much more sea level rise we have in the future. Because as you mentioned, what's happening is sea level rise -- the salt water is intruding into areas that were, in the past at least, dry enough to support the cedar. As sea level -- let's assume that it continues to rise -- that margin will move further and further inland so more and more trees will be affected. And

eventually you could see the conversion of areas that were upland wooded areas, that are maybe a few feet above sea level into areas, that are more like the Coastal Wetlands that we see on the margins of Barnegat Bay and the other back bays along the coast of New Jersey.

SENATOR SMITH: Any succession plant that you think would succeed the White Cedar?

DR. BROCCOLI: I'm not sure I know enough about that topic to answer that question.

SENATOR SMITH: Would you ask the people who are studying it to, maybe, send us a note on that?

DR. BROCCOLI: I would, yes.

SENATOR SMITH: Let me acknowledge the presence of Senator Sam Thompson, who has arrived; and Senator Linda Greenstein.

And Chairman, if you have any questions; or we'll open it up to members to ask questions.

ASSEMBLYMAN EUSTACE: I do, if you don't mind.

SENATOR SMITH: Sure.

ASSEMBLYMAN EUSTACE: And I would like to welcome Assemblyman Wisniewski for joining us; thank you.

ASSEMBLYMAN WISNIEWSKI: Chairman.

ASSEMBLYMAN EUSTACE: Professor, you spoke about research on battery technology. And it seems to be one of the hindrances to a lot of the renewable projects. Where do you see us going, and do you see a calendar for how we'll work more on storage?

DR. BROCCOLI: Well, the timing, when it comes to this kind of basic research, is hard to predict. But it is an area of focus for exactly the reason that you mentioned.

A lot of our alternative forms of energy, such as solar and wind, are intermittent. The sun isn't shining 24/7; the wind isn't always strong. So that creates a need to store energy so that you can use it at times when the wind isn't blowing hard enough, or the sun isn't shining.

So this is an area that we are definitely seeing more attention, not only in research that's happening at our university and other universities, but also in the private sector. Elon Musk has made one of the focuses of his company the development of better battery technology that can be used in conjunction with, for example, solar panels on a home or a business to store energy.

So I think it's quite likely in the next decade we will see some big advances as we move to new types of batteries that use different combinations of metals. Lithium ion batteries are what most of us have in our phones and in our laptops, but the technology is now looking beyond that.

ASSEMBLYMAN EUSTACE: I appreciate that. And I know vanadium technology is one of the greater storage techniques, but it is so vastly expansive in a liquid state that it's hard to handle.

And you mentioned Elon Musk; I appreciate that. The Powerwall may make us solar homeowners able to store much better than before.

Thank you, Professor.

I'm going to ask my members if they have any questions.

Members? (no response)

Thank you; thank you, sir.

SENATOR SMITH: How about on this side; any questions for Dr. Broccoli? (no response)

No? Okay.

Would you invite the next witness?

ASSEMBLYMAN EUSTACE: Sure.

Thank you very much for your testimony, Professor.

DR. BROCCOLI: Thank you.

ASSEMBLYMAN EUSTACE: Next up is Professor Edward Lloyd from Columbia University; The Fund for New Jersey.

EDWARD LLOYD, Esq.: Good morning.

Thank you, Messrs. Chairmen and members of the Committee.

My name is Edward Lloyd; I'm here as a Trustee for The Fund for New Jersey. The Fund is a philanthropic foundation that has been active in New Jersey public affairs for nearly 50 years.

Today I will discuss the third report in The Fund for New Jersey's *Crossroads New Jersey* series. The title of the report is, "Climate Change Adds Urgency to Environmental Protection."

As the name of the *Crossroads* series suggests, our state is, indeed, at a crossroads. For years, the State has delayed making responsible decisions that would allow us to meet our fiscal obligations and to invest to help New Jersey's communities to thrive. The *Crossroads New Jersey* reports offer options for how to confront problems head-on.

The first report detailed the severity and urgency of the State's fiscal crisis; and recommended steps for New Jersey to take to get our fiscal

house in order and get back to making the public investments so crucial to our well-being, like safe and reliable transportation, clean air and water, good education, and houses we can afford.

The second report focused on jobs and the economy, and recommended policies that extend to everyone; the opportunities that many enjoy in a state where the cost of living is significantly higher than the national average. We emphasize expanding access to good jobs, more investment in small businesses, and job training plans that benefit both workers and New Jersey's employers.

The report I will discuss today is the climate change and environmental report. The report, on both climate and environment, emphasizes strong policies that are necessary to protect the natural resources of the Garden State, as well as the health and well-being of our residents. These policies have always been important; but now, because of the threats of climate change, they are urgent.

For almost 50 years, The Fund for New Jersey has focused its philanthropy on improving the quality of life in our state. We support good policy decision making by making grants to nonprofit organizations in New Jersey. This year, when New Jersey chooses a new Governor and Legislature, the Fund's Board decided that we needed to do more. *Crossroads New Jersey* reports present balanced and constructive recommendations on key issues. Our aim is to encourage informed and serious debate; we do not presume that our recommendations are the only options. The Trustees do think, based upon the evidence and input from experts, that the options presented are sound and workable.

In addition to the three reports you've heard about, other issues covered will include criminal justice, transportation, education, housing, and land use.

I want to underscore that as a philanthropic foundation, The Fund cannot and does not support candidates who take sides in partisan debates. As a courtesy, our reports are being sent to the candidates for Governor, and recommendations in these reports are not based on any positions the candidates may have taken.

The Fund's climate change report demonstrates that climate change does indeed add urgency to environmental protection. A little history is instructive. As I'm sure most of you know, 50 years ago New Jersey saw serious threats to its physical and economic well-being. We became one of the first states to create a cabinet-level department to safeguard the environment and natural resources. That was a new idea in 1970. New Jersey became a national leader in preserving open space, protecting air and water quality, promoting recycling, cleaning up hazardous waste sites, and keeping people safe from toxic substances. We protected the Pinelands, and the Highlands, and the Meadowlands.

Today, we need that commitment again, for two reasons. One, climate change makes environmental protection more important than ever. Temperatures are rising, and human activity is the main reason why -- especially burning fossil fuels including coal, oil, and natural gas. As the report states, summers in New Jersey are going to be as warm as Alabama is today.

Second, we have been backsliding in recent years. We have rolled back rules on water quality management, on septic in the Highlands,

on pipelines in the Pinelands. And now, the sea level is rising, and that's a fact. You heard the Professor document that. The question is, what are we going to do about it?

The Fund's climate report lays out common-sense ideas for how we can make sure New Jersey offers the best possible quality of life for the generations that come next. It will not happen by itself. Starting with the next Governor and Legislature, it is up to the people and the leaders of New Jersey to grasp the scientific realities that face us, and take the actions that are needed.

The Fund report is an action plan for restoring environmental protection in New Jersey. It covers a lot of ground -- and air, and water -- because the challenges we face are so vast.

I won't mention every recommendation, though I urge you to look at all of them and to understand that all these issues are connected to each other; and that we need to take a comprehensive approach to make sure we address every aspect of how climate change threatens New Jersey's well-being.

The report covers four main areas: Advancing Clean, Homegrown Energy; Preserving and Protecting Water Supply and Quality; Invigorating State and Regional Planning; and Ensuring Environmental Justice.

Advancing clean, homegrown energy is the best way to reduce dangerous carbon emissions. New Jersey should rejoin the Regional Greenhouse Gas Initiative. We should step up efforts on renewable energy sources, mandating that 80 percent of electricity comes from those sources

by 2050, doing more to move ahead with offshore wind, and adopting meaningful standards for saving energy.

We should stop the diversions from the Clean Energy Fund and go back to using the money as it was intended -- for clean energy projects and technologies.

We should place a moratorium on all pending pipeline projects, and undertake a review to determine whether they are necessary, safe, and consistent with reducing the impact of climate change.

Preserving and protecting water supply and water quality is especially important as erratic precipitation patterns, due to climate change, affect the amount of water in reservoirs and aquifers. Without safe and abundant water resources, New Jersey cannot overcome the impacts of climate change.

We should restore and strengthen Clean Water Act protections; we should update the State Water Supply Master Plan; we should assess all State water programs, and make all necessary repairs and improvements.

State and regional planning used to be the backbone of environmental protection in New Jersey. We were a national leader, and we need to be one again.

We should develop a climate action plan to address threats to the coast from rising sea levels. The Shore Protection Master Plan is 35 years old; I think it's time to update it. The 35-year-old Shore Protection Plan predates decades of development, it predates Superstorm Sandy, it predates the latest climate change revelations, and it predates the sea level rise.

We should update the State Development and Redevelopment Plan, the Pinelands Comprehensive Management Plan, and the Highlands Regional Master Plan to address today's threats and tomorrow's.

The fourth key area is to bring environmental justice to New Jerseyans who suffer disproportionate dangers because of where they live -- often in urban, economically distressed areas. No State regulatory approval or funding should be given for any development before it is screened to make sure that it does not add to pollution burdens in such communities.

We should significantly step up efforts to test for lead and reduce exposure to lead. We should reduce diesel emissions. And we should develop emergency plans to address the impacts of climate change involving community residents, local groups, and environmental justice organizations.

As the report makes clear, time is not on New Jersey's side. Challenges that previously were little known now turn out to be substantial threats to residents' well-being. And in many instances, the situation is worsened because of action deferred and protections weakened. From rejoining the Regional Greenhouse Gas Initiative, to developing a Shore Master Plan, to protecting economically struggling communities, restoring New Jersey to national environmental leadership is about far more than bragging rights. The state's quality of life is on the line.

Thank you very much. I'd be happy to answer any questions.

SENATOR SMITH: Dr. Lloyd, again, you're open for some questions I hope?

MR. LLOYD: Sure.

SENATOR SMITH: Who does the Shore Master Plan? Is that CAFRA; is that the State Planning Commission?

MR. LLOYD: I believe it's DEP.

SENATOR SMITH: DEP.

MR. LLOYD: DEP; yes, yes.

SENATOR SMITH: Okay.

I thought your suggestions to update all the various master plans, in light of our experience in the global climate change, is a great idea. And with Chairman Eustace's permission, I'm going to work with him to see if we can find a way to get that on the front burner, because that does sound like a very good way to--

MR. LLOYD: That would be very helpful.

SENATOR SMITH: --for New Jersey to start to adopt changes to policy.

MR. LLOYD: As you know, those plans are not addressing climate change now, and they should; and they should be updated as soon as possible to do that.

SENATOR SMITH: All right; let me give you a harder question.

MR. LLOYD: Sure.

SENATOR SMITH: There is a discussion in New Jersey now, in the energy world, which has a dramatic impact on climate change and our sustainability. And I have seen your recommendations about more efficiency and more renewables. But the part of the item that's not in there is this whole discussion about our nuclear generation. Our plants are

getting very old; Oyster Creek, as you know, is going offline, I think, shortly.

MR. LLOYD: Two years, I believe.

SENATOR SMITH: Yes. And there's a separate recommendation here about pipelines -- that we should have a moratorium. And we have a national Administration that wants to see more coal.

So the question is, should New Jersey be seeking ways to keep those nuclear -- the elderly nuclear power plants open because they are carbonless -- they generate no carbon in the production of electricity, in light of the fact that they're aging and they're also expensive? And you've seen a couple of states now look at subsidization to keep their plants open. And the other alternative is, if you don't have that energy, does that stimulate more gas pipelines?

Does your group have any recommendations on that stuff?

MR. LLOYD: We have not delved deeply into the nuclear area, as you can tell from my testimony and from the report. I think that the projections that we are using assume that the nuclear plants -- other than Oyster Creek -- the nuclear plants will finish their useful lives, which gets us into the 2040s. But there is no question that, at that time, we have to replace them, and we think we should replace them through renewable energy.

SENATOR SMITH: There's no question about more renewables.

MR. LLOYD: Right.

SENATOR SMITH: But the discussion now is that the plants will be closing early -- that they, from whatever the utility model is, they

don't make enough money; that natural gas is much more profitable. And you know, utilities are corporations and their job is to take care of the shareholders. So should New Jersey be involved in that, or do you think we don't have a role?

MR. LLOYD: I think New Jersey--

SENATOR THOMPSON: As an interjection, on the same subject there -- some people were talking to me about the same thing.

SENATOR SMITH: Right.

SENATOR THOMPSON: And they assert that the three nuclear power plants do supply roughly 50 percent of our total energy needs.

SENATOR SMITH: Right.

SENATOR THOMPSON: So if they were to go out, then again, what -- the question you're raising is, okay, how do we meet that 50 percent of our energy needs?

SENATOR SMITH: Yes; so what do you think?

MR. LLOYD: Well, I think that we have -- that's a major part of our energy; and the other major part is natural gas. And natural gas has far more carbon emissions than nuclear. So certainly our first priority should be to replace these, when we can -- the natural gas-generated electricity with renewables.

To the extent that nuclear power -- the plants we have -- the three plants that we have are not going to last their expected lives. I think we have to also be in to replace that capacity with renewable energy. I think that the obvious -- I shouldn't say *the obvious* -- the most important ways to do that-- Offshore wind will have an enormous role to play in that;

solar power will have an enormous role. And then I think the other thing you have to look at is the transportation sector which, as you know, is an enormous contributor to greenhouse gases.

SENATOR THOMPSON: I guess you could go in the direction of natural gas. But if you go to natural gas, then you're concerned about climate change and CO₂ -- carbon dioxide emissions. You increase the CO₂ if you go that direction.

SENATOR SMITH: Yes. There are no easy answers in any environmental issue.

MR. LLOYD: True. One of the things, if I may--

SENATOR SMITH: Sure.

MR. LLOYD: --one that we've seen -- there has been a significant increase in natural gas electric generation in the state. And that has slowed our ability to reduce emissions from carbon dioxide. So I think we need to address the natural gas sources of electricity as well.

SENATOR SMITH: Any other questions from our members?

Senator Greenstein.

SENATOR LINDA R. GREENSTEIN (Vice Chair): Thank you; thanks.

Thank you; is that on? (referring to PA microphone)

SENATOR THOMPSON: That one's on.

SENATOR GREENSTEIN: It is? Okay.

Thank you very much for your testimony.

Just a couple of questions.

How do you think we're doing on renewables here in New Jersey? I mean, when I -- years ago, I thought it would take many, many

years for us to get somewhere. I feel like it's going faster than I thought, but I'm still not sure that we're anywhere near where we need to be. What's your thinking on that?

MR. LLOYD: I think we've slowed down, I think. And I think we need to speed up. I mean, the goals that we suggested of 80 percent renewables for the electricity--

SENATOR GREENSTEIN: What percent?

MR. LLOYD: Eighty percent renewables of the electricity sector by 2050 are achievable and reasonable. And I think that we need to retool or reinvigorate our solar program, and certainly begin to look at offshore wind. I mean, we've been stalled with offshore wind for years--

SENATOR GREENSTEIN: Right.

MR. LLOYD: --and that has enormous capacity to generate electricity, where the estimates are from 3,000 to 5,000 megawatts. And that certainly could help address both the questions -- the nuclear plant supplies, as well as the question of the natural gas-generated electricity.

SENATOR GREENSTEIN: I see you have a number of suggested areas. In terms of prioritizing, which of these do you think is the most important? How would you -- what would you put at the top for the new Administration? (laughter)

MR. LLOYD: Yes, that's a good question. I think there are probably a number of them. But the one that comes immediately to mind, I think, is the proportion of electricity generated by nonrenewables. And that's an area that I think we can, perhaps, achieve success in most quickly. Other states have set -- New York, California, and Hawaii have set 100 percent renewable goals by 2050. We think that 80 is achievable; it may be

that, 5 years from now, we revisit that and change it. But I think that's the most significant thing.

And I guess the second thing I would add would be planning -- that we have to plan. I think there's a quote from -- I think it was Benjamin Franklin in the report that said, "The failure to plan is to plan for failure." And I think that's one of the things that Chairman Smith brought up. I mean, we have plans that we develop all the time: the State Development Plan, the Pinelands Plan, the Highlands Plan. We need to have those plans address climate change and how those regional authorities can help us -- well, the regional authorities and the State authorities can help us address these issues.

SENATOR GREENSTEIN: And the last question I would have is, over the last couple of Administrations, what are some of the things that you think we've actually done well here in New Jersey?

MR. LLOYD: Well, we've been a leader in solar power. I mean, we're third -- I think third in the country and first in the East. We-- It's tough after that, to be honest with you.

SENATOR GREENSTEIN: Really. (laughter)

MR. LLOYD: You know-- The electricity generation -- we have gotten rid of almost all the coal. I mean, Public Service deserves credit for closing the two large coal plants. We've made some progress on transportation, although we're still driving more than we have in the past, and we need to turn that down. And planning, again, will address that. If we plan our communities so that we can reduce the need to commute, and make them livable communities where people can live and work, that could help reduce vehicle miles travelled.

SENATOR GREENSTEIN: Thank you.

ASSEMBLYMAN EUSTACE: Thank you, Chairman.

Assemblyman Wisniewski has a question; but I just wanted to address your testimony, which I appreciate; and it was very thorough.

You do know that the 80 percent by 2050 is a bill that the Senator and I have pushed, but this Administration has blocked--

MR. LLOYD: Yes--

ASSEMBLYMAN EUSTACE: --time and time again.

MR. LLOYD: Yes.

ASSEMBLYMAN EUSTACE: As reentering RGGI has been blocked--

UNIDENTIFIED MEMBER OF AUDIENCE: Could you speak a little louder?

ASSEMBLYMAN EUSTACE: Sure; I apologize.

--as RGGI has been blocked by this Governor time and time again. I think that both gubernatorial candidates have said that they will support both of those initiatives, which is vitally important.

MR. LLOYD: Yes.

ASSEMBLYMAN EUSTACE: I'm glad that you pointed out that the coal plants are closing -- that's vitally important to this state -- and that a lot of that pollution from coal comes from other states. Many people don't know that.

How to address wind -- vitally important for this state -- has been stalled under this Administration. And we have a commitment from gubernatorial candidates that they will do something.

The problem with wind, as you know, is the expense of wind, and how much it costs to generate a kilowatt hour with wind -- which has been reduced drastically in Europe, and that's usually because of manufacturing. My hope is that as you talk about planning documents going forward, that we talk about manufacturing blades and units here in New Jersey. There's plenty of land in Southern Jersey where we could build these things. And these are massive blades; they are 300 feet long. And so the problem is you would need to build a ship -- you would need a ship to go to Denmark and bring the blades -- a large enough ship to bring the blades here, which drives up the expense. I'm sorry to go on and on, but I wanted people to understand how this works.

So rather than do that, if we could build the blades here it would save an enormous amount of money and create lots of renewable jobs. One plant in Denmark employs 6,000 people building these blades, which they ship around the world. If New Jersey were a manufacturer of these units, we could take the market on the entire East Coast easily -- of both continents--

So as far as I'm concerned, what we suffer from is a failure of imagination. When we talk about renew -- 80 percent renewables by 2050, what we suffer from is a failure of imagination. None of us thought we would be carrying our computers in our pockets 5 years ago, 10 years ago. And what we suffer from is the idea that everything changes every day; renewables are the future. And hopefully, as you say, we'll address it in the Legislature and try and move forward aggressively, if you will.

I thank you for your testimony.

MR. LLOYD: Thank you.

ASSEMBLYMAN EUSTACE: Assemblyman Wisniewski.

ASSEMBLYMAN WISNIEWSKI: Thank you. Chairman.

Professor Lloyd, we heard Senator Thompson and Senator Smith talk about the nuclear plants going offline, probably by 2040, constituting about 50 percent of our generation capacity. That's a lot of generation. Your recommendation is to replace it with renewable; the question I have is, that's a very broad topic. Theoretically it includes nuclear. Is it possible to replace that 50 percent entirely with non-nuclear renewable resources?

MR. LLOYD: By 2050, I think the answer is "yes;" 2040 may be a greater challenge. And there will be tradeoffs between replacing nuclear power or replacing natural gas. Those are the two major generators of our electricity today.

So I think that's why an aggressive program to expand our renewables' capacity will help in any event. It could be used to replace nuclear, if that becomes necessary; it should be used to replace natural gas, because we know the emissions from natural gas are contributing to climate change.

ASSEMBLYMAN WISNIEWSKI: And those natural gas plants will need to be replaced just because the lifecycle on some of them will have reached their maximum useful life. And so that will call into question -- a 50 percent number may even be greater. Do you think there's a role for nuclear power in New Jersey, going forward?

MR. LLOYD: I think there's-- Look, we clearly have three plants that operate that generate a major part of our electricity. I don't think we could walk away from them tomorrow if we wanted to.

ASSEMBLYMAN WISNIEWSKI: But at some point, if we do nothing, they will be closed.

MR. LLOYD: That's correct.

ASSEMBLYMAN WISNIEWSKI: And so the question really is, do you think in light of their anticipated closure, is there an ongoing role for nuclear in New Jersey that the State needs to be engaged in -- that process to make sure that we are replacing some of that with new nuclear capacity?

MR. LLOYD: This really goes beyond our report, so I don't want to get too far afield.

ASSEMBLYMAN EUSTACE: Sure.

MR. LLOYD: But to the-- We do call for planning and for a climate action plan. And I think as part of that plan, we need to address precisely the issues that many of you have raised. I mean, what role should nuclear play, going forward? Should these plants not last until 2040, how are we going to address that energy need? I think the planning -- we need to sit down and think that through. As I said, it goes beyond the scope of our report to address directly the question about nuclear plants closing earlier than 2040.

ASSEMBLYMAN EUSTACE: Sure; and then one of the issues even if you do get to bat, is that one of the major American manufacturers -- contractors for nuclear is in bankruptcy; so that -- who would build it, even if you wanted to do that?

MR. LLOYD: Right.

ASSEMBLYMAN EUSTACE: Thank you.

MR. LLOYD: Thank you.

ASSEMBLYMAN ROONEY: I have one question, Chairman.

So Professor, I have a question on wind. And echoing what our Chairman spoke to on Denmark and manufacturing -- you spoke specifically on offshore.

MR. LLOYD: Yes.

ASSEMBLYMAN ROONEY: But I would assume when the Chairman visited Europe, you see that wind is something that they do inland more often than not, in other states. What is your feeling on that, and how could that contribute and add to the 2050 goal?

MR. LLOYD: Again, it's a little beyond the report, so I don't want to get too far out on the limb.

But we have -- there are wind generators in Atlantic City. So I think that because of the wind availability on the coast, that is an obvious place to go. And because of the potential of 3,000 to 5,000 megawatts, that's an obvious place to go. I don't think that precludes wind generation in other places in this state that have the wind--

ASSEMBLYMAN ROONEY: We have a lot of mountain sites, you know--

MR. LLOYD: That's correct.

ASSEMBLYMAN ROONEY: --within the state.

MR. LLOYD: But as -- with respect to both the coast and the mountains, I think the esthetic impact is something we're going to have to evaluate. One of the things that we called for is, at least for the offshore wind, is to do planning to make sure, again, that we're not harming sensitive environmental areas. And I think the same would be true for any

inland wind power -- that we have to examine what the impacts beyond the energy impacts might be on the area.

ASSEMBLYMAN ROONEY: Thank you.

ASSEMBLYMAN EUSTACE: And if I could, Assemblyman, the estimates on wind power inland in New Jersey are really not high enough for large projects. So that's the reason there aren't large inland projects; the shore and offshore projects generate a lot more wind.

ASSEMBLYMAN ROONEY: No, I agree with that. But I think there's a mechanism to have both and complement in some way.

ASSEMBLYMAN EUSTACE: Sure.

ASSEMBLYMAN ROONEY: We're looking at small generation plants of homes now in other areas. I don't see why we wouldn't include that in the discussion at least--

ASSEMBLYMAN EUSTACE: Sure.

MR. LLOYD: Yes.

ASSEMBLYMAN ROONEY: --going forward.

MR. LLOYD: I wouldn't rule it out. But I think the Chairman is right, and this is why we focused on offshore -- because the potential there is so great. But we're going to need every bit of renewal energy that we can find to meet these goals. And we think that -- as I said, I would not rule out onshore wind either.

ASSEMBLYMAN ROONEY: Right; thank you.

MR. LLOYD: Thank you.

ASSEMBLYMAN EUSTACE: Thank you.

SENATOR SMITH: Thank you, Dr. Lloyd.

And just for the record, we're not afraid if you go out on a limb; it's okay. (laughter)

MR. LLOYD: Thank you.

SENATOR SMITH: Our third set of experts -- Jeanne Herb and Dr. Marjorie Kaplan. They are from the Rutgers University New Jersey Climate Adaptation Alliance.

J E A N N E H E R B: Good morning, and thank you so very much for inviting us to participate this morning.

My name is Jeanne Herb; I'm an Associate Director of a research center at the Rutgers University Bloustein School.

And I am joined by my colleague, Dr. Marjorie Kaplan, who is the Associate Director of the Rutgers Climate Institute.

Prior to joining Rutgers, both Dr. Kaplan and I spent more than two decades in State government here in New Jersey; so we're very pleased to be back in front of a Committee.

We will stipulate that we're not here actually representing Rutgers; but rather we're here in our roles as the facilitators of the New Jersey Climate Adaptation Alliance, which we will give you a little bit of background on in a minute.

Our purpose here, today, is to talk to you about three things. First, we want to introduce you to the Alliance, so that you can see it as a resource both in terms of the people involved, as well as the work of the Alliance and the work that we've done over the past six years. Second, Dr. Kaplan will highlight some of the products that we put out that do provide some policy insights. We will also give you a coming attraction for some additional work that you'll be seeing just after Labor Day that also will

provide some policy insights. And then third, we'll give you just some beginning thoughts and some personal insights based on the work that we've done in supporting the Alliance.

And very important -- we're here to invite you to our September 27 conference, and there is a flier for that in your packets. And that is a conference where the Alliance will come together to essentially assess the State's work and efforts in moving towards some of the policy goals that the Alliance has laid out over the past six or seven years. So we invite you to come to that conference. And it's at Duke Farms, so it will be at a lovely venue.

For the sake of clarity, our discussion will focus both on issues that relate to adapting to a changing climate -- which some people will refer to as *preparedness* or *resilience* -- as well as efforts to reduce greenhouse gas emissions, which is generally referred to as *mitigation*. So when you hear us talking about *adaptation* and *mitigation*, that's how we, sort of, view the world.

Of the three topics we want to cover, I want to just give you a fast overview of the New Jersey Climate Adaptation Alliance. The Alliance is a network of organizations and individuals -- many of whom are in the room today -- who came together in 2011 after a conference where we outlined climate impacts in New Jersey. That group came together and made the decision that what was not needed in New Jersey was yet another big organization focused on a particular issue, but rather the opportunity to bring together thought leaders in various sectors.

So at that point the Alliance was born. We were asked to facilitate the Alliance. And at this point, the Alliance operates under

Chatham House Rules, with about 45 organizations representing conservation groups, representing environmentalists, representing public health professionals, representing businesses, and local government who have come together -- oh, and also transportation and energy -- who have come together to work together to build capacity, initially on climate adaptation in Jersey, and now moving more and more towards mitigation.

Former Governors Kean and Florio serve as our active Honorary Co-Chairs, and Marjorie and I serve as Facilitators.

Over the past six years what our work has involved is a lot of public education and outreach. And so if you want to really get educated on climate change impacts in New Jersey specifically -- not necessarily globally -- we invited you to visit our website. And everything you could possibly want to learn about climate change in New Jersey you can find there.

We also have focused on analyzing the actual impacts of climate change in New Jersey in different sectors. We've had a strong focus on impact-to-built infrastructure, a strong focus on public health, a strong focus on coastal communities and inland communities, and also a very strong focus on populations and communities that are particularly vulnerable to a change in climate. Dr. Kaplan will talk about that too.

We've also developed public policy recommendations, early on, on resilience and adaption; and now we're moving towards developing recommendations on climate change mitigation and emissions reductions.

We've developed tools, such as mapping visualization tools, that communities all across New Jersey use to plan for a change in climate conditions. Right now, those tools have a strong focus on coastal flooding;

but we are working towards looking at other climate impacts, including temperature and inland flooding as well.

And we've also done a lot of stakeholder engagement. We've spent lots of time working with thought leaders in many different sectors to understand what their needs are. So whether that's the public health community or the water resource managers -- to understand their needs; and to then reflect their thinking and their needs in our policy recommendations.

Most of this work was done with funds that the Alliance has received from private philanthropic sources. And our goal was to be able to produce data information, policy recommendations, and insights that you as leaders can use to move forward. So we hope you will see us as a resource now and into the future.

So with that, I'll turn it over to Dr. Kaplan to highlight a couple of our products.

MARJORIE KAPLAN, Dr.P.H. Thank you for having us.

In June of 2014, we issued a report with 50 State-level recommendations. We put a brief of it in your package. These centered on integration of climate science and risk management into existing programs to reduce vulnerability to climate change, to partner with community organizations, to enhance education and outreach, and undertake research to address gaps.

So I will briefly highlight five examples of follow-on work that's been very much guided by these recommendations.

So the first one relates to the convening of a science and technical advisory panel -- or STAP panel -- on sea level rise and coastal

storms, with expertise that's specific to not only New Jersey, but these scientists, including Professor Broccoli, who are recognized nationally and internationally.

So it resulted in statewide estimates for sea level rise that Professor Broccoli already noted. And we developed some maps for you today, that are in your packet, to demonstrate for you just how this kind of information can be used.

So the first map, Figure 1, shows what daily high tide could look like in Lavallette, where we are right now, in 2050, when combined with the STAP central estimate for sea level rise of 1.4 feet, or 17 inches of water, using 2000 as a base year. In addition to changes in the daily tide, sea level rise will also raise the baseline, as you heard, for other types of coastal flood hazards. So if you look at the second map -- I think you just turn your paper over -- it shows an 8-foot water level in Lavallette in 2050, which approximates the height of the Sandy storm surge, roughly 6 feet -- we use 6 feet at Barnegat Bay and Atlantic City -- plus the same 1.4 feet of sea level rise. So that's just showing you how you can put sea level rise on top of existing historic type of information to get a sense of where you will see places that will be inundated.

So the work that we've done is informing practice at the Federal and State level. For example, a project that we have called the *New Jersey FRAMES* -- which is a regional resilience planning study for 15 towns of the Two Rivers Council of Mayors in Monmouth County -- is ongoing right now. It's a NOAA-funded project with the DEP Coastal Management Program. And in your package you have a flier about something called the *Map What Matters* Public Engagement Initiative that's just kicked off.

And so this project specifically -- they came to us and said -- the Department, actually, said, "We'd like to use this Science and Technical Advisory Panel project to inform this 15 town study." So we're just kicking that off.

Also, the Naval Weapons Station Earle, Joint Land Use Study in Monmouth County are applying the STAP recommendations. And they're being used by people outside of New Jersey as well. For instance, a method we used is being used by the Ocean Protection Council in California.

The second example: We convened a work group of New Jersey public health officials to guide development of a public comment draft, that we issued earlier this year, on climate and health for New Jersey, using CDC guidance, synthesizing available information on health impacts associated with climate change. For example, rising temperatures -- for which data for New Jersey show that heat related hospitalizations and emergency department visits during the warm season, from May to September, have been rising over the past decade. Also looking at expected air quality changes, such as increases in ground level ozone, which can trigger asthma and COPD; heavy precipitation in storms, which can result in both acute impacts, ranging from drowning to water and food contamination, to reduced access to prescriptions and medical treatment, to chronic issues resulting from storm events, such as mold exposure and mental health impacts.

And a recent New Jersey DOH study found a positive association between heavy rainfall events and hospitalization for

gastrointestinal illness during the warm season here in New Jersey. So we are seeing these effects.

We're in the process of finalizing this report, addressing comments, and it provides an initial point of reference to enable our workgroup to advance next steps, such as identifying appropriate interventions, and quantifying expected disease burden for New Jersey.

In another study, we undertook an analysis of social vulnerability of New Jersey's populations to climate change using exposure to the 100-year floodplain as an indicator of flood risk. And we found that almost 70 percent of the most socially vulnerable populations in New Jersey -- those are in census tracts that lie within the FEMA 100-year floodplain, representing a population of over 675,000 persons. That's a report that you can access.

We also developed an online interactive tool with maps of New Jersey by county that show past temperature trends and projected temperatures through 2100, using multiple climate models and different climate emission scenarios. And we developed a similar interactive story map that shows the relationship between New Jersey's regulated industrial facilities and flood hazards.

And my last example relates to an analysis of climate change adaption in the water supply sector from impacts related to temperature, precipitation, and sea level rise. And this report describes how climate change scenarios can be used to modify or create various models related to water availability and source water quality, at the very least, in a qualitative sense of future conditions; and how utilities and regulators should be able to incorporate these estimates into ongoing asset management programs,

while also considering the need to manage water resources to reduce water supply vulnerability to climate change, through practices such as water conservation, water use efficiency, beneficial reuse of wastewater, and stormwater.

And I'll turn it back to Jeanne to wrap up.

MS. HERB: So just in terms of-- So what Marjorie has talked about is -- a lot of our work, for the initial several years of the Alliance, focused on adaptation and resilience. And after several years of deliberating, the Alliance has come together and felt that it was time for them, as a network, to be able to speak to issues about emissions reduction. And they've asked us to do work in this area.

So one thing that we have done -- not under the umbrella of the Alliance, but rather in our role at Rutgers -- was we updated the State's Greenhouse Gas Inventory. A copy of that is in your packet; we did that in 2015. Updating that is a requirement of the Global Warming Response Act; but we felt that it was important, sort of, in the spirit of *what gets measured, gets managed* -- that we felt that it was important to update that. So that's a really important tool for you, as you're looking forward to potential policy making. In particular, you would look to Figure 1, which is the pie chart that is a really great cheat sheet for you, in terms of looking at what the major sources of emissions here in New Jersey are. And certainly we point to transportation, electricity generation, commercial and industrial and residential sources. But we really don't want to also miss opportunities for also addressing highly warming gases that are not CO₂.

We also point to the tremendous benefit of natural sinks, that provide almost 8 percent of a reduction in greenhouse gas emissions here in

New Jersey, and looking for opportunities to be able to enhance and restore those natural sinks.

We'll remind the Committee -- just to make sure we're all on the same page -- that part of what this work did was to look to see how are we doing towards moving towards the limits -- the statewide limits that were set 10 years ago in the Global Warming Response Act -- that sets a 2020 goal of getting to 1990 levels of greenhouse gas emissions; and then a 2050 goal of achieving 80 percent emissions less than 2006 levels.

Right now what the emissions inventory points to is that we're about 75 percent of the way. We have to go and reduce 75 percent more of our emissions to get to that 2050 limit. So clearly, there's a lot of work to be done.

The other requirements in the Global Warming Response Act was to do this inventory; create a plan -- a comprehensive plan for addressing all greenhouse gas emissions, not just CO₂; and to create a monitoring and reporting program.

What we've done, in terms of moving forward on behalf of the Climate Adaptation Alliance, was we initially convened a group of thought leaders here in New Jersey and we asked them, "What is the information that needs to be brought to fore in order to be able to help policymakers engage in decision making on these kinds of emission-reduction issues? What are the issues; what's the analysis; what's the data that's needed to inform a civil dialogue in New Jersey on addressing -- on helping us to get to our statewide targets?"

We got a lot of input on what information is needed, and Dr. Kaplan and I have worked with some experts across the country to conduct

that analysis. That is a report we really can't speak to too much today, because we're just in the middle of finishing it. But it's quite substantial; and we expect that it will be out and available to you, and we will happily brief you on it in mid-September. That is an independently produced report, not one being done by the Alliance. But it will include the following types of information: It will examine the efficacy of New Jersey's statewide limits that were set 10 years ago in the Global Warming Response Act, in light of the latest climate science and the Paris Accord; it will review existing authorities in New Jersey that can be used to achieve those statewide limits; it will review emission trends in New Jersey; and it also looks at notable policies in other states. It does not, in and of itself, make policy recommendations, but we hope it will be a tremendous tool for you by highlighting and outlining policies in other states that seem to be notable.

And finally, it looks at opportunities to address and undertake climate policy with a specific eye towards populations that are especially vulnerable to a change in climate, as well as to communities that are especially vulnerable to a change in climate, including communities along the coast, inland, as well as communities that are already disproportionately burdened by pollution.

In addition to issuing that report, right now the Alliance is working actively to be able to issue a set of recommendations based on the content of the report. And so both the report and the Alliance recommendations will be available to you, again, in about mid-September, in time for our September 27 conference.

In terms of a couple of insights -- I think more personally from us, based on the work that we've done with the Alliance, is we would point

-- and this is a little bit of a coming attraction -- is we would point to the fact that there is a tremendous amount of authority already in New Jersey to move us proactively towards achieving our statewide limits.

We also encourage you to see the Alliance as a ready-made stakeholder group for you, that is available to you -- and as our we. But the Alliance is a group that has thought about these issues very concertedly for the last seven years.

We also have consistently heard from local communities and local decision makers that they're looking for direction from the State, as well as consistency from among State agencies.

We're impressed that there's a need to listen to the needs of local communities and local governments as to what types of support they need. In some cases, it might be science-based standards; in some cases it might be incentives and technical assistance. And we are also impressed that there is a need -- constantly what we hear from local communities, in the hands-on work that we do with communities, is that they feel that they need to have consistent direction from multiple State agencies.

We are also -- one of our other insights is that we see that there are many approaches in other states that are moving beyond just looking at CO₂ -- and that are looking comprehensively at their inventories and seeing the contributions of other greenhouse gases, and looking for innovative policies in those areas that drive innovation in the private sector.

We see that there are opportunities to prioritize climate policy in ways that deliver important co-benefits, including benefits to public health, and benefits where climate policy both brings a nexus between mitigating climate emissions and adapting to a changing climate. So for

example, when we restore coastal wetlands, we also not only provide a protective buffer to communities, but we also sequester carbon.

We also have come to really understand that there are populations and communities that are more impacted by a change in climate, and there are opportunities to specifically address the needs of those populations such as senior citizens, people with limited English proficiency, and people with compromised health; as well as communities that are already disproportionately burdened by pollution.

We recognize that there are approaches underway in other states -- which the report will highlight -- that really recognize the value of multi-state partnerships in terms of leveraging the ability to influence and impact private markets.

And we also recognize leadership in other states where the state views itself as a leader in terms of its own actions.

So thank you for allowing us to participate. We hope this is the beginning of a conversation, because we really do hope that the resources -- as the work, the analysis, but also the people who have been involved in the Alliance -- can be a resource to use.

So thank you very much for letting us join you today.

SENATOR SMITH: So I hope the first 122 copies of your report will be sent on November 8 to the new Assembly, the new Senate, and-- Well, send two out to the two main party gubernatorial candidates ahead of time so, hopefully, there can be some policy debates between them. But right afterwards, to the new legislature as well.

MS. HERB: We will surely do that.

SENATOR SMITH: That will be helpful.

I have to agree with your comments about the emissions inventory. The surpiser on that, if you look at the graph, is that transportation--

MS. KAPLAN: Yes.

SENATOR SMITH: --is responsible for 46 percent of the greenhouse gas emissions in this state; and electric generation about 21 percent.

MS. KAPLAN: Yes; that's what sets us apart.

SENATOR SMITH: So, you know, while we're having this big discussion about electricity, we're not talking as much as we should, about transportation, obviously. And I'm looking forward to receiving your report, just because I like to start a fight. (laughter) In one of the documents that you sent to us, and I think it was some of the preliminary information-- Although I want to make sure that it's you.

MS. HERB: We did not send you anything ahead of time.

SENATOR SMITH: Oh, then maybe it's the Rutgers people I have to pick on. (laughter)

It says "The Department of Earth and Planetary Sciences Institute of Marine and Coastal."

DR. KAPLAN: Oh.

SENATOR SMITH: Is that Dr. Broccoli?

MS. HERB: No, that probably would have been Professor Scott Glenn.

MS. KAPLAN: Did Scott send you--

SENATOR SMITH: Is he here?

MS. HERB: No, he's not; he couldn't be here today.

SENATOR SMITH: All right. Well, let me at least pull the pin and throw the grenade. (laughter)

It was sent from that gentleman at the Institute of Marine and Coastal Sciences. It is a very -- I'm sure will be a controversial statement. And this is just to get the Shore Partnership absolutely crazy. (laughter)

The paragraph is, "New Jersey is presently engaged in an expensive experiment involving beach nourishment as a buffer against sea level rise and shoreline erosion. The efficacy of beach nourishment as a viable policy option for the long term -- that is, the next 100 years -- remains to be proven. Alternatively, a policy of strategic adjustment, where developed properties in high hazard erosion and storm inundation zones are acquired and removed should be carefully considered. Such a coastal Blue Acres program would mirror the approach that New Jersey has successfully used involving vulnerable development in river floodplains. Future work is needed to identify high hazard conflict zones where strategic adjustment may serve as a preferred policy option."

So--

MS. HERB: We suspect that's probably from Professor Norbert Psuty.

MS. KAPLAN: Yes; but--

SENATOR SMITH: Say it again, louder.

MS. KAPLAN: Yes, it's probably from another faculty member.

MS. HERB: Yes, yes.

SENATOR SMITH: Okay.

Well, in any case, that would be extremely controversial down the shore. (laughter) The--

UNIDENTIFIED MEMBER OF AUDIENCE: (off mike) You said you liked to fight.

SENATOR SMITH: Beach nourishment is the Holy Grail from the point of view of many people. But it's an interesting idea -- that maybe our money is either better spent or apportioned between also the acquisitions of properties that are in harm's way. And since you're finalizing a report, I'd like you to address that; put a paragraph or two in there so that we can see where the Climate Adaptation Alliance would be on that project.

MS. HERB: We could certainly do that.

And I will say that I did recently have an opportunity to look at the 35-year-old Shore Protection Master Plan, and was surprised to see the vision of the authors -- because it actually did speak to and anticipated sea level rise. So that was really great that that was part of the agenda.

SENATOR SMITH: It wasn't anticipated in the--

MS. HERB: It was; I mean, clearly the science has changed a lot since then. But it was definitely something that the 35-year-old plan pointed to as something that needed to be considered, moving into the future.

SENATOR SMITH: Okay.

MS. KAPLAN: And I'd also like to add that one thing that would be of particular interest to this audience would be the companion report that we did to the STAP report, which is also on the web and we can get it to you. But it provided context. We did a lot of interviewing of local

mayors and local municipal officials to try to find out what their concerns were; and it also provided context for describing what the sort of regulatory landscape is for New Jersey and at the Federal level.

MS. HERB: We certainly heard from a lot of local coastal decision makers and the professionals who work for them -- that it's too much to expect a local councilmember or a local mayor to really wade through the kind of complex science that Professor Broccoli presented today. And so as part of that companion report, when we did a lot of listening as to what some of the needs of local decision makers were -- that's where we really heard a need for some guidance on the science, but also consistent guidance from various State agencies across the board.

SENATOR SMITH: And if you have extra copies of that, if you could send it to members of the two Committees, we would appreciate it.

MS. HERB: We're happy to do it, yes.

MS. KAPLAN: We will do that.

SENATOR SMITH: Any questions?

Senator Thompson.

SENATOR THOMPSON: Yes, there is something that is often mentioned in these discussions, and I always kind of wondered about its genesis. Thus as we go into the discussion about climate change and so on, it's -- everybody says, you know, what we do in everything else, our decisions should be based on the science. And as someone with a scientific background, I agree with that.

And what is very often stated is that one of the things we need to do in order to handle this is we need to have an 80 percent reduction in

CO₂ emissions by a certain date. I've always wondered where the *80 percent* number comes from. Thus, is there somebody who says, "Yes, 80 percent is why we're doing the job;" if it was 90 percent, or 70 percent, or so on? What is the basis for our coming to the conclusion that it's an 80 percent reduction we need?

MS. HERB: When the Legislature passed the Global Warming Response Act 10 years ago, which was where the--

SENATOR THOMPSON: I'm sorry?

MS. HERB: When the Legislature passed the Global Warming Response Act--

SENATOR THOMPSON: Oh, I know we put that in there--

MS. HERB: --that number--

SENATOR THOMPSON: --but I don't know the basis of where the number came from. That's what I'm looking for.

MS. HERB: That number came from the Intergovernmental Panel on Climate Change. So it was consistence with the IPCC work, and part of the report that we'll be issuing out in September is to go back to the latest climate science work -- since the Global Warming Response Act is 10 years old at this point -- and to ensure that that 80 percent is still the right target for us. So that's where it comes from.

SENATOR THOMPSON: Well, that's what I'm looking for -- is, where did it come from?

MS. HERB: From the Intergovernmental Panel on Climate Change.

UNIDENTIFIED MEMBER OF AUDIENCE: (off mike)
You're telling us when it was; you're not telling us where it came from.

SENATOR THOMPSON: I mean, it's a nice, round number, but still, you know--

MS. KAPLAN: No, it came from -- it came from a consensus of scientists looking at what the--

SENATOR THOMPSON: --I'd like to see a justification for the number. Should it be higher, should it be lower, or somewhere else? I don't know, but I'd like to see that.

MS. HERB: Yes.

MS. KAPLAN: It came from a consensus of scientists looking at where we would need to get to, to prevent dangerous warming.

SENATOR THOMPSON: I'd like to do my own analysis; or to see the data, and to see if I agree with it.

MS. HERB: Okay.

MS. KAPLAN: We can send it to you.

MS. HERB: We can certainly send that to you.

ASSEMBLYMAN EUSTACE: Thank you very much for your testimony.

MS. HERB: Thank you very much.

ASSEMBLYMAN EUSTACE: I have two questions for you.

MS. HERB: Oh, sorry. (laughter)

ASSEMBLYMAN EUSTACE: The first has to do with the transportation sector -- and, hopefully, you'll address this in your report -- and that is, we have no infrastructure for alternative vehicles. And we have been introducing bills consistently in the Legislature to try and get them through, and they've been blocked by the Administration.

I drive an electric car, but I can't get there from here. You know, there's a charger in the State House that doesn't work (laughter), so that's emblematic of where we are.

So I think one of the things you need to address, as we address transportation as being the biggest contributor -- that you think about alternative vehicle infrastructure. Some states in the country have done a phenomenal job, mostly attributed to Elon Musk, who has created a California infrastructure that is unparalleled in the world. So hopefully we'll be able to address that, because transportation is the biggest knock; and if we could get more people in electric cars, who have range anxiety, to know that they could get from point *A* to point *B*, electric cars would be one of the ways; hydrogen is another way -- and certainly there are other -- biofuels and things like that -- that would help reduce things.

MS. HERB: We agree; transportation is critically, critically important. And the report does have a very strong focus on opportunities in the transportation sector--

ASSEMBLYMAN EUSTACE: Great.

MS. HERB: --and also notable policies in other states--

ASSEMBLYMAN EUSTACE: I appreciate that.

MS. HERB: --not just California.

ASSEMBLYMAN EUSTACE: And I do appreciate you mentioning that carbon dioxide is not the only contributing greenhouse gas. And I want to know your opinion on methane; and where we are in New Jersey on methane, which is far more problematic, if you will.

MS. KAPLAN: Well--

MS. HERB: I'll buy Marjorie some time. (laughter)

But just, also, so you know, in the report that's coming out -- I know we keep saying this report is coming out -- but in the report that will be out in September, we also do focus on methane specifically, in terms of leakage and looking at policies in other states in that area as well. So there will be a strong focus on that, as well as other highly warming gases, you know, in terms of some very comprehensive work that's been done in some states, not just California.

ASSEMBLYMAN EUSTACE: Thank you.

MS. KAPLAN: So methane is one of those things that, you know, we're seeing -- what we know is an issue in terms of pipelines, in terms of distribution -- and so, from the supplier to homes. And we have some of the largest numbers of those kinds of pipes in New Jersey. I know that there are utilities here that are taking a forward-looking approach to addressing--

ASSEMBLYMAN EUSTACE: Thank God.

MS. KAPLAN: --their methane emissions, and they've done some very progressive work. PS has done some very progressive work with EDF.

MS. HERB: EDF.

ASSEMBLYMAN EUSTACE: Yes.

MS. KAPLAN: But there's no mandate, right? So we will talk about it in the report.

ASSEMBLYMAN EUSTACE: Thank you; I appreciate that.

Assemblyman Wisniewski.

ASSEMBLYMAN WISNIEWSKI: Thank you, Mr. Chairman.

I was looking at the pie chart showing the amount of carbon emissions from transportation. And the Chairman correctly asked questions about alternative fuel vehicles. But I wanted to see if you had an opinion or thought about how we spend our transportation capital dollars in New Jersey.

We recently reauthorized our Transportation Trust Fund, and we have a plan to spend \$2 billion a year. But that \$2 billion a year that's being spent is being spent largely on the traditional way of getting from point A to point B -- which is getting in your car -- and not a predominance of it going towards mass transit. For example, to get to this meeting today, you have to take your car.

MS. HERB: Right.

ASSEMBLYMAN WISNIEWSKI: There was no way -- the nearest train station is in Bay Head; but then, from Bay Head to here, it's still questionable as to whether you could get here. So you could take an Uber, which is-- (laughter) Or a Lyft, or a Lyft. But largely, a fossil fuel way of getting here.

Do you have an opinion or a thought about that?

MS. HERB: Part of what you'll see in our report is a discussion on what is, sort of, often referred to as the *three legs* of the transportation stool -- which is looking at transforming the market to alternative fueled vehicles, transforming the fuels to be less carbon intensive, and then reducing vehicle miles travelled as an opportunity to be able to reduce greenhouse gas emissions. And part of what we do is we look at innovative policies related to all three of those legs.

And I guess in terms of my next comment -- I can't quite figure out which hat I'm wearing to say this; it might be a hat from 10 years ago -- but I would certainly point you to the initial comprehensive plan under the Global Warming Response Act that was issued in 2009, that had an extremely strong focus on the transportation sector. And that involved a lot of stakeholder engagement from the transportation sector in terms of looking at opportunities for less carbon-intensive fuels, looking at investment in mass transit, and then also looking at innovative ways to reduce vehicle miles travelled.

So there are lots of opportunities in that 10-year report; but hopefully, our report will be helpful to you too by pointing you to some really innovative policies in others states, including -- not just California.

ASSEMBLYMAN WISNIEWSKI: Great.

You would agree that one way to reduce vehicle miles travelled is to invest more in mass transit.

MS. HERB: Correct.

ASSEMBLYMAN WISNIEWSKI: Okay.

ASSEMBLYMAN EUSTACE: Thank you very much, ladies.

MS. HERB: Thank you.

ASSEMBLYMAN EUSTACE: Next up is David Kutner, New Jersey Future.

D A V I D M. K U T N E R: (off mike) These chairs aren't comfortable after a long time.

ASSEMBLYMAN EUSTACE: Well, I'm a chiropractor; I could probably help you with that. (laughter)

ASSEMBLYMAN ROONEY: They took the comfortable chairs out. (laughter)

MR. KUTNER: Good morning. Thank you for inviting me to talk.

My name is David Kutner, and I'm the Planning Manager at New Jersey Future, responsible for the organization's municipal outreach and assistance, with a focus on coastal communities vulnerable to sea level rise.

I'm a licensed professional planner with more than 30 years of land use and environmental planning experience; a lot more.

With me today, by the way, is Peter Kasabach, our Executive Director.

Founded in 1987, New Jersey Future is a nonprofit, nonpartisan organization that promotes responsible growth, redevelopment, and infrastructure investments to foster vibrant cities and towns; protect natural lands and waterways; enhance transportation choices; and provide access to safe, affordable, and aging-friendly neighborhoods to fuel a strong economy.

Today I am going to describe the work we've been doing with New Jersey communities in the aftermath of Hurricane Sandy; and then talk about immediate and long-term actions the State can take to prepare our communities for the consequences of climate change and sea level rise.

Since early 2013, I've overseen New Jersey Future's Local Recovery Planning Manager program, which provides ongoing and direct assistance to municipalities seeking to rebuild from the devastating damage of Hurricane Sandy.

The Local Recovery Planning Manager program is unique, compared to the various assistance efforts launched after Hurricane Sandy, because we embedded professional planners in communities that were hard hit by the hurricane. Six communities participated in our program: Sea Bright and Highlands in Monmouth County; Little Egg Harbor and Tuckerton in Ocean; and Commercial and Maurice River in Cumberland County. So we covered the state.

Our Recovery Planning Managers set up desks right in the town halls so they could work closely with elected officials and staff on many issues they faced in the aftermath of the storm. We continued to work with these towns for at least three years; and we're still working with some of them today, five years after the storm. This long-term, hands-on relationship was essential to gaining the trust of local officials and community residents.

All the towns that sustained damage from the storm were seeking to return to normalcy: getting residents back in their homes, businesses back in operation, and mountains of debris cleared from the streets. We all remember the pictures.

During our first program year we worked with our participating towns to address these objectives. We were able to successfully obtain \$8 million in grants for projects ranging from purchase of emergency communications equipment to installing green infrastructure; from restoring a community park to obtaining a police car. However, we knew that eventually the towns would need to move forward from emergency response to long-term recovery, and that meant confronting the vulnerability to future coastal storms and risks associated with sea level rise.

Increasingly, residents and communities we're working with are acknowledging that circumstances in their towns are changing. One resident who I spoke to told me that she used to enjoy-- By the way, she was displaced as a result of Hurricane Sandy, and it took her two years to get back in her house. She told me that she used to enjoy the thrill of storm events. Now she views them with alarm and dread, emotions clearly on display when I watched residents frantically moving cars, boats, families, and neighbors, as Hurricane Joaquin bore down on the coast in 2015.

When we started our work we found that no municipality was prepared to respond to the damages they experienced from Sandy. In Sea Bright Borough, for example, 50 percent of the businesses were wiped out, and 50 percent of the residents were forced from their homes. It was months before the town was able to contact many of these displaced families; and in some of these municipalities, residents are still not back in their home five years after Sandy.

But in honesty, our coastal towns really should have been prepared for Sandy. On average, almost every year for the past two decades New Jersey has experienced a presidential-declared disaster on some part of its coast. We keep repeating these experiences, and we keep responding by insisting on rebuilding and returning everything to pre-storm condition as quickly as possible without considering the inevitability of the next event.

The storms are trying to tell us something and, frankly, we haven't been listening.

We're now experiencing coastal risks that the State can no longer afford to ignore. Sandy was our most dramatic storm event in recent

memory, but it has been followed by two presidential-declared flood-related disasters and several severe storms and nor'easters.

Towns today are experiencing recurring flooding during regular high tides. Today, flooding is occurring in the streets of towns during the high tides. And we used to shrug these occurrences off as nuisance flooding; but they're not merely a nuisance when they regularly inundate larger areas of the coast, block emergency evacuation routes, and cause considerable property damage. Projections indicate that these conditions -- the projections you already heard -- that these conditions will grow more severe over time.

The relationships New Jersey Future cultivated with the towns and their residents enabled us to discuss climate change and sea level rise, and what it would mean to their futures. In Little Egg, we worked with a steering committee for well over a year to prepare a detailed risk analysis. When that analysis was completed, we asked the council to schedule public hearings to discuss our findings with the residents of the town. It took us four months before the elected officials would even talk to us about setting up those meetings. They told us that they were really nervous about discussing these topics with their residents because, in one councilperson's words, "It will scare the hell out of them."

In the end, however, the meetings were scheduled, and very productive public discussions did occur. These are really difficult conversations for local officials to initiate because they fear that people will no longer invest in their towns, or they will simply move out. And local officials have no buffer right now. The Administrator in Little Egg told us, "We can't do this by ourselves. Invite State and Federal agencies and other

towns to join the conversation; but on our own, we can't talk to our residents about these issues."

We really need to figure out a way to facilitate these conversations, because we can't keep rebuilding in the 1 percent flood zone if we want resilient, thriving municipalities with sustainable tax bases. In Toms River, the valuation of land and buildings in the 1 percent flood zone -- that's the 100-year flood zone -- is worth a staggering \$4.7 billion, encompassing one-third of their entire land area. What happens to their tax base when those properties are under water?

We can't ignore what climate science is telling us, and we can't ignore that our communities are entirely unprepared for the consequences of climate change and sea level rise.

To demonstrate what communities will face, and in terms that local officials could relate to, we developed an analysis that translates risk into financial impact. We recognized that maps alone are not sufficient; as good as they may be they are often written off as abstractions to most people. So we developed a parcel-based risk analysis that predicts the depth of inundation throughout a community, and models the structural damage that occurs to calculate financial exposure -- and that was translated into the impacts on the tax revenue losses. This analysis enabled us to determine, for example, that by 2050, sea level rise plus a Sandy-magnitude storm, would inundate 55 percent of the area of Little Egg Harbor, and the Township could lose as much as 35 percent of its assessed value. That would clearly be an economically unsustainable hit.

It was at this point, with these calculations in hand, that municipal representatives finally acknowledged that we have to seriously consider how we respond sea level rise.

To effectively respond to risk, New Jersey's municipalities, as Jeanne pointed out, urgently need State-level direction and assistance. There are several steps the State can take to move coastal communities forward toward resiliency. These actions need to be taken right now while we still have time to plan ahead, instead of waiting and reacting to conditions of sea level rise that will leave us with no alternatives.

The State should, one, assume a leadership role in assisting coastal municipalities to implement adaptation and mitigation. So far, they've been absent in that role.

They need to establish uniform, forward-looking sea level rise standards and guidelines for mitigation planning that municipalities can use. We suggest using the sea level rise projections from the report that Jeanne mentioned and Professor Broccoli mentioned -- the New Jersey Climate Adaptation Alliance Science and Technical Advisory Panel's *Assessing New Jersey's Exposure to Sea Level Rise and Coastal Storms*. Just about every organization that is doing work in this field right now in New Jersey is using that report for its projections.

Adopt principles set forth in President Obama's Executive Order 13960, which encourages State, county, and local agencies to use the best available science to ensure that no critical facility is located in an area subject to current and future flood risk.

Also, require and provide assistance to enable every coastal community to assess its risks and vulnerability to sea level rise. These

assessments need to be performed immediately because even though sea levels are rising and damage from storms is becoming more severe, we still have time to plan and enact rational adaptation and mitigation strategies.

And we also need to perform these analyses immediately because land use changes that ensure that people and property are not in harm's way will require a long period of adjustment before they achieve successful outcomes.

We also need to recognize that climate change and sea level rise will overwhelm the resources and abilities of individual municipalities to plan for them. Sea level rise and storm events don't respect municipal boundaries; they have regional impacts and they demand regional responses.

Steps the State could take to better support our communities through a regional approach could be:

Entering into broad-scale dialogue with at-risk communities. We need to reimagine the future of the Shore and how it will be used, and how current development can be shifted gradually out of harm's way. Reimagining the future of New Jersey's coast is going to necessarily involve extensive engagement and communication with local residents, business owners, and officials to garner the support that is going to be necessary to implement necessary adaptation strategies.

The State needs to adopt a regional perspective to all local planning and programs. As I've already mentioned, adaptation can't be implemented on a community-by-community basis. Uncoordinated, individual responses -- such as sea walls and bulkheads -- can and do result in unintended adverse impacts on neighboring communities. Effective

response must encompass entire coastal areas unconstrained by municipal boundaries.

The State can also consider the creation of a regional resilience commission, and explore the development of regional revenue sharing policies. Regional tax sharing was a founding principle when the Meadowlands Commission was established to protect fragile wetlands. That approach could serve as a model policy framework to balance windfalls and wipeouts to help municipalities make the right development choices in vulnerable coastal areas.

Also, the State could revise the Municipal -- this is a must -- revise the Municipal Land Use Law to require incorporation of risk and vulnerability analyses into municipal master plans and local zoning. The MLUL must be revised to address the risks of sea level rise and climate change. Towns will also need technical and financial assistance to align local land use plans and policies, zoning regulations, and capital investments, with natural hazard information mitigation and adaptation strategies.

And we need to align State programs and incentives to discourage development in areas at risk of flooding or inundation. This could be accomplished through a rekindled State plan process.

When I first I met Mayor Dina Long of Sea Bright Borough, she was wearing her hip-high waders. She told me this was normal; the town experiences flooding on a monthly basis, and waders are standard-issue Borough attire. The problem stems from the fact that the Borough's stormwater outfall pipes are lower than the level of the Shrewsbury River during high tides; so as the river rises, waters back up through the collection

system and regularly floods the street. The thing is, the flooding is occurring more often and becoming more persistent. It's happening with alarming regularity in Miami, where fishes are swimming in the streets during high tides, and in many coastal towns up and down the East Coast.

The State can and should take a lead as a valuable partner to mayors like Dina, who are striving to do the right thing but need support, guidance, and funding to plan an orderly transformation of their towns into communities that can be sustainable in the face of sea level rise and a changing climate. To that end, New Jersey can follow the path set by several other states, including Massachusetts, New York, Maryland, Delaware, Virginia, and North Carolina -- just to name a few.

We urge the members of the Joint Environment Committee (*sic*) to advocate for policy changes and enact legislation to protect and preserve the vital economic and environmental resources that are New Jersey's coast.

I have a lot more detail about what our program did and how it operated in the reports that are in your packets, entitled *In Deep*.

I'm happy to answer questions.

I might point out that we have an event planned in Trenton on August 17 to talk about the issue of regional response to sea level rise. It's going to be at the War Memorial, and we invite you all to attend that one as well. So your schedule should be pretty full between us and Rutgers.

So thank you very much.

SENATOR SMITH: Any questions for Mr. Kutner?

We'll start on the Assembly side; any questions for Mr. Kutner?

(no response)

On the Senate side? (no response)

You were remarkably thorough, concise, and maybe even brief.

MR. KUTNER: Thank you very much.

SENATOR SMITH: We consider you guys a resource, and we won't hesitate to call.

MR. KUTNER: Thank you very much.

SENATOR SMITH: All right.

So now we get to the general public.

We have a 12:30 deadline; we have 13 slips turned in -- people who would like to talk. So we're going to ask for something that's rarely seen at a Trenton hearing: a little self-discipline. (laughter) We're going to ask everybody to take no more than three minutes; be concise. This is a challenge. Get your point of view; we all want to hear what everybody has to say, but we need you to say it in three minutes or less.

And the first one is Tom Fote, Commissioner to the Atlantic States Marine Fisheries Council; on climate change and fish.

Tom.

T H O M A S P. F O T E: I will try to be very concise.

Fishermen knew about climate change a long time ago, when we started seeing stocks, basically, vanish, and move further north.

When you were sitting talking about the nuclear power plants -- we saw thermal pollution when they started building all the power plants. So when we started pulling one-through systems -- where the water just goes through and comes out -- if you look at Barnegat Bay -- and then it had ecological effects. Remember, when the Oyster Creek plant opened up, they had to buy all the property around Oyster Creek because it basically

promoted the shipworms, which ate out all the bulkheads, so they couldn't use the property that way until we got other means.

So we've been experiencing that; and if the power plants want to stay, they need to do cooling towers. Even the regular plants need to do cooling towers, because that's thermal pollution and we have that all the time.

I just had two weeks' of meetings -- fisheries meetings -- with-- I just left from Philadelphia last night from the Mid-Atlantic Council and the Atlantic States Marine Fisheries Commission joint meeting. And one of the things that we talked about is lobsters. They are the canary in the mine -- that, and surf clams. During the 1990s, the water started warming up. The lobster population grew dramatically in New Jersey and in the Mid-Atlantic region. But as the temperature got to this point, it started going in the opposite direction. We're talking about -- we've been talking about it for five years now -- putting a moratorium on the harvest of lobsters in the Mid-Atlantic to try and rebuild the stocks. We know it's useless, so we haven't put the fishermen out of business. But the fishermen are putting themselves out of business because they are naturally losing boats because they can't make a living.

So we've gone from 30-something boats in New Jersey down to about 15 that are actually still lobstering; but they aren't making the money they made in the 1990s and they are not catching the fish.

The scary part is, Maine has seen the same kind of boom. As a matter of fact, that's why you're getting lobsters for \$5.95 a pound. But that's going to stop. They haven't had good recruitment in five years, basically because the water had warmed up, the population grew

dramatically again, and now they haven't seen babies for about five years. As a matter of fact, they're planning what's going to happen, because unlike the lobster industry in New Jersey -- that was worth a couple of million dollars, \$10 million or \$15 million -- in Maine, it's worth \$1 billion. So that's going to be a crisis, and Congress will have to deal with it.

We're seeing fish from the South up in the North; cobia and many other species. We also lost the surf clam industry. The surf clam industry was one of the biggest commercial fisheries in New Jersey. It was worth about \$250 million. It disappeared out and north, because they had to go to colder water and deeper water. It's going to affect both the recreational and commercial fishing industry; it has already done that, besides regulations that we're looking at, and the amount of fish that are around.

So I'm going to cut it short. But I am talking about thermal pollution -- we need to do that in the bays and estuaries. One of the other hats I wore for 18 years -- I was the policy member of the Barnegat Bay Estuarine Program, representing the citizens of Ocean County. And we started looking at what's the effects of eel grass and everything else in the house.

As a Sandy victim, I just got my -- actually, I just got my CO about a month-and-a-half ago. I'm raising my house; it took me two years -- an interesting operation. But I went up three more feet because I know what they said what the flood level is, it's not going to be good enough in about 10 years from now for the people who move in.

I want to be concise, but you need to do the fishermen involved in this (indiscernible). Industry in New Jersey is worth \$2 billion, both the

commercial and recreational fishing. We need to take into consideration when we look at (indiscernible).

I hope Jeanne Herb heard that, and maybe get a few of the commercial fishermen and recreational fishermen in her Alliance.

Thank you very much.

I'll answer any questions, probably after the hearing, because I don't want to hold you up.

ASSEMBLYMAN EUSTACE: Thank you, Tom.

Next, John Tomicki, League of American Families.

J O H N T. T O M I C K I: Is this on? (referring to PA microphone)
Can you hear me?

SENATOR SMITH: We can hear you.

MR. TOMICKI: Fine.

Trying to stay within the parameters of 3 minutes -- I might go 3 minutes, 45 seconds. I hope you don't shoot me in the head.

As you know--

SENATOR SMITH: You're already 30 seconds behind.
(laughter)

MR. TOMICKI: I'm not a climate change denier because, guess what? Climate fluctuates all the time. The question is, as we've said earlier today, one of the things you're focusing on is CO₂. Is it a blessing or is it a curse? And I heard the wonderful phrase, which just came out of the lady behind me -- and I just couldn't catch her name -- *natural sink*. Now, who on the Committee -- because there's a lot of talent up here, and I hate to lose even Assemblyman Wisniewski, because it takes a long time to learn this field -- it's not what I learned when I went to the Wharton School; I

was arguing with them on disposable society and renewables. That was 1956; that was the subject of my thesis. But I'm not a climate paleontologist; I don't know engineering; I just know how to think sometimes outside the box.

Glomalin -- anybody hear the term *glomalin*? (no response) No? Neither did former Congressman Holt, when we had a Committee hearing; Congressman Bishop had it on-- What is this thing; what has happened? Well, they discovered something called glomalin. Where is it? It's a sticky protein at the bottom of what grows down in the grass plains. Guess what it can do? It sucks in and gloms down CO₂.

He was shocked to see it at the hearing that-- And by the way, there was a mention of Obama's Executive Order -- because that order also encourages you to do things in natural sinks, although they didn't fully understand what it is.

So it's there; it can be done now. If I told you that it could take and absorb, by the science -- if you adjust your agricultural practices. Now, this just takes a side bar, and I've mentioned it before, and I have never gotten through all of it yet -- part of it is in this PBS thing. What it is -- and working in the natural grasslands; some of those grassland roots go down 12, 14 feet. Carbon dioxide gets in, converts over, and it becomes like this sticky sugar protein. It replenishes the soil.

So you have a North Dakota rancher, 200 acres. He was doing the proper rotation of grass, animals, and whatnot; and replenishing the glomalin, which they found, I think it was 1996. And a big storm comes in; five inches of rain. A farmer over here with 300 acres, he gets washed out. This farmer is not. It absorbs, it holds water, it can do things.

By the way, I'm glad you raised the issue of New Jersey sinking. That was something I didn't know, because when you get into what's going to happen in the wetlands and the other areas -- that's another thing for another thing.

But if we adjust our agriculture practices, it's working now in North Dakota, Texas, and Virginia. The Rodale report -- everybody hear of Rodale? Know where it is? (no response) Okay, it's over there in Pennsylvania; it's a great research institute. They put out a report, and it said, simply put, "By the adjustments of your agriculture practices, we could sequester more than a 100 percent of the current CO₂ emissions with a switch to widely available and inexpensive organic management which we term *regenerative agriculture*." It's there now, it can be done.

I mentioned before, the hearing -- which I'll get a transcript of it for you -- because I know it works. The Rodale report talked about how this will happen; it's a potential to remove all the anthropomorphic CO₂ from time in recorded history. It's that good. Is it being done now? Yes; the U.S. Natural Resource Conservation Service is now subsidizing -- I'm a little uncomfortable with subsidizing -- but it's subsidizing these practices for the economic and financial benefits.

Now, there's always a debate. People on one side of the (indiscernible) -- we have climate change; it's all being caused by CO₂. Other people say we should subsidize. I can show you the win-win solution. If you go and do the natural sinks -- and I can give you a plan for the agriculture things that should be done here. How many countries are doing this now? They have finally glommed on; there is a subsection of the Paris

Accord -- how many countries? Australia, Austria, Ethiopia, Germany, Japan, Mexico, Morocco, Netherlands, New Zealand, Philippines, etc.

SENATOR SMITH: You don't have to read them all, John.

Listen, it's an interesting idea. Obviously, it's beyond the scope of three minutes.

Can you send us the source information so we can evaluate it?

MR. TOMICKI: Sir, I'm going to do an op-ed piece because it's here. And I'm glad you didn't know about it, because neither did former Congressman Holt. But it's here now. What we need are three test programs done in New Jersey. Go in and test it, and within three years you can prove how it can work now. That nails the CO₂ problem; not the methane problem or the other things. But it's here now.

SENATOR SMITH: Listen, we'd love a solution.

MR. TOMICKI: Pardon?

SENATOR SMITH: We'd love a solution. We'd like to see the information.

MR. TOMICKI: You'll get the information.

SENATOR SMITH: And let me ask you to meet with the two representatives of Rutgers to make sure they know about it.

MR. TOMICKI: I know. When I heard the words *natural sink*, my heart leaped.

SENATOR SMITH: Terrific. (laughter) I appreciate it.
Beatrice Humphris.

MR. TOMICKI: Pardon?

SENATOR SMITH: The next person -- Beatrice Humphris.

B E A T R I C E H U M P H R I S: (off mike) Could someone else go first, please?

SENATOR SMITH: Okay.

John Weber, Surfrider.

J O H N W E B E R: (off mike) We're going in reverse order.

SENATOR SMITH: No, actually, these are the slips that were turned in. We're taking them in the order -- at least, we think it's the order.

MR. WEBER: Thank you, Mr. Chairmen, and Committees.

I'm John Weber; I work for the Surfrider Foundation. It is great to be back here in Lavallette.

This was one of the first towns that the Surfrider Foundation's Jersey Shore Chapter planted dune grass in, after Sandy. It was great to be out here with Council President Anita, with many other people in town getting their hands dirty. Clearly, this is a town that gets it and understands things like natural dunes provide natural protection.

So Surfrider Foundation's mission is the protection and enjoyment of the world's oceans, waves, and beaches. I'm going to emphasize *beaches* here. You've heard all about climate change and sea level rise today. What I'm going to talk about is, what is our response to that. And our response, on the beaches, is typically beach fill, beach replenishment, or armoring. *Armoring* meaning seawalls, bulkheads, sandbags, geotextile bags or geotubes; in short, hard structures to keep back the ocean.

I'll start with beach fill. Our organization finds beach replenishment to be incredibly problematic. In Monmouth County, they

had the biggest beach replenishment project at the time; the biggest one ever the Army Corps ever did in Monmouth County. It negatively impacted fishing and surfing, and it left our beaches steep and dangerous.

Those beaches were just big, wide, flat beaches without dunes. They provided zero protection from Sandy. I mean, all those Monmouth County towns got hammered in Sandy -- Sea Bright, you know. Sea Bright has the most engineered beaches in New Jersey, and it was the town that was hit the worst. Spring Lake, Belmar -- all these towns. We all know what happened. They did not provide a lot of protection.

In the mid-2000s, on Long Beach Island, there was a huge problem with easements, and you had a lot of pushback from homeowners. Some of those homeowners came to this Committee to speak. We were in Toms River, at that hearing, and they were giving you an earful about how they were being asked to just give over part of their property.

In the late 2000s, in Cape May -- the beaches of Cape May got so dangerous that U.S. Senator Frank Lautenberg ordered a study of why so many people are breaking their necks on Cape May beaches. So this is all a result of beach replenishment.

Right now, today, in Margate, New Jersey, the Army Corps has destroyed yet another beautiful beach in the middle of summer. If you don't know what's going on in Margate, please google it. The *Philadelphia Inquirer* is doing the best reporting on this right now. In short, the Army Corps plan pushed away -- sand away from the frontline of houses to create dunes and left this huge depression that has filled up with water -- with rainwater -- and people need to trudge through a foot-and-a-half of, like, disgusting water to get to the beach. It's the biggest mess ever.

The sad thing in Margate is that people in the town didn't want this project. They fought it, there was a referendum; they won. They went to court; they won. The project happened anyway. And what these folks -- the locals said was going to happen to their beach, happened to their beach.

There's a documentary out there called *Shored Up*. Everybody should watch it; it's about beach replenishment. And in it the Army Corps admits that if the only thing you're doing is beach replenishment, with respect to sea level rise, it's just not sustainable. You're not in a sustainable position. So my concern here, from a policy perspective, is that we're putting a lot of eggs in that basket. And not only is it problematic, but the people who do it -- the Army Corps -- they say it's not sustainable in the long run.

A couple of other words about seawalls. In short, seawalls on an eroding beach, on a high-energy beach like an ocean beach -- a seawall will cause the beach to disappear, okay? We love our beaches here in New Jersey, you know? A seawall can be really effective at protecting the private property, but the beach in front of it tends to disappear. It's simple physics -- that the energy of incoming waves has nowhere to go; it hits a hard structure, it bounces back, and it takes sand with it. And that beach disappears.

So, again, from a policy perspective, in our minds at Surfrider Foundation, we think the State should really look at the policy of seawalls and consider not allowing them on ocean beaches. I mean, you're going to get lower energy places on the bay fronts and stuff that are all bulkheaded anyway. I don't think we're going to outlaw bulkheads or seawalls on bay beaches. But we should consider it on the ocean beaches because the sea's

coming up; we already know it's coming up. And if those rising seas run into seawalls, we're going to lose our beaches, and we love our beaches here in New Jersey. So that is going to be unsustainable.

There's a University of California Santa Barbara study out -- I just saw it today -- on seawalls, on exactly this subject -- how they're going to be problematic in the face of sea level rise.

And then, in Imperial Beach, California, they were looking hard at sea level rise and what they were going to do. They were considering armoring. And the town did a big study, and they found it's less expensive - - way less expensive to do retreat than to armor, than to try and hold the ocean back. So I think there's some lessons there we can take.

If I can have 30 more seconds -- I'm not just an environmentalist, I'm involved in local government. We love our local government here in New Jersey. I was on the Planning Board for nine years; I'm also an elected leader in Bradley Beach now. When we re-did our Master Plan in Bradley Beach, I said, "We need to put something in here about climate change and sea level rise. We're a coastal town; we have two lakes on either side." And the Chair of our Planning Board said, "No, that's not our job." They couldn't get their heads around the fact that we need to plan for this stuff in our Master Plan.

So again, from a policy perspective, something's not getting through to local folks, elected leaders. I know the work that Jeanne's doing is great work; the flood map -- there are things like that. These are great tools for municipalities. But for some reason, we have 500-something municipalities -- I don't think they are all planning for climate change. And we have the tools to do that. Every town needs to do a Master Plan.

Probably 300 of these towns are affected by climate change, so they should be incorporating that.

So that's just a word on getting the word out there -- the good work that's happening.

And I will leave it at that, and assume that you don't have any questions.

ASSEMBLYMAN EUSTACE: Thank you, John. I appreciate your testimony, and you and I have had the discussion.

SENATOR THOMPSON: I have one; I have one question.

ASSEMBLYMAN EUSTACE: Hang on one second, Senator.

And you and I have had the discussion about the seawalls and the shoring up. So we appreciate your testimony; it's been well-heard. And some of the suggestions were that the State do something about mandating climate change and planning in the future.

Senator Thompson.

SENATOR THOMPSON: You say, "Don't build seawalls," and, "Don't do beach replenishment." So what is your suggestion what we should do about the problems that occur? Just let nature take its course; or how should we deal with it?

MR. WEBER: Well, certainly not. And I am on record saying, this is why it's a difficult problem.

SENATOR THOMPSON: I'm looking for a solution, not just what not to do.

MR. WEBER: Right; we're all here now. And what these towns have to realize is, we're on a barrier island right now; it's going to get pinched. These towns need to start planning for the fact that the shape of

their town -- and my town as well -- is going to change. It's going to be narrower. I don't like living in a condo, but to get the same amount of people on this barrier island when it's much narrower -- because the Bay has risen and the ocean has risen -- well, maybe we're all going to have to live in condos. I'm not one of those people who says, "Everybody needs to move to Pennsylvania;" I'm not. (laughter) But we need to start planning now, you know? I mean, there are people, like, who think -- retreat in that sense.

But, I mean, there's careful planning. I'll give you an example. I looked at pictures from Asbury Park from the 1920s. There are at least eight big structures out on the beach. There are not eight big structures out on the beach in Asbury Park anymore. Unfortunately, they got wiped out by storms. If we carefully plan-- You know, it's like that's *unplanned* retreat. What we're trying to avoid is unplanned--

SENATOR THOMPSON: So you are basically in agreement with the chap from New Jersey Future who says we have to plan; don't rebuild where you shouldn't be building, and so on.

MR. WEBER: Exactly. I mean, that will be a huge first step. And I know there's a huge resistance in New Jersey, but that's a huge first step.

ASSEMBLYMAN EUSTACE: Thanks, John. I have to cut you off.

MR. WEBER: Thank you.

ASSEMBLYMAN EUSTACE: We have at least 10 more people.

Thank you.

He did suggest retreat.

Cindy Zipf, Clean Ocean Action.

C I N D Y Z I P F: (off mike) First, I have to let the Chairman back in.
(laughter) (referring to a locked door)

Okay.

ASSEMBLYMAN EUSTACE: Oh, okay. (laughter)

MS. ZIPF: Thank you very much, Mr. Chairmen and Committee members, for coming to the beach. I know it's a tough challenge -- a tough job for today.

But I really want to thank you for the topic that you chose to speak about, because it is one in which there is so many compelling -- so much compelling information and facts, and you had such excellent testimony presented here today -- the tools and the ideas. And the game plan is out there for us to embrace, but we need that leadership.

I also want to mention something that didn't get talked a lot about -- ocean acidification is one of the facts and problems associated with climate change. And ocean acidification is something that is just mind-boggling. How could we acidify the ocean? But right now, all that CO₂ is going into the ocean; the ocean is taking one for the team here and absorbing a lot of it -- much, much of it, and to its own demise. So it's a very serious issue.

And because of all this, obviously we should be moving away from fossil fuels as quickly as possible. But it's obvious, also, that Washington didn't get the memo. Specifically, I'm talking about President Trump's Executive Order No. 13795, which is the Implementing an America-First Offshore Energy Strategy. This has triggered BOEM -- the Bureau of Ocean and Energy Management -- to move very swiftly. And

Secretary Zinke has already rescinded the denial of permits that will allow for oil exploration just south of us, from Delaware Bay south to Florida. We can expect to see five companies at the same time in the same -- roughly the same area, blasting the ocean with over 250 decibels every 15 seconds for up to a year. That will have very devastating consequences to the marine life -- everything from harassment -- scaring things away -- to death. It is a very harmful activity, and it is likely to happen very soon -- by the end of this summer or this fall -- again, everywhere south of us to Florida.

And of course, sound travels in the ocean. So this is going to have an impact to our fisheries as well, and marine life.

BOEM has also started a new five-year offshore drilling plan. Now, that might sound odd, because we just completed one in January; and that was supposed to last five years, until 2022. But the President's Executive Order has triggered a new five-year plan, so we're starting again. And BOEM -- the Bureau of Ocean Energy Management -- has requested information on their new plan, which includes the entire Atlantic Ocean, the entire Gulf of Mexico, the entire Pacific Coast, and all of Alaska. And so they are winnowing down that large area in this process. They are seeking now public comments, called *their request for information*. And that -- so the public is invited, governors are invited, elected officials are invited to present information on whether their area should or should not be included in this next five-year plan.

And based on that information, they will make a decision; and that's expected by this fall. I was on a call yesterday -- a national call that BOEM held on this program; and it is a very fast track. By this fall they are going to respond to all that information and make the recommendations. It

is imperative that New Jersey, the New York-New Jersey region, the Jersey Shore is not on that map.

Obviously, offshore oil and gas drilling is a polluting circle. There is just nothing beneficial about it. From the exploration, as we heard, with seismic testing; to the drilling; to the exploration; to the drilling muds; obviously, the potential for development. Oil drilling is dirty -- not just offshore, but on land. You'll need to have very large industrial complexes off on our coasts somewhere to manage that. We have a remarkable diversity of marine life, and we have a very strong clean ocean economy, for which there is no allowance for offshore oil and gas development.

New Jersey, right now, has no laws or regulations protecting it from offshore oil and gas drilling. We are extremely vulnerable, and it's only the political will of the people and our elected officials that has kept it at bay to date.

And we have not yet heard from the Governor; he has expressed, in the past, that he has been opposed to offshore oil and gas drilling off the Jersey Shore. He has not yet made comments to BOEM; so we're hopeful that before the comment period ends, the Governor will stand up for New Jersey and oppose offshore oil and gas drilling off of our coast.

We also urge each and every one of you to step up and do the same. The comments -- it's a fast track, and the comments are due August 17. So if anyone is interested in this room, or beyond, you can go to our website; the web link is right there where you can click on it and submit your comments and express why the Jersey Shore is not an appropriate place for offshore oil and gas drilling.

ASSEMBLYMAN EUSTACE: Thank you.

MS. ZIPF: Thank you.

SENATOR SMITH: And by the way, thank you for your testimony.

The Chairman and I are having researched two things: First of all we have, over the years, expressed our view on offshore drilling--

MS. ZIPF: Absolutely.

SENATOR SMITH: --but it sounds like we need to do it again. So we're going to take a look at resolutions in both of our Committees. And then we're also going to check out the comment you made that it's not illegal in New Jersey waters to do drilling. So if that's not the case, we're going to take a look at it and see whether legislation is needed there.

MS. ZIPF: Yes.

SENATOR SMITH: We appreciate the good suggestions.

MS. ZIPF: Yes; and there are other things the State can do on State lands to help also make it more difficult or challenging.

So we look forward to working with you.

SENATOR SMITH: Would you send it to--

MS. ZIPF: Yes, will do.

SENATOR SMITH: --Chairman Eustace and myself?

MS. ZIPF: Will do.

SENATOR SMITH: Okay.

MS. ZIPF: Thank you very much.

ASSEMBLYMAN EUSTACE: Thank you.

MS. ZIPF: Thanks.

SENATOR SMITH: Doug O'Malley, climate change.

(laughter)

Actually, you're not *climate change*; you're Environment New Jersey. (laughter)

ASSEMBLYMAN EUSTACE: It's all on you, Doug.

D O U G O' M A L L E Y: But it could be my middle name, right? (laughter)

I want to thank every member of the Committee, and both Chairmen, for holding this; and obviously, the previous testifiers.

And I wanted to say that one of the things that's come out in the testimony that I think is critical to have a conversation on, is this question of, can the Jersey Shore be the same as it is today moving into the future. And what we're hearing from the testimony is clearly that the fire bell of climate change is going off. And even if we act now, we're going to see big changes here along the shore.

And I wanted to reference a study that I don't think was referenced -- Union of Concerned Scientists. They looked at the National Climate Assessment from 2014, which is currently being updated by the Trump Administration, and a leaked copy has come out. So we'll see if that changes.

But looking at the 2014 study, 21 towns -- 15 of them along the Shore -- are going to see chronic flooding in less than 18 years. So, you know, we're talking 2035; this is not a future generation. And this chronic flooding is going to be covering more than 10 percent of that town's landmass every two weeks. Obviously, those numbers go up as we get to the end of the century. And the Union of Concerned Scientists said time so that New Jersey had the second-highest risk, compared to Louisiana.

So we're talking about the future of the Shore and the future of our coastal communities, especially our inland communities, including cities like Newark and Jersey City. You know, this doesn't -- this should not be a theoretical discussion, because when we're talking about these solutions, there's true economic cost. John Weber referenced, and also New Jersey Future referenced, the fallacy that building a seawall is going to solve this problem. It's not. But we do have records -- not only of buildings in Asbury Park -- but whole communities that have been wiped off the map. There's a West Cape May, there's a Cape May; there's no longer a South Cape May, because that was washed off earlier this century. We're going to see more of those communities be under threat. And this is assuming that we actually take action.

And so referencing the work of the Fund for New Jersey and the testimony of Ed Lloyd, we clearly need the next Governor to take an incredibly aggressive stance on moving forward on climate change.

And to kind of reference the agenda we need to see the next gubernatorial administration take, we need to reopen the Energy Master Plan and come up with a plan on reaching 100 percent clean energy by 2050. We need to make New Jersey a national leader in offshore wind, which Assemblyman Eustace -- you referenced that economic opportunity. That's where we're going to see the largest source of clean energy -- that's where the largest source of clean energy will come from. We've been behind, but we can catch up. We need to include a social cost on carbon on all energy infrastructures, including fossil fuels. Because right now we have just an insane amount of gas infrastructure that's being proposed for the state without an analysis on the carbon impacts.

And finally, as both Chairmen referenced, we have the largest source of our carbon pollution in the state coming from the transportation sector. We need to be looking at electric cars. And so your frustration, Chairman Eustace, on finding a charger and having a charging station that works -- it's not just the State House; it's everywhere in the state. And hopefully, Pam Frank will get a chance to testify, from Charge EVC, on the role that New Jersey can take to make electric car infrastructure commonplace in this state, to plan to be transitioning our vehicle fleet over to an electric fleet over the course -- not just of decades but, really, over the course of the next eight years, by 2025, and then slowing ramping it up. Again, that's part of New Jersey's Clean Car Program; but we obviously need to speed it up.

So thank you so much.

ASSEMBLYMAN EUSTACE: Thank you, Doug.

Dave Pringle, Clean Water Action.

D A V I D P R I N G L E: Thank you for sharing the comments of (indiscernible); that we're doing this today.

I think it's especially important, given where the Trump Administration is at; and the U.S. climate scientists being brave and sticking their necks out earlier this week.

There are two points I want to really drive home, and they are concerning about 100 percent clean energy: Is it doable, and do we have a choice.

And if you believe the science, it is not only absolutely doable, it is absolutely critical. We do not have a choice; we have to do it.

The Solutions Project -- which is a consortium of international scientists, engineers, and Ph.Ds., run primarily out of Stanford and Cornell -- has developed plans for 100 percent clean energy using existing technology for every single state, recognizing the resources that they have available to them; and for over 130 countries. So they're using existing technology -- how we can get to 100 percent clean energy by 2050.

Our nuke plants will be gone in 2050 that are running in New Jersey. Most of our gas plants will be gone. So they will be replaced with something. What will they be replaced with, and what are the costs and benefits? And if you do the math, if you factor in healthcare costs, you factor in the climate costs, you factor in what consumers pay -- wind, water, and solar are the ways to go.

It would create over 140,000 jobs in New Jersey; it would save \$12.4 billion in avoided healthcare costs every year; it would avoid 1,500 deaths from air pollution every year. That's according to the engineers and Ph.Ds. at Cornell, and Stanford, and the Solutions Project.

So given where the Federal Administration is at, it's especially critical for states to lead. And until this Administration -- and even for the first couple of months of this Administration -- where we are leading, at a great Offshore Wind Act that was never implemented-- But I know the Senate has been trying; we got an 80 percent renewable bill passed twice. So there is a lot of potential out there.

And when we talk about 100 percent clean energy, the focus is on transportation and electricity; but it's also heating, and cooling, and industry. And one of the arguments against going 100 percent renewable is you can't use renewables to get to the temperatures you need to for every

industry. You absolutely can. Because you produce clean energy, you then use that clean energy to split a water molecule -- you get hydrogen, and you get the temperatures you need for heavy industry. That's what the Solutions Project talks about -- is using existing technology. It's doable today.

We obviously have infrastructure in the ground now; you know, this doesn't happen overnight, thus you need to do the transition.

So there are a bazillion policies that need to be happening here. Doug, and John, and Ed Lloyd led out on a lot of them. I just want to quickly run through a couple of them.

Obviously, the 80 percent renewable bill, in the short term; we need an energy efficiency portfolio standard; we need to stop raiding, immediately, the Clean Energy Fund; we need to do electric cars; we need to revamp the mass transit system.

And, you know, we can always make changes; and we're talking -- over the next 35 years, things are going to change. We're probably going to have driverless cars by then, let alone electric cars. And so if we don't go for it and if we don't set the benchmark, we'll never get there; and we can always make adjustments. Because no one can predict exactly how smoothly things will or won't go.

But where there's not a will, there's not a way. And we need you to lead the way and have the will.

Thank you.

SENATOR SMITH: Thank you.

Dan Fatton, Work Environment Council of New Jersey.

DAN FATTON: Good afternoon.

Thank you for convening this hearing; and thank you for allowing public comment.

My name is Dan Fatton; I'm the Director of the Work Environment Council of New Jersey. We're a coalition of 70 labor, environment, and community organizations dedicated to safe, secure jobs and a healthy, sustainable environment.

I'm also one of the Co-Founders of Jersey Renews, and I want to talk to you a little bit about our coalition. It's more than 50 groups. And we've heard a lot from experts this morning and environmental groups. But we have union support. So groups like healthcare unions, like the HPAE and the Shore Nurses Union, have joined with education unions, like the NJEA, the AFT New Jersey, the AAUP; as well as service union workers, like 32NJ and the United Steel Workers and the Communication Workers of America.

We have joined with the New Jersey environmental community -- specifically Environment New Jersey, and Sierra Club, and Clean Water Action -- as well as groups like Moms Clean Air Force and ReThink Energy. And all of us have come together; we've built consensus, because we're demanding a comprehensive approach to addressing climate change, which is why we're so happy that you are having this hearing.

Our groups represent diverse faith, labor, environment, and community organizations; and we want you to be ambitious. We've laid out more than 20 policy principles and strategies, which you can review in full on our website *Jerseyrenews.org*. We've also gathered endorsements from more than 50 faith leaders and collected petition signatures from more than 800 residents in the state.

We want you to act on climate. And I want to highlight just three pieces of the platform.

Number one, developing offshore wind; number two, job training; and number three, using the Clean Energy Fund for clean energy purposes.

So on number one: supporting offshore wind. We want to begin construction of at least two offshore projects. We have built consensus around 3,000 megawatts of clean energy by 2025, and 5,000 megawatts by 2030. There was a little bit of discussion about this this morning, and I encourage anyone who is interested to come to our event that's happening next week in Atlantic City, Wednesday, August 16. We'll have policy experts -- national people talking about offshore wind and the potential for the manufacturing jobs, and creating an ecosystem around the offshore wind.

Number two, on job training. In the past, there's been funding from the State. And we want to reinvigorate that program -- that we could be supporting union apprenticeship programs, we could be providing funding to training centers, and providing incentives for companies to actually hire the graduates of those programs -- which was a program that was in place under Governor Corzine.

We could also recreate a needs-based rebate program so that folks who can't afford to weatherize their own homes can get support to make those efficiency improvements done.

And number three, on using the Clean Energy Fund. We want to commit a significant portion of those funds in a socially responsible,

labor-friendly manner. And frankly, stop using it to plug budget holes, and start using it as it was intended when you all helped set it up.

One final note: I was really encouraged that 21 mayors in New Jersey, and at least one gubernatorial candidate, have committed to holding up the Paris Accord. In the absence of Federal leadership, we know that we need local, State, and regional leadership here. However, I also want to caution that the devil is in the details. And we need to do more than just pledge commitments to reducing emissions; we actually need to make a plan. And I think both New Jersey Future and the Climate Adaptation Alliance touched on this this morning. Thanks to the leadership of many of you, in 2007 there was -- New Jersey passed the Global Warming Response Act. We've had several laudable initiatives in our state. But I've seen some of the data on the CO₂, and we are not on target for even our own emissions reductions. We need comprehensive greenhouse gas planning, reporting, and progress tracking. And it's worth noting -- and thanks to Jeanne and Marjorie for helping me realize this earlier this week -- that New Jersey did not adopt the greenhouse gas emissions monitoring and reporting regulations that the Act required. So in order to understand our progress, we must first measure the emissions, and we must do better.

So thank you, again, for having this event.

ASSEMBLYMAN EUSTACE: Thank you, Dan.

Next up is Debbie Mans, New York/New Jersey Baykeeper.

DEBORAH A. MANS: Thanks.

Debbie Mans, New York/New Jersey Baykeeper. We're based in Keyport, and we work on clean water issues in the New York/New Jersey Harbor Estuary. So it's nice to be down at the beach -- the other beach.

So climate change needs to be more than just about rejoining RGGI. And climate change is a unifying factor across branches of government -- the Legislature, the Administration, and Republicans, Democrats, and Independents. It's a unifying factor across geography -- the working waterfront that we have in northern New Jersey and Delaware Bay; beaches, forests, farmland, and urban centers. And it's a unifying factor across sectors: the environment, transportation, agriculture, energy, tourism, businesses and corporations, the economy, public health, academics, and NGOs.

And I think addressing climate change and sea level rise should be the next big idea in New Jersey. And it's through cooperation between the agencies, the government leaders, businesses, and universities, and the NGOs that we start implementing this big idea.

I think there's a tremendous opportunity to tap into the expertise and advocacy that has been developed over the last seven years in New Jersey, and to make New Jersey a leader on climate change.

So thank you.

SENATOR SMITH: Thank you.

Beatrice, are you ready yet?

MS. HUMPHRIS: (off mike) Well, yes.

SENATOR SMITH: Beatrice Humphris.

MS. HUMPHRIS: I guess I'm as ready as I'll ever be.

(laughter)

First of all, I certainly want clean air, clean beaches, and so on. I'm not for dirty air or dirty water.

But I do question quite a bit of this climate change. And it seems to me climate change refers to temperature change, which we all know -- if you are as old as I am -- changes constantly, daily, monthly, yearly, century-wise. Climate change -- what exactly is your definition of *climate change*? Does anyone here have a definition for *climate change*? (no response)

No, I didn't think so. (laughter)

MR. PRINGLE: (off mike) I do.

MS. HUMPHRIS: Okay.

Excuse me -- you do?

UNIDENTIFIED MEMBER OF AUDIENCE: Yes.

MS. HUMPHRIS: Well, would you give it, please?

SENATOR SMITH: You know what? Not productive.

Anything else you want to say?

MS. HUMPHRIS: Yes; yes, I do.

I'd like to know why some of you people here have mentioned you would like to rejoin RGGI, the Regional Greenhouse Gas--

SENATOR SMITH: Greenhouse Gas Initiative. (laughter)

MS. HUMPHRIS: I'll get it right.

UNIDENTIFIED MEMBER OF AUDIENCE: Initiative.

MS. HUMPHRIS: Initiative; yes. Why would you want to do that when we know -- at least I think I know -- that it is a carbon tax to fund a political means of funding. If we breathe, we're emitting carbon dioxide; are we going to start taxing us because we're putting carbon dioxide in the air? Which, incidentally, is a vital-- It is not a pollutant; it is vital to

life on this Earth. And if we didn't have carbon dioxide, we wouldn't even be here.

We're cutting down trees, right here in Jackson, to put up solar panels. Now, trees give off oxygen and use the carbon dioxide, as I understand. And yet, we're putting up solar panels; we've done it in New Jersey here. Cutting down trees and putting up these ugly solar panels on land that used to be nice to look at. And we're doing it constantly.

Now, I'm not saying we shouldn't have solar energy. But do we really need to make this state look like a giant solar panel in order to get what we need?

It's true; it's very true that we have computers nowadays, and all these wonderful things. But we cannot lose, as we say, the baby thrown out with the bathwater. And that's a lot of, I think, what we're doing here.

And the facts; I have a paper full of facts that deny some of what we're hearing -- like the temperature going up. I understand that I have facts by scientists and footnotes here that show the temperature hasn't gone up significantly -- maybe two-tenths of a degree in the last 19 years. And the report goes out in Washington, and yet we've been indoctrinating our children for over, I believe, 19 years in the schools that climate change is going on and it's going to affect us.

Now, definitely the water is a problem here; I won't deny that. And I won't deny that the temperature changes now and then. But I deny this climate change, or that we can do anything about it. We are mere humans; the volcanoes affect climate.

Oh, another thing. They say that the droughts, and the hurricanes, and the fires, and all these things-- Documents prove -- studies

show they're not any worse than they were before. In fact, some of them have gone down -- the amount.

And I can give you the footnotes here, if some of you want to see it.

SENATOR SMITH: I tell you what. Why don't you send a copy to us, and we will circulate it to everybody. And we can look at your information.

MS. HUMPHRIS: Well, I could do that, I suppose, if you'd like to see it.

SENATOR SMITH: Sure.

MS. HUMPHRIS: But I really get very annoyed with some of the facts; and the 97 percent scientists that prove it. Where the devil is this 97 percent? I understand it's based on 47 people. (laughter)

SENATOR SMITH: Well, listen, we do appreciate your point of view. You've gone a little bit -- actually, a lot beyond the three minutes, and there are a few more people who want to speak. If you'll send us a copy, we'll take a look at it.

MS. HUMPHRIS: Thank you.

SENATOR SMITH: Thank you, Beatrice.

And we are at 12:33. I don't know how we have five slips left. I think people started to add to the slips.

If you can say what you have to say in one minute, all right? (laughter)

So Patty Cronheim, ReThink Energy.

And one minute; we have the egg timer going. (laughter)

PATTY CRONHEIM: Okay. Man, this is intense.

All right. My name is Patty Cronheim; I'm with ReThink Energy New Jersey. That's the New Jersey Conservation Foundation's Stony Brook-Millstone Watershed and Pinelands Preservation Alliance campaign to help New Jersey swiftly transition to renewable energies and energy efficiency.

Ninety-three percent of New Jerseyans feel that renewable energy and energy efficiency is essential to our future. People have talked about offshore wind; we agree with that completely. We agree with 80 percent by 2050; we know it's possible, we know it's doable. Imagination is key; we need data to support that imagination, so we need long-term planning, which we are in favor of and we will help support and want to be a resource.

And I want to just say, energy efficiency -- we are only at 0.5 percent gains per year right now. Massachusetts is doing five times more; let's not forget energy efficiency. It is key.

SENATOR SMITH: Yes.

MS. CRONHEIM: Thank you.

ASSEMBLYMAN EUSTACE: Thank you. (laughter)

SENATOR SMITH: Great job.

ASSEMBLYMAN EUSTACE: Great job. (laughter and applause)

SENATOR SMITH: Great job.

Lyle Rawlings, can you do it in 60 seconds? (laughter)

UNIDENTIFIED MEMBER OF AUDIENCE: (off mike) I can name that tune-- (laughter)

L Y L E R A W L I N G S: Thank you, Mr. Chairman. You know me better than that. (laughter)

SENATOR SMITH: You're eating into your time. (laughter)

MR. RAWLINGS: Okay.

I missed some of the testimony; I understand the question was asked, "How fast can we ramp renewables toward the 80 percent by 2050 goal that you and Chairman Eustace have sponsored?"

I'll give a brief answer. If we ramp solar from the current 425 megawatts per year to 500 megawatts per year, hold that steady through the year 2050, we'll get to 18 gigawatts of solar by 2050. If we do about 6 gigawatts of offshore wind, we will get to 80 percent renewables by 2050.

And just a quick word about the economics of offshore wind. A recently completed RFP in Europe for North Sea Wind -- the average bid was less than half-a-cent over the cost of wholesale power; and some very large bids were zero over the cost of wholesale power.

And solar, as we've shown, is not just economically neutral; it provides a net benefit to consumers in New Jersey.

That's it.

SENATOR SMITH: Thank you.

ASSEMBLYMAN EUSTACE: Good job.

SENATOR SMITH: Britta Wenzel; one minute.

Britta is Save Barnegat Bay; a wonderful organization.

BRITTA WENZEL: Thank you; thank you, Chairman Eustace and Senator Smith, and Committee members.

First, I want to really thank you, over the last eight years, leading on Barnegat Bay issues -- TMDL, stormwater utility. You've done

everything that you could do; and more recently, lately, with the native plant bill that you helped to push through, and was signed into law.

I've been here before talking about the pumping stations along the Route 35 project.

What I wanted to talk to you today about is -- for clarity, we're not talking about reopening Oyster Creek nuclear power plant, right?

SENATOR SMITH: No.

MS. WENZEL: Okay; thank God.

In terms--

SENATOR SMITH: But there should be-- You know, there's supposedly a study group studying the future. I have heard nothing; heard absolutely nothing. Somebody should be planning what should happen with that facility, and it's not happening.

MS. WENZEL: That's a serious public conversation we should have, right? And also, asking Exelon to help pay for some of the remediation in Barnegat Bay and studying pre- and post- when the plant comes offline.

But I did want to mention -- in particular, you're looking for policy goals. And we are a local organization here, working with municipalities. I live in Lavallette; I'm a very storm-affected person. The decisions that are being made locally, in the last five years, or since the storm, have been difficult because it's trying to help families and businesses get back together. And the local officials are struggling to make new decisions today.

So really what I wanted to mention to you is the importance of a sediment management plan, going forward, for Barnegat Bay. So for

example, Lacey Township, Seaside Park -- all these municipalities that are along the bayside, that are facing a steady rise in water may need living shorelines, and they're really difficult to put into place because we're only allowing them to go out to the 1977 old shoreline. That makes the decisions difficult. Also, the sediment is very much needed by the marshes, which not only sequester carbon, but nitrogen too -- that's very important -- from Barnegat Bay.

So thin layer deposition -- all these kinds of-- Last year you heard from residents in Eagleswood, who were upset with the combined disposal facility being sited in their neighborhood. These are difficult decisions; we need to work together. It deals with multiple agencies -- so NOAA, NMFS, the State of New Jersey, the Department of Transportation -- all of these agencies. It's very complex for local leaders to navigate. And so a sediment management plan would be really important.

And Assemblyman Eustace, I want to just go back to our friend Beatrice. Because I, too, have been to Antarctica and the Arctic. I happen to be Scandinavian; a good part of my family lives above the Arctic Circle. These things are not fictitious; they are real.

ASSEMBLYMAN EUSTACE: Thank you.

MS. WENZEL: And I thank you for investigating them yourself.

ASSEMBLYMAN EUSTACE: Thank you; thank you, Britta.

Next is Michael Kennish, Rutgers University. One minute or less, if you can.

M I C H A E L J. K E N N I S H, Ph.D.: Thanks for holding a meeting today. It's a very important topic.

My colleagues and I at Rutgers have been working intensely over the last four years looking into the sustainability of our coastal wetlands, which are extremely important for protecting our coastal communities upland of those systems.

We're trying to determine how long these coastal wetlands will be in existence, basically, as sea level rises. We have data that's coming in from these studies that indicates some of the marsh areas are highly susceptible already, as Cattus Island in Toms River, for example, and some of the areas down in Tuckerton. The concern we have is that there's marginal erosion which has been very significant: one-and-a-half to two meters or so in terms of erosion on some of the leading edges of the marshes. So they're under stress -- beginning to be under stress. And over the next 60 years or so they are going to be drowned. Some of these are going to be completely lost in that period of time; and then down in the Delaware Bay area, perhaps a century from now -- it doesn't sound like a long time -- but we have a lot of assets in this state that we have to really set our mind to protecting.

The concern is that, really, the coastal communities are really located right adjacent to these marshes upland. And when these get flooded, it's not going to be like instantaneous; it's going to be an insidious loss. And you're going to have a gradational loss to the coastal communities to even nuisance flooding. By the way, nuisance flooding has increased 600 percent in the last 60 years in New Jersey, and that's from NOAA data that we've acquired.

So we know that sea level is rising, and it is laying a platform that's causing future concerns that we have as a state.

We're proposing recommendations at Rutgers of what we can do to support the natural environment and buttress the environment to defend better against these conditions. So we want to work with the State legislators, as well as the State -- DEP and so on -- to implement these recommendations so that we're doing our part to help, at least during the -- some of the problems.

But we really, seriously, have a real major problem in this state, as a coastal state -- a lot of resources, our coastal communities.

And so, really, the final statement -- the bay shore areas for our state -- the bay shore areas of New Jersey are truly the Achilles' heel for future problems. We're looking at the beaches on the ocean side. But the problems with flooding and serious problems down the road are going to be in our back bay areas -- these lagoons and so on -- that we don't have a real good way to defend there. It's not like a linear defense, like along the beaches.

ASSEMBLYMAN EUSTACE: I have to cut you short. Thank you very much.

DR. KENNISH: Okay; thank you.

ASSEMBLYMAN EUSTACE: Pam Frank, Charge EVC.

One minute or less, please.

P A M F R A N K: (off mike) I can do it.

ASSEMBLYMAN EUSTACE: I know you can. (laughter)

MS. FRANK: Thank you both, Chairmen, for your leadership. That shouldn't eat into my time. (laughter)

Charge EVC -- we have 24 members; we're a coalition working to advance electrification of transportation. We have utilities, tech

companies, labor, consumer advocates, manufacturers, automotive retailers, and NGOs -- national and local.

I've been looking at charts like this (indicates) for, like, 20 years. And I've been just waiting to take a bite out of the big blue, which is transportation, okay? So the thing I want to say today, we're ready to take a bite out of the big blue, which is very exciting for us and for our members. And you'll see in a press release we're going to release tomorrow some encouraging information.

First of all, before we've even really started our work, we've got over 10,000 cars on our roads in New Jersey that have a plug; that's an important milestone. Yay, us -- and we haven't even gotten started yet. Sixty percent of those cars were sold in the last two years, which is kind of interesting.

And also, in 2016, that plug-in car registration was up 79 percent over the prior year, and we expect these trends to continue.

But most important for this Committee's work, and for the subject today, is I just want to underscore the point that I drive a 100 percent plug-in; it's all battery, no gas. Every mile I drive on that car -- every mile I drive on that car is 70 percent less polluting than a mile fueled with gasoline. And that's based on the grid we know today.

So there is so much to be done here; we have a lot of work to do. We're ready to partner with you. We'll have a press conference on September 14 to announce our findings and a roadmap with lots of very good policy recommendations for you to consider.

Thank you.

SENATOR SMITH: Great.

ASSEMBLYMAN EUSTACE: Thank you very much.

SENATOR SMITH: Thank you.

And that, Pam, is our last witness.

Everybody say, "Hooray."

ALL: Hooray.

SENATOR SMITH: It's always a pleasure working with Chairman Eustace and the Assembly Environment Committee. We are partners in progress, and hopefully even more progress as we get into the new Administration.

I know I want to thank everybody for coming; not only the members in both Committees, but for all of you for coming to a hearing on a beautiful, sunny day at the New Jersey Shore. (laughter)

Chairman.

ASSEMBLYMAN EUSTACE: I want to thank you, Chairman, and the Senators, for attending today. Thank you to my fellow Assembly members for being here.

And most importantly, everybody who came down to testify and witness. Hopefully, we'll be making some progress. We have a commitment to do so; and with the new Administration, we should see some wonderful changes.

Thank you, one and all.

(MEETING CONCLUDED)