

Global Climate Change Commission Meeting
Tuesday, October 23, 2007
10:00 a.m.
Room 643 LOB

The Legislative Commission on Global Climate Change met on Tuesday 23rd October in Room 643 of the Legislative Office Building with Representative Pricey Harrison, Co-Chair, presiding until Mr. Garrou arrives. Other members present were: Sen. Albertson, Sen. Cowell, Sen. Pittenger, Rep. Thomas, Rep. Underhill, Rep. Wilkins, Dr. Eggers, Mr. Tim Toben, Mr. Urlaub, Ms. Choi, Mr. Everett, Mr. Howard, Mr. Peele, Dr. Phaneuf, Mr. Profeta, Dr. Riggs, Ms. Prayer, Mr. Slocum, Dr. Smith, and Dr. Uzochukwu. The visitor registration is Exhibit A.

Representative Harrison called the meeting to order and indicated that Co-Chair, Mr. Garrou is on his way to the meeting having traffic problems on I-40 and gave the floor to Mr. Givens for introductory remarks.

Mr. Givens welcomed everyone and gave a few introductory remarks. Chairman Garrou is in route and expected to be here in another thirty minutes or so. A tractor trailer overturned that blocked all of the lanes on I-40 and that is probably what has some of the other members as well. With regard to changes in membership, I will recognize each new member and indicate if you wish to say anything. We have a continuing member who has been appointed by the Speaker to replace himself as the House Co-Chair, Rep. Pricey Harrison. We welcome you as Chair. Rep. Harrison states she is looking forward to work with everyone. Rep. Lucy Allen could not be with us today, she has been appointed to replace Rep. Harrison as a member. Rep. Charles Thomas has been appointed to replace Rep. Wilma Sherrill. Rep. Thomas said thanks and he's just glad to be here from Bumcombe Co. Jane Preyer is the Executive Director of the Environmental Defense and has appointed herself to replace Michael Shore who previously represented Environmental Defense and has moved on to other employment. Other than Rep. Allen the only other member that I know has contacted me about scheduling conflict and not being able to attend is Susan Thompson. Ms. Utley has not been contacted by anyone. Mr. Givens told the members that it is always helpful when we know when you are in route or may have some difficulty in getting here and being late versus whether you can't make the meeting.

You have been given a revised membership list (Exhibit B), please look and make sure that your information is correct. If it is not correct, talk to Ms. Utley and we will correct it for you. There may be another change or two in membership caused by people resigning their academic appointment. With regards to the agenda this morning(Exhibit C), a lunch break was not scheduled hopefully we can finish before lunch. Adjournment is expected sometime between 1 and 2. The agenda is straightforward. Our first presenter is from the

PEW Center with an update on what is happening around the nation on climate change since we last had an update about a year ago, Pat Hogan will be presenting that. Agenda Item #5 - Mr. Givens will be talking about Senate Bill 3. The most important item is Item #6 – the Climate Action Plan Advisory Group met a week ago today and made its recommendations for consideration. There are 50 some of those, they will be presented by Mr. Tom Peterson.

Last you will hear from the folks at Appalachian State on what they characterize as draft preliminary results of a macroeconomic analysis. We wanted you to hear where that stands and perhaps give some guidance to that work which will be presented by David Ponder, Graduate Research Assistant.

The co-chairs have settled on some tentative meeting dates and they are on the back of your agenda. The next meeting is scheduled for the 4th of December. We can make adjustments if we find that a lot of members cannot have conflicts on a particular date.

Your attention is called particularly to the February meeting because I want you to be aware of the plans for that. The Emerging Issues Forum will be focused on energy this year. That forum will be held on Monday and Tuesday, the 11th and 12th of February. One of the speakers they expect to have is the chair of International Panel on Climate Change, the IPCC. They've just issued a new report and a recent co-recipient of the Nobel Prize. It may be that we will schedule our meeting at the McKimmon Center on Monday or Tuesday in connection with the Emerging Issues Forum. I ask you to hold those dates on your calendar and we will keep you posted and free up the dates we don't intend to use as soon as possible. I think the topic will be of great relevance to this Commission and I think it may be possible that we can work out some coordinated attendance perhaps this Commission would even be in position to pay these registration fees. I will have to investigate that.

On the matter of the Interim Report – we last met in February and we spent a good deal of time going over various recommendations and taking votes and then the staff was instructed to prepare an interim report. Chairman Hackney and Chairman Garrou felt that there need to be some further mechanism whereby you saw it one more time before the report was made. The report was placed in my box of items to be reviewed and promptly covered up by bill drafts. There is a draft interim report, it has no official standing. We are discussing what if anything to do about it, the practical accomplishment of this process is the enactment of the energy bill Senate Bill 3. Once we get in session, we have to suspend work on interim activities and we just simply don't have time.

At this time I would like to introduce to you Terry Nordon who is the vice counsel for Science and Innovation with the British Consulate General's Office in Atlanta. He is visiting us today, as you know, we've had an ongoing discussions with the British Government and particularly the Atlanta Consulate General. They were

the sponsors of the best reception that I attended during the 07 Session. Ms. Nordon.

Ms. Nordon: Good morning. Thanks for having me here.

Mr. Givens: We have a Commission website where we try to post documents relative to this Commission. Ms. Mundt informs me that we will promptly post all documents that are associated with this meeting. I encourage all visitors in the audience to sign the visitor registration. Members please get in your reimbursement forms, the quicker we get them from you the quicker you can get paid.

Chairman Harrison: At this point I would like to recognize Patrick Hogan from the PEW Center on Global Climate Change and thanks for making the trip down here.

Mr. Hogan: Thank you very much for bringing me down here today and giving me the opportunity to speak to you all. Many of you heard from my colleague Josh Resinki about this time last year in October 2006 and I took from the agenda that I am going to be giving an update on national and state level action on climate since last October. I also am going to talk a little bit about what has been going at the international level. So just to give you an overview of where we are headed and I should preface it by saying that a lot has happened in the past year so it is an awful lot to take in and I've tried to just pull out the highlights but it may seem like a bit of an information dump at times. I'll be giving some quick highlights from the international policy landscape followed by an update on federal and congressional actions here in the states including an update on what the 2006 congressional elections mean for climate in the U.S. The current policy landscape here in the U.S. and some other major initiatives at the federal level and then I will wrap up with state and local updates and tell you some of the highlights from state action from around the country.

This is really a policy update so I haven't included anything on the science. I am happy to talk about that during the Q&A session if you have any questions. But there have been a lot of development in climate science as well in the past year. Whenever you talk about climate change and climate policy at the international level it is helpful to think about how different parties come to the negotiating table and why there are such different perspectives on what different countries should adopt as their responsibilities for addressing this problem. Hopefully, I know the numbers are a little hard to read (Exhibit D) but the sketch of side by side comparisons of cumulative emissions for each of these countries as well as total annual emissions at the moment. The US is the largest annual emitter of CO₂ from energy use followed closely by China and then the 25 year countries. Together the US, China and the EU make up well over half of all the energy related CO₂ emissions in the atmosphere. Although official data is not available yet, it looks like based on preliminary evidence and estimates that China may

have actually just surpassed the US as the top annual emitter this past year. If it wasn't last year it is going to be this year or the year after, sometimes very soon. While much of the climate policy debate especially here in the US focuses on annual emissions, what really matters from a scientific perspective is cumulative emissions. Since greenhouse gases, CO₂ especially stay in the atmosphere not just for a year but for hundreds of years. So it is really that build up of gases over time that matters. If you look at the cumulative emissions side by side of the annual emissions, the US's share is closer to 30 percent and the EU's is pretty close as well, it's around 27 percent. While China has just contributed 7 percent of cumulative emissions so everything is already up there. So this evaluation of historic responsibility that shapes the demands and viewpoints of the developing nations like China when they come to international climate negotiating tables. This just offers another cut at looking at the international emissions landscape on a per capita basis. The US is about four times the world average on a per capita basis for CO₂ emissions, China is just below. Even compared to other developed nations the US is pretty out in front on this one. We on a per capita basis emit about twice as much as the European Union or Japan.

Now just to go through some of the highlights from international theme this past year, a group of eight summits in June 2007 called for a global agreement on a post 2012 framework under the UN Framework Convention on Climate Change in 2009. Within the UN itself at the end of September, there was a high level meeting held in NY with over 150 countries in attendance, many high level delegates and the goal of the meeting was to send a strong political signal to accelerate upcoming work at a meeting which I'll talk more about in just a moment. What was really evident from this meeting, unlike in many previous forums, is that by and large all of these countries are no longer questioning the science, they've really gone under the question of what to do about this issue. I think of the 150 delegates in attendance just one was saying that the science wasn't good enough there is no need to act. Everyone from the other 149 countries was saying that we need to get the ball rolling on a new framework. Of course another major international event was the meeting held just shortly after the September meeting – this was a meeting organized by the President to bring together the 15 top emitting economies that includes both developed and developing countries. What really emerged as the issue at this meeting was the distinction between voluntary versus binding commitment and who should adopt which. President Bush's vision has remained largely unchanged during his time in office and he's calling for a long term international goal, but individual countries would not be subject to any sort of binding emissions cap or commitment. The bill would be reached purely on a voluntary basis alone. At this meeting, 14 other nations present basically said this is not good enough we need binding commitments of some sort. Even China and India are saying look binding commitment doesn't necessarily mean targets for everyone but it means that every country has some sort of policy commitment to help address this issue and they are willing to adopt some sort of policy that could help produce their energy consumption and make them more efficient.

You may have also heard another major international development very recently, former Vice-President Al Gore and the UN Intergovernmental Panel on Climate Change shared a Nobel Peace prize and I guess many of you have already seen *An Inconvenient Truth*. I've heard that the DVD sales are doing very well – it's been booming, but we will actually never know exactly how many copies were sold because the Supreme Court intervened to say stores have to stop counting how many people buy it. Little bit of a problem. That's a joke. The Supreme Court has done lots of stuff but not quite to that level. Looking ahead if we ask the question what's the likelihood of a new international framework coming together any time soon, it's very unlikely that real negotiations are going to happen any time before 2009. The first chance to get that process moving is this upcoming meeting in December. It's really a potential to launch a new UN process, it's the first chance for nations to come together and talk about and submit their proposals for what post 2012 framework should look like. I keep saying post 2012 because 2012 is when the Kyoto protocol commitment period expires and that is the current international framework that many nations are offered.

Just looking at some other major emitters around the world and actions that they've taken this past year – Australia has historically been pretty skeptical of taking action on climate. Of course in addition to the US they were the only other developed industrialized nation not to ratify the Kyoto protocol. However due to a number of circumstances, one of which may have been a pretty devastating drought that hit Australia this past year. They are now thinking seriously about setting a cap and trade scheme on reducing emissions through emissions trading. If that does need to go forward it will commence some time between now and 2012. New Zealand Australia's neighbor is also thinking of setting up an emissions trading scheme. European Union of course already have their scheme up and running and it is functioning pretty well. Especially considering it's a new market – the first program of its kind and it is very ambitious and it covers CO₂ emissions from over 12,000 facilities across the European economy. You can see trading volumes have been pretty high just in the first stage. The first stage which ends fairly soon, 2008, was set up as really a learning phase to help the system find its leg and get the kinks out. The Kyoto commitment period is 2008-2012 and they hope to have everything ironed out amongst the market really functioning smoothly. The EU of course has also issued some pretty aggressive statements regarding global climate as well including a 20 percent renewable portfolio standard for the EU. They are putting a lot of effort into funding carbon capture and sequestration projects and committed to reduce greenhouse gases 20 percent below the 1990 levels by 2020 and will go even further if other developed nations, mainly the US agree to similar cuts.

Leaving the rest of the world behind focusing in on what's been going on at the federal level here at home. Of course the democratic victory in the 2006 election has a lot of implications and ramifications through many policy areas but

especially climate change. I will not go through all of these names but all of the key committee leadership posts in the House and Senate have been filled by democrats who have pledged to make climate change a priority and already have in many cases. The senator from California which is kind of a poster child for state action on climate change has certainly made this a priority and really wants to get a bill through her committee. She of course replaced the former chair who declared that climate change is the greater host of all times. This change in Congress is just one reason that this has been a kind of key change amongst industry and large businesses this past year as well. Not only is this increasingly recognized in the US action on climate is no longer a question of if but really a question of when. They are also starting to embrace it – this change in attitude is due to a number of factors, the democratic congress increasing likely other legislation. Of course the states are continuing to exert a large amount of pressure with all the steps that they are taking. Other countries are calling on the US to step up and take substantial leadership on this issue. US public pressure is probably at an all time high, which corresponds to a greatly increased awareness among the US public of this issue and what it could mean. There are a number of other reasons but many are starting to see it as this is coming sometimes very soon.

One of the reason it makes climate change regulate greenhouse gas regulations or legislation fairly likely is the Supreme Court's decision from earlier this year in *MA et al. vs. EPA* which many of you may have heard about. Especially in this case, MA several other groups sued the federal EPA for not regulating emissions of four greenhouse gases especially CO₂ from the transportation sector, auguring that under the clean air act EPA had not only authority but a duty to regulate these air pollutants since they threaten public health and welfare. The EPA of course said the opposite, we don't have the authority to regulate these gases, it is not our responsibility. Ultimately the Supreme Court sided with the states in what is pretty landmark ruling. The court ruled that the EPA not only has the authority to regulate CO₂ and other greenhouse gases under the clean air act, but that the EPA has a duty to protect public health and welfare under the act. Essentially told them you need to go away and rethink your position and once you can come up with a really good excuse for not regulating these gases you need to do so. Essentially the EPA would have to prove that CO₂ and other greenhouse gases don't cause climate change which at this point would be pretty difficult to do. This obviously has implications for potential regulation of the vehicles and stationary sources by the EPA, and also implications for a CA proposed greenhouse gas standard for vehicles.

I had mentioned before that businesses are starting to wake up and are not only seeing climate legislation as very likely but are also looking to embrace it and thinking it could be a good thing. Probably no where has it been more evident than in the US Climate Action Partnership which you may have also heard about emerging with (inaudible) I believe. Initially this was a group of about 14 including several large major players in business and industry from every sector

of the economy. It includes major utilities, oil companies, auto manufacturers, and a host of others. The partnership started with some of these companies and a hand full of (inaudible) including the PEW Center. Since the initial inception the US cap has grown substantially – it now has 33 members total, 27 of which are as large corporations. US cap emerging goal and with what they're calling for is rapid enactment of legislation at the federal level that creates a mandatory but flexible climate program. It includes some sort of market program especially cap and trade that reduces emissions on a steadily declining float towards 2050 and promote technology research development and appointments. The important thing about the US cap target that these businesses have endorsed is that they are informed by where the sciences simply need to be based on the latest science. In order to avoid dangerous build up of greenhouse gases that can lead to really unpredictable and potentially dangerous climate change, we need to reduce emissions somewhere between 60 and 80 percent from current levels by this century. US cap targets call for a long term target in that area.

I am not going to run through everything on this slide because it is very wordy. I think it is important to look at this and think about the contrast between the current situation encountered and how things were in the 109th – it's a very different story in the 110th. There have already been less than a year in the current congress over 125 bills, amendments and resolutions related to climate including a record number of cap and trade system proposals, and this combined with a number of hearings if you compare that to action in the 109th across two years, I don't think the number came anywhere near that, so that's pretty significant. Action in the congress in the 110th is also included the formation of select committee on energy and the effects of global warming in the House. So I am not going to go into great detail on a lot of the specific bills other than to illustrate how they stack up. The one pretty significant piece of legislation that was just released last week is a new proposal from Senators Lieberman and Warner. And it is significant is not leaked because it is bipartisan in nature and has a pretty decent chance of passage and getting out of the Environment and Public Work Committee. The bill is sponsored by the two senators listed above and by several others on both sides of the isle as well and I should note that includes NC Senator Elizabeth Dole. The Lieberman-Warner bill would basically take a very strong step towards getting the US where it needs to be in terms of emissions reduction. It was set up in an economy wide cap and trade program covering transportation fuels, utilities and other large sources are also driving climate friendly technology development and innovation. The target would establish our ambitious yet certainly achievable – they get up to kind of a low end of where the science that we need to be about 65 percent below current levels by 2050.

I am not going to read the individual names here but this just shows how the six major cap and trade proposals in the Senate stack up against one another in historical emissions or business as usual emissions. So if we continue to do nothing we will end up on this sort of deep red clarifying slope that goes off into

infinity – that is what we really want to avoid. You can see that the six major proposals in the Senate basically all get us more or less where we need to be. Some of them have more or a declining slope over time, some take more of a step approach but really they all get us to where we need to be in the long term. You can also see in the graph the US cap recommended target represented by the grey band that a lot of the bills fall into. If the safety valve is hit then the Bingaman bill would look pretty different and probably would not get us the emissions reduction we need.

Now we are going to leave the Senate behind and get onto what I think is really the most exciting stuff going on around the country. The site wise this might look like it is not a matter of congressional redistricting gone terribly wrong, this is just to make a point that sometimes when I start talking about state action and climate people raise the question “Why does that matter?” and in the states are tiny, how can their emissions production make a difference? The truth is that state emissions are pretty significant – they’re significant contributors to the problem and can contribute significantly to a solution. So the numbers on this map have changed a bit in that China is closer to the equivalent than all the states on this map. But the basic point is still the same and that is when you just start talking about a handful of states, four states in the west, a handful of states in the northeast, you’re talking about emissions equivalent to those terms major admitting economy around the world. So working together or individually, states can make a significant dent introducing absolute emissions.

So you heard from Josh last year, I believe he talked briefly about the regional greenhouse gas initiative and I’ll just give a quick update on what’s happening with that. Just as a quick refresher, RGGI as it is affectionately known is the first mandatory US greenhouse gas cap and trade program, first program of its kind in the US. Its goal is to stabilize power plants CO₂ emission. The current levels between 2009 and 2015 and then reduce those emissions 10 percent below current levels by 2019. So when it first started RGGI had just seven states signed on and just within 2007 that number has gone to 10 as MA, RI, MD have all joined which means that RGGI, if you think back to the math I just showed, now that those states involved admit 10 percent of total US emissions and are equivalent to the 8th largest emitter in the world Canada. At the moment RGGI is still in the implementation stage, it is not really going to get up and running until 2009. At the moment individual states are adopting RGGI’s model rule which is kind of a blue print for how RGGI is going to work and individual states have to adopt it through (inaudible) or regulation. States are also working on allowance option design. How they are going to distribute the emissions allowances under the cap and trade program. There are of course two broad categories of doing that, you can give away allowances for free based on some metric or you can auction them off and emitters have to pay for them up front. And you can auction some of your allowances, you can give some of them away for free, you can mix and match and do a bit of both. What is interesting is that many of the states are committing to or seriously considering 100 percent auction of their allowances

which is a pretty significant change from where things were about a year ago. Massachusetts actually just released its draft auction rule which was set up a 100 percent of the auctioning of allowances. RGGI is also close implementing their regional organization which will oversee and coordinate a program working on leakage issues and being able to attract imported electricity. Leakage is an issue whenever you have a group of states adopting regulations, especially in this case, rules and regulations of greenhouse gas emission as it is possible that those emissions will simply get pushed out of the capped region states may end up importing electricity produced outside of their borders that have high greenhouse gas emissions associated with its production.

Mr. Profeta: They're working on a system that will track the leakage at this point not a system that will actually have any program to control the leakage is that right?

Mr. Hogan: Exactly. So you also may recall that last year Josh talked about California's action especially the passage of 8032 A Global Warming Solutions Act of 2006 which set the first binding economy by targeting as many states and will hopefully get California to 1998 emissions level by 2020. Probably they are still thinking about how they are actually going to do this, it's great to set a target but then as you all know it's very difficult to figure out the way to meet it. One thing that is going to set with me is the release of California Market Advisory Committee report earlier this year. The committee was formed after a clash with the governor - 8032 authorizes the use of market mechanisms such as cap and trade and the committee's objective was to come up with what that system might look like and make recommendations for its design. And while it is likely that a market will be adopted in California, it is not a sure thing but either way this is a very comprehensive piece of work and it is well worth looking at. Also another major development in California just from January was the announcement of the nation's first low carbon fuel scanner in the state which aims to reduce the carbon intensity of vehicle fuel sold in California 10 percent by 2020. It's worth noting that when the state carbon intensity that means this reduction applies across the life cycle basis – so it's not just looking at tailpipe emissions, it's the wheel to wheel emissions associated with a gallon of fuel. So it takes into account emissions from transportation of fuels, from refining it and the whole production process. So it actually allows a fair amount of flexibility and how fuel distributors meet this requirement. You may have also heard in the news relating to California's proposed vehicle standards for greenhouse gases because it is becoming a pretty hot button issue, both at the state level and at the federal level. So if implemented California's proposed standard would mean that in 2012 new cars would have to emit 22 percent fewer greenhouse gases by 2016 cars still in the state would have to emit 30 percent less. I guess it's worth giving a quick bit of history here, so under the federal cleaner act, California has unique authority to set emissions standards for vehicles in the fair air quality standards because California actually started regulating those things prior to federal government. So California can set a substandard and then it is really a formality

but they have to submit a waiver to the federal EPA – federal EPA has to grant waivers California can go the same way. Other states can choose to follow either of the two standards, it can follow California or it can follow the federal standards. What's happened is that California proposed these standards several years ago and applied for the waiver from the EPA, the EPA has yet to grant it. But it has been a long on going process and in fact California announced earlier this year that if the EPA doesn't hurry up and say yes or no, they are going to sue them and I think it was actually just a story yesterday saying that the case will be filed next week. So that is setting up a bit of a show down again between the state and the federal EPA. This is significant because if the standards are implemented, 14 other states in addition to California will adopt them. Just this year Maryland, Florida and New Mexico all announced their intentions to do so - which would mean that the standards apply to, I think almost half the new car market in the US which is a lot of cars. And of course, the auto manufacturers are not too thrilled about this so they have filed law suits in California as well as in Vermont. The Vermont case was actually just settled against the auto manufacturers, the judge basically said states can do this and the auto makers would have to be innovative. Of course that's in appeal but it could have significant consequences for others in the law suit in California and elsewhere.

This is just a map illustrating all the states that have indicated they will adopt the standards if they (inaudible). Probably the other major collaborative effort that has emerged in the past year at the state level is the western climate initiative. Which was formed in February 2007 by five states and it since grew to include six states including Utah and two Canadian provinces so it is actually an international effort now. There are several observer states participating in the process who may opt in at some point and at this point even without counting the Canadian participants, these states are responsible for over 12 percent US emissions and are comparable to Germany which is the seventh largest emitting nation in the world. What these states are trying to do is similar to what the RGGI states are doing but a bit more ambitious. They are aiming to set up a regional target and then some sort of economy wide regional cap and trade system to help meet it. And that target was just announced in August they want to hit 15 percent below 2005 level by 2020 and the next step hopefully within the next year is to devise and implement the system that will allow them to meet that.

I am sure you have also heard about a major development in Florida just this past summer when Governor Charlie Crist signed three climate related executive orders. I am not going to go through every thing here basically we go everything including the kitchen sink related to climate change but the order set statewide targets creating governor's advisory team to come up with a strategy for meeting these targets, adopt California's vehicle standard creates building efficiency code including a host of other measures. So it is definitely a significant turning point not just in Florida but also the southeast. So this is by no means exhaustive but this just gives a quick run down of some other major events from the past year including NC's adoption of their renewable energy standard. NC

actually has the distinction of being the 25th state to adopt this standard so the official half way point happened right here. In the past year eight states have established legislative climate commissions or executive advisory groups. A number of other states have either joined regional initiatives that target or adopted a number of other policy measures. You may remember seeing about summer of last year but it changed quite a bit. This shows all the states that have adopted targets and in many cases what's shown here for the most part are just near to mid term targets but all these states have long term projects as well. At this point there are 17 states that have adopted greenhouse gas emissions targets and seven of those targets were set just since last October. This gives you an idea of how quickly things are accelerating especially at the state level.

Question: Are those a combination of voluntary and mandatory targets?

Mr. Hogan: It's a combination of targets set for executive order and targets set through legislation. It's not necessarily clear that one is more binding than the other and the main thing with these targets is that its showing a commitment to leadership and that this is a curious issue for these states and they are committed to addressing it. I guess one thing I can say that is significant is that, I said that seven states adopted targets within the last year and all but two of those were set through legislation. So until this past year, historically most of the states have been setting targets through governor's action – executive order. But now that is changing, more and more legislatures are getting on board and really seeing this initiative tackle we are seeing more and more that bills are being enacted to set state wide targets.

This shows the 26 states plus the District of Columbia that's adopted renewable energy mandates. Illinois is the most recent, NC was just before that. So it is pretty amazing that there are now over half the states – well over half the population – has the renewable energy mandates of some sort. And of course they range across a large degree in terms of ambition in large part that is due to the resources available to an individual state. So some targets are pretty ambitious, 25 percent by 2025 and others more moderate but none the less it's a pretty interesting map to look at potentially given the debate on the hill in DC about a proposed RPS for in entire nation.

I am not going to go through all these in great detail but this just shows some of the collaborative effort that states are participating in. You can see the western climate initiative in the west, northeastern states participating in RGGI, many of these other efforts such as the Western Governor's Association are not looking at climate change directly necessarily but are looking at definitely related issues especially energy production. I guess one such major collaborative effort among at this point almost 40 states is the climate registry. So this is an effort to develop a common system for reporting, tracking and verifying greenhouse gas emissions and greenhouse gas emissions reduction. The platform that these states are working to develop would be (inaudible) to voluntary programs or

mandatory programs but really could lay the foundation for impending federal policy because before you can reduce greenhouse gas emissions you have to be able to track them and verify where they are coming from and where they are being reduced. This is just a quick update all the states adopting climate action plans – at this point there are 36 that either have completed plans or plan in progress. I am not going to talk a lot about local initiatives, of course local initiatives matter and there's been a lot of action at the municipal and city level across the country this year. One pretty significant effort is being spear headed by the Clemson Climate Initiative. This initiative was launched about a year ago in August 2006 and aims to mobilize action in large cities around the globe by helping these cities pull their purchasing power to reduce their cost of energy, their energy use and to become more efficient. This really cumulated in the energy efficiency building retrofit program which is a collaboration between the Clemson initiative, several major global banks and energy service companies and 16 the of world's largest cities including here in the state, Chicago and New York. In these cities these partners are all going to work together to reduce energy use in municipal buildings and find ways to make these buildings much more efficient.

The last of the conclusion and then hopefully we will have time for any further questions you may have. At this point much of the world recognizes the need for serious action on climate and everybody is starting to look ahead to and think about what a post 2012 international agreement might look like. And while it is true that for a number of reasons momentum is really picking up at the federal level. It is also true that the states are way out in front of this issue and are continuing to lead on climate and are probably going to do so for a while to come. States are achieving significant in the real emission reductions while simultaneously providing models and lessons for possible federal action. And even with the feds stepping up and doing their part some national efforts of the state level are likely to continue playing a significant and key role. It really doesn't matter what happens in places like NC and other states for these reasons and others. That is it so anyone have any questions I am happy to take them.

Mr. Garrou: Questions for Mr. Hogan? Thank you.

Senator Pittenger: Mr. Hogan I appreciate your presentation. Like to ask you about the relationship to China – it seems to me that your graph did indicate that maybe the eastern part of the country was a matter of emissions but now you said verbally that it's the whole country in reality. I think I would beg to differ with you on the role of China and the perception that what we are doing related to cumulative transcends or supersedes annual impacts – I think it's flawed. China to my understanding is launching a new coal fired power plant about every nine days and has about 550 of them. I think that becomes a serious consideration if we're going to look at regulations and mandates and standards and caps in our state and around the country. Doesn't that seem irrelevant to you?

Mr. Hogan: While we absolutely think that we need to get China and India and other developing giants on board somehow, but it's important to keep in perspective where they're coming from and it's unlikely if not impossible that China will adopt any sort of mandatory curve especially without the US showing leadership on this issue. We're hoping that China will bring us some sort of commitment whether or not it is absolute emissions reduction it might be a commitment to efficiency, waste reduced energy use. Due primarily to its Kyoto contribution many countries do look to the US as a leader in this issue and say that before we're on board you have to prove your commitment as well.

Senator Pittenger: I would just say in perspective, it seems to me that the US by nature of its own expression of the various states and members of congress, even the Democratic leadership that you outlined today from what I've read their contact with the Chinese, the Chinese seem to be not moved and really under-strained in their interest to pursue their economic development. These would be the use of these coal fired power plants.

Mr. Hogan: Of course the problem is this is the quintessential collective action problem. But really up until now the US and China especially has been using inaction on the part of each other as an excuse for doing nothing which benefits no one in the long run. So it is much more likely that China will come in the negotiation and think seriously about taking action, and they know this is a problem. In China they read the same scientific reports that we do, many of their cities will be especially vulnerable to potential impacts of climate change. So they know they can't afford to ignore them. But it is unlikely that they will seriously sit down and negotiate until they know that the US is a firm commitment to addressing their own emissions.

Ms. Choi: Follow up question on that. I think I read a report earlier this year Carnegie Mellon did on climate emissions and really how much that growth is driven by the US markets. It is almost likely its already occurring where goods and services are being made in China for the US market. Do you have any thoughts on how to deal with that trend? You've seen some of those proposals at the federal level on using trade rules and laws to try and address the situation, has PEW done any work on that?

Mr. Hogan: I am not sure that our international folks have addressed that specifically. But that is absolutely right a lot of products produced in China and the emissions associated with those products are parts that are being sold over here in the states. It's really statewide demanded at least in part, driving this rapid development overseas.

Mr. Profeta: If I could just speak – I was actually looking to testify in the Senate on that issue in July and we in our website have done, had our best trained lawyers do logical look at these questions and I think there are options. Both the

bills in the Senate debate right now from Bingaman and Lieberman contain the same provision which I would just characterize ask for (inaudible) pack to be negotiated but if its within five years with no pack you begin to incorporate the price of the carbon into the imports into the US from China and other uncapped countries. I would say it is a grey area of international law. We will not know until it's litigated but in the last five years the trends (inaudible) are that environmental protection through such measures are more and more permissible. I invite you to look at that report on our website that talks about the fine points of legality.

Representative Harrison: Thank you Mr. Chair and than you Mr. Hogan for your presentation. I want to follow up on the (inaudible) bill emissions case you're discussing and we've been struggling with that issue here in NC and from what I understand about 30 percent of greenhouse gas emissions come from metal sources or at least in NC maybe approximately. These states that have adopted the California standards are waiting to implement until we get the resolution on the (inaudible) standards and did the Vermont court resolve the (inaudible) standard or was that just a separate issue that Vermont implemented the California standards?

Mr. Hogan: That's a good question – there are really two (inaudible) that have to be overcome. One is getting a waiver from the federal EPA and that process is dragging on and now looks like California is going to take them to court for failing to grant the waiver. And the other is litigation on the part of the auto makers. There are at least two such cases, there's the Vermont case filed in Vermont by auto companies and then there is another case in California. The Vermont victory in favor of the states, the case has been appealed so it is still going to be tied up for a while. But if that's upheld then it's likely that the California or at least possible that the California law suit will be tossed out. They are very similar and so the judge in California might look at the previous ruling and say this has basically already been decided. It's likely that that process is going to go on for a while. At this point, the standard is supposed to kick in starting in 2009 which is coming up pretty soon. It may be that they end up being implemented but that the deadline for them will (inaudible).

Dr. Smith: Thank you. Appreciate your presentation – since we have met last and you emphasized this but I just want to reiterate it. SC has established their commission and it is moving forward. I am involved with that and its been very positive but the biggest development is in Florida and just absolutely (inaudible) to that state into a leadership position with Republican Governor Charlie Crist taking that lead and I think some very innovative things. And they now have a similar body to our climate action team that is meeting regularly and meeting their first deadline of November 1st and we're tracking that very closely and being involved with a number of folks down there. These are all very positive developments for the south and I think they should hopefully lift NC's spirits to the leadership that the state has provided and that we will need to continue to

find leadership. One point that you brought up about the federal, I think we actually have a tremendous resource because I know that Tim and the folks at Duke have been very involved with the Lieberman/Warner bill. One aspect of that which I think everybody needs to pay very close attention to is this whole question about allocations and how they are going. The allocations are not, I would predict, going to be dealt with as they were dealt with under acid rain cap and trade, there is actually going to be a much more sophisticated regime of how to deal with it. Some of us are advocating for 100 percent option but there are various allocations that are being done and looked at and I think that debate is very well based right now. But in our deliberations, I think one thing we should pay very, very close attention to is that there are provisions and I would like to ask Tim maybe to share with the group for states who do certain things to get these allocations. These allocations are worth serious money because the overall allocation budget may see a hundred billion dollars annually. How states receive allocations for taking early action, what is being proposed in this bill and what will be further debated in the coming months, I think is something that we need to pay very close attention to because it may help advise us on some things we want to do. Tim I was wondering if you might just share some insight that you've developed if you have a moment. I think it would be very helpful and its relevant to this particular topic.

Mr. Toben: I'm just lucky that I brought the bill with me. Does everybody understand what the allocation pool is when you create a cap and trade program on greenhouse gases you create emission allowances that you have to hold one to (inaudible) greenhouse gases? You will have to give those in SC and Georgia – well you don't have to give them (inaudible) but they should be given generous allocations. There still is some that get allocated to other people who can sell them and derive value from them. If they worth what they're worth to you right now, they're worth about \$30 a ton and they can create six billion tons in the US program – that about \$180 billion dollars worth of value. There is a program here overall that gives about nine percent of those credits to the state, they reward states that have taken action on the coupling, I'm making sure that the POC are adjusted to award on efficiency and that they reward states that have taken energy efficiency building standards and they reward states for taking early action in terms of creating a cap on their own emissions. The contingents are allowed at least five percent of that pool is given to the coupling efficiency investment states and two percent of the pool is given to states that are taking early action in terms of capping their own emissions. There is also another pool that goes to states generally just to have resources to adjust in the climate change. Its this one bill that most likely to move to the floor – it's an early draft though but I think the overall message is that the federal legislation is looking at states that are taking early action moving and trying to award their actions.

Mr. Garrou: Would these allocations go to the state government?

Mr. Toben: This pool would go to the government itself for their own usage and there is a long laundry list that they can use them for.

Mr. Garrou: Welcomed Representative Harrison as Co-Chair and looks forward to working with her. I would also like to apologize for being late, a big accident on 40. Now we will hear from George who will tell us about the REPS that was passed in the Legislature last session.

George Givens: As I indicated in the beginning, many of you are familiar with this and if you've already heard all you want to hear about this bill, (Exhibit E) I will not be offended if you take a little break and I'll try to keep it as entertaining as I can. You have three documents that are coming around in connection with this presentation, a copy of the bill itself in its ratified form and signed by the Governor that's Session Law 2007 397. There is also a summary (Exhibit F) which I will be using as my guide through this and a copy of the fiscal note (Exhibit G). Now the bill in its entirety is a complex bill that deals with a number of different areas. This bill by the way was sponsored by Senator Albertson, it was one the earliest bill that was introduced which is why it is numbered Senate Bill 3. There are different ways to characterize the contents of this bill, I tend to think of this bill as having five parts – it has the renewable energy and energy efficiency portfolio standard and that's where I will be spending most of my time. It also has provisions related to man size management, it has provisions related to recovery of additional cost under the annual fuel adjustment clause, it has provisions related to construction cost of base load generation, I'll be talking about that only in most general terms and then it has some tax relief provisions related to the phase out of sale taxes paid by farmers and manufacturers for electricity, pipe and natural gas and other fuels and renewable energy credits. There is also a provision in here that adjusts the public utility and electric membership cooperatives, regulatory fees, that was done both in this bill and in the budget bill so it is not an essential part of this bill.

This bill and its House companion, not identical companion, but its kindred bill in the House introduced by Representative Harrison, House Bill 77 started out as energy efficiency bills with emphasis on renewable energy portfolio standards. The background of that involves this Commission and Environmental Review Commission and goes like this. There was a proposed study in the Studies Act of 2005 a studies bill that required a study by the Utilities Commission of the feasibility of these renewable energy portfolio standards. The Studies Bill in 2005 failed of enactment – that happens with increasing regularity around here. The Studies Bill of 2007 also failed of enactment but studies will never the less be ongoing. As a result of that the Environmental Review Commission consulted with the Utilities Commission about the possibility of conducting the study. The Utilities Commission was able to accommodate that request and fund the study about three hundred thousand dollars more or less, something in that range. It seemed advisable to increase the quality of the study and basically the buying, people who would be affected to establish an advisory committee and the Utilities

Commission did that. That resulted in the preparation of a (inaudible) proposals and ultimately the Capper Associates was selected as the contractor to conduct the study. Lacapper subcontracted with GDS Associates for a study of energy efficiency as a component of the renewable portfolio standard and these reports are reports that you've seen, I think we had presentations on them and distributed them to you last year or early this year. As I said they lead to the drafting of Senate Bill 3 and House Bill 77. Senate Bill 3 was then the subject of a large stake holder process, we met either in this room or downstairs in 544 averaging 75/80 participants a meeting and we met for several months hammering out the details and adding portions to the bill to make it acceptable to various interest groups.

Turning to the renewable energy portfolio standard, first of all, it would be useful I think to talk about what is a renewable energy resource. These are defined in the bill and there is a list and I'll comment on some of these. Renewable energy resources include solar electric, or solar thermal energy, wind which we have an abundance in this state in the mountain region and the coast and then we also have an abundance of legal and political restrictions on the use of wind. Hydropower – many people have the idea that hydropower is a much large share of the generation mix now than it really is. Hydropower is used primarily to meet peak load in demand and by most accounts all of the available hydropower resources in this state have pretty much been dealt out because of flooding large new areas of land which displaced so many people and so many other resources. Renewable energy resource also includes geo-thermal, we don't have too much of that in this state, perhaps none, ocean current or wave energy, we have a long coast, we don't have particularly high tides variation here and of course the coast are committed to other resource uses. We have biomass resources and sometimes we refer to as the Saudi Arabia of biomass and so this bill gives particular attention to biomass resources. It's an interesting list of things that's included in the definition of biomass resource, including agricultural waste, animal waste, wood waste, (inaudible) combustible residues, combustible liquid resource, combustible gas, energy crops and landfill methane. Also included in the definition of renewable energy resource are waste heat and hydrogen. Specifically excluded from the definition is peat, fossil fuels which we are told are gas and nuclear energy. So what does this bill do or what do you say about the use of those. It says that electric public utilities must achieve a generation mix that includes 12½ percent renewal resources on a phased in schedule that starts at three percent by 2012 and caps out at 12½ percent by 2021. That 12½ percent is made up basically speaking of 7½ percent renewable resources in and another 5 percent that will be derived from energy efficiency.

The LaCapper recommendation was a 10 percent renewable standard. There were folks that wanted that number to be higher, and that was the subject of a great deal of debate. The LaCapper study on which we relied indicated that the 10 percent would be doable without undue economic dislocation, in other words without excessive cost. We did feel that based on the GDS report that there was

room for an additional two and one half percent to add on to the energy efficiency component. One of the important features of this bill is that it includes everybody we didn't leave anyone out. Early in this process the electric membership cooperative and particularly the Electricities, the municipal electric power suppliers asked to be left out and they (inaudible) through the negotiation process able to stay in – they have a less aggressive schedule, their requirement caps out at 10 percent in 2018. All of our major suppliers of electricity are included. Electric public utilities which includes the investor owned utilities, we have three in this state, Duke, Progress and Dominion and the (inaudible) in the co-ops can basically meet the REPS requirements by generating electric power at new renewable energy facilities. This bill is focused on bringing new facilities on line and there are a couple exceptions to that. We made the exception for existing poultry waste and we made an exception for existing small hydros to encourage their continued use.

Another way this requirement can be met is through the use of renewable energy resource to generate electric power at a generating facility, reduce energy consumption through the implementation energy efficient measures, purchase of electric power from renew and renewable energy facility, purchase of renewable energy certificates derived from instate or out of state sources. The purchase of certificates has captured 25 percent, there is a lot of back and forth about what would or would not be constitutional under interstate commerce considerations. Most states that have adopted an REPS have included a limitation on out of state sources in order to encourage instate development and certainly those requirements are constitutional until challenged and found not to be constitutional. And we believe that because they are not enacted for economic reasons primarily but for public health and safety reasons that they would probably be sustained. We have that schedule of implementation. We have some speakers set aside for solar, for swine waste and for poultry waste. These are covered in your summary but for solar and swine waste it is two-tenths of one percent on a schedule that would cap out at 2018 and then for poultry waste it's expressed not in percentage but in terms of mega watt hours and it caps out at nine hundred thousand mega watt hours in the year 2014. So these particular set aside and there has been some discussion about those for replacing the bill in recognition of particular interest and goals and values including the environmental value of dealing with swine and poultry waste on the one hand and the desirability of encouraging solar which is probably at this point the most expensive of the renewable sources. So they represent a negotiated agreement among interested parties that reflect those values.

The bill does require that biomass combustion processes for new renewable energy facilities that deliver (inaudible) would have to reduce emissions of air pollutants to degree that it is achievable for the facility taking into account the environmental and economic impact. There is concern about the emissions from biomass facilities, there is that provision in the bill and the value of the use of biomass depends upon what you compare it with. If you compare biomass to the

most pristine source that might be available, then it perhaps compares unfavorably but if you compare it to the sources we actually have it appears to be as environmentally advantageous. The bill provides that the cost of these renewables will be recoverable by the utility through an annual rider approved by the Utilities Commission. And that rider is capped to prevent what is called rate shot. The schedule of caps is in your summary for residential customers in the period of 2008-2011 is capped at \$10 per customer account per year, in other words, less than \$1, it maxes out at \$34 per year or a little less than \$3 per month in 2015 and thereafter as a separate schedule for commercial accounts and industrial accounts.

The Utilities Commission is charged with rule making to implement the REPS, that process is underway – there is among the many instructions to the Utilities Commission a provision that provides for what is called an off ramp that authorizes the Utilities Commission to modify or delay the requirements if it determines that it is in the public interest to do so. Other noteworthy provisions that the rule making that the Utilities Commission has directed to address is to establish interconnection standards for renewable energy facilities, to re-examine the net metering issue and to ensure that renewable energy facilities that deliver power will be in substantial compliance with all federal and state laws regulations, etc for the protection of the environment and conservation and natural resources. There is also extensive reporting and analyses requirements, this is covered at the bottom of page 5 of the summary and I will not go into too great a detail about that.

Senator Clodfelter and his floor debate on this bill characterized the demand side management provision as one of the most important sleeper provisions. The demand side management is distinguished from energy efficiency in this way – energy efficiency is the process by which you get the same amount of work for less energy input. Energy efficiency occurs when you replace a 100 watt incandescent light bulb with a fluorescent light bulb that produces the equivalent amount of light but requires substantially less electricity perhaps on the order of 13 watts instead of 100 watts. The demand side management on the other hand doesn't necessarily involve any reduction in the amount of energy required to perform a task but shifts it from one time period to the other to reduce the total peak demand at any one time on the system. In general the electric providers have to meet the requirement for the last kilowatt when someone flips the switch to turn on the lights on the hottest day in August and that last kilowatt of demand is typically the most expensive so it is expedient to shift demand where possible to other time periods where demand is less. This bill provides for recovery of cost of demand side management programs through an annual rider.

There are several sections here dealing with cost recovery – there are adjustments to annual fuel cost and perhaps it would be useful to take just a moment to talk about the way electric utility rates are established. In general there are rates established by the Utilities Commission that reflect the rate base,

that's the capital investment that the utility has, and reflect a return investment against that rate base and what the rates should be are determined periodically by the Utilities Commission through what is called a general rate case, which is a proceeding that's conducted for particularly utilities we just finished one for Duke that resulted in significant adjustments.

The other component of the bill is the fuel adjustment clause – this occurs outside the general rate case and reflects the cost to the utility of fuel and allows the utility to recover the fluctuating cost which can go up or down over time of the fuel component. Senate Bill 3 expands the use of the fuel clause to provide for the recovery of costs other than fuel in particular for the cost of what are called reagents that is the chemicals necessary to make the scrubbers work. The scrubbers that in particular are required by the Clean Smokestacks Act, such reagents are among the line of limestone and so forth. There are a number of other costs that will be recoverable under the fuel adjustment charge that is being renamed as fuel and fuel related charges. You can see those at the bottom of page 6 over to page 7 of your summary.

The other component of the bill that relates to the allocation of cost has to do with allocation of cost to finance base load generation. In general base load generation is paid for under existing law in this manner. A utility that proposes to build a new coal or nuclear plant goes to Commission and gets what's called a certificate of public convenience and necessity that authorizes the construction of the plant. The utility is then responsible for going out and designing and building the plant and for financing the plant through the usual financing mechanisms. The utility does not get to recover any of its costs until the facility is determined by the Utilities Commission to be used and useful. In other words, it's placed in the service at which point cost that approved and reasonably incurred goes into what is called a rate base that is the total capital investment upon which rates are calculated. The only exception to that mechanism is what happens if the costs are so excessive that the utility experiences financial distress in which case there is a possibility for inclusions of cost before the seller actually goes on line. The problem with that mechanism is the financial distress standard means that the interest rates are likely to be higher, almost certainly be higher if the utility has to resort to that. On the other hand if they don't go into financial distress then they are faced with the long term carrying cost from start to finish of the project. Those interest costs then become a significant factor that would have to be added to the rate base all at once when the plan actually comes on line increasing potential for what we locally refer to as rate shock or sticker shock when the adjusted bills come in.

What this bill provides for is a mechanism of ongoing review under which once the certificate of public convenience and necessity is obtained and construction begins and costs can be evaluated by the Utilities Commission on an ongoing review basis and those costs can be determined to be reasonable and prudently incurred if they are at that time instead of waiting for the end of the process. That

also allows for the possibility of what is called construction work in progress or whip as it is often referred to inclusion of construction costs in the rate base before the plant comes on line. There are all sorts of variations that have to be considered including cancellation of the plant, that's all included in your summary I'm not going to go into that in great detail. I would just observe as follows: the effect of this in the eyes of some folks is to make construction of coal or nuclear plants easier. It does do so in the sense that it makes it less expensive, it is not a weight lifting contest so it is not a matter of easiness it is just a matter of cost. Whether or not those plants will in fact be constructed will be debated in various forms including if the Utilities Commission in the certificate of necessity process opposes it. This bill does not prejudice that except to provide for what is hoped would be the least cost financing mechanism for rate payers should those facilities be required.

We have not opened a new base load plant in this state since Sharon Harris went on line in the late 80's. Given the projected population and economic growth it appears likely that new base load generation will be needed even if there is not economic development and no increase in population the existing facilities in some cases are getting quite old and it is probably desirable to build new facilities that would be cleaner and more efficient than some of the existing facilities that we have. There is of course the hope and the goal of this bill that traditional base load generations may not be necessary if renewables are demonstrated to be able to meet the demand and the only way to determine that is to start the process of bringing them on line which will take us back to the original goals of the bill.

The other provisions of this bill have to do with tax relief there is a phase out of the sales tax paid by farmers and manufacturers for electricity, pipe and natural gas and other fuels. That phase out occurs in 2010 and then there is a provision that establishes renewable energy tax credits for nonprofits. That's a matter of primary tax law and it's explained in your summary on page 10. The bill also contains a severability clause. One other feature of the bill is that there is a provision of the bill that deals with the possibility of a federal energy bill on the same subject. The state law says that unless the federal legislation, whenever it is enacted, pre-empts the state law that the Utilities Commission will be charged to determine which provisions are the more progressive or more stringent and implement the better provisions of state law and federal law. It remains to be seen whether there will be a federal pre-emption because of NC's actions and the action in IL, I believe this summer there are now a majority of states in the nation that have a REPS so it seems to be probably relatively unlikely that the Congress would pre-empt all the federal action that is occurring. That remains to be seen. That's the summary and I'll do my best to answer any questions.

Senator Albertson: Thank you Mr. Chairman. Just a comment and I guess everybody can understand now why all the members of the body up here love

and appreciate George. You just heard a good analysis of this bill. George you always amaze me. Thank you.

Mr. Garrou: (Can't hear anything)

Mr. Profeta: (Inaudible) provision on this issue, provisions I've talked about on allocation to the state. The pre-empt question will probably be in the federal RPS debate that's currently in conference.

Mr. Garrou: (Inaudible can't hear)

Mr. Profeta: Not (inaudible) in the record.

Representative Harrison: Actually I talked to a member of Congress staffer yesterday and he said it does not at this point.

Mr. Urlaub: Thank you Mr. Chair. I was wondering if I could ask a clarifying question of Mr. Profeta about a comment he made earlier relative to Mr. Givens' presentation. Did you mention earlier that one of the items in proposed climate legislation is that states that has decoupled their rates and could get some type of preferential allocation of carbon credits?

Mr. Profeta: Yes.

Mr. Urlaub: Because I noticed here in the summary as well of Senate Bill 3 our state Utilities Commission is asked to no later than September 1, 2008 to prepare and submit an analysis of whether rates structures, policies and measures including decoupling and place in other states should be implemented in NC.

Mr. Profeta: I would just like to clarify – there are three main proposals that you have to consider in terms of what is going to happen in federal legislation. There is the Lieberman-Warner proposal that come of out the Senate Environment Committee that will be the vehicle to the floor. There is Senator Bingaman proposal from the Energy Committee that will meet it on the floor and will have to resolve their differences and then the House Representatives (inaudible) and (inaudible) are writing their own bill on cap and trade. The Lieberman-Warner bill contains this provision on the states and it is the vehicle for the Senate right now. The Bingaman I believe has not (inaudible) nothing explicit on these issues and the Dingle bill is still a glimmer in Dingle's eyes and no one knows what it says.

Mr. Garrou: (Inaudible).

Mr. Givens: Mr. Peterson has arrived and if you're ready to go I think we will stick with the order.

Mr. Brock Nicholson: Thank you Mr. Chair. I will lead off with a few comments and then turn it over to Tom Peterson with the Center for Climate Strategies who will run through the real heart and meat of the CAPAG work. First of all a few comments here, Secretary Ross does send his regards he was here for a short while but was unable to stay but he again appreciates the work of this body and the CAPAG. I particularly want to thank those members of this body who are also very active both as work group members and as members of the CAPAG also I believe there were nine sort of joint members that has been working on both efforts certainly. As you recall, our last meeting was the 22nd of February and since then we have had actually three more CAPAG meetings. At that meeting we presented to you the first 16 recommendations which were unanimous recommendations from the CAPAG to this body and then in May and then again in June we had entertained the balance of what now is 56 measures. We often refer to 53 but we kind of sliced and diced then and we are now up to 56. We did have a meeting just last week to start the process of reviewing the report, the last decisional meeting was in fact in July and this meeting last week we are starting to meet with the CAPAG members on our report. I believe being passed around is a piece that we handed out at that meeting of the preference executive summary in Chapter 1 and Tom will refer to some of the graphics in that piece when he discusses the real heart of it. It's the piece with the globe on the front, (Exhibit I) small piece there. I will point out that this part of it and the balance of the report which is rather voluminous is on the website and available. We do have very limited number of copies available so if you would like a paper copy we have a couple of those remaining that we might be able to get you one. So if you are interested, just let us know.

One of the significant things that we will talk about and Tom will talk about specifically is great economic opportunities that many of these measures offer and that they are in fact called savings net of cost. On the advice that we got last week which is important, we will emphasize in the final report, if that is in order to realize these benefits, these savings one needs to spend money up front of course and we will provide some more emphases on that part and more information on that. You will not necessarily see that in the copy you have today because that is in fact the same copy you had last week. It is a draft copy it is not a final by any means nor is the body of the report either. I think to sort of set the stage here a little bit I want to emphasize a couple of things that we have put in the preface of this report and you should have a copy I believe inside your cover there. I'll just read a portion of this: This report contains recommendations from a voluntary stake holder advisory group on potential measures and I'll kind of back up and emphasize voluntary and again emphasize that these members put a lot of time in and a lot of effort on this and in these eight meetings and in excess I think by now that at least 80 phone calls and or meetings relative to work groups. It was quite an investment and we really do appreciate that. This advisory group came up with these recommendations of potential measures to reduce greenhouse gas emissions that are worthy of consideration by policy makers in NC. And that is part of the process we are here today about is to show

you what has been done and of course the final report with its revisions will be the actual instrument that will present those to you. The Climate Action Plan Advisory Group consisted of more than 40 volunteers from business, industry, environmental groups, academia, government and the general public. The consultant Center for Climate Strategies, CCS provided facilitation and technical analyses expertise from over 300 potential mitigation options, more than 50 were analyzed considering likely greenhouse gas reduction costs and benefits. This report is not intended to be a climate action implementation plan for NC. Such a plan will come only after state policy makers access these and other recommendations further. However the data, the results and the recommendations contained in this report provide valuable guidance for the creation of an action plan or plans for legislative, administrative, regulatory or voluntary action. I guess I wanted to site just a couple of examples, we've actually started down this road already and George summarized Senate Bill 3 which I guess is a grand example of one of the recommendations in concepts that we provided last February and that was for a REPS. The one that specifically the CAPAG was talking about was not recommended with a number in it per say but certainly the concept was recommended as were a number of other measures on energy efficiency that showed up and I believe it was Senate Bill 668 and a number of other bills which did succeed in the Legislature this last session. So I think in one sense our recommendations and recommendations of this voluntary group are showing up. Another item that I think we are very proud of and was touched on earlier a little bit in one of our crosscutting measures presented in February and that was that the state should join a multi-state registry effort. We went a step or two beyond that and we in essence joined a national one not just a multi-state one, the climate registry. In early February NC became active as one of the charter or steering committee states for development of this registry and we now serve not only as a member but on the executive committee of that registry and presently developing a general reporting protocol which will be out in about a couple of weeks for public comment. This will be in a sense the national standard for reporting into these be it business or industry, government, states, universities and so forth. This is a voluntary registry as Patrick indicated earlier but will be designed to facilitate those states that may want to have reporting by their entities to be mandatory. It's voluntary it will be third party verified so that the quality of the information in that registry, whether it's put in AZ or NC, WVA will be of the same quality. The other thing that NC is doing relative to one of the recommendations that was made to this body in February is that we have served notice on our large sources in NC that they will be reporting greenhouse gases starting in 2008 for the year 2008 as part of their normal inventory process.

The last thing I want to mention before Tom fills you in on the success of this group is a presentation you will hear from Appalachian State. You probably heard me over the course of the last year and a half - two years talk about the sense that we have that many of these measures have good economic value in their own right and that they have some jobs potential. We thought we had better

have some work done to put some quantification on those assertions and so we did as an adjunct to the CAPAG work proper and we contracted with, actually CCS has as a subcontract to Appalachian State University to run some jobs analyses on the measures that are being recommended which you will get today following Tom's presentation is a look at the preliminary results and in earnest, Appalachian I want to say that this is excellent work, these are preliminary results. There is more work to do, you are free to ask questions certainly and any advice on how the implementation should be framed from this body I think would be very welcome. It is preliminary but I think it is perceptively very good news. I think with that Tom I will turn it over to you.

Tom Peterson: Thank you Brock. About what I would do is provide a summary in the form of a series of slides and tables of the work of the CAPAG and in order to bring the Commission up to date on the progress that it has made since your last review is work in progress earlier this year and then be happy to take questions whatever your directions are there.

First thing I would like to do is just (inaudible) excuse me, it is a obviously a thick document - the technical details are in the appendices and I'll share some of that information but I just wanted you to know that you can access this information directly in report that has been provided. The very first part of the process involved the development of a preliminary inventory and forecast of emissions in NC. The slide that is posted right now is the final version that went through the deliberations of the CAPAG and involved a number of suggested modifications to either the data sources methods or assumptions that were used on the initial draft of the inventory and forecast. It was finalized by the group to incorporate all suggested changes and you can see the results of it broken down by sector. The bottom line is an increase in emissions from 1990 to 2020- that's significant and this is certainly a recurring pattern that we see in all states in the US as a continued climate emission.

To summarize the final mitigation actions recommended by the Commission they are broken down in five areas that correspond to work groups that assisted in an advisory capacity to CAPAG in terms of understanding potential options for consideration. How they might be designed, how they can and should be analyzed, etc. and the total number is 56 depending on how you count some of the sub-options. You can see the break downs by individual sector but obviously this effort was comprehensive in terms of looking at all sectors and looking at all greenhouse gases within the sector so a comprehensive process. I just note that I believe it was the last time that this group got together it considered 16 of the options that the group had come to early consensus on that we will note a little bit later on, and the remaining 40 since that last meeting have been fully developed and finalized by the CAPAG. So again the last time the Commission got together it was able to consider and endorse 16 early consensus items. There were a number of other options that were suggested by the Commission at that last meeting that were approved as well. At the end of the day, out of the 56 options

48 received what we call a unanimous consent which was no objections to final recommendation. Eight of them received what we term a super majority which was five or fewer objections. We also had a third category of consensus available which was simple majority but all of the recommendations either were unanimous consent or super majority. And just to remind the Commission we did use the formal procedure of voting by inviting objections. Where objections were identified asking for constructive alternatives that would address the various consensus allowing the group to work further to iron out potential conflicts and barriers to consensus and it was certainly successful in the vast majority of cases in terms of ironing out potential conflicts. Within the report for the eight recommended actions that received the super majority of support we do have a section which characterizes the barriers to consensus which is where you will find the rationale for the objections that were registered. But again they were at a relatively low level in terms of overall percentage.

This graph is a summary of two different assessments in an aggregate level that this group finalized. The blue line is the top line of the inventory and forecast that we saw just a couple of slides ago. This is the rate of emissions growth over time from 1990 to 2020. The green line is the level of reductions in year 2010, in 2020 an aggregate that are estimated from all 56 actions recommended by the CAPAG combined. So this is, if you will, the level of effort where achievability that is estimated from all actions together. And within the report you will find for each of the work groups in the summary chapter an explanation of how that green line was calculated because it is not a simple addition of all the actions. It takes into consideration overlapped and interactions between the recommended actions so that has been scrubbed out, if you will, and that green line is a line that is the result of the integration of all 56 actions combined. You can see that roughly the end point in 2020 of emissions were all 56 actions to be implemented and their potential for reductions realized would bring emissions back very close to 1990 levels.

This is, as you will see a little bit later, actually a relatively important index point - we see that many states and other jurisdictions are planning for both short and intermediate target years. The most common and intermediate target year is the year 2020 and it gives us a very strong basis for comparison between the efforts of different states and we now have the advantage of having bench mark for quite a few states that have undertaken comprehensive climate action plans. So we can compare the potential here in NC with others and it compares very favorably.

In the report is a lot of mass and accounting and one of the summary tables that you will find is the break down by each of the color coded sectors or work group areas and the result of quantification or the recommended actions in each of them. So we see in the first column the estimated greenhouse gas reduction potential for year 2010 and that's expressed in million metric tons carbon dioxide. The next column we see the estimated greenhouse gas production potential - a

snap shot in year 2020. The third column which is total 2007 through 2020 is the cumulative greenhouse gas production potential for that particular sector for that set of 13 years. With each of the options one of the design decisions that the group made was when that option would start, when it would stop and so the timing of the option varied just based on the will of the group. But the earliest they start is 2007 some of them may start later than that because of various legs involving implementation.

The fourth column is the net present value of the direct cost or cost savings associated with the implementation of the actions if it were to be adopted and were to be implemented based on the decisions that the work group made in terms of design and implementation mechanisms and related assumptions. The final column is a ratio that shows us the cost per ton of carbon dioxide equivalent removed. This is an important metric in climate change mitigation the cost per ton per measures and you will see a graph in a minute that profiles each of the individual options on a cost per ton basis as well as a total tonnage reduction basis. So for most of the options the group requested quantification of the environmental benefit in terms of greenhouse gas production potential as well as the direct cost in terms of the cost per ton of greenhouse gas removed for that action. In some cases quantification was not requested, educational programs would be one example, but in most cases quantification was conducted.

At the bottom of this slide we have provided a call out of the cumulative greenhouse gas emissions that would be removed between now and 2020 were all 56 options to be implemented based on the analysis that the group agreed to. We also show the cumulative cost in this case, cost savings that would be associated with the full implementation of all the 56 actions. The number is a negative because the net which is a combination of positives and negatives shows unbalance, a savings would be associated with the implementation of these actions. The details of those savings are included in some detail in the appendices of the report for each and every option. Most of what is driving the cost savings figures is energy savings that are involved with the implementation of these actions.

Appalachian State University has been asked to take a look at potential economic benefits that go above and beyond the direct cost or cost savings associated with these actions. So they will specifically address the estimation of potential job impacts, personal income, and value added. But these numbers do not include any of those potential secondary economic benefits that they will cover later today.

This is also not inconsistent in terms of results with what we've seen in a number of other states and a number of other comprehensive climate planning processes in the last few years in terms of their being a significant finding of potential cost savings that is driven by the priorities that the CAPAG and other advisory groups placed on economic performance for their selection of options. So the group

generally has wanted to find options that were high economic performers. Brock mentioned the list of 300 or so potential actions that were pulled together at the outset of the process based on actions already underway in other states as well as NC. The group added almost 60 new potential actions to that list and then went through a process of prioritizing and selecting actions for recommendations. And one of the criteria was greenhouse gas reduction potential but a second criteria that was very important was the cost or cost savings, obviously the group worked very hard to find options that performed well on both measures. The other two criteria that the group used were co-benefits and feasibility issues which played an important role.

Representative Harrison: Thank you on the net present value slide, did you say the figures there are primarily energy savings derived? Is there any factoring in there that cause the carbon emissions?

Mr. Peterson: Thank you for asking – this analysis does not modify the cost of emission in terms of their potential environmental impact. So it is not quote unquote, a cost benefit analysis because the symmetries of that particularly mean monetization symmetrically above cost and benefit. In this case, this is a monetization of the actual cost of implementation and the environmental benefit as expressed in physical terms, the tons reduced.

I wanted to just give you a thumb nail here on the contents of the technical appendices of the report because they are the record of decision of the CAPAG in terms of actual recommendations and all of the related details. The majority of this report is in fact a technical appendix within each and every one of the 56 actions that were recommended by the CAPAG. There is a policy template we call it which is a mitigating template which is written up in whatever level of detail the CAPAG thought was necessary to capture the information that was needed to reach final agreement. Some are brief, others are long but in all cases they include a standard set of descriptors of that option that you can look at to identify the details that were behind the recommendation. It includes a description of the policy in what we hope is plain English, a description of the policy design which is the statement of the numerical goals timing in terms of target years for start and stop, a coverage of parties who actually have to implement the action and any other key features of what we call policy design. These were developed early in the process after the priorities for analysis were first developed because that is the set of parameters that we need in order to quantify both reduction potential and cost. That is the next section of the template which is the estimation of greenhouse gas reduction potential and cost or cost savings. I would like to call to your attention very specifically in blue a set of key descriptors of that work which have been important, not only in the structuring of analyses but the development of consensus behind them. We do our best to break down analysis of the actions in terms of the data sources that were used, the methods used for analyzing data, key assumptions and key uncertainties, and we do this in order to try to provide as much transparency as possible in terms of how the numbers

were developed. It is not unusual for the members of the CAPAG to want to see modifications of any one of these elements of analysis to determine what their level of sensitivity is and to bring in line the analyses with what they believe is the most realistic and appropriate approach. So a big part of this process was working for a long time with advice and assistance of the technical work groups and then decisions by the CAPAG to work on the analysis to bring it to a level that was acceptable for final decision making by the group. And you will see again quite a bit of background material in the current list of appendices there is actually another set of reference material that accompanies that that is posted on the web.

The other elements that are in the policy template for each and every one of the 56 actions that are important include a description of related policies and programs in place. All of these analyses are above and beyond business as usual so to the extent necessary. There is a notation of key business as usual policies and programs already in place to the extent that the group felt it was important. There is a notation of significant co-benefits, significant feasibility issues and for the eight actions that did not receive full consensus a description of specific barriers to consensus. We did our best to solicit feedback from the group on their specific rationale for those who did object in the eight cases where there were objections and have tried to reflect that as much as possible in a fact based format. Then finally there is a listing of the actual final levels support for the actions so I walked you through this just to help you crack the report and understand how to read through the technical appendices in each of the policy templates. Again the detail there is the reflection of the work the group felt was needed to reach final agreement.

This is a summary slide which is probably too small and other wise scripted to understand – it's contained in the final report. It is a lifting of many of the 56 recommended actions with their estimated greenhouse gas reductions and I suspect this is an accumulative number but this is a simple ranking of the scale of reductions associated with each of the individual actions. So certainly not all of these recommendations are created equal in terms of their potential to reduce emissions, we see a series of what we call big ticket items and then others that slope down but were considered none the less to be important by the group in terms of identifying a full level of effort and also bringing forward important co-benefits.

The next slide is the graphic portrayal of the cost per ton for most of the 56 actions recommended by the group. On the left you will see lines that go down or bars that go down beneath zero. These are the actions that based on the analyses of the group would actually result in a net financial savings. It is important to underscore that the net calculation involves a combination of positive costs, cost outlays combined with cost savings. The timing may be different many of these involve an initial outlay in year 1 with savings in later years. The mathematics of the calculations for each of these are found in the

technical appendices but you can see that a great many of these options result in net economic savings. I would also observe that this is a fairly consistent pattern that we see now not only in other state climate action plans but in independent research, McKenzie and Companies produced a supply very recently which is looking at very recent results of either negotiated agreements or actual implementation of greenhouse gas abatement measures. It is very clear in the literature and reflected in the work of this group that at least potentially there is a significant opportunity for economic savings for individual measures. On the right of course, we see measures that on the net resulted in a positive cost outlay. They are non the less important in terms of the achievement of the overall level of effort to reduce emissions in aggregate. I would observe here also that it is not uncommon for plans to be focused on the combination of all actions positives and negatives so that the combination taken together maximizes the economic performance rather than simply isolating measures one by one.

I have listed on the slides and the final recommendations by name for each of the actions. I will not go through them in detail now but we certainly can go through them in detail whenever if you would like. In blue I have highlighted actions that were approved by this group at its last meeting based on early consensus recommendations of the CAPAG. Quite a few in this cluster are residential-commercial-industrial; you will see that this category includes energy efficiency and conservation measures in particular. The second group that had only two early consensus items at the last meeting is the cluster we call energy supply which includes electricity and heat primarily. But this is what we call stationary source energy supply and activities that can shift to lower emitting technologies and practices.

The next cluster is transportation and land use – it turns out that I made an error when this group last got together and did not note that two of these actions actually had been identified as early consensus by the CAPAG so they were not reviewed and recommended for approval by this group, but these have all been completed since. Transportation and land use involves the combination of light duty and passenger vehicles as well as heavy duty vehicles. Freight for instance, and within the arena of passenger vehicles the three areas generically of focus are the reduction of the carbon content in fuels through renewable fuels etc. The reduction in transportation and travel demand through location efficiency and the improvement in vehicle technology or operations that reduce the carbon foot print of the actual operation of the vehicle. Those same categories apply to freight as well.

Agricultural forestry and waste included a series of potential action areas. None of these were available for consideration at the last meeting of the Commission but have since been completed and generically include a combination of bio-energy, energy recovery from waste, other forms of efficiency and waste, the conservation of forest and farmlands through protection and through improved conservation practices for working land and some technology improvement in the

operation of the farms. The final set of recommendations are what we call cost-cutting issues, they generally pertain to more than one sector and include inventory forecast, reporting registry, a series of measurement approaches designed to support actions taken at the individual sector level as well as education and outreach. And then the whole arena of adaptation to climate change to the degree to which we have climate change inevitable, adaptation to it, and then, of course the consideration of the establishment of goals by the Commission. I would just note with respect to the goal issue, one of the more important pieces of information that was developed by the CAPAG just supports considerations by this group was the quantitative analyses of the emissions reduction potential of the actions taken into consideration, cost, co-benefits, feasibility issues. These were all approved at the last meeting of the Commission with the exception that the discussion of goals is on a continued basis.

I had mentioned earlier the consistency of outcome with the CAPAG process in other state climate planning action processes in the US. Last year we did a scale up analysis through my organization of the results of plans that were available and completed at that time. It is clearly out of date because a large number of states have undertaken and many have completed plans in this calendar year. But based on the scale up analysis of the actions taken by what we call leadership states, those that have developed climate action plans, we see a potential for reducing emissions to 1990 levels. The national growth rate and emissions from 1990 to 2020 is roughly 50 percent and the collective effort of these states were it to be scaled to all 50 states would reduce emissions to 1990 levels again with the same caveats that we discussed earlier in this presentation assuming all actions were fully implemented and the estimates were accurate in terms of their actual emissions potential. This is a very significant finding in that by coincidence this matches the level of effort that is identified in the interim year of 2020 by many federal bills under consideration in Congress and it is a benchmark in terms of early action that is consistent with long term climate stabilization goals that have been recommended by many members of the scientific community and are discussed in the intergovernmental panel on climate change for the assessment report National Academy of Sciences etc. So the level of effort from the actions identified through these processes appears to be consistent with stabilization needs.

We also see a pattern that recurring potential cost savings for many of these actions that scales up at a very significant level. In the pattern that emerged in terms of the action taken in states are very consistent with what the state of NC's advisory group identified include energy efficiency and conservation which is the top wedge. Clean and renewable energy, we call that energy supply and the second wedge – transportation and land use efficiency, a very significant wedge that follows – agricultural and forestry conservation which appears to be a relatively small wedge in this diagram. But it maps the reality that much of the reductions potential in the two wedges that proceed it, energy supply and

transportation and land use are derived from bio-energy whether it's ethanol, biomass, coal fired etc. So the use of biological resources, biomass in particular for energy production is very significant in terms of the pattern. We then see outcomes in terms of reductions from waste management, industrial process emissions which are smaller but none the less important. There is another wedge that we don't include in state processes because of purely federal jurisdiction which relate to aviation emissions and those are addressed through other means but we have included them here for purposes of illustration. Again this is a scale up analysis which would suggest that based on the data that was available at the end of the last calendar year that if all US states were to pursue similar ambitious climate action plan, the US at large would be on a pathway to reductions that are very much consistent with science and policy.

Finally, I have listed most but not all of the climate action targets that have been established by states based on the results of their climate action planning processes. Some of these targets were set in advance some of them were set as a consequence of the process and the results that it yielded. What we see in type that is too small to read very easily right now is a consistent pattern where states have used an index year, typically 1990 or 2000 and then established percentage reductions against that index year at future points and time. Typically an early period of 2010/2012, an intermediate period which is typically 2020 and a few cases 2025 and a long term target which is almost universally 2050. And so we see bench marks established for early, midterm and long term greenhouse gas reductions that states have established. This list is growing as more states take action and there are a couple line items here to be determined in the case of Colorado and Montana in particular. The advisory groups in those states did make formal recommendations on goals and they are under consideration for adoption by governments in those states.

Mr. Garrou: Thank you Mr. Peterson. Questions for Mr. Peterson?

Dr. Riggs: I just want to thank you for all your efforts and a very nice presentation summary of what is a very important part of this whole climate change business – and that's stabilizing the climate. It still bothers me very much that we are not dealing with, we've got 56 items in here or sections, one called CC5 deals with adaptation. And adaptation to climate change we have, I'm told, the thirteen billion dollar a year tourist industry a large portion of which is down on the coast. One storm could take care of what you've got out there as far as your benefits and we have conflicting processes going on right now that are all short term processes that's totally ignore what's happening out there on the coast. If we don't get a handle on that the golden goose is going to go away and this deal with everything from floods and droughts which we're experiencing now, to storm impact. We have an excess of bridge that we're thinking about building out there that exceeds billion and probably a billion and a half dollars. And it's likely to be a bridge to nowhere. One summer, one storm could make that all gone and it's something that I think we have to get a handle on. I don't

see any place in your scenario here where we can adapt or plug in the protection of our present economic system and our present resource space which is absolutely crucial as we move forward in this changing system.

Mr. Peterson: Thank you and I certainly don't disagree with anything you've said. I would only note that one of the outcomes of the process which was focused on mitigation was none the less by the CAPAG to identify the need for a planning process to develop a comprehensive adaptation plan for the state and under the crosscutting issues #5 recommendations which I believe the Commission endorsed at the last meeting. It is calling for a blue ribbon commission on adaptation that will presumably tackle this issue.

Dr. Riggs: So how do we make this happen? And when can it start happening? We need to get on with it. We've been lucky this year.

Brock Nicholson: Well I think that is an excellent question and point and as Tom pointed out that was in fact one of the recommendations. I think as I said at the outset, what we provided here are options to be considered by the policy makers in the state so I would assume that it would next go to whether it's the Legislature or combination of Legislature and the regulatory process and administration.

Mr. Garrou: Is the recommendation that there be a legislative commission?

Mr. Nicholson: I don't know that we spelled it out whether it's legislative or otherwise but I would think certainly that's a logical option and perhaps this body could further consider that as one of the options. I think certainly in debating the form of commission and how it is layed out the pros and cons would be legislative or otherwise. Certainly outside of what the CAPAG specifically did certainly we can envision certain advantages of that.

Representative Underhill: Thank you Mr. Chairman. I would just like to strongly endorse Dr. Riggs' statement. This is extremely important to those of us in the eastern part of the state. I certainly concur with all of your recommendations but we are ignoring a major vulnerability that we must address whether it's a blue ribbon commission, legislative commission. I don't care what kind of commission it is but we have got to get a handle on this particular problem. The sea level rise is going to doom a large sector of our economy in eastern NC and the state if we don't do something quickly. People will be displaced and it is very crucial that we address it sooner rather than later. Thank you.

Mr. Peterson: Other states are now actually developing adaptation processes and in some cases in parallel with the mitigation process, the state of MD for instance. So we are certainly seeing this, I think headed toward becoming the norm.

Mr. Nicholson: If I might very quickly add, the department and the division certainly are committed to assisting and developing such a program where we could do that.

Senator Pittenger: Thank you. Mr. Peterson I just want to clarify your response to Chair Harrison and I haven't read all of the 56 recommendations and action points. Is there a cost benefit analyses in these proposals?

Mr. Peterson: There is an economic assessment of the cost of implementation for each of the actions, the cost of removing greenhouse gases from the atmosphere for each so it is the development of information for a cost per ton of each of the actions.

Senator Pittenger: Then it does not include a cost benefit analyses for those proposals?

Mr. Peterson: This analyses and to my knowledge, no analyses other than some emerging work, the Stern report for instance have not used a monetized value for the avoidance of climate risk, so we did not attempt to monetize that because we are not aware of standard cost figures that we could use for that. So instead this is structured more as a cost effectiveness analyses to address risk reduction objectives.

Senator Pittenger: Follow-up? How many economists are with you on your center?

Mr. Peterson: Quite a few, including myself.

Senator Pittenger: Let me ask you this, in terms of your funding groups, Z Smith Reynolds, Rockefellers, have they been pretty aggressive in terms of this issue, is that shared bias that you have or is that a concern that it should be of some folks who are looking for an objective analyses. People pretty much have been on the front center who have funded your efforts in creating an urgency in this issue and it is totally anthropogenic cause.

Mr. Peterson: The work that we did in support of this process that was funded jointly by the state for DNER and private funders that have provided cost share was structured to support the specific purpose and goals that were established by DNER for the process. So our task was to support that purpose and the set of goals that were established in this process and that was the basis upon which the state and other funders have provided our organization support in terms of meeting the objectives that were layed out by the state in this process. As we have brought cost share from private funders to this effort, by the way, we are extremely grateful to the Z Smith Reynolds Foundation and to others who have assisted. The role of private donors in public policy in this country simply cannot be overstated in terms of the importance of picking up the slack or resources that

simply do not exist in the public sector quite often. But let me just say that in structuring those agreements we do not allow any contingent outcomes. So there is no agreement and we would prohibit any agreement that would specify any particular policy outcomes or other decisions that would be made by the process. The investment that they make is based solely and strictly on the process that we have been asked to manage by the state.

Mr. Profeta: I would just like to go back to where Dr. Riggs and Representative Underhill were and there was a comment that either Tom or Brock made at the very end of that conversation saying that a lot of other states had already created processes to address it. Is there any way that we could benefit from those other state's actions so that we don't have to start from scratch but we can actually take some wisdom from what they've done already?

Mr. Peterson: I think the states that are really hammering out the most current and comprehensive approach is the state of Maryland. We are conducting concurrent processes in MD for adaptation and mitigation and those are already being picked up by other states. So I would say yes, I would point to that as a primary example that you could use.

Mr. Toben: Thank you Mr. Chair. I am on the same line learning from the work of others. It has been a great deal of work in the last year or so on carbon dioxide and the carbon market both in the US and abroad. And Duke University through the Nicholas Institute has been involved in the net process and I would recommend and support a session within our next meeting that might more specifically address that opportunity as it relates to NC proper. There is a lot of data that has been developed over the last year or so that I think might give us some insight into how a carbon market cap and trade system might benefit the state. Thank you.

Representative Thomas: Thank you Mr. Chair. I sort of have a statement and a question here at the same time. I guess most politicians do that. I'm new to this group but it occurs to me that much like my mother asked me when I was in fourth grade, why would a person ever need a computer. She didn't understand that perhaps one day individual people might want to use computers. It was viewed as a business tool only. I think we all know now that everyone does use a computer and people can need them. I think that there is another point here to look at and that is where is the final solution, where do we find the final solution? And the final solution is a relatively unlimited supply of clean energy and we can talk about all the mitigating circumstances that we want, the economic impact of this or that, but in reality whoever solves that be it an individual, government entity, a university, a group of folks, they are going to print money. They are going to make a ton of money. It will make the Alaskan economy with the pipeline look like some sort of lemonade stand. I would really like to see us come up with something that helps direct some energy and effort towards the ultimate solution. We talk a lot about the negatives and the bad things that are

happening but if we can put a man on the moon and we can solve the Manhattan project and we can rid the world of smallpox, somewhere out there is a technological solution to this issue. And it is not just simply local abatement and we have a golden opportunity as a state, particularly in my region of western NC to seize that economic and environmental initiative and get them working together as opposed to having two diametrically opposed groups that are saying we are here to defend the economy and we are going to have to oppose the environmental initiatives and vice versa. There is an opportunity here for us to work together to direct both state and private resources towards a solution that really would have profound economic impact for all of our citizens. So if there are any suggestions in that positive manner I would love to hear them from any of our presenters. Thank you.

Dr. Phaneuf: Thank you. I would like to bring our discussion back to the economics a little bit if I could. So you suggested on a number of occasions the idea of negative cost and you were fairly clear in answering that indeed didn't consider the benefits. So we are talking about a negative cost estimate in the analyses? You talked also about consensus among groups throughout the country that these negative costs might emerge from these types of actions. I am an economist an environmental economists and I think I say with some confidence that there is a consensus among professional economists that you can end up with negative costs from these types of regulatory interventions. And I would just like you to address that sort of contradiction because I think that the consensus of mainstream economics is as strong as the consensus of mainstream science for warming is from human intervention. So to suggest that there are negative costs does this just sort of go against the consensus of science and if we are going to do that I think there has to be a response or reason for that and I'll listen to your response if I could.

Mr. Peterson: Well the report that the CAPAG developed and the reports and recommendations by other advisory groups across the US which include a great number of economists, whether they are mainstream or not I'll let them speak to themselves, have been developed through a technical consensus building process that has examined all of the elements of analyses that they felt were necessary to reach an agreement in terms of moving forward with a recommendation. And it has involved the participation of practitioners from various industries or organizations that would be involved and have been involved in actual implementation as well as other analyst. So these have been diverse groups. They have gone through a process using direct analyses and data or accessing other studies and then reforming and revising them based on what they think are more realistic assumptions to provide these results. The data tells a different story than whatever portion of the economic community may add a theoretical level think that negative costs are not possible. I would observe that a number of businesses that have undertaken action, some of them very large businesses discovered that they also could achieve very significant cost savings by focusing for the first time in their business operations on greenhouse gas

emissions. The consequence of that has been to identify new opportunities that there may not have been an adequate incentive to identify before and the net result of that has been actual after the fact savings. So I think that the consensus that I referred to is a consensus of negotiated agreements and recommendations that have come out of these participatory exercises. I would note that again a number of economists have been involved in these exercises and a number who I think are fairly well recognized have been involved in assessments that have been noted that our energy prices in the US today are high. They are likely to increase and for various reasons many of which are related to institutional barriers, we may not be achieving the level of energy efficiency and conservation that market forces alone would drive. I think what's behind many of these recommendations is an opportunity to bring down barriers so that the markets themselves can correct and go back and chase these incentives. So there is perhaps the market failure.

Dr. Phaneuf: Yes (inaudible) that material it is just that it really is a red hair, I mean when people like me who are trained to speak about these things and hear about negative costs immediately it doesn't sound credible. I think if these recommendations are to go forward I think that we need to come to terms with that because that will be the reaction among even the most liberal environmentally minded mainstream economists, I think. And then we can disagree on the people and so I wouldn't mind actually the list of economists that you consulted with, I probably know several of them.

Senator Pittenger: Thank you Mr. Chair. I'm just responding to Mr. Peterson's comments regarding the business world on interest. I remember we had three different business leaders come here, Mr. Key who is Sr. Vice President of Bank of America, Tom Darden, with Cherokee, and the man from DuPont, Mr. Bailey I believe, and all three of them outlined what their companies are doing as related to eliminating greenhouse gases and reducing them. Every one of them said categorically the government should not play a role in that. The free market should reign and allow technology and astrometry to work its way out of this.

Ms. Choi: Thank you. I just want to follow up on Representative Thomas' comments. We also agree that technology is essential for meeting carbon contained future and we don't believe it is just one syllable but a multiple prong approach that's going to be needed to get to where we need to be from energy production to production level goods and services. I look forward to working with you on that. We believe electricity in particular can be part of that solution and certainly we are looking at nuclear energy which is a large scale source of energy without the greenhouse gas emissions.

Mr. Urlaub: I just want to say I am glad that this issue came up because this was one of the rationale for Senate Bill 3 that recently was adopted from my organizations' perspectives. Is that when you have a base line in any project out business as usual, what the cost will be to society, to consumers, to businesses

of continuing with business as usual and then model out an alternative, sometimes we find that the alternative net long term present value and estimated annual cost are less than what business as usual would be. And that's one of the ways that I was seeing the number here. That's presented in front that's been generated by the CAPAG process was that we're talking about doing something that we don't currently intend to do at least we haven't signaled that we intend to do it by our current regulations which brings me to the point made by Senator Pittenger. I would argue that regulations very much shaped the way our institutional barriers to adapting to climate change and mitigating it and a lot of work was done this year and a lot of work is involved in these 56 recommendations to actually remove government regulations as a barrier to realizing the cost effective measures that are in these 56 recommendations. So it is a little ironic that what we are considering in many of these instances is a changing government role or reduction in government role possibly to realize cost savings. At least that is how I am seeing it.

Representative Harrison: If I can respond quickly to Dr. Riggs comment about adaptation. We had contemplated introducing legislation for the long session this past session and we thought it may conflict with this climate change commission. Although I think it probably will compliment rather than conflict. So we anticipate having something for sure in the short session. Just to give you some confidence, a lot of us are very concerned about that.

Thank you Mr. Peterson for coming I had a couple of questions clarifying – I am looking at the summary and the chart on energy supply and there are three items on their ES2, ES4 and ES6 that don't have any figures associated with them and maybe you said this at the beginning. I am just wondering if it is because it is not quantifiable or if we've already had the (inaudible) of portfolio standard that you have cap and trade in there and then the (inaudible) I just wondering what the status of those recommendations are?

Mr. Peterson: I believe you are on Page 1-13. On ES2 the shaded region is simply because underneath that umbrella there is an ABMC, a lot of print there. The group did not choose to provide a quantification of the potential impacts that either a carbon tax or a cap and trade program at the state or multi-state level in that recommendation as I recall is more qualitative in this structure as well as ES6 and (inaudible).

Representative Harrison: If I could just follow up? On the public benefit charge could you elaborate on the discussion regarding that particular issue please?

Mr. Peterson: I would like to – I am truly afraid I may not do it justice because I cannot off the top of my head remember all the details that were involved there. You might invite other members of the group who were involved in that discussion. I think certainly the public benefits charge is one of the areas where we see a positive cost outlay leading through investments to not only emissions

savings but potential economic savings. But that does involve a transfer payment and so as I recall there certainly are concerns about the level of transfer payments and then the need for finding ways for the folks who make that payment, the losers if you will, to benefit from the pool of winners and benefits that result. Those are just a couple of the many things that I recall.

Representative Harrison: Ok thank you.

Senator Pittenger: Thank you Mr. Chair I would just like to respond to my good friend Mr. Urlaub. Seems to me that if there is any consideration to impose a larger tax on energy, electricity or gas that it is certainly going to be the growth of the economy and opportunity for research and development for improved technologies. So I think that would be an (inaudible) for the government that would certainly stifle what our goals might be.

Dr. Riggs: Representative Harrison, if the last legislative session did not consider this because it would conflict with the Climate Commission that would imply to me that the Climate Commission needs to get on the stick and we have all sorts of things in the mill that are going on also in the legislature right now. Decisions that are major decisions that are very short term coastal decisions that are going to be terrible with respect to this whole adaptation business coming down the road. We don't need to start hardening our shore lines for example and I did not understand your statement I guess with respect to that.

Representative Harrison: If I can just respond. I talked to someone on the staff and other colleagues and I think we felt like this Commission had addressed adaptation, it might continue to be addressing adaptation in this interim period before the short session when we would make our final recommendations to the Legislature and that would be one reason for opposing legislation. I understand the urgency and I agree with you, I am anxious about it too.

Dr. Riggs: So when and how do we go about doing that? I put a poorly worded recommendation on the table to try to help get something going. I am not sure how we proceed.

Representative Harrison: If I can respond, I expect legislation to be introduced and I'll introduce it with Representative Underhill to establish an adaptation commission, how it is comprised, whether it is legislative, whether it is administrative or if it is highly imposed, I pledge to you that we are going to do something about that beginning in May.

Dr. Riggs: Thank you.

Brock Nicholson: I might make a couple of quick closing points. As you can see we had quite a stack of items here and a lot of considerations for future policy development perhaps through legislation and so forth. Again we are committed

to help however we may in terms of helping put that together. I will say as far as our remaining schedule I may have sort of implied that, but our intent is to finish the comment work by the CAPAG members on the report, get that finalized and then along with placing the Appalachian work at least the executive summary of the report so that it all can be together and we will get all of this finished by the end of the year. The major thick piece that many of you already have, we don't expect to change much in substance but more in just details and refinement. So that is our game plan to finish up by the end of the year. The CAPAG is in a sense still convened to be available for assistance on technical issues with the Commission at least through the early or mid part of 2008.

Mr. Garrou: We think we can finish this next session in half an hour and I am afraid if I let you go to lunch, I will not see many of you when we reconvene. So with your permission let's soldier on and see if we can finish by 1:30. The next presentation is David Ponder. I think Brock is going to introduce him.

Brock: Dr. Dennis Grady has been helping with this project and we have a graduate student, David Ponder, who has been most of the heavy lifting on this but I think Dennis will give an introduction.

Dennis Grady: Thank you co-chairs, thank you Brock. Let me be very, very brief given the lateness of the hour here. We were approached by the Division of Air Quality I am the Director of the Appalachian State University Energy Center. We were approached by the Division of Air Quality in July if we interested in taking on a project. The project basically entails taking the information that you see in the technical report from the CAPAG technical working groups running them through and then put output models that we have developed at the Energy Center that we've developed basically under contract with the State Energy Office to estimate the economic impacts of various policy alternatives for the Energy Policy Counsel. Driving the train has been my colleague, Jeff Tiller and my graduate assistant, David Ponder. I want to emphasize that what we have used here in terms of the analysis is the information that was given to use by the technical working groups that Tom just mentioned. I also want to emphasize that these are preliminary draft results they are a work in progress. We still have about five to six more weeks of analyses to do. We haven't even completed the analyses and all of the recommendations. So with that said I'll turn this over to David and he can walk through the process of the model, the assumptions and what we found.

David Ponder: Thank you Mr. Chair, Madam Chair, members of the Commission, members of the audience. My name is David Ponder. I am a graduate student studying public administration at Appalachian State University and I am happy to be here with you today and talk about the work that we have been doing. I think all of you have the slide (Exhibit H) that you will see on the screen. What we will do today is briefly talk about how the input/output models that refer to as the NC energy scenario economic impact model works. We will

talk about the selection of the CAPAG policy recommendations that you've just heard about from Tom Peterson, a work considered. We did not model all 56 of the recommendations that are presented in that report. Next I will talk about sort of how we treat the data and how that data is handled in the model and then I'll talk about some of the preliminary results and what we look forward to completing in the coming weeks.

The model that we used as Dr. Grady mentioned was developed for the NC Energy Policy Council under contract with several recognized experts in the field. It has also been peer reviewed by Dr. Adam Rhoades out of the University of Southern California and the model has served as the basis of similar reports conducted in a number of other states.

Senator Pittenger: Dr. Rhoades' PhD what is that in?

David Ponder: I believe it is in Economic Geography. Just a little bit of background on how input/output modeling works. The concept of input/output modeling was conceptualized originally by Nobel Laureate, Loffly Lantif. Dr. Lantif basically came up with this concept of how sectors of the economy relate to one another. And basically what you can do is you can look at the actual transactions that occur in the economy and then describe those relationships. And if you will, think of it as a basket of goods and services, we as consumers demand goods and services for things like groceries, transportation, utilities, health care. And in turn those industries that provide us those services demand goods and services from other sectors in the economy. The health care industry relies on the pharmaceutical industry, relies on the marketing industry, so we are all connected, if you will. What happens is as we change the relationship in the economy as we change the demand for goods and services there is a ripple effect that goes out throughout across the economy. And essentially what the model does is it measures the multiplier effect of changes in the way we conduct our investment. At the core of the model is a 39x39 economic sector matrix like I said describes the consumption and production functions of each of those sectors in the economy and those are derived from the IAP group in Minnesota which stand for Impact Analysis for Planning. It is the standard source of commercially available input/output data which is itself derived from the Bureau of Labor Statistics.

The model captures the direct/indirect and induced effect in the economy associated with changes in demand. The direct effects are those direct changes in demand. Say we build a new ethanol plant in NC, that investment creates a direct demand for construction and other goods and services. In turn the construction firm that builds the bio-ethanol plant demands goods and services from other industries and then those induced effects are the recent wages paid the laborers building the plant. What the model does is it calculates changes in total employment and I want to emphasize here that it is total employment and part-time employment. The Bureau of Labor Statistics did not collect a per hour

employment data for every sector of the economy so it is difficult to translate that into fulltime equivalents although we're doing our best to figure out a way to do that. The other thing that the model calculates is changes in income. If we are employing people in a given sector based on the average wage in that sector, what is the effect on earned income? And in turn what is the effect in terms of total value added, which is income as well as rents, royalties, profits and the IAP model captures some indirect business taxes, things like sales and excise taxes, although it says not captured income tax.

Like I said, it was not possible in the six week period that we were given to conduct this analysis to do a thorough analysis of all 56 options considered by the CAPAG group. Instead we bundled 31 policy options into 24 analyses, seven from the energy supply sector, 10 from the residential/commercial, and industrial sector, 10 from the agricultural, forest and waste sector, and four from the transportation and land planning. In aggregate, these 31 policies that we examined represent 90 percent of the greenhouse gas emissions reductions in the CAPAG process.

This is a really important slide and I think it will help explain to us how the model treats the data. As Dr. Grady said, what we did is we took the assumptions from the CAPAG working groups and sort of parsed them out into outlays, investment and energy reductions and dollar savings as a result of energy efficiency gained, typically. An outlay is just what it sounds like – the program costs something to implement, that means there is less money in your pocket and because you are spending it on something else. Your rate may go up and so therefore you're spending less money on the typical basket of goods and services. On the other hand the money that is being outlaid is being invested in other technologies. It is being invested in energy efficiency, it is being invested in clean renewal energy technologies, it is being invested in biomass and bio-fuel type technologies. So that is a positive impact to the economy. On the other hand, if we're investing in efficiency and clean renewal energy, we are not investing in conventional sources of energy. So we want to take for account the displacement of that investment and not a curse.

Additionally, you want to consider the net impact on interest payment. So if a given investment in an alternative technology yields a given gain in interest payment, you want to account for that. On the other hand, if you're not making interest payments on your conventional resources, that's a negative. So depending on the scale of the policy those interest payments are a plus or a minus.

Finally many of the policies considered by the CAPAG results in reductions and energy consumptions, because you're not spending money on utility bills that creates increased personal cash flow and on the business side of things, it increases cash flow for businesses that is freed up for other investments. And so that is typically a gain in the economy. Conversely, if you're not sending money

to the utility company, they are not realizing the benefit of that revenue until you want to take into account that as well. So what you end up with when it is all said and done is a total change in net demand for the basket of goods and services based on the policy under consideration.

Those net changes in demand are then plugged into the input/output model and generate the impact that we previously discussed - impact in terms of employment, impact in terms of income, and impact in terms of total value added. Based on preliminary findings these are some of the results. If you look at the entire study period, 2007-2020 you see a net gain of 328,738 jobs. I would not worry about the 38 because in all economic modeling there is a little give and a little take. But I think the important thing to take away here is that the trend is positive. There are particular steps of policies that tend to have more positive employment impacts particularly in the agricultural and forest industry. That's because there's a labor intensive industry and so investments in those are primarily local investments as well. So you see bigger gains in those sorts of policies.

In terms of cumulative impact on personal income it is on the order of 14 billion dollars over the study period and in terms of cumulative value added over the study period it is on the order of 20 billion dollars. Just to give you a little bit of perspective on these numbers, in the base year that we looked at which was 2004, that was the latest year data from INPLAN was available when we started this process. Total jobs in the NC economy were about five million, total income in the NC economy about 250 billion and total value added in NC on the order of 300 billion. So again we see mildly positive impact, but in terms of the scale of the economy these are not earth shattering figures.

Next I want to turn to some of the specific policies that we model so that you can see how those come out. We completed analyses that chose the energy supply options 1 is ES8 which is essentially a municipal biogas policy that call for capturing methane from wastewater facilities to generate electricity. Clearly the big blue there is what is going to capture attention. That's a combination of Senate Bill 3 that was modeled by the CAPAG group as well as some additional energy production tax credits for renewable energy and accounts for a little bit of the biomass that significant overlaps in the biomass analyses conducted by the agricultural and forestry groups and the energy supply group. So that biomass component most of that is already captured in the REPS type analyses. As a point of reference, these values are consistent with the results from the LaCappra study. There is just (inaudible) which was talked about earlier by Mr. Givens. The LaCappra study looked at a 20 percent, a five percent and I think a 10 percent and it included some energy efficiency components in there as well. The primary reason why the results are similar is we followed the same logic as the LaCappra study which is a fairly conservative assumption that the only thing that's sort of gained in the local economy is the value of construction dollars. That is a conservative assumption because more than likely you are going to

have, if you move in this type of direction you are going to see industry form, there are already (inaudible) industries, green collar industries in NC but we want to stay on the conservative side and be consistent with something that we thought you all were all familiar with.

Ms. Choi: David just real quick. Seven recommendations that you modeled were energy supply. It only shows three here, 8, 1, and 2.

Mr. Ponder: That's right. We've not completed the analyses of the advanced call policies and we've also done a PBS analyses which was energy supply option #7 and we're still trying to figure out the way to treat that because the way the CAPAG treats it, it counts all the efficiency gains in RCI2 and so we are trying to figure out what is the appropriate level of a PBS to analyze. Does that answer your question?

Ms. Choi: It's a total of seven. I don't have the complete list in front of me but in the end it is seven.

Mr. Ponder: Another perspective on those numbers is instead of looking at the jobs impact is to consider the total value added. As we talked about total value added is income plus profits, plus some indirect business taxes and again you see the general trend is toward an increase. That is because as the policy is ramped up as the REPS bill comes on line you see greater investments in renewable energy technologies. So that typically accounts for that ramping affect that you see here.

Next I want to talk about the agricultural forestry and waste options. There are a number of those options that we modeled. Clearly the ones that stand out are our policies to promote cellulosic ethanol and policies to promote the conservation of farm land and forest land, followed up by investments in bio-diesel productions. The goals for cellulosic ethanol production are fairly aggressive. My recollection is that it is a 20 percent ethanol displacing petro derived gasoline by 2020 and again you see the ramping of the policy effect. In essence, what you have to do to get that much ethanol produced in NC which is what the policy calls for, you have to build a lot of ethanol plants. So that is what you see there those construction jobs associated with building ethanol plants.

The conservation easement policy is a boom queue of households because it essentially is a cash payment, if you will, to the households and then the model assumes and goes out and spends those dollars on its typical basket of goods and services. So when we all get our tax refund check we go out and we buy that HD TV that we've been wanting all year long. So that is sort of the effect that you see there. Then the bio-diesel policy again is a fairly aggressive standard, I think it is 20 percent again by 2020 but what we're talking about is a different scale. The diesel consumption in NC is less than the gasoline consumption in NC so the impacts are less.

This is another way to take a look again at these policies and again it is important to note that some of the policies have a consistent ramp up of in total value added. But you can see that not all of the policies create total net value for the economy. The recycling policy – now that one may be a little deceiving because of the number of significant digits revealed here in the graph. But in line, per policy 13 the urban forestry measures for example while you have an initial investment in planting trees around houses, the assumption is that you only get so much energy savings from that tree planting. And by the end of the study period the costs are outweighing the benefits there.

Next I want to turn to some of the demand side related options what I refer to as residential/commercial and industrial options and what their net jobs impact are. Clearly the big job creator is funding for energy efficiency, RCI1, 2, and 11 is a combination of a public benefits fund which is I think a one percent public benefits charge and then a one and one-half percent utility revenue, dedicated one and one half percent of utility revenue to efficiency. So that's two and one half percent and that will put you well within the top ten states in the country in terms of investments and energy efficiency. Essentially what you see here and again we follow the LaCappra assumptions about how efficiency dollars are spent on a combination of purchasing retail goods and services and it is also a combination of installing the goods that you buy. So you're buying a new dryer and washer, you're buying a new heating system or air conditioner for your home but then you have to hire someone to come in and put it in. You see the gain here from both the retail sector in the economy seem to gain in spending there. The gain in construction related type jobs in installing that equipment but again the peak here, the curve comes from the energy savings. By the time the policy is fully implemented, you are getting dollar savings in your pocket and again the assumption is that you or if you were an industry, you're going to go and spend that on other goods and services as the data would suggest.

The next big gainer here is building codes. Again it is a combination of increasing investment and construction and if you think about it the constructors sector is a fairly laboring intensive secretary of the economy. But again you get sort of in the near term some construction jobs but really when you see the curve starting to come on that is where you're seeing the gain in energy savings. Because your energy bill is less, you're spending money on other goods and services in the economy. The other policies of note are the policies for combined heat and power so that is sort of an industrial and commercial level efficiency measure where you use the thermal energy associated with producing electricity to do some other things. That's again driven by investment in construction and the other policy bundle that we looked at 7 and 3, sort of what is termed as a beyond code policy and government building policy. So these are government buildings moving beyond the conventional building code standard and having a number of other commercial and residential type buildings meeting higher than the recommended energy code standard. So again you are getting

investments in construction and because you are not spending your dollars on electricity, you're spending it on other goods and services.

This slide is I think one of the most interesting slides and it really illustrates what was talked about at the beginning of the last presentation is if there are short term costs associated with implementing some of these policies. And it isn't until the long trend that you really start to see the gain. The screen is sort of smooching everything together a little bit but I think you can read from that first line. You can see that the PBS type policy you get sort of an initial rush of investments to meet other policy after a while the displaced utility investment sort of catches up and then it is not until sort of the end of the study period that the energy savings again catch up with the displacement in other investments. You can see that trend sort of consistently throughout. With just one note on RCI9 - that is a policy to encourage green power purchases by state government and so what you see there is sort of the short term investment in renewable energy, short term investment in construction jobs associated with acquiring those resources and then by the end of the study period it assumes that those facilities are already filled and then you sort of go into an operations and maintenance type mode. Then by the end of the study period you actually start to see a slight downward trend.

The next steps in the next five to six weeks include a complete and thorough betting of the assumptions that we've made and how we treated the inputs provided to use by the CAPAG facilitators and their team of professionals and economists. They have assisted me greatly so far in treating the data but like we said at the outset, these are preliminary in draft results. We want to make sure that we get this right because we understand that this is an important study and we take seriously the work that you all are doing.

We also need to complete our analysis of the transportation/land use option. We have not begun that process we're working to make sure that we're treating the data appropriately for the input/output model. We hope to initiate that work in the coming couple of weeks. And then finally, we want to complete a final report which we will make sure that each of everyone of you receives a copy of so you'll have plenty of reading to do. This will help you go to sleep a little bit faster.

Just in conclusion I want to offer some thanks to the team of CCS economists and particularly Dan Wei and Tom Peterson who have been invaluable to me in handling these data inputs and also I want to extend thanks to Skip Laitner who is now with the American Counsel for Energy Efficiency Corp. In economy Skip was the original brain child behind using input/output analyses to study the economic input impact of efficiency type policies. And then of course the team at ASU Energy Center, Jason Hoyle, Jeffrey Taylor and of course Dr. Grady.

Mr. Garrou: Thank you Mr. Ponder. I take it you are also looking for input from us as to how this data might be better presented or improved. So if we have that sort of input from the Commission that would be great and also questions.

Representative Wilkins: I guess I wasn't quite prepared. Thank you Mr. Chair, I am on page 3 of the handout which would be, I'm looking at the middle frame which would be your 8 overall frame. I was out of the room very briefly and maybe I am asking for something that you've already given us. Is there a margin for error in these numbers?

Mr. Ponder. This is not a statistical sample. This is based on the data that is used to drive the model as based on the actual input/output account developed by the Bureau of Labor Statistics and Bureau of Economic Analyses. That data is treated by the INPLAN group in Minnesota to create what are called an industry by industry table. Those are the tables that describe the relationship between given sectors. So you and I for example have a particular demand for goods and services as our income changes our ability to demand those goods and services changes and so this is really an accounting method versus a statistical method. Talking about margins of error doesn't really apply.

Representative Wilkins: Mr. Chair may I follow up? I would still like a ball park guess. I don't care if it is two percent, 25 percent, 50 percent I think it is important that we know whether it's two or 50. Could that possibly come at some later point, even if it is a best guess?

Mr. Ponder: The technique involved here is a technique based on a financial accounting. The outputs that we're getting are as good as the inputs that we're given and certainly we plan on conducting sensitivity so we will manipulate some of the assumptions. Say for example, some of the financing assumptions can play an impact on the ultimate outcome of a given policy. So we will present those sorts of sensitivity analysis in the final report but they will not be margins of error. What we can do is provide the sort of, if you change this assumption, this is what happens.

Representative Wilkins: I just think some sort of guidance is important for us if we're expected to be on the ball policy makers here.

Mr. Ponder: Yes sir – we will certainly take that into consideration. Thank you.

Ms. Choi: David I raised this to you earlier and I just have a question. The INPLAN matrix is a static matrix that assumes that the cost of producing the unit of goods or services doesn't change. But it looks like a number of the recommendations would impact the cost of production for energy or for farming, food and so I am just wondering if maybe there is a better model to use to determine economic impact. (Inaudible) seems this model use for, for instance at the federal level and looking at the economic impact of some of the federal

proposals for cap and trade, I'm just wondering if there might be a different model that we could use that would take into account the dynamic changes and how you produce goods and services under these type of recommendations.

Mr. Ponder: There are a number of other types of input/output models and this is the model that we have and that we can afford, frankly. I would say this about the model and some of these dynamic issues that you raised. There are some things that we do differently in our model that typical input modeling doesn't do. So for example, we take into account changes in labor productivity. So as labor productivity goes up you see a decline in unemployment in that given sector of the economy. So we do adjust over time for things like labor productivity, there are feedbacks for price changes in terms of fuel and we are currently working on what we call the Adam-Rhoades deflator. Which is exactly I think the point that you're getting at, which is if you have policies that increase the cost of electricity then you may have sort of a level of elasticity associated with where the consumption of electricity may go down, depending on what the price is. We are in the process of incorporating that feedback mechanism as well.

Senator Pittenger: Thank you Mr. Chair. Mr. Ponder you're here for economic analysis of your climate mitigation strategy and I do appreciate your role in terms of political scientist, public administration. I respect that but were there some environmental economists PhD trained folks who gave input in this process that were on your specific team?

Mr. Ponder: Yes absolutely. As I mentioned Dan Wei who is a PhD economist I believe her degree is again economic geography. She is also at USE (inaudible) provided a lot of help and assistance in need kind of climbing the learning curve, if you will. There has also been as I said review by the other facilitators involved in the technical working groups, Jeffrey Tiller who was unable to be here, his master's dissertation was in input/output analysis and then we've also worked with Skip Laitner who is formerly of the EPA and now is at ACEEE. He is widely recognized as a pioneer in this type of analysis.

Senator Pittenger: Mr. Chair at some point I was just like to make a recommendation if we could have Dr. Ed Erickson a member of our Commission who is an environmental economist speak to us on this I think it would be great.

Dr. Eggers: Thank you and Thank you for your presentation. I am interested in the sensitivity analysis, tornado diagrams too I think that would be fascinating. This is less a question for you than a statement for the Commission and I think what this is bringing to light is something that we need to consider in our role of making recommendations. And that is these jobs are real jobs that I think will be out there, plus or minus some amount. We need to make sure people are trained to carry out these jobs. I was invited to testify before a House congressional subcommittee and small business. One of the other people

testifying, we were talking about energy issues, one of the business owners testifying said he had to go to Atlanta, he's in TN, to find a company that could give him energy efficiency lighting in his manufacturing facility. And then in TN he could not find an electrician to install it and he had to bring in an electrician from GA who is trained adequately to install it. Now in Asheville where I'm from, Asheville-Buncombe Technical Community College is trying to get funding for a pretty large scale program to help people that didn't have green collar jobs basically, electricians, plumbers, builders, and so on. And in our university and community college systems we need to be training people who have the knowledge to do this because traditionally trained folks need to be re-trained in order to really do several of these kinds of jobs well. So that is something I think as a Commission we should consider and I would also very much echo Representative Thomas' earlier statement about investments and research and thinking outside of the box. Because while we are making good progress we are talking about 1990 emission levels as if it is a great goal. But it is not the ultimate goal it is kind of like smoking three packs a day and trying to get down to two. That's a good thing but we actually need to go far further than that and that will require technologies and things that we don't currently have. So as a Commission I think we need to look at funding research to support those initiatives as well. Thank you.

Representative Harrison: Thank you Mr. Chair. Thank you for your presentation, actually I have a clarifying question on a slide. You were giving us the context of what the current situation is - I thought you said five million jobs in NC and 20 billion in accumulative income, is that correct?

Mr. Ponder: It is 250 billion in accumulative income, 304 billion in total value added. This is as of 2004 and those values are derived from the IMPLANT data center.

Mr. Givens: David when do you anticipate that you will have your final work product?

Mr. Ponder: Excellent question – our current goal is the end of November.

Mr. Garrou: We have two young women in the back who are Annie Delmedico and Lorna MacAllister who come from the Montessori School of Raleigh and they have one or two questions. Maybe each has a question. So I'll recognize them.

Ms. Delmedico: Earlier you were talking about payments, would there be any taxes that would be forward to pay for solar technology and CO₂ consumers, etc.?

Mr. Ponder: I think the way some of the policies are written they are not taxes per say. Typically what they are, are surcharges to a monthly bill that you get from the power company. So you pay an extra dollar a month or two dollars a

month on your power bill and that goes into a big pool of money. Then the power company takes the money and invests it for all of us to reduce our energy consumption.

Mr. Garrou: Were you Annie or are you Lorna? You're Annie.

Mr. Garrou: Thank you girls. Thank you, David. That was a good presentation, is there any other discussion or announcements.

Representative Underhill: Thank you Mr. Chairman. In light of several of the comments that were made earlier in this session while Tom Peterson was speaking, I would like to see if we could have a speaker from the state of MD to address our Commission about what they are doing in MD and perhaps we could get some people from MD and maybe their consultants down to talk about that.

Mr. Garrou: On the adaptation issue.

Representative Underhill: Yes whatever they are doing in MD. Thank you.

Dr. Eggers: Just a note. The payback period on the lights of that the manufacturer installed was six months.

Mr. Givens: I would just observe generally that the co-chairs and counsel are in the process of developing a plan for the work of this Commission from now until the 2008 regular session the so called short session. I am talking to various folks in connection with that and we will be talking to others over the next few weeks. If you have particular suggestions or input such as Representative Underhill's, we would be glad to have it and to factor it in our thinking. We hope to have a cohesive and meaningful plan of activity from now until this Commission is scheduled to conclude which is technically the 15th of April but I think we will be working right on up until the Short Session convenes. One of the issues before the Legislature and what this Commission may well want to weight in on is what comes next in terms of not only adaptation of which Representative Harrison has spoken to and other aspects of the climate change and how that might continue to be addressed on an ongoing basis.

Mr. Garrou: I've been asked to remind you to turn in expense reports and unless there is any other business we are adjourned for the day. Thank you.

Respectfully submitted,

Mr. John Garrou
Co-Chair

Thelma T. Utley
Commission Clerk

APPENDIX

Exhibit A Visitor Registration Sheet

- Exhibit B 2007-2008 Membership
- Exhibit C Agenda
- Exhibit D Update on International, Federal and US State Action on Climate Change – Patrick Hogan
- Exhibit E Session 2007 Legislative Fiscal Note
- Exhibit F NC Legislative Commission on Global Climate Change
Brock Nicholson and Tom Peterson
- Exhibit G Climate Action Plan Advisory Group Recommended Mitigation
Options for Controlling Greenhouse Gas Emissions
- Exhibit H Economic Impact Analysis of Bundled Climate Mitigation
Options – David Ponder