MINUTES
Legislative Commission on Global Climate Change
January 13, 2009
1228 Legislative Building

Minutes

Representative Harrison called the meeting to order at 10:15 a.m., wished everyone a happy new year, thanked them for coming, and introduced the sergeants-at-arms and visitor registration (EXHIBIT A). (Agenda – EXHIBIT B). Members present: Co-chairs Garrou and Harrison, Senator Albertson, Representative Lucy Allen, Representative Alice Underhill, Representative Wilkins, Dr. Andrews, Dr. Boyles, Mr. Cecich, Ms. Choi, Dr. Eggers, Dr. Everett, Mr. Glaser, Mr. Howard, Dr. Phaneuf, Mr. Profeta, Dr. Riggs, Mr. Slocum, Dr. Smith, Mr. Stephenson, Ms. Tompkins, Mr. Urlaub, and Mr. Regan.

Mr. Givens: Thank you Madam Chairman my remarks will be mostly brief. This is our third meeting in this interim we met in November, met in December. At the November meeting I reported to you on the discussions amongst counsel and Co-chairs about recommendations. There were some six possible areas and we in November solicited input from any member of the Commission that wanted to offer suggestions relative to those matters primarily and today's meeting will focus on that to the extent that folks have responded. We do have a couple of presentations that we want you to hear before we get into potential recommendations. We welcome today Bob McKinstry who is going to talk to us about an alternative approach that may (inaudible) the federal and state level as the new authority and new administration have focused at the state and federal levels. And then we are going to hear a report from the Division of Air Quality on the extent to which adoption of the California Motor Vehicle Emissions Standards would be a benefit in terms of reducing carbon emissions. This is part of what would have been a follow-up study by the Environmental Review Commission (ERC) had the ERC chosen to go forward with it. The ERC approach would have included an economic analysis. Our information today is just the environmental side of it. When you get to item 6, following these are the matters that the Co-chairs and counsel considered for your requested input on and you will note that some of those do not specifically have presenters. We put them on there with the thought that we would at least have some discussion, hopefully not (inaudible) but hopefully directed towards something that can materialize by the next meeting. There is one more meeting scheduled and it is on the 27th of January. Our current thinking is we will take no votes today on any matter but rather will hear these and then with whatever planned additions can occur between now and the 27th. At that time we will approve a report and recommendations. I will emphasize again on Tuesday 27th of January that is the day before the General Assembly convenes for the 2009 Session. It will be I think a hectic place around here but we've had meetings on the day before session for other commissions before that worked and we can make that work here as well. We will be back in our regular large room at that time.

With regard to minutes – we are going to ask you this morning to approve the April minutes if you are prepared to do so. They were distributed just this morning and if you are not comfortable with approving them we will defer that to the next meeting. When we do get the April minutes approved we will have provided you with minutes for all meetings except those that have occurred in this legislative interim which are the November, December meetings plus of course this meeting will generate its own set of minutes. One thing we certainly can deliver is the minutes for November,

December and we hope that by the 2nd January meeting we can have minutes for this meeting as well.

Madam Chairman you may want to see if there is a motion with respect to the minutes (EXHIBIT C) for the 22nd April meeting.

Representative Harrison: Do we have a motion?

Dr. Eggers moves to approve minutes of April 22, 2008 and Dr. Smith seconded. The Commission concurred. The motion passes.

Mr. Givens: If you see some correction we can still make a correction if it is not too extreme. That concludes my remarks and we will just proceed and see how we get through the day. We do expect to finish without a lunch break there are some other meetings that folks have to attend. I believe we can accomplish that goal and be done by 1:00 p.m. at the latest.

Representative Harrison: Our first presenter will be Mr. McKinstry, Senior Advisor for Center for Climate Strategy. Mr. McKinstry if you will come up to the podium.

Mr. Robert McKinstry: (EXHIBIT D) Thank you and I would like to thank you for inviting me here to share my thoughts with you. Let me pull up the PowerPoint. I am going to talk about the opportunity to integrate some of what you've been doing and many other states have been doing into a federal climate system. We've been wondering where things are going to go in the area of climate change for quite some time. The crystal ball is getting a little clearer with the administration which has taken a position that it will make an endangerment finding under the Clean Air Act. This arises out of I think what was inevitable after the Supreme Court decided Massachusetts versus the Environmental Protection Agency (EPA) and became more obvious when the EPA staff published advanced notice of proposed rule making under the Clean Air Act. What still remains unclear is what the role of the states is going to be? You are probably familiar with this in Massachusetts versus EPA when the Supreme Court held that there is authority under the Clean Air Act to regulate emissions of greenhouse gases and the EPA's reliance on factors outside of the statutes in denying a petition to regulate automobile emissions required that the matter be remanded. The issue on remand is whether emissions cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare. In response to that, this summer EPA issued an advance notice of proposed rule making that raises a number of issues under the Clean Air Act. The reason this is a complex issue is that a finding under Section 202 relating to automobile emissions would trigger identical findings across the board under the Clean Air Act. The staff analyses follows some statements by some of the agency has which I don't think were terribly impressive but there is a very thoughtful analyses analyzing how categorical standards are these specific emissions standards for automobiles for power plants and so forth. Under the pertinent sections of the Clean Air Act could be used and how cap and trade might be integrated under the existing Clean Air Act. What EPA really fails to do, and it misses a big opportunity, is how to engage the states particularly under Section 110 State Implementation Planning Process. And I think one of the things that is obvious from the experience we've gotten from the states so far is that you really need planning at the state level. You can't do it all with the magic hand of the market. Different states have different capabilities for low or no carbon energy. For instance, Arizona recently proposed a 250 megawatt thermal power plant which melts salt with

mirrors and the salt then keeps the electricity going during the peak hours when they all turn on their air conditioners in Phoenix and Tucson. We can't do that here or in my home state of Pennsylvania but we can use for instance a lot more in the way of biomass which they don't do well in Arizona. So there are different capabilities – more importantly there are different legal regimes from state to state. Particularly for transportation, land use, building codes and utility regulations there is a great need to consider both the legal and factual in a relationship. You have problems of leakage you have problems of salt inducing emissions in a different area. You need to think about how you treat demand based emissions versus direct emissions. I think the experience we've had and there have been some studies at the Center for Climate Strategy as recently completed on economic efficiency that state plans can be more effective than a one-size-fits–all/inside-the-beltway type solution. That is both because the planning is hard and you need to approach this with a scalpel in some cases rather than a sledge hammer. But also one of the things I think that we've seen in the states given what is contrary to theory is that you get a lot less influence by trade associations and inside the beltway there is a major influence in trade associations. One of the benefits of state plans is you have individual companies and much more grass roots types of participation.

I may be telling you what you already know here but what we've seen during the interaction of the Bush Administration over the last eight years is an emergence of what I call the new old federalism where the states are leading from the box. That's not unusual in fact every single major environmental law that we had has been based on a state model and I think one of the things that is unusual is that climate change has gone so far as it has. We have had a lot more experience at the state levels than we have at any other. It has always been two or three states that have acted and then there has been a demand for the federal government to act. So we are acting at a very different climate so to speak where we have a lot more states already acting. The states are fairly significant it is not like the states are minor actors. This is an old chart but if you looked at emissions and treated the states as separate nations Texas would be 6th, California would be 12th and if you looked down here at Pennsylvania I happen to know that it is one percent of the world's emissions. You can get an idea of this. There is Ohio, which is a little ahead of New York. Florida, Indiana, Illinois, Minnesota, and Louisiana are all about the same. What are we seeing done in the states – what we've seen done is a lot of what I think you've already been dealing with over the last year or so. We have a large number of state emissions inventories and forecast – identification of where the emissions come from and where they are going. We now have 31 major state climate planning initiatives since the year 2000. There were some older plans that really were not worth much. We have a wide variety of now statewide and regional greenhouse gas targets calling for anywhere from 50 to 85 percent reductions in time frames anywhere from 2040 to 2100. I think the consensus seems to be coming towards 80 percent by 2050 and as you'll see there is some good economic data suggesting that a 10 percent reduction below 1990 levels by 2020 can be done very cost effectively.

You've also seen the development of a wide variety of both cap and trade programs and technology based standards. California AB 32 calls for a statewide cap and trade program but California has gone well beyond that. They have established their own emissions standards for their electric generating sector expecting a little more than a combined cycle gas generation. So imported electricity is subject to California emission standards, Washington has the same, Massachusetts and New Hampshire both have emissions standards and of course we also have a whole series of reporting systems and registries. One of the things that we've seen is that we have

very different rates of growth among the states. As shown here, Arizona is at about 165 percent growth, actually this reads 150, but it is actually 165 percent growth. Down to New York, which is down around 20 percent growth from the years 1990 to 2020. This shows the coverage of the state plans which cover all regions of the United States. The development of the plans basically identical or very similar to what you've done here. The process has been similar, the portfolios of options that are selected have been different and they have been tailored to each particular state. Typically this process has been run by consensus based on transparent analysis where you can look at the assumptions and so forth. They have been based on the involvement of a variety of stakeholders and they established some pretty common decision criteria, which is the greenhouse gas reduction potential cost effectiveness, what are the additional co-benefits and cost such as reduction of other types of air pollution and what is the feasibility? And feasibility involves both--is there technology and is it legally feasible, particularly in some of the areas such as land-use for example or even utility, given the structure of the utility regulation. Different methods may have differential feasibility in different states.

In terms of the policy actions when it is emerged as you know is that there are over 250, actually some people count it at 350 individual policy actions that have been described and identified by these various state processes. And all six key areas, energy supply, residential, commercial and industrial, transportation, land use, agricultural forestry and waste management and the process has, I think you've gone through, these are looked at they are sometimes clustered into a group of policy actions that are particularly appropriate for the State. They are evaluated for greenhouse gas reductions, the cost effectiveness, co-benefit and evaluated and then compared to goals. These 250 aren't limited to just one or two policy options. I think that is very important. They cover the whole gambit of legal tools including codes and standards, market based approaches like cap and trade and tax which have been a part of virtually every plan but it has been a part that's been fit into an interval portfolio.

Financial incentives – financing mechanisms are something. Since I've come back from the university into private practice with my law firm, we have been looking at this quite a bit. Financing becomes very important not only how do you finance alternative energy but particularly how do you finance energy efficiency and conservation measures and aggregate a lot of small projects for example. An example of what some states have done, for instance Delaware, Vermont and California now have energy efficiency utilities so we think we can do the same thing in Pennsylvania with a municipal authority. Then there is a wide variety of other instruments that have been used. One of my friends Professor John Durnbark often talks about the issue of tools and he says that you take an axe, an axe is a pretty handy tool, you can build a log cabin with it they did it many times but if you want to build a more modern house, you need a bigger variety of tools. You tend to get splinters in your feet from splitting the logs in a log cabin. You need screwdrivers, saws, power tools you need other contractors, electrical contractors and so forth. So it can't be one level of government and it can't be one tool. It has to be a portfolio.

For example, one measure that's been widely adopted is a renewable portfolio standard, which North Carolina has adopted, as have 34 other states. The RPS's vary greatly from state to state. There has been a lot of talk about developing a federal portfolio standard. There has also been some talk about pre-emption and the state standards though do vary and they vary appropriately from state to state. California has a much higher percentage of renewable energy and can impose a higher standard. Should you simply allow sources in California to sell credits in a federal

standard to some state where you have a very low standard, or should you have a mechanism that allows each state to develop an appropriate percentage? Portfolio standards are very effective at reducing greenhouse gas emissions and this just shows something done a number of years ago by the Union of Concerned Scientists, which showed what could be achieved when there were just 20 rather than 34 RPS'. The policy planning results have been really significant. You know the North Carolina results. I wanted to show the results of a couple of other states starting with Arizona. Arizona has the highest growth rate in emissions and population in the country so it should be the toughest nut to crack. Under a business as usual you would have had a 165 percent growth in emissions by the year 2020. In fact they proposed 49 different policy actions across the board which would reduce emissions to 2000 levels by 2020 with a 50 percent reduction by 2040 if those are kept in place. Most notably with savings of 4 to 5 billion by 2020 and that just shows what Arizona achieved and the other thing that is really significant about this in what you select is the measures differ in cost effectiveness.

And one of the things we see here on this chart that was prepared for the results of the Arizona plan is that there are very significant net negative cost in a number of measures. In other words there is cost savings per ton. Now this actually has some important ramifications with respect to planning and with respect to the use of market based mechanisms. I am in favor of market based mechanisms and they have to be a part plan but they have to be a part that is carefully tailored and made specific to the state plan. Now the significance of these is the fact that we have negative cost today and if all things were equal, people would be implementing measures that had a negative cost. There is the theory that you don't leave $20 sitting on the road if you walk past it. What is happening? One thing may just be that people aren't looking down and you need to create a mechanism to have people look at something and the cap and trade would do that as would the anticipation of regulation. But there are a lot of other things going on that present market barriers and those have to be considered. For instance we have demand side management as one of the negative cost issues. That is something that requires intervention in state utilities regulatory programs and that is going to be required on a state by state basis. I really seriously doubt that the utility system is going to be taken over by the federal government and each state is going to have to consider what it wants to do with its system in the utility regulation and how it is going to address climate change in that context.

You see the same thing with Minnesota – here are a variety of policy recommendations and the other thing you see is that you get reductions across the board. Some in energy supply some in agriculture-forestry and some in transportation and land-use and some residential-commercial and industrial. And again you see the same thing very significant cost savings and across the board particularly in the residential-commercial and industrial and transportation sector shows the same thing. The final thing and this came from a study that I am sure you are familiar with, which is the study done by Center for Climate Strategies (CCS). The CCS study indicated that state measures can have significant positive economic and employment impacts. The CCS study showed a positive impact of 15,000 jobs, 565 million dollars in employee and proprietor income, and 302 million dollars in gross state product. Again this is something that we came up with looking at what was particularly appropriate for North Carolina and what are the portfolio measures that are most appropriate for you. That is what is missing in some of the discussion of the federal options – how do we engage the states and how do we incorporate these types of efforts into a state program.

CCS recently scaled up what could be done nationally if the state planning process was applied in all 50 states. They scaled it up from data that was complete from 20 state plans. This shows the emissions that could be reduced, and again the emissions are from all sectors. The results are presented in two recent papers and I can provide you with copies of those. They are also found on the CCS website (http://www.climatestrategies.us/). The second paper is the one of the citation that I give below. The first paper basically shows what can be done nationwide if we use the state planning process. Basically it shows that we could achieve a goal of ten percent below 1990 levels by the year 2020, which puts us on a path towards the 80 percent by 2050 goal at a savings of 85 billion dollars which is a very significant savings. Now of course if the other measures become more costly and you always look at the cheapest measures first and you put off the others but one of the important things about this is if we start now, we will add new technologies which will develop and it will become easier to achieve savings later on. The other thing is when we start changing infrastructure like buildings, power plants and so forth and move down that route the savings tend to accumulate as you go down. Some of the things that might be costly today by 2020 or 2025 become a lot less costly.

In the economic incentive piece CCS analyzed the 900 different policies that have been adopted in 20 states and grouped them into 80 bundles. A lot of times you have a slightly different policy because you have slightly different state legal structure or economic structure but they are similar types of policy. The analysis with respect to who can do this is also very instructive because they looked at it first of all in could these be something that could be used for an economic stimulus. One of the interesting things is 44 moved to funding within one year and 68 had a high to moderate job creation potential. So in other words, with the existing state policies we have that could move very quickly into getting money into the economy on a basis that would actually be meaningful and create significant numbers of job and at the same time reduce greenhouse gases. What is also significant is who can do this? Of the 80 bundles the federal government has a role in 52. What does that mean? It means the federal government doesn't have a role in 28 and only three of the areas are federal jurisdiction exclusive. Let's look at the states on the other hand have a role in 70 of the bundles and 18 of those areas the state has the exclusive jurisdiction at least under our system. So you can't do it without the states. Local has a not insignificant role and you can say local is state since local governments are the creation of state government but if you look at it they had a role in 22 bundles and one exclusive role.

A second issue which is often pointed with respect to states is the fact that you do need national coordination and we exist in a national market and in fact we want to have national coordination to the extent we can because the national market does a lot of really good things. But we have a lot of regional efforts, which can be scaled up and could be adopted as federal measures and probably should be incorporated into any federal plan. Those regional efforts right now come down to the climate registries, the western governor's initiative, RGGI and the Midwestern greenhouse gas accord and that shows the current membership. Actually this is a year and a half old chart now and it doesn't include the Canadian provinces which are active in a number of the initiatives and I will show you what's happened to Florida. Florida has said that it wants to join both Regional Greenhouse Gas Initiative (RGGI) and the Western Climate Initiative (WCI) so I guess you would have the yellow and purple stripes for Florida, although it hasn't actually formally acted. I think the most significant effort is the Climate Registry, which is now an international measure with all of the Canadian provinces, 39 U.S. states and the six Mexican provinces participating. That really serves as a basis for the reporting and measurement function that we will need to have in any sort of

federal program. North Carolina of course is a member of the Climate Registry and the Climate registry has adopted a general reporting protocol, a general verification protocol for third party verification of reporting of emissions and emissions reductions. It is currently voluntary but they are developing a mandatory program for use in the states.

RGGI has 10 northeastern states and has developed a model rule for the electric generating utility cap and trade that is now being implemented in the 10 states. In each state it allows for some offsets from forestry, it allows for backing and encourages retirement of allowances. One of the interesting things is that the RGGI system allows the allocation of allowances to be left up to each individual state rather than necessarily saying you will give them away to existing emitters. Each state in the end analyzed it and decided they would go to 100 percent auction. We now have had two auctions - the RGGI system went into a compliance period begin January 1st of this year and in the two auctions they have sold roughly 44 million allowances producing revenue for the states of about 132 million dollars, which the states intend to use to support loan carbon intensity solutions including energy efficiency, clean renewable energy and energy efficiency. The RGGI states and Pennsylvania, Pennsylvania for some reason, which I can talk about it later, someone is interested and decides not to join RGGI had entered into a letter agreement committing to developing a low carbon fuel standard. Looking at the life cycle cost of fuel and then they are also addressing transportation standards through fuel and the works of the northeast states. The other initiative regionally advanced significantly of course is WCI, which involves seven states and four Canadian provinces. Now it is WCI even though it involves Quebec and Ontario, which I think most people would consider part of the east and now we have Florida saying they would like to join it. WCI established common emissions reduction goals and they announced the structure and schedule for a regional cap and trade system. This is interesting because phase one will go into effect in 2012 and establish a cap and trade for all the direct large emitters and phase two will regulate the smaller emitters, homes, vehicles and so forth by going up stream and requiring allowances for the sale of fuels that will generate greenhouse gas emissions. They are going to have declining caps and there is going to be a minimum requirement for auction. Utah really doesn't want to go to an auction. California wants to go to 100 percent auction of the allowance. Arizona was going to go to 100 percent auction but Arizona is sort of a question because Governor Napolitano is going to Washington and they don't have a Lieutenant Governor so a Republican the total opposite of Governor Napolitano is going to become governor so no one really knows what is going to happen with Arizona after this occurs, but they were committed to go to 100 percent auction. And as I mentioned, Florida has just completed its state planning process and they are the fourth largest economy in the U.S. and they've recommended potentially joining both WCI and RGGI and have come up with a very cost effective climate plan as well. It just shows what impact they would have by joining RGGI.

Now we have a lot of progress in this State as well as others in climate change. The question is how can we preserve the existing state progress and advantages and extend it to the recalcitrant states and keep national markets and consistency. I think actually we can do it using the existing Clean Air Act pretty well rather than starting anew with a brand new legislative process. I think we can tweak the existing and perhaps add some authority. I would like to talk about that with you for a minute. One of the things that is evident if you look at those charts that I showed you, most states have done something but I think there are seven different states which haven't done any planning, aren't doing any planning, haven't joined in any of the regional efforts, haven't joined in the Climate Registry, and don't have an RPS. I guess Mississippi is one of them - we can talk

about some Mississippi problems. I think that they are perennially listed around 49 or 50. I think Nebraska is another one maybe we should call it the Nebraska problem. But there are states that need to come on and we also have the Texas problem. Texas is the sixth largest emitter of greenhouse gases and they have a very weak, very small RPS and that's about it. You need to have something that can fit and compel more uniform action and that can be done with the existing Clean Air Act but it can't be done the way the Clean Air Act has been used in the past. As I say it is not your grandfather's or grandmother's situation.

The way I think the federal government should precede and I don't really know where the Obama Administration is going. I know they are thinking of using the Clean Air Act to the maximum extent they can. They've also said they are going to make an endangerment fund which will trigger. They could establish a secondary welfare based max at the range of 450 to 550 parts per million by volume. We are committed under the framework condition of climate change to keep levels at a point which would prevent dangerous anthropogenic climate interference with the climate system. Most people say that at that level it is closer to the 450 than it is to the 550. I think that that could be expressed equally under the federal laws as a secondary max. Then require each state to develop a state implementation plan designed to achieve the United States fair share of emissions reductions. Obviously we are not going to be able to do the job ourselves but on the other hand we can't sit back and say I am not doing it because Johnny is not doing it or China is not doing it. We have to act to responsibly take our fair share and what is our fair share? Probably at least a no regrets would be what we see the states have been adopting which is about ten percent below 1990 by 2020 and 80 percent reduction by 2050. Now actually we will probably need greater reductions in the United States since we emit 15 percent of the world's greenhouse gas emissions with 4.5 percent of the world's population. While it is nice to say we grabbed it first and therefore we can keep a hold of it, I don't think the rest of the world is necessarily going to agree to that and I think basically we have to show leadership. Then each state would then adopt a plan designed to achieve emissions reductions. Not what has been done in the past, in the past we focused on local concentrations in the atmosphere. So you have to do elaborate modeling and you have to look at each specific facility, you have to figure out will it violate the ambient standard of ruling, violate the Sulfur Dioxide (SO2) standard of the fine particular standards. That's important because you want to make sure that people aren't breathing things that are harmful to health. Since they have all been based on health you don't need that for greenhouse gases. What you need for greenhouse gases we can breathe a lot more carbon dioxide than we are ever going to experience at the point where we would flood New York. Some people might like that but I am sure there is some other city that would be flooded that they actually liked. Since we are not going to have health impacts from carbon dioxide or greenhouse gases we really can look at numerical emissions reductions goals. That could be readily accommodated. Each state could then develop a plan along the same lines that North Carolina has developed to meet those emissions reductions goals submitted to EPA. EPA can look at it and approve based on whether it achieves the program. And as I said part of the state plans and part of the federal program will be a cap and trade. But I think the key is to integrate cap and trade into the larger legal landscape and planning of policy landscape. Now federal cap and trade alone will not work well. Many of the cost effective mechanisms are not being implemented. There are market barriers and imperfections that mean that simply putting a price on carbon will not work. Markets doesn't work in all cases – we certainly know that as people have looked at their 401Ks recently and you need a system that includes regulations and these include command and control regulations and include careful planning and thought.

What are the barriers for cap and trade to work? One is a lack of knowledge – for instance, some of that is going to be endemic. Building codes work much better than cap and trade – why is that? If you talk to a developer the developer will tell you everybody says they want me to build for energy efficiency. But if I put those measures into my building, nobody will pay the additional capital cost even though those energy efficiency measures have pay back periods ranging from half the year to three and a half years. So I just build to code – now why is that? One, when I go out and buy a house I can't really evaluate what my operating cost are going to be and I am pretty sophisticated in that regard. Two, even if you could do that (you may be able to do some evaluation) you are qualifying for mortgages, do mortgage lenders consider how your operating costs are going to play out? No, they usually look at your income and they compare your income to what the cost is, even though you may have lower fuel costs and lower electricity costs. I saw somebody shaking their head. I'll predict the operating cost if you do the work, but I don't think the question of whether you can and you will are separated. I think most people look.

Dr. Everett: Have you ever purchased a house? And have you ever asked the owner to show you the bill that he gets from his utility each month? Was that hard?

Mr. McKinstry: Yes. Yes. No it is not hard but if you are purchasing a new house for example, predicting them and comparing the two can be somewhat difficult and you may need in addition some suggestions that perhaps you can go to a requirement to put an energy sticker on houses similar to energy cost. But that's an additional measure and that's what I mean. I said that under our current system cap and trade alone it will not work because of these energy barriers. So I will give you that you can evaluate this, but you need the energy sticker requirement so that you can compare. I can compare my hybrid with other cars that I was comparing because I have that energy sticker. I can't do that with a new house.

Dr. Everett: How is that working out for people who are able to purchase in the market, the cost spectrum of purchasing a new house?

Mr. McKinstry: I use it – it depends on the price of gas. So in that case you are right with the two together you need the price plus the requirement for the information. But that I think really makes my point that you need to consider portfolio approaches you just can't rely on one without the other. Lack of connection between capital and operating – you will often see this in new leases, home mortgages, there are also legal authorization barriers. We worked with Salt Lake County recently in actually developing authorization for energy increment financing. We have tax increment financing where you can do a revenue bond based on your tax savings but at least under that state law had to do specific authorization through energy increment financing so they could make investments in energy efficiency and conservation in public buildings and finance it with the energy savings rather than the (inaudible). There are legal barriers to some of these things. Inability to pass true cost as in utility regulations that has to be considered. There is also an inability to aggregate capital for many small actions. That is particularly important for things like energy efficiency in existing buildings. Then lack of a real market in land-use and transportation is going to require a different portfolio of measures than simply a cap and trade.

What would be EPA's duty? They would determine in a state by state emissions reduction goals, establish technology based standards for the appropriate sector. For instance automobiles and vehicles there are many sectors where EPA would be moving I think in the near term. I think they

could also establish uniform standards for a cap and trade program that would be approved as part of the state plan and have established standards for approving the state plan. What would be the contents of a federal implementation plan that would be imposed if states failed to act? I've had some discussions with environmental groups who are very much against this approach. Some are very much for it and some are very much against it. The Center for Biological Diversity is against it and some of the people in the Sierra Club are against it. I was talking to David Bookbinder in the Sierra Club and he kept saying if Arkansas doesn't adopt it, well in fact Arkansas is moving forward with it. We are very happy to use Arkansas as an example, which was a bad example. In fact, most of the states will adopt it and most of the states will move forward. If there are problems in enforcement that doesn't detract from adopting a plan that will work for most of the states and will coordinate most of the actions, if most of the people do comply with the law most of the time. Where there is a cap and trade the state would determine what sectors would be appropriate for that state and how the state would allocate. In other words, it would be very similar to what we have seen in the regional approaches. North Carolina could decide that they like the approach taken by WCI, which involves more cap and trade and less in the way of commanding control measures or incentives. Or maybe they will say I want to have a much narrower one. They will choose it once it is approved. They would submit that as part of their whole portfolio of actions. If the portfolio of actions meets the reductions goals, EPA would approve it and then the credits that were created by whatever way you chose to create the credits would be tradable nationally and could be used in North Carolina and your credits could be used in other states. But you would be looking at what measures would work. This would be similar to the way the European Union (EU) program has worked and the EU has established a pretty good market based system. They are selling credits, they are trading credits and if a state failed to submit a suitable plan that EPA could designate a fit including a cap and trade element.

Under this program there would be a lot better incentives for state action than have occurred before because of the idea of being able to allocate these allowances. First of all if you are planning and developing a state plan with a mix and measures it is probably more likely to be acceptable with the stakeholders in this State. You're developing something that is appropriate for the state. More importantly the revenues from state allocated allowances would get to be kept by the states rather than going to the federal government. This would create a real incentive for states to develop their own plan and develop their own cap and trade since a federal plan would simply result in allowances being given away absent some sort of federal creation allowances. You would maintain all of the existing enforcement mechanism incentives as well but perhaps the most important incentive is the economic development potential that could be used. The advantages of the approach are you get better economic efficiency and better stakeholder acceptability I think this is more likely to be effective if you approach it with a scalpel on a state by state basis. You are going to preserve the existing progress at the state level because you can't do it at the federal level alone.

Thank you, if there are any questions I will be happy to take them.

Representative Harrison: Do we have any questions?

Dr. Eggers: Thank you for your presentation. We know that even if we are successful in reducing by 80 percent emissions by 2050 we are still increasing the net concentration of greenhouse gas. That is actually important and it's hard work but if we stop there it is just a slower net. I was talking

to Dr. Pachauri, who is the head of the Intergovernmental Panel on Climate Change (IPCC), last February and I said don't we actually have to do a carbon negative? He said "oh yes." I wonder if you are seeing any carbon negative conversations starting to emerge as goals.

Mr. McKinstry: Not yet I think it is really hard to do. Jim Hansen has been talking about that. I don't think we want to go down too much because normally in the cycles we would be going back into an ice age. So there may be some advantages to somewhat slower transition into a somewhat warmer climate regime in the long run. Whether we go up – I mean in the normal cycle we would be in an interglacial and if we stayed at 275 parts per million by volume as opposed to 386 right now we would normally expect the climate to be in the cooling phase. So I guess you don't want to go too far down, but the question is what should be the ideal point at which we stabilize. I thought that the 80 percent reduction would end up stabilizing at about 450 and keeping us at about 450 is what I had understood because we have stuff being taken out of the system still. Meaning you do have things moving into sediments and into trees and so forth and certainly at the lower carbon levels we were just having the normal cycling in the carbon cycle because the higher concentrations you are going to have things taken out of the system more frequently. I guess I haven't heard people talking about going negative. I am not sure where you would want to go negative or what the model would say. What did Dr. Pachauri say in terms of going negative?

Dr. Eggers: He just said that we have to do it and Jim Hansen is saying at least 350 now.

Mr. McKinstry: He is saying 350 and that is what I said. Jim Hansen is saying that now and he says we can do it but then he says we need to eliminate all coal use unless it is sequestered immediately. So he at least thinks we can do it.

Ms. Choi: Thank you for coming, I appreciate your presentation. I have one comment and I have a question. The comment, Progress Energy is also in Florida. I just wanted to clarify that in Florida we have an interest primarily in that state. I think on what other companies in that State are doing. In Florida they have not made a decision on joining RGGI or the WCI. The Governor's action team recommended federal action as the primary way to address these issues rather than a regional approach because of uncertainty.

Mr. McKinstry: Well they did say either RGGI or they said we could join either right?

Ms. Choi: They prefer federal than regional approaches. That was their recommendation. I mean I know that they were looking at RGGI and the WCI. I would not say that they want to join them.

Dr. Smith: I have been advocating and I think technically that is correct although it is Florida Power and Light, which is the state's largest utility, that wants to see Florida join RGGI. They have actually come out with that position and have been pretty forward on it. So I think there is a very active discussion going on down there. We'll see what happens.

Mr. McKinstry: Mind you my proposal is not a no-federal cap and trade. Mine is a federal cap and trade that is sufficiently flexible, but that can include these programs. It is still a federal system.

Ms. Choi: My question is on the Clean Air Act, which we've commented on. We compare it to the grade pool initially with the decision to find and deal with clean air issues. Finding a new area that

is not in the health phase concentration of greenhouse gas that we have here, but recent court decisions have taken a pretty strict interpretation of the Clean Air Act and your recommendation. If you can touch one hand and have that possibility in there to focus on emission versus complications in modeling of Section 110 do you see ….

Mr. McKinstry: Actually I think you're talking about the Clean Air Interstate Rule (CAIR) decision. The mercury decision was entirely different – that's 112 that are toxic and if it's toxic it's irrelevant. I think this is consistent with the CAIR decision particularly since the Court of Appeals just modified this decision and removed its stay. Although it is a completely incomprehensive decision in their modification but I think because greenhouse gases are different the problems that were encountered in the CAIR rule can be dealt with in the rule making.

Dr. Everett: I was just going to say that we don't do business in Florida but for those who are active in that area, given the concern expressed, the state or what their commitment is, there is new generation in the state of Florida that is going forward.

Ms. Choi: I think their commitment is the same again in Florida. Progress Energy and FP&L are both are investigating new generation. We've not decided but we are actively engaged in pursuing the possibility of new nuclear generation. And they are looking at nuclear.

Mr. McKinstry: I've been talking about efficiency and alternative energy but I think one of the things I've seen come out of a lot of the climate plans has been nuclear and nuclear has to be a part of the mix. There are very interesting stories told by Jeff Lenburg who works for CCS. Jeff was the former Commissioner of Environmental Protection in Vermont. He was talking about how he had seen an environmental activist cut his teeth on opposing nuclear ending the process and now saying yes I think nuclear has to be part of the mix.

Dr. Smith: I just want to also respond. I didn't (inaudible) advance beyond this public staff the Commission actually last time adopted a goal of 20 percent renewable portfolio standard for the state of Florida. I think now it is still under review by the Legislature and they're moving forward, which is what the Governor wanted. I personally would say that I (inaudible) about this nuclear option because of the cost and a breathtaking number are now some concern with the Legislature about the cost. There are a lot of questions about demand and the justification for that (inaudible) generation. We've got significant (inaudible) already and in some places 30/40 percent and I think what we are missing is the standard portfolio efficiency renewable (inaudible).

Mr. McKinstry: Right.

Representative Harrison: I have a question about RGGI. I didn't realize they were 100 percent auction. Are they finding any loss of businesses jumping out of the region because of the adoption of the cap and trade and 100 percent auction?

Mr. McKinstry: I have not heard of that occurring. I mean the price is very low right now. The initial compliance period is a relatively long one and initially it is just a cap and there isn't a whole lot of fossil fuel fired generation in RGGI. They import a lot of it from western Pennsylvania.

Representative Harrison: Has the observer said it's for western Pennsylvania?

Mr. McKinstry: Pennsylvania did some analyses and they were going to end up buying credits from everybody else but they were assuming that they were going to give away credits. Actually there are some of us who have been saying that Pennsylvania should look at it again, given the fact that the allocation method is different and Governor Rendell has been looking for some ways to get money for economic development.

Ms. Choi: I saw an article online at WRAL. They did a story about people leaving one state for another state and California was leading that list. I can't remember the energy cost but New York is on that list and these are all in the top five states of people leaving one state coming to our State. There were few on the list of people coming from one state to our State they were number two on the list.

Mr. McKinstry: That trend has been going on almost my entire life time. Pennsylvania is up there too. Pennsylvania is not a member of RGGI.

Representative Harrison: Thank you for making the trip and your presentation. Next on the agenda is Janice Godfrey from the Division of Air Quality (DAQ) of the Department of Environment and Natural Resources.

Ms. Janice L. Godfrey: Good morning – My name is Janice Godfrey. I am the Mobile Sources Team Lead for DAQ. (EXHIBIT E) Thanks for having us here this morning for the opportunity to speak about the vehicle standards for greenhouse gases. The Mobile Sources Division (MSD) was asked to take a look at the greenhouse gas standards for the perspective of possibly introducing what California has done in North Carolina and so in our studies we came across a report from the California Air Resources Board (CARB). They did a greenhouse gas reductions study using their mobile model called Emission Factors Model (EMFAC) and it made sense to us to just piggyback on this study because it was already in existence. Several of the states in the United States are using this study to make their comparisons for their state. Additionally, the tools we have available to us in North Carolina, our mobile model does not make the estimates of all of the greenhouse gases. It just uses a very simple estimate for carbon dioxide (CO_2) and we wanted to also evaluate nitrous oxide and methane. So we used the CARB study to come up with some advice for the Legislature. It's less resource intensive to go ahead and use the study that already exists. And what they did was they used fuel as a surrogate for the various states across the United States and made comparisons between the greenhouse gas reductions under the CARB regulations and the proposed federal standards, the Corporate Average Fuel Economy (CAFÉ) standards. The CARB regulations are also known as the Pavley standards, which you may have heard them referred to as well.

The federal standards assume 35 miles per gallon by 2020 with a phase-in schedule beginning in 2011 and I say assumed. The Pavley standard assumes an effective date of 2011 with more stringent aspects of the standard Pavley II starting in 2017. We looked at the study and what we saw was that the CARB standards are considerably more effective at reducing the greenhouse gas standards than the federal CAFÉ standards. However, the EPA denied the waiver for California to invoke their own standards. But what's important here is to realize that there is a difference between the California standard and the CAFÉ standards. The California standards are aimed at

reducing greenhouse gases. Whereas the federal standard's aim is just to reduce fuel consumption across the United States.

Here are the results: In the year 2016 the proposed federal CAFÉ standards would reduce greenhouse gases by 2.9 metric tons, whereas the Pavley standards would reduce it by 3.7. The additional benefit of Pavley over CAFÉ would be 0.8 million metric tons. By 2020 when CAFÉ standards are a little bit further along as well as the Pavley standards, the more strict Pavley standards. We would see a 5.9 million metric ton reduction under the federal CAFÉ standards and a 7.9 million metric ton reduction under the Pavley standard. So the additional benefit of Pavley over CAFÉ would 2.0. If you look at it accumulatively for the year 2009 through 2020, the federal standards would give about a 28.4 million metric ton reduction of CO_2 equivalent and about 39.7 million metric ton under the Pavley standards. The CO_2 even refers to carbon dioxide equivalent so it includes nitrous oxide and methane. Overall accumulatively between 2009 and 2020 the Pavley standards would offer 11.3 million metric tons more reduction than the federal CAFÉ standard. And if you're wondering, a metric ton is equal 1,000 kilograms. The baseline year for the study is 2002.

California intends to do this through a combination of reducing tailpipe emissions of the carbon dioxide methane and nitrous oxide and secondly by mitigating fuel emissions of hydrofluorocarbons (HFCs) from air conditioning units in automobiles. Our review includes a little bit about how we compare the California standard. California used a vehicle mix of 55 percent passenger cars and 45 percent light trucks and the Pavley standards only affect cars and trucks under the weight of 8500 pounds. But the North Carolina mix is currently 61 percent cars and 39 percent trucks so we do reason that the standard Pavley standards may have a slightly greater effect in North Carolina because our vehicle mix is weighted more towards cars. However, you have to keep in mind that North Carolina has no current legislation to implement Pavley standards. The process would take some time and therefore North Carolina would start at a later date, which would decrease the benefits depending on the duration of the legislative process. We also want to state that we would like to think of this as a part of a more comprehensive package where North Carolina would also consider low carbon fuel standard on the order of ten percent by 2020 as well as the promotion of alternative fuel vehicles. And currently 15 states, with Florida being the most recent, have set up some legislation so that if California receives their waiver they can go ahead and that legislation is ready to go into effect immediately.

The latest on the waiver is that on December 9th the EPA Inspector General concluded that EPA's procedure for denying the waiver did meet the statutory procedural requirements and so that still has not given them the waiver. And they based their decision on the fact that their opinion was that California did not establish a need to meet compelling and extraordinary air quality conditions. Meanwhile the federal CAFÉ standards are in limbo as well. On January 7th the Bush Administration effectively said they were not going to do anything to accommodate rule making on CAFÉ standards and have left the decision to the Obama Administration. Their reasoning is that because of recent financial difficulties of the auto industry that they believe a more thorough review of the matter is in order as it affects the industry. So basically neither the California standards nor the CAFÉ standards are a done deal. This mainly will just serve as some food for thought for now. We don't have any indication of what the next administration will do and we can think along the lines of what we can do proactively, as 15 other states have done, by evoking or starting some

process with the California standard or we can take a wait and see approach as far as what the next administration determines.

Dr. Andrews: Thank you. Two questions: First of all – I don't know the Pavley standard in detail; do they do anything about grandfathering or referencing the existing vehicles or maybe a new vehicle?

Ms. Godfrey: New vehicles – they will only affect the new vehicle fleet that they would expect to be in production and for sale by 2011. But that was just a standard if the waiver had been in effect last year. And they have not done any studies of looking at how the benefits will decrease based on that waiver coming in later so the benefits would be less.

Dr. Andrews: It could result in some adverse incentive if you would hang on to old cars longer.

Ms. Godfrey: I think every state makes their own laws concerning that and I believe in California that that is correct. That it would be difficult to sell a car that was 2011 or greater or later model year say in 2013 if it came from another state and didn't meet the California standards.

Dr. Andrews: That was going to be my second question – to what extent is the difference between California and North Carolina as to whether California is (inaudible) situation in a more isolated large market, as opposed to North Carolina where someone can just go across the border and buy a car.

Ms. Godfrey: We are more isolated here. We are more isolated because if we instituted something like the California standards the closest state that would also have those rules would be Florida and there are some states in the northeast and then there are several states out west.

Dr. Everett: Maryland is closer than Florida.

Ms. Godfrey: Maryland is closer – ok thank you. I think out west there are more states that are involved in California standards with I think Oregon, Washington. I think if you went across state lines out there it might be a little easier or if you were in the northeast it would be a little easier but none of our surrounding states that I am aware of have discussed the California standards.

Dr. Everett: This is really helpful. I am trying to put all the pieces together so maybe you can help. If you get back to the Climate Action Plan Advisory Group (CAPAG) report, that we all worked so hard to put together, there is a list of actions that would improve our greenhouse gas emission. I think, maybe you can confirm, that if you look in the Executive Summary on page 1-16 there is a graph and it shows the mitigation options that we can choose from and how much reduction we will get by choosing these options which I've always been an advocate for looking at that graph when we select what we are going to do. I believe that TLU-5 (Tailpipe GHG Standards) is the one that this speaks to. So if you look at that graph the suggestion is that if we went forward with emissions reduction for these vehicles that you would achieve something like 45 million metric tons reduction per year. Could somebody tell me if that is the approximate way to keep it right?

Ms. Godfrey: You said million metric tons per year? In what year?

Dr. Everett: This is a continuum from 2007 to 2020. The difference of course is a lot of that reduction would happen anyway and that is the message I tried to point to on that graph.

Ms. Godfrey: The cumulative. I talked about the cumulative being a little bit less than that. A lot of the reduction would happen through the CAFÉ standard is that what you're saying?

Dr. Everett: Right. It's not an incremental benefit of adding this whenever you do the cars to lower the emissions even further is really not represented on that graph.

Ms. Godfrey: Again let me reiterate. I think that they are two different things. The CAFÉ standards- their goal is to reduce fuel consumption. The California standards- their goal is to reduce greenhouse gases. California claims that through their standards you actually reduce fuel consumption more than you do with the CAFÉ standards.

Dr. Everett: So the point is the graph is kind of misleading in that if there is a national standard for vehicle mileage by adding a CAFÉ standard for a greenhouse gas (inaudible) add on we will not really get this much of that we will get some differential between them which is what you point out.

Ms. Godfrey: (Inaudible) is the reduction and fuel use.

Dr. Everett: So when we look at this figure in the report and try to decide which one of these is a good option (inaudible) to shrink that bar it doesn't mean we didn't do it. It is just misleading the way it is characterized in the report currently.

Ms. Godfrey: They say that all standards are going to come one way or another. This would be something if we wanted to adopt something from California that would be something additional that North Carolina would have to do.

Mr. McKinstry: Did you say what percentage of the U.S. population is subject to the California standard if the waiver were granted. I think it is more than half of the U.S. population in which case you would really be joining the larger (inaudible).

Ms. Godfrey: In those 15 states you are saying they comprise over half the population in the United States. I defer to you on that one. I think it is fairly close to that. Florida did adopt it and it is ready to go as soon as the waiver is in place. The Governor signed it.

Dr. Smith: The Governor has issued an executive order but the Legislature hasn't convened so it is not a done deal.

Ms. Godfrey: So the Governor signed it, but you're saying that the Legislature has not.

Mr. Howard: I am just curious if anyone has examined or compared the cost benefit in terms of metric tons. Has anyone proposed what it cost to achieve that reduction?

Mr. Givens: Well in the Studies Act of last year there was an authorized study of the ERC to do an environmental benefits and the economic cost. The ERC has thus far chosen to go forward with that study. So the answer is yes it's out there but no studies currently that I know of.

Representative Harrison: The advocates have done a study and Environmental North Carolina and what they came up with was gas at $2 a gallon was a $20 per month saving for the owners of the car. Sell it and that would include those who finance and it ends up being a $20 net savings per month for the car.

Ms. Godfrey: I just found my notes that say an executive order directing the Governor deemed that EPA grants a required waiver so I apologize for not really knowing the whole process. But yes.

Representative Harrison: You all remember that this is one of the recommendations from the chairs that we consider adopting this clean cars emissions standard. I just want to point out that the 11.3 million metric tons is close to the reductions of the REPS bill -which I think is about 13 million. Same time frame but 2021, somebody might correct me on that but we took pretty significant steps adopting the RPS but achieved similar carbon reduction. So I just wanted the Committee to be aware of that.

Dr. Phaneuf: (Inaudible) it just might be worth investing the information out there to see what these kind of things that are altering consumer prices for the new vehicles. It actually has the potential to discourage people from buying new cars and keep them driving their dirty ones. It can affect the carbon plus I don't know if that is the case or not but it probably isn't, but I don't think we should ignore that possibility.

Representative Harrison: Sure and actually the figures per car in the 1,000 to 3,000 range and it recessed to about 3,000 advocates say it's about 1,000. So it is somewhere in there and we, for sure, in this current economic economy ought to be thinking about that.

Representative Allen: Thank you and I am not sure this question makes any sense to anyone and I probably shouldn't ask it, but following up on Dr. Andrews question about the cars. Are all of the cars considered whether they are kept more or not in these figures?

Ms. Godfrey: No. The Counseling and Air Resources Board used a national averaged vehicle age. We may have a little bit more turn over in North Carolina we don't have statistical facts to base that on this morning. We do have evidence that there is a little bit more turn over of cars in North Carolina.

Dr. Andrews: When thinking about the others and how it interacts with other kinds of options and in fact there have been several proposals that we have put forward at the federal level. I think the most recent one was by a distinguished economists Allen Blizzard from Princeton who was one the presidential advisors who was proposing a kind of national password brokers program as far as renewal of the economic recovery process offering to buy up old cars so he could get people motivated to buy newer and it is unknown at this point but it would be a potentially (inaudible) relationship for this kind of a policy that would avoid the incentive for keeping the private cars longer.

Ms. Godfrey: We would have a lot of benefits from that. Not just in greenhouse gas reductions but in ozone reductions as well.

Representative Harrison: Any other questions? Thank you for your presentation. So we are to the part of the agenda where we are going to start talking about specific recommendations beyond the California Clean Car Standard. First off is the notion of adopting a goal for reducing state greenhouse gas emissions. We had Dr. Pachauri here talking about a point at which we will be facing universal catastrophic climate change being 450 to enhance the same at 350. We have the CAPAG recommendations that show some of the incremental gains we can make by adopting certain recommendations and the need for making these recommendations, the ties to the current reductions. Then it turned out that 80 percent reduction of 1990 by 2050 this is not a mandate it is just a goal and what is appropriate. I'm stuck and I don't know if Mr. McKinstry want to comment on basically what other states are doing; I know you alluded to that in your presentation.

Mr. McKinstry: I think that the tendency is going to the 80 percent by 2050 from 1990 levels. The IPCC says 50-80 percent world wide by 2050. We're sure high emitters, the United States that is. What we need to do is to stabilize even if we only go by way of representative reductions. I think California specifically adopted the 80 percent by 2050 goal and I've been involved in several county and city processes where we've gone to that. I think it is better to adopt a realistic goal and that is probably where we are going to go so we will know what we're shooting at and particularly if people are making long term capital investments they need to know where you're going. The practical matter is the more intermediate goal is the one you're going to be shooting at and I think that although there is a wider variety at 2020 than an immediate goal and some of that has to do with the varying state growth rates. As I said, Arizona is going back to 2000 for 2020 but they would have otherwise had 165 percent growth rate given the fact that they have such high population. You tend to be on the higher side of population growth compared to other states. Meaning the analysis done by CCS was ten percent below 1990 for 2020 and as I indicated if you scale up the playing states, which involves the full range from Arizona down to New York, you can do the ten percent below 1990 by 2020 with net plus savings. I actually think those two are reasonable goals. Of course the real devil is going to be what happens as we get closer to 2020 and we're looking at other intermediate goals to get to 2050, but I think looking at where we have to go anyway is going to be realistic.

Representative Harrison: Thank you I think on the last figure that I saw we were up 16 percent from 1990 levels. Somebody might have something more current than that. I don't know Ivan you may know but how many of those are hard fast caps versus goals. Do you know how many states adopted?

Mr. McKinstry: None have adopted some hard fast caps. I don't believe any of them are hard fast caps. I believe all of them are goals.

Dr. Andrews: One of your slides that you didn't draw particular attention to refused to reinforce the importance of this to North Carolina, which states that our greenhouse gas growth rates from inventories shows North Carolina is the third highest, way above most others. In fact, North Carolina is only behind Connecticut and Maine, which I wouldn't think of as anywhere near as major industrial growing states as North Carolina.

Mr. McKinstry: Arizona is the top one so you are looking at the black and white picture, which is harder to look at; it is color coded in the original. Third sounds right. I think North Carolina is third. I think you're right but I will check it.

Representative Harrison: I think you're looking at the slide on page 4. The point is we are going to have discussion today and vote on recommendations with more discussion on the 27th so anybody else wants to have some input now?

Representative Underhill: Thank you Madam Chair could you give us the two sources that we're talking about.

Representative Harrison: I think the one that we've been talking about less frequently has been 80 percent reductions from 1990 levels by 2050 but the appropriate interim step we haven't arrived at but I think Mr. McKinstry says ten percent below 1990 by 2020 is that right?

Mr. McKinstry: Ten percent below 1990 by 2020 is what the analysis we've done and has shown that it is achievable. I see what you're looking at, the code that you're looking at – there you see it's a color code on the right if it is in color but the bright yellow is North Carolina and North Carolina is right there below the top is Arizona and then purple is Nevada. Arizona is number one, Nevada is number two in greenhouse gas emissions growth rate and then New York is…. This is your projected growth rate so your projected growth rate by 2020 was roughly 110 percent if you look at the graph. New York is down here at about 122 percent and some of that is population stagnation some of it. The states with big old cities with big public transit programs have an easier time of it in some cases.

Dr. Everett: I don't know if I have an opinion yet about what our goals should look like if we were to have one. I think that there is a missing piece – it may be out there and I just haven't latched on to it yet. In the big CAPAG report it might be in there but let's just for the sake of discussion assume that we have not hit an 80 percent reduction from 1990 emissions by 2050. It would be helpful to me at least, to see what we would in fact have to do to get to that goal. For instance if you look at the table of 116 in the Executive Summary and if you summed up the emissions from the first ten actions on that list, which I haven't done but maybe somebody has, would it get you to that goal? Or if you did all of those actions would it get you to that goal and then look back at the actions and say in order to get to this goal I must do these 12 things and then see how people feel about the goal. Inherently it feels good to say a reduction goal 100 percent of our emissions by 2050 but I have no context in which to see whether we can do it. I have looked at the first few on that list just to see what they look like in terms of policy. We did the first most aggressive one already by this graph - 170 million metric tons from renewable energy portfolio standards. Although it wasn't the same renewable energy portfolio standard that was in this report the General Assembly already got this. So we've already cut what we are going to achieve in that target because we weren't willing to go to the 20 percent route of what do we have to do to get there is very important I think.

Representative Harrison: Good point and I do remember that Tom Peterson went through some of those with us about a year ago. We should probably dig up that chart again because I think he gave a good summary of what it would take to achieve that.

Dr. Everett: Kind of the other side if you flip one page of that report it gives you kind of what I'll call the freebie – it says all the things, if you believe all of this report that we've got here, everything on the left hand side of the graph on page 1-17 is free. Doesn't cost any money, saves you money and my question would be why don't we do all of those they are all free, they don't cost any money.

So if we just look at the policy recommendations for all the free ones and see how the General Assembly feels about doing all the free ones that will give us a good sense of how far they are willing to go on the ones that cost.

Representative Harrison: Good point.

Dr. Smith: I don't necessarily disagree with what George was saying I think we should look at it. My understanding was that there was some discussion about an aspirational goal driven largely by what science says we need to do and then a shorter term goal that we basically look at the amount that we've done in CAPAG. Quite literally I think some of the technologies that we're kicking in by 2050 we may not even have in our hand. So I was thinking that based on all the scientific understanding that we set that aspirational goal again. It is voluntary parties coming out of this today and then we look at the shorter term goal that is based on compiling the best of the best and some innovation of some of the things we are going to hear during the course of the day and try to set a nearer term goal we think has some political rounding in it. But that we don't lose sight of what the science says we need to do. In that way it is just sort of a confrontation of some of the goals based on two different sources and criteria.

Representative Harrison: Good point.

Mr. Profeta: Talking about these goals – we have heard in Steve's presentation we have two goals. We have a short term one that seems to be something that's more pragmatic earned than what the analysis are saying. How far can we go that we can sort of measure and can plan for and then the point is aspirational when we think of science calls us to do so that we have that…

Dr. Smith. I am not sure that the two are necessarily (inaudible coughing) primarily but I just think that….

Mr. Profeta: I think creative target, a clean goal needs to be a plan and needs to challenge or make people evaluate taxes and the only question for us is how am I going to get there? With their wisdom and creative (inaudible) I think we've got something. Is this Commission ready to set a goal? I think it is not a question that we wanted to, what then do we do with it, what then do we hope happens to it. (Inaudible) the first one will be considered the one that we ask them to. We recommend our government plan for this with the new technology and the second one we ask if it is aspirational and where we think we might want to touch upon here and give ourselves capable of getting that. It is hard to know what position to take and not really defining what the goal is used for.

Dr. Smith: One thing of the shorter term goals is that it … I mean the long term goal, and we tried to establish it (inaudible) the policy in the State, is to basically use some sort of evaluation measure and I think that there are, as George indicated, a set of policies that we think may be able to be done cost effectively with minimal (inaudible) to them. We should evaluate regular (inaudible) based on the scientific goal where we are dealt with differences than if we struggle with additional measures and (inaudible).

Mr. McKinstry: Actually the 10 percent and 80 percent are precisely that division. The 80 percent is where what states are adopting because of the science based goals and I argue with

municipalities and counties. I think it is very useful to have what the science based goal is even though it doesn't have any camber because then at least you have a metric that you can evaluate with. The 2010 goals are generally ok. Let's look at the portfolio of mechanisms that we've adopted and what can we achieve if we do it right cost effectively in order to achieve other goals. Just one other thing, there are a couple of slides if you look in my presentation – you should have the same analysis for North Carolina. Unfortunately, I don't have the particular graphs with me but I have the Minnesota and Arizona examples for you with all the selected negative cost mechanisms. The states have adopted the negative cost – with the negative cost it doesn't mean that it's net negative cost because it may be a cost in one person's pocket but another person gets a lot more savings. So saying its negative cost is just the average cost and automobiles standards are good examples. Actually it is not the consumer who gets hurt by distance, one of the reasons Michigan has been resisting is because the auto makers make a lot more money through the big heavy gas guzzlers than they do than the smaller vehicles. That analysis hurts the automobile company but probably creates a net negative cost across the economy. That is one of the things that is important. The other thing that is important about the positive costs is you don't want to necessarily cut out the measures that are positive cost. If you look at the Arizona chart there for instance or Minnesota, the reduced plan conversion and increased reforestation are ones that had significant positive cost. Most states have included prevention of sprawl as part of their (inaudible). Everybody hates sprawl but in fact that has some high positive costs associated with it. There may be other reasons that you may want to accept some of the mechanisms that may in fact cost more money but have a positive cost.

Representative Underhill: Just a follow up to your comments. Did I hear you correctly that you do have North Carolina chart you just don't have them with you?

Mr. McKinstry: That analysis hadn't been done – Tom should have ... The economic analysis is done in every state planning process so if he doesn't have it in chart form you can generate it in chart form. It should be in the report.

Representative Underhill: I just wanted to make sure I had access to it.

Representative Harrison: Ok - Dr. Everett and then I think we'll move on to the next item.

Dr. Everett: Let me just add a couple of other observations as we think about this, what kind of goal is a goal? What does the goal look like? The things that are instructed that are hidden in all of these graphs – one is that some state emissions will not grow as fast as others so they might meet a reduction in goal based on what their economy looks like. We have an economy of (inaudible) our economy has the importance to weigh in. While the scientific goals are important I recall that a global goal and the fact that North Carolina might need to take some steps to get to that global or scientific goal that we might not find acceptable in North Carolina. From these actions we ought to pay very close attention to costs some other states make and take those steps or countries without the impact we see here. The final point is if we look at the CAPAG report it talks about emissions per capita in North Carolina and how we are doing. We are well below the national average already so I don't think we should feel this burden to take on North Carolina to meet this national or international goal that we look at the actual activities that we have to undertake and it's very painful to look at.

Dr. Smith: Would you agree that not all of these activities are …..

Dr. Everett: I agree.

Ms. Choi: I'm thinking we can look at more than just one analysis before we decide on what goals we need as we are able to make sure that we have the same competent action that we have.

Mr. Profeta: I proposed the question and I am not sure we have answered it. What the purpose of the goals are and I wanted to say if there is not objection I would be the first one to appreciate the more pragmatic goals based on analyses and subject to aspirational goals where we think we need to move to meet by 2050. That's not the purpose of the two specific goals and I am part of this move (inaudible). I ask if they would be able to talk to me about just dealing with that thing but I would like to know it.

Mr. Slocum: At the risk of being (inaudible), goals have a nasty way of walking into manholes and that's just an observation but to get to the ideal of goals who's to say it if we have to buy into the idea that the science is helpful and that all of these fires are happening and if we don't act and do these things the world comes to an end as we know it. And I'm sorry I can't get to the fact that the science itself, I don't believe it is and consequently I do have problems with goals be they aspirational or any other type at this point.

Representative Harrison: Thank you Mr. Slocum the Commission actually adopted a resolution that signed off on the science so we are already beyond that point. I appreciate your point. We are going to move on. I just want to remind members to sign your expense form because we haven't gotten any up front. We are going to skip around the agenda a bit and Mr. Stephenson is going to present next on adaptation recommendations.

Mr. James Stephenson: Thank you Madam Chair and member of the Commission. I asked for some time on the agenda to talk about adaptation and to bring back up. We've seen several presentations on adaptation particularly coastal adaptation during the last several meetings and I am conscious of the two deadlines that are approaching one of course is the Legislature to convene in a couple of weeks and if there is legislation that this Commission is to move forward it has to be before now. The second is that there will be a point at which the Commission reaches a final report and that action will occur probably a couple months after the Legislature adjourns in the fall. There are three handouts (EXHIBIT F) that are coming around to you now for the greenhouse goal reduction recommendations that we've been talking about today and previous meetings. We had the benefit of the CAPAG report. Unfortunately the CAPAG report did not cover adaptation in any depth and basically recommended a blue ribbon commission that would look at adaptation. However, for the purpose of the adaptation we were fortunate that the Nicholas Institute for Environmental Policy Solutions did prepare a memo to the Commission in March 2008 (EXHIBIT G) and I'm passing that memo around to you so that you can review it. We don't have time today to go through it point by point but I suggest that what we might want to do is to ask for the Nicholas Institute to update this memo for our next meeting because there may be some new recommendations that have come forth that they are aware of in the interim since more than nine months have passed. And second, we might ask the Nicholas Institute to separate out which of these recommendations may be executive in nature and which may be legislative. Currently the

Perdue Administration has the capacity to issue executive orders or the secretary of DNER has the capacity to implement some of these recommendations without the need for legislative action.

There is a second handout on specific legislation that I would like to bring forward to the Commission that we think is pertinent and timely given the changes that are occurring at the coast particularly due to sea-level rise. There are two pieces, one is labeled Coastal Hazards Mitigation Program (EXHIBIT H) and this is one of the recommendations that is in the Nicholas Institute report to us. Although it is truncated somewhat in the report it is actually a climate hazard mitigation program and with this legislation here we truncated that down only to coastal counties. And again the purpose of the recommendation in the Nicholas Institute report was to create a fund to acquire conservation easements or a few simple properties that are located in high risk areas that are subject to sea-level rise or climate change impacts. The funding source for this since there is not money without a funding source in 2009 would be a surcharge to the beach fund. The beach fund of course is an insurance fund in 18 coastal counties that funds under the insurable last resort in coastal counties and a modest surcharge to the beach fund would be the potential funding source for this hazard mitigation program.

The second piece of legislation that I've brought forward is a change to the water resources development program. One of the problems that we face at the coast with sea-level rise and structures and hazardous places is there is no incentive for relocating structures as sea-level rises. What this legislation would do is to make relocation of structures and allow the activity in the existing program, which is called the Water Resources Development Program. And if you look down to number 8 that is the new language, it's underlined, that would be added in this proposal. And finally, one of the things that the Co-chairs had suggested that we look at was a requirement that State agencies take climate change into account in their on-going planning and operations and this is of course a great idea. It has been considered in some other states such as Maryland, but the thinking here is obviously with any proposal there are two ways to go. One is the legislative route and one is the executive route and I would just suggest that this may be an issue that could be handled by Governor Perdue if she so chooses. Of course legislation is always an option if that is what the Commission and the Co-chairs prefer. Are there questions?

Dr. Everett: It would help me if under your first proposal, which was the Coastal Hazard Mitigation Program, where in the proposal would they put money for proposal hazard mitigation program with a surcharge on beach plan? Do you have a sense of what that looks like and the x percent on the beach plan equals x million dollars. Do you have something in the context of how much money you can raise if you put a ten percent surcharge on 20 percent or what does it take to have real money in the program?

Mr. Stephenson: My sense is that we probably would be looking at a percentage much lower than that because clearly there are these surcharges on the beach plan. My sense is that we may be looking for something one percent or less.

Dr. Everett: Even with that rate? Did one percent of that million dollars in the bucket…

Mr. Stephenson: That's why I put an x in there because we still are working through those numbers. And those numbers are changing too. Another way to approach that may be to simply give the Commission the opportunity to set those rates themselves based on changing

circumstances, greater needs. There are two ways to approach that although I think it probably makes sense to set a minimum that the Commission can then go above.

Dr. Everett: And then on the second one the Water Resources Development Program – I guess I am going to characterize this maybe unfairly but the context both in the beach fund and the highway mitigation fund and kind of everything I see tumbling down, let those people who want to develop on the coast assume more of the risk. That is kind of the idea behind all of these things and so I guess in the Water Resources Development Program which doesn't have very much money in the first place, it seems to me maybe it would be inconsistent to say that you know if you've got to be threaten up there on the front row we'll pay 75 percent of the cost for you to move it back. Is that inclusive with the other activities?

Mr. Stephenson: Reality is always inconsistent I think, but the issue here is the proposal is not to buy the land, the proposal is not to buy the structure, it is simply to move it, which is a much lower expense than the other two propositions.

Mr. Slocum: Jim on your Coastal Hazard Mitigation Program it says the program shall acquire a conservation easement for fee simple properties in these areas. It doesn't say may acquire it says shall. So are you saying that all of that private property this program is going to at one way or another acquire rights to?

Mr. Stephenson: I think it means appropriate – good point.

Representative Harrison: We have had – thanks Jim if you will stay up here. We have had a number of discussions about adaptation and Dr. Riggs had brought forth some recommendations two years ago and we are getting copies of those and they will be coming out (EXHIBITS I, J, K) so if you want them while we waiting for those handouts but I will remind folks that we've had numerous discussions about the appropriateness of hardening our shorelines in light of sea-level rise and increased intensity and more frequent storms and the notion of better disclosure in real estate transactions on the coast so that folks know what they're getting into. Those are two things this Commission has spent some time talking about. Dr. Riggs if you want to talk a little bit more about it.

Dr. Riggs: This has been a very frustrating Commission because we have an existing billion dollar industry down there on the coast that is in trouble and we've got to deal with this. And right now we have all sorts of plans going forward that are going to set the states for the next 25/50 years. Sea-level is rising, there are over 400 houses in the surf zone, they didn't start there, there's 25 miles of highway in the surf zone that didn't start there and we've got to start doing business a little bit different. There is a lot of conflicting pressures going on down there in the coast – everything seems to be good right now to help people make a lot of money but sea-level is rising at a rate of almost two feet per century right now and it's going up. And that is a very good science. That is as good a science as any place in the world. Let me go back. We've had a series of presentations the last couple of weeks; you've gotten this copy of "A Vision for the Future North Carolina's Coast in Crisis" (EXHIBIT K). This has all sorts of recommendations in the back. Not that we have to back away completely, what we have to do is adapt to these changes and there are ways we can do it and maintain the economy. I just got back from Texas and I spent a week down there in Galveston Island and Bernard Peninsula. Bernard Peninsula does not exist any more. It's gone

and Ike was not a major storm. They have not recovered four years after Katrina and Ivan and Rita and those other storms just off Mexico. They are not even thinking of recovering yet in most of those places. If we had a major event and we are not ready for it in North Carolina; we will pay a very severe decadal scale economic price both in the economy as it presently exists and the resources that go on. If you open up two little inlets, three little inlets, the economy is going to go down the toilet. I think that we've got a tremendous amount that's going on right now with respect to this legislative session. The terminal groin is going to come up again, everybody wants to harden their shoreline we have more and more money going into 125 miles of coastal shoreline that wants beach nourishment today, right now. There isn't enough money for that there isn't enough sand for that. How do we maintain those barrier islands as a resource? You can change your system with sea-level rising as fast as this - some of those islands have lost 75 percent of their length in 100 years. There isn't any place for those islands and roads to go any more on some of those islands and this is real. This is real science; it is not scare tactics.

This particular document (EXHIBIT L) that was handed up some time ago is a summary version of a major document that is being published by the U.S. Geological Survey and it's stuck in the Government Printing Office. We condensed that to this so that we could get some of the science out on the table with some recommendations, "A Vision for the Future" - Part 2" is past, present, and future inlets of the Outer Banks, barrier islands. In North Carolina we know exactly where these inlets are going to be. How do we manage them when we get that storm that opens these things up? That's crucial – this is coming off of the printing press today. I'll have it for you at the next meeting. At the last meeting you had a presentation on the estuarine shorelines. You have 5,000 miles of estuarine shoreline that are being hardened at about somewhere between 30 and 40 miles per year. Sea-level rise and an ecosystem, our wetlands and fisheries and water qualities they are removing, which is (inaudible) very well documented. If we want to have our fisheries 25 years from now we got to deal with disaster shorelines; we will harden them as fast as we can. These things have to evolve with the system and how we are going to do, which is absolutely essential in my opinion, we need to develop a commission that deals with these problems of adaptation. The status quo will not hack it anymore. As part of those recommendations that we've submitted in the past which seem to have gotten lost, I haven't even gotten minutes from most of these meetings. I got a call recently about wanting to know where those recommendations were. They are not in the records I understand, so I think they need to go back into the records now that a little time has past and we can upgrade those a little bit. One of the recommendations in there is a disclaimer. The people that are moving out to the coast don't have a clue what's going on out there. They go out on a nice pretty day they sit there and they think what a neat place to retire, they invest their money and then along come September and October and we get five storms in a row and their shoreline is gone and their beach is gone. They don't know what they are buying into and we have to educate them and I think the disclaimer law which Representative Harrison has been pushing for a long time and the real estate and developers don't want. We have to educate the people and that is one way we can educate them. They have to know what they are buying into out there. That is not Raleigh real estate out there and we can't do business like it is a Raleigh real estate. We can grow gardens on a barrier island because the storms all wash the barrier islands and it is just some things that I think we need to deal with as an adaptation commission of some sort. I don't know how you structure that. I am not politically smart enough to figure that out but this is really important for the future of North Carolina.

Representative Harrison: Thank you for that Dr. Riggs. I would just point out that some of these recommendations have been made consistently over the past decade or two. The notion of requiring vulnerable properties and requiring better disclosure on the real estate came out of a legislative study commission that was convened after Fran and Bertha covered our coast and we had gone for several decades with relative or little storm frequency and then all of a sudden we got walloped. So those are some recommendations that have been batted about and as Dr. Riggs pointed out have a pretty huge obstacle in terms of the special interest that aren't too keen on them but we are going to continue to move along on that. Tim Profeta you indicated that Bill Holden might be able to update these recommendations for us.

Mr. Profeta: Jim asked me to (inaudible). I think we do have – I think there is a possibility (inaudible) this morning and thinking what could be an executive branch or a legislative branch effort and I think is being updated (inaudible).

Representative Harrison: That would be great if you can get it out before the next meeting. That would be good. Any questions for Jim or….

Ms. Susan Tompkins: Thank you. I would like to ask the scientists from the coast, Dr. Riggs and Dr. Stephenson. What is for the record the sea-level rise out of our Outer Banks and our coast of North Carolina as of (inaudible) year?

Dr. Riggs: There is a variation across the State. Southeastern counties are rising ever so slightly and the northeastern part is sinking ever so slightly. So it is not the same across the state. Up in what we call the Albemarle, for 200 years the rate for sea-level rise was three inches per century with some basic stability. That is when most of the barrier island for 100 years ago increased to about 7-8 inches per century, more than doubling. Today it is up to 18/20 inches per century almost 4 to 5 times decreased rate of rising in the last 200 years. The southeast isn't quite as hot but they don't have any sand so the problem of little rise in southeast is equally as bad as it is in the northeast.

Representative Harrison: I think Ms. Tompkins we saw some pretty dramatic maps last meeting if I recall correctly and that was sobering to say the least. We're heading on Dr. Riggs recommendations put together with Jim Stephenson and Walter Clark back when he was on this Commission back in January 2007, which I think should be part of the record. I wanted to share them but they are now and so if that is it for adaptation we are going to back up to Dee Eggers if you will. Dee Eggers and Michael Regan have similar recommendations about the extension life of the Climate Change Commission. Dr. Eggers if you want to go first.

Dr. Dee Eggers: I was glad to prepare some language (EXHIBIT M) on making this body a permanent body since climate change seems to be permanent and justify this kind of response. George how much should I tell them what we talked about? We never even spoke I guess. George Givens and I had some conversations about how a permanent climate change commission could be and should be structured and so he sent me away with some operating orders and marching orders I should say and this is what I came back with. I looked actually at climate commission language from several other states, Sweden and the UN body and put some of these together. Instead of reading through this what I've done is prepare a PowerPoint with some of the specific highlights of this. And what is going to happen is Michael has also prepared language and

the idea is that I've covered some things that aren't in his language and he's covered some things that aren't in my language and we will work together over the next couple of weeks to come back with one single proposal, but right now here is what is in mine.

Not address specifically – pay attention to this our ex-officio members of the Commission and there is not an advisory group proposed in this language. What is addressed, how membership is appointed specifically the House and the Senate and the Governor each would appoint one-third of the members and going down to the next slide. The expertise that needs to be represented on the Commission, powers and duties, pay attention also to mitigation and adaptation language here and lack thereof. Also in Michael's we'll need to make sure Stan if you could maybe keep an eye on that, that we have what needs to be there. And also addresses the issues of retaining current members of this body on the permanent climate commission at least initially because we have been meeting for three years and there is still a lot of knowledge in this body that we would not want to loose in the arena. How do we transition into it? So initially I suppose that the Legislative Commission on Global Climate Change be members of the permanent climate change commission for a period of one year and that the permanent commission then move to 18 total members. The House and Senate would each basically select three representatives and three other members. So from the House we would have three elected official and then three other people appointed by the Speaker of the House. From the Senate we would have three elected officials and three other people appointed by the Pro-Temp. And then the Governor would appoint six members for a total of 18.

The three year appointments would be initially staggered so the entire Commission would not rotate off after three years. But in order to have a staggered appointment I just put in that the initial appointments would be one, two and three years. The expertise – this was addressed in many of the commissions documents that I looked at. Expertise represented on the commission would be energy, natural resource conservation, economics, engineering, climatology, finance, law, policy, transportation, land use, coastal geology, consumer protection, State energy policy, or another field substantially related to the duties and functions of the Commission. There is language that indicates that there should be considerable representation of that so that it is not all attorneys or all coastal geologists or all you know engineers or something. But it is important because it is a very technical work that there be expertise on this Committee at that time or commission.

The powers and duties – Number 1. There are several bullets here but to study on a continuing basis, as they relate to human health, environment and economic impacts. First of all, what's going on with the data so existing and projected emissions levels for the State and sequestration information. And also expected impacts – this list is the same list that came out of the formation of this Commission with two additional words and those words are ecosystem services. I inserted that because it is important to look at the expected impact, not just on natural resources which a lot of people interpret as things that can be extracted but also on ecosystems services. And what that refers to are the things that support life on the planet like waste sequestration, water purification, air purification, pollination services, pest control and, nursery habitat. Those kinds of things also are impacted by climate change and those things directly affect human health and well being and they also directly affect our economy. So I quickly added them to this list in the proposed language. Also to take note of actions by others whether it is states, other nations, etc. Identify economic opportunities for the State of North Carolina through the emerging carbon market because we have discussed this as a Commission before and had presentations. There are some

significant economic opportunities for North Carolina with respect to climate change. Then cost of actions taken by the state and benefits of actions taken by the state and others – this again just verbatim out of the Climate Commission language and Michael has the same on that too.

Under powers and duties - Number 2. It is to make recommendations in the following three areas. In areas of emissions reduction goals, carbon sequestration goals and reduction of emissions both direct emissions and indirect emissions from State government activity. And that the Commission may make recommendations regarding there is some language here so pay attention to these bullets, how to strengthen resilience of vulnerable communities. Just a very important thing to address I think soon. How the State can improve institutional capacity to adapt to climate change. Identifying correct policies and procedures that currently undermine greenhouse gas emission reduction and we have it in procurements and all types of state policies. We've got language that actually undermines our ability to reduce greenhouse gas emissions very effectively. This is dry work but important. The second bullet there mobilization of new and existing financial resources to the climate change and identify ways to integrate risk reduction and adaptation into development plans of state agencies and local government. So that our local governments and our agencies are exclusively considering whether it be increased storm frequency, rain events, sea-level rise, we get this into our planning processes. That would be very good for us in the long run in terms of health and economic health. And that is it. Should I take questions now or should Michael present his and then we can both take questions?

Mr. Michael Regan: Mine will be very brief because most of the draft compliments one another. What I did want to call special attention to were in our draft Section 1 and Section 12 (EXHIBIT N). Section 1 focuses primarily on the composition of the permanent commission. Our recommendation of the permanent commission could consist of seven members appointed by the Senate Pro Tem, seven members appointed by the Speaker of the House. Do we not have copies? Again the difference is in the composition of the permanent commission. Seven members appointed by the President of the Senate, seven members appointed by the Speaker of the House, and seven executive office representatives appointed by the Governor. The idea behind is to have a stronger legislative presence on the Commission to pursue and promote stronger policies. And then there is an additional change as well, which is an advisory committee. Establishing an advisory council to serve as an immediate resource to this new permanent commission. This advisory council would be primarily made up of expertise that is exhibited by the current Commission. So those are the two major differences in the proposal that we submitted and Dr. Eggers draft. When you look at the subsequent language in the other section it primarily resembles Dr. Eggers' suggestions. Hers are a little bit more detailed and ours are a little bit more generic but for the most part they compliment one another very well.

Representative Harrison: But the point of having more legislators in here is to have more buy-in when we have recommendations for the legislature. I think one of the short-comings of this Commission, which has wonderful expertise, is that we have too few legislators here to carry the word on when we get into session. So I think that is a good move. Anyone have any comments?

Mr. Givens: I would just observe this is going to pass through the Co-chairs and counsel filter and one of my concerns is that this new permanent entity not conflict with ERC. That will be taken into account and we will bring back something that I think will work for everyone.

Representative Allen: I will follow up on that because I am on the ERC. The question is not so much to that but how many of these things can be covered by existing commissions and/or standing committees of the legislature. I see some cannot but I see a number can with the subcommittees and interim committees and things like that. Once you take those out if there is enough left for a commission.

Representative Harrison: And that is worth considering. I don't know that we're doing much with the land of climate at the ERC. I just don't know our energy policy or Joint Legislative Utility Review Committee that actually hasn't been meeting but there obviously are the committees that cover this but I don't know, it makes sense to have it. George you might want to comment on that.

Mr. Givens: At least in the matter of adaptation, which is going to become increasingly important there certainly is not a single entity that would be focused on that. For the mitigation that may mean many of those would fall under the purview of other entities. That is something we will take a look at. One of my concerns is that as far as environment and natural resources matters are concerned there is a limited number of staff. We are the same people who staff every entity and it is in our interest that it not be too many because we get spread thinner and thinner. So all in we will do our best to factor in and then once we get a bill together it will still have a long way to go.

Dr. Riggs: I do a lot work with these various commissions. The Coastal Resources Commission (CRC) and ERC have their hands are full just trying to enforce regulations that exist right now. The Division of Coastal Management and CRC has developed a science panel to interact with and try to deal with new issues but I can assure you that nobody is dealing with these big issues yet. The resources that I see out there are not available. We have got to get serious about this and if we count on them too much they will enforce what we've got.

Mr. Urlaub: I am just struck that many of the issues that have come before this Commission over the last few years have required a very multi-faceted approach. We've been asked to think about many aspects of North Carolina simultaneously and I wonder if anybody in North Carolina government right now has such a task before them. Especially looking at the prospect of federal regulations that North Carolina would then have the immediate pressure and requirement to comply with or prepare ourselves for under a president now and a private entity sector that are all calling for that federal action on climate change. I am struck that this is something that can serve us well going forward and kind of this unknown or regulatory environment that sounds like it is going to become more clean very soon and it just put us with our government infrastructure ready to take action as the federal government moves down this path of taking action if for no other reason.

Representative Wilkins: Thank you Madam Chair. An earlier recommendation by Dr. Riggs was that we evolve or we develop a panel that looks specifically at adaptation. So Madam Chair I would encourage the Co-chairs and George to stay on target with keeping coastal adaptation as a part of whatever goes along with it.

Representative Harrison: Absolutely. I think your point is you probably don't want an additional commission but this would be an integral part of the Climate Change Commission's work. I agree with you.

Mr. Givens: I believe that some of the most severe impacts will be coastal. I think adaptation is a state-wide issue. I think it would be a mistake to divorce adaptation from mitigation efforts and what we are talking about here is an advisory body as opposed to a regulatory body. Coastal Resources Commission and those other entities are I mean the executive branch is regulatory. If you went that route you would not have members of the General Assembly on them because of the Bundy decision. I think the advisory route is probably the best way to go at this point.

Dr. Andrews: I have one question looking at these versions. I wanted to ask Mr. Regan, it says that the Commission would include seven members appointed by each of these sources it doesn't specify that those members would be member of the General Assembly. Unless they were, wouldn't they be the risk of dividing the membership or be unclear about the distinction between that body and the body?

Mr. Regan: Yes the intent of the language is that they be members of the General Assembly.

Dr. Andrews: I would like to see that cleaned up a bit.

Mr. Regan: We can do that.

Mr. Givens: Mr. Hudson and I have created quite a number of commissions both regulatory and advisory and we imagine that we have enough experience to get this one right, we certainly hope we do.

Mr. Profeta: I think the proposal is (inaudible) probably has here any action out of this Commission has been that we haven't had (inaudible) representation from people or the (inaudible) people who would have to go and the argument and that is truly (inaudible). I would like to embrace the idea of creating a commission that is really non-elected officials and they have a clear (inaudible).

Representative Harrison: We are going to go back to Steve Smith.

Dr. Smith: We are going to try the technology here. One of my associates John Wilson who presented the last is going to try to call in I think we will see if that works. But I will go ahead and get started. What is being passed around (EXHIBITS O and P) is both a summary PowerPoint, I don't know if we can get this going. I'll let somebody who is Bill Gates comparable get that going. We have just a very quick PowerPoint here and then we actually have a narrative memo that goes along with this and this is basically growing out of. If you remember I think it was the last time we presented some work that we had done on "Cornerstones," which basically just looked at some of the ways to get some of the target reductions that we believe are necessary. One of the areas that we feel is right and important and I think has a lot of opportunity and hopefully most people view as a win-win situation is to basically do a better job of capturing waste heat through various types of waste heat recovery, combined heat and power and other technologies and there are lots of innovation in this area right now. A lot of people basically call this energy recycling and we believe that it is a valuable area to look into because it is in essence just waste and miss-opportunity and it dramatically increases the efficiency of what we want to accomplish. On the slide it is more difficult to see but if you look at the chart we basically looked at the business as usual case going from the approximate 170 million tons that we are at now. Approximately up to business as usual out to 2030 depending on the scenarios of habits grown in the emissions here in the state may be 280

million tons. We were looking at what are the various wedges are very specific to North Carolina that you would be able to get reduction. We have all talked about some of these in the course of our discussions here and in CAPAG. One of the areas that we feel is very large is the area of energy recycling and we've dug into that number much more deeply than we did in the CAPAG process and determined that it is potentially a significant contributor and therefore this proposal is to really drill down into that even more. Looking at the technical potential here and then trying to identify any legislative or regulatory barriers that prevent us from really fully exploiting this because this is being done in all parts of the country. Many states are doing a much better job of capturing this waste and increasing efficiency. So this is an area I think is good for economic development here because it helps a lot of the industrial infrastructure that we have. It is good because it helps us potentially put off the need for new generation because we are actually taking advantage of just missed opportunities here and as you will see as we go through this, we think it is very cost effective. This is just a chart that basically shows kind of where the current production goes and what happens to a lot of that heat and again I think we all know but I will reinforce for you that when we burn coal we are only getting out of that about 30/35 percent of the chemical energy that is actually in that fuel. The rest of it is lost to basically waste heat or whatever. So we have tremendous missed opportunity there and we need to figure out ways that we can squeeze more work out of each unit of energy that we are consuming. In a very real sense, global warming pollution is as much about basically waste and inefficiency as it is about anything else. Because what we need to do is we need to figure out how we make our systems more efficient. By making our systems more efficient then we are able to not only solve this global warming problem that we are struggling with but we are also going to make our industries and we are going to make our State more competitive to be able to compete both here in the United States and internationally. This is just a really rich vein for us to dig into.

This chart shows just roughly – this is base done data from Lazar Management which is a national or international consulting firm looking at the various types of way that we potentially can generate power going forward and some of the projected costs. The top green bar is showing that combined heat and power is actually a very viable option, very cost competitive compared to others and there is a range there where those costs are going to come in. We need to get in and dig in more deeply into what the potential is here and in the State of North Carolina for these cost savings. We have tried to take a first order look at the potential for energy supplies through this and again we are looking at the technical potential and again depending on how we deal with regulatory barriers. Depending on how we get by in both the industrial sector and the utility sector will determine what type of (inaudible) or how much of this potential do we actually grab over the next 20 or so years. Part of what we are proposing in this proposal is to actually identify a better sense of what that potential is. So we move from just a technical potential to beginning to look at what is the feasibility of capturing this. And then also really begin to dig deeper into what are the regulatory legislative barriers that are preventing us from taking advantage of this vast resource.

A couple of reasons that we feel that this is appropriate for this Commission to struggle with and potentially make some legislative recommendations is that we believe that the electricity from energy recycling is under valued and we developed that concept more in the memo. But basically there are a host of reasons of how historically we've looked at what are called the avoided cost and how we deal with those. We need to take another look at that to basically encourage the development of this. There has been some good work done on interconnection standards but we think there is some additional work that can be done there just to make sure that there is greater

standardization so that an industry that wants to engage this knows exactly what they are up against and how they can interconnect and share their power. Making sure that non-utilities are not barred from selling because when we think of this we don't need to look at this just as electricity. There is actually a lot of formal energy that can be captured in the form of steam or hot water or other things like that, that we need to make sure because if somebody has excess steam and just down the road somebody else is actually burning fossil fuels to make steam that they need and if there is just someway to connect those two together you can basically displace the need for additional fossil fuels or additional pull on the overall grid. So if we can find ways to be more efficient so that surplus are able to communicate with demand then we may actually be able to gain some efficiencies there and we think that there may be some legislative or regulatory barriers that are preventing that from happening. So we want to work with industry and other innovative individuals to try to figure out a way. Let's make sure that we make our system as efficient as possible so that we make ourselves as competitive as possible and we reduce as many of these greenhouse gas pollutants as possible.

We think there may be some environmental permitting. Again we want to tread lightly here but there are some concerns about some industry just because of some fuzziness in the law that they may not be willing to go into this space and I think we need to dig into that a little bit and really answer some of those questions about what are some of the challenges under things like new source review and others. Our organization is a very strong champion of new source review but we do understand that in some of these smaller cases we need to make sure that that rule is not serving as a barrier for increased energy efficiency in production. So we need to be sophisticated and thoughtful and this is something else that I think some legislative direction could help empower DNER and others to really dig into that and understand it better. The other thing is that the recent passing of the REPS may not be allowing all the players to really engage this in the way they need to and find ways to get credit. So there may be ways to tweak the recent passage of that important renewable energy portfolio standard that allows some other players to take advantages of this or allows the utilities to fully exploit the opportunity of energy recycling, so again just making sure that as we move forward that we continually refine and look at these opportunities as something else that we develop in the memo.

So here is basically a quick run down of what we think some of the starting points for discussion would look like. Make sure we are offering a market price for the electricity and not just locked into the avoiding cost particularly for things that have this many advantages. Remove any remaining obstacles interconnection, authorize the sale of thermal energy by nine utilities to neighboring areas so that we can fully take advantage of the investment of whatever fuel goes in and we are not wasting anything. Provide sound environmental permitting so that industries have a clear sense of what they can and cannot do so that they can fully exploit this. Look at slight tweaks to the REPS law that would allow full use of energy recycling in the context of energy efficiency. I don't know if John ever got on. I guess he didn't but. John is on. John is our research director and so if we have any questions he dug into these numbers more specifically. Let me go back and re-emphasize this. Our quick and dirty look at this number says that if we were to come close to reaching that technical potential it may amount to as much greenhouse gas reductions in the business as usual case going forward. As nearly 40 percent of the emissions from the coal fired power plants in this State. This is not an insufficient area. I think it is a really good area. It basically gets us to help our industry be more efficient, makes them potentially more competitive, helps them with their overall fuel cost which I think is something we all want to do in this economic

down turn. We want to make industry as competitive as possible in this State but it also helps us to solve this really difficult complex problem of how are we going to get on that downward slope of reducing emissions. The fact that we are using energy right now to heat water one place or create thermal load and there may be surplus and we are not sharing that and we are not figuring out ways to have that be able to use to do additional useful work and some of that is just literally going up in the air as heat and it drives me nuts because I know that we can be much efficient in how we do these things. So let me stop there and answer any questions.

Representative Harrison: Thank you and we did get a presentation on this about a year and a half ago with several recommendations about what we could do to remove the regulatory barriers to make it easier.

Dr. Phaneuf: (Inaudible).

Dr. Smith: I think there are opportunities to look at that. I think you are going to have to evaluate it on a case by case basis. I think there are other states that have some incentives. The other thing is that we are looking and we know that at the federal level energy recycling is getting a renewed look. And so as we start looking at the sort of massive economic stimulus package that is coming down. I constantly tell states in the southeast you need to figure out a way to stick a little Velcro on your state so that when that money goes flying some of it gets stuck into the state so you can actually do some things. So I think having a fresh look at this to take advantage of that is probably a thoughtful thing for North Carolina to do. John do you have any ideas on the actual installed cost or strategies that other states have used to really work with industry to maximize that?

Mr. John Wilson: I didn't hear the question so…

Dr. Phaneuf: I can rephrase it a little bit. The barriers to this kind of thing that you describe are pretty convincing right so regulatory barriers were not doing that. If those were dropped would there be obvious incentives to engage with this or would the installation cost or sort of the start up cost and these kinds of things also be sort of a hindrance to it. What is the kind of bigger barrier do you have a sense of that?

Mr. Wilson: Ok yes, I think I understand the question now. I think that these are the recommendations that we obtained from industry and others and we believe that if these recommendations are implemented they will go a long way toward resolving the problems that are out there now. There may be afterwards a cost gap and I think that is what you're talking about a sort of price cost gap and the problem is we really don't know that with the available data. There is a real shortage of (inaudible) third party market data in this field and the good thing is that there is not a lot of down size to pursuing the strategy that we've put forward here. It will probably be more cost effective simply to make a strong effort and then see how the market responds and at that point do an analysis and determine what further steps might be necessary and if they are appropriate.

Dr. Smith: The other thing I would add is that we have been working with Tom Caspen, the individual that we brought down to speak to this Commission. We continue to dialogue with his company Renewable Energy Development and he stands ready to re-engage with the state and with any sort of legislative initiatives. He has been developing these projects across the country

and has been doing some work with us over in the Tennessee Valley area. He is also looking at Florida and I think he believes there is a robust market here in North Carolina. So he is prepared as are others to engage. Other questions?

Mr. Urlaub: Just a point of information. The U.S. Department of Energy Southeast Combined Heat and Power Center is located at the NC State University campus and is a resource for North Carolina on this. When we asked them during 2007 for Senate Bill 3 (SB 3)our process was unrealized economic valuable potential for combining heat power in North Carolina in excess of 2000 megawatts of capacity. So that is equivalent to the nuclear power plant proposals that are on the table right now. We've served a similar state's purpose in those applications.

Representative Harrison: Mr. McKinstry has some insight on what other states are doing.

Mr. McKinstry: There are a variety of incentives – one thing you can do is something that Pennsylvania and Ohio have done is to include….. Combined heat power is generally under the category of energy efficiency and energy conservation and for instance Pennsylvania created a tier two in their RPS which includes a lot of things like waste coal because we had a huge waste coal problem but they threw a lot in but the energy efficiency required a separate RPS standard. So if you have that you can try to goose it up. Now one of the problems with it is figuring out what that percentage should be. In the case of Pennsylvania they set it so low that the tier two credit reps are valueless but Ohio has a brand new bill and we will see what happens to that. That is one mechanism that you can use. Another mechanism that can help it is tying in someway to a cap and trade. For instance in the (inaudible) program reduction in fossil fuel combustion is one of the things that can generate carbon credits, so let's suppose you want to set up a combined heat and power with a district heating program. If you have that type of credit you establish a district heating and you can get carbon credits for the reduction of everybody's oil and gas heat that went up that is now being supplied by a combined heat and power program.

Dr. Smith: Do you mind explaining what district heating is – I am not sure that everybody knows that.

Mr. McKinstry: District heat is the old style. I have a power plant, I am generating steam, the high quality steam goes into generating electricity, we put the low quality steam into a steam loop which then goes around to the various homes and businesses and supplies those businesses. Now there are a lot of these programs that are being financed – sometimes it is just because there are a lot of existing financing incentives at the federal level you can use. For instance, district heating and power can be financed with taxes and bonds which helps and in some cases you can classify some things as solid waste bonds which you can get financing for. Then you can also look at how you can encourage people to really look and examine the issues. Sometimes the real problem is putting the deal together. You're putting in the steam and you're getting the customer.

Dr. Everett: Have you looked at those same graphs I keep pointing you to, to see where combined heat and power falls out on the two graphs in terms of reductions and emissions and to the terms of costs.

Dr. Smith: We feel that the CAPAG process as good as it was did not dig deep enough into this so you will see that our numbers are more robust than what we did in the CAPAG because I think we

just sort of went past that relatively quickly. John do you want to talk about which of the CAPAG recommendations this was nested in and I think what we are proposing is that we sort of re-aggregate some of these together and look at them as a stand alone because again I think there is some really good work done there but I think they may have been disaggregated and we are not sure that we really dug it deeply. Our analysis post CAPAG went further in looking at the potential here.

Mr. Wilson: I can comment on this briefly but it can get technical pretty quick. The CAPAG analysis was based on a 2000 megawatt estimate and where we assumed somewhat more partly because the CAPAG estimate was based on CHP only and we are looking at broader range of technologies here. So we looked at a larger number as the potential for the region. We also expanded the analysis out to be 30 so that's another explanation for some of the differences in scale here between the recommendations. Also I think our specific package of recommendations is developed a little bit further than what is in the implementation measures section under ES-3 and ES-9. Certainly I think sort of a result of that report but it is a little bit augmentative.

Mr. Givens: What did you mean by environmental permitting the scene as barrier and (inaudible). Seems to me that every time anybody wants to build a highway or hog farm or just whatever that the environmental regulations are there.

Dr. Smith: We hope that environmental regulations isn't a barrier – our discussion with some people in industry indicate because of some of the fuzziness around rules like new source review there has been some concerns that if they undertake such an operation that it would subject them to additional regulatory actions potentially that could serve as a disincentive and so I think that what we would seek to do and again those of us who have been involved in the whole discussion about new source review it is a very rich area of discussion. But I think what we would want to do is clarify in any sort of permitting that certain types of combined heat and power (CHP) or energy recycling activities that fall under certain…. In essence the minimum or very low standards are viewed as one way and not lumped in with others. So I think it is sort of making sure that we go back and review the way the DENR and others look at this area so that it doesn't serve as an unreasonable burden to making that goal. I think it is just a fine tuning of some of the rules there to make sure that there is some real clarity so that industry doesn't say we are just not going to go there because you know we are afraid it is going to bring our whole plan under some new layer of review. I think that others in the room here could probably comment on how much of an issue that is but it was communicated to us by some people in industry as a potential concern. We wanted to show good faith from the environmental prospective that we are willing to sit down with industry and have that kind of conversation to really make sure that there is clarity and that people are not playing a game of gotcha here where you think you're doing the right thing and all of a sudden you get warped by something unforeseen. So that was just an area that was brought up.

Ms. Choi: Looks like a number of your recommendations get to the Utilities Commission regulation with what it cost (inaudible)… The regular reviews of what it cost and we know (inaudible) I guess I am just wondering if you talked with the Utilities Commission about these changes and what the impact would be to other customers if they were thinking about these type of changes.

Dr. Smith: I think that is an area that obviously there is both a legislative component for this and a regulatory component that would obviously involve the Utilities Commission. My sense is that our

experience with the Utilities Commission is lot of times they sort of are in static mode until they get nudged by the Legislature to re-look at some things. So it may be that we need that nudge legislatively to challenge them to dig into this as opposed to just assuming that they are going to do the right thing because there seems to be a certain (inaudible) over there sometimes where they don't want to open things up unless they are encouraged by the Legislature to do it. I think this may be exactly the type of area where we need a fairly clear legislative encouragement or this Commission or some other way to do that to get them engaged. We are in constant dialogue with the Commission on a number of different fronts. John, have you talked with public staff specifically about this or any of the other staff over there?

Mr. Wilson: No we have not talked to them specifically about the regulatory changes that would be required. It is my understanding that they feel pretty confident that the current laws are properly implemented and so that is why we feel that this would be a legislative change to look at handling these issues a little differently given the policy objections of the Commission.

Dr. Smith: I don't think this area has been dug into by the Commission. You are right there is sort of a general review of avoiding cost but I think those reviews tend to focus on other areas and I think that this is something that constantly does not get swept up. So I think if this Commission and the Legislature were to say we basically in North Carolina want to squeeze every bit of work out of each unit of energy and that is a directive and therefore let's go back and look at energy recycling and find all of the barriers that prevent us from doing that. I think that would elevate this issue within their eyes and hopefully deal with. Ivan you may have direct experience with this.

Dr. Urlaub: The Utilities Commission adopted E100 sub 113 the rule making for the renewal and efficiency portfolio standard. And there was some discussion with the public staff as well about recommendation number 5 in your memo. Take more effective use of the REPS law. The first sentence of the second paragraph at the top of page 7 I think summarizes the conclusion of those discussions of the Utilities Commission. There was a change made in the language in Section 2 of SB 3 on the last page before the bill was I guess the (inaudible) are frozen. So universe of energy efficiency that could be implemented and restricted eligible compliance measures down to only energy efficiency implemented that is paid for by the regulated electric utilities. The vast majority of energy efficiency potential that is out there all of a sudden becomes ineligible to satisfy the REPS requirement in SB 3 when it was passed into law. So that is something that is specifically (inaudible) would require our legislators' modification or amendment.

Dr. Smith: I think there are probably several things like this that once we begin to dive into this a little bit probably are going to come to the surface. And so what we are hungry for is members of this Committee and again the industry members and utility members were eager to work collaborative with you and to struggle with this and then also the Legislative members or other champions that would like to dig into this to basically let us do some work and help everybody understand this a little better. Lets get in and do a good faith effort to try to identify where these barriers are and really work collaboratively to try to knock them down in the context of again making the state more competitive and eliminating the waste and also reducing global warming pollution which is something we desperately want to do. I mean this is one of those areas that we think could potentially be a win-win situation for all parties involved if we all come to the table with some agreed upon goals.

Representative Harrison: Thanks. I am (inaudible) how late it is and when we told you we were going to try and get you out of here. We have a couple more items on the agenda and then we have at least one speaker who drove up here from Charlotte. So I just want to quickly address the two items on the agenda that are on there next which are the emission of buildings constructed with state funds, the state building code and then an item that isn't on here specifically but the notion of green jobs. These are all things that we've talked about as part of the recommendations for…..

Representative Wilkins: Madam Chair may I address 8 and 9 in one agenda?

Representative Harrison: Sure. I was actually going to just say that the notion of state funds going into buildings - I think we've talked about this some here, we've talked about it in the Energy Policy Council, at the Emerging Issues Forum and it is just that we've already made the policy decision that we were not going to construct any more state government buildings that did not meet a certain level of energy efficiency. I find that logic to money that goes into state buildings it may not necessarily be state buildings could be the reason for that. If you want to comment on that, please do. We don't have the language we have been working on the language since last session but we don't have that flushed out yet.

Representative Wilkins: I certainly think as state government we need to lead by example here. We sort of did it belatedly but that is sort of what we did with getting rid of smoking in certain places. We cleaned up our house long over due, but we cleaned up our house and then asked the public to do the same. But one thing I would caution you about is to be very, very specific in defining the state funds. You could send down a mandate on your counties and cities and I think about lottery funds for school construction. What are they, when do they become counties. The other thing number 9, I am not going to be ready to go here anytime soon until we see some recovery in the housing market. Thank you.

Representative Harrison: Sure and that first point that you made we've actually been trying to flush that out which is why we didn't have legislation for the short session because it did actually get discussed at the ERC as well. But we will not go forth until we get that. We have to figure out how much percentage of it and you have a threshold in terms of is it near $10 or is it near 10 percent or 500,000 or however that is going to go up to. We are very mindful of the closing and mandates for sure. It is just that I think a lot of us think physiologically for putting state money into any facilities that ought to meet a certain level of proficiency because I think that is the way we are going to be going, the country the state in terms of building more efficiently and greener. So we have the green jobs we just haven't figured out what that is going to look like yet and hopefully we will have a recommendation for it before you at the January 27th meeting. State building codes Larry did you want to talk a little bit about what the State Energy Office is doing?

Mr. Larry Shirley: I can very briefly. The State Energy Office has been working with the State Building Codes Council and the Department of Insurance to try and increase the energy efficiency in building codes. The Building Code Council is in charge of implementing the code and putting recommendations in place, etc. To enhance this we've got the grant of half a million dollars from the U.S. Department of Energy and $50,000 from the National Governor's Association to begin training inspectors, building inspectors in the field. Discretion for implementation in the code is county by county or city by city is in the field in terms of implementation. So it is very important that

those inspectors be trained well and in many cases we have found evidence that they were not implementing the energy code. So it is very important that this occur now so that we can gauge them in an intensive process in that regard, 20 workshops over the next three or four months. The other thing we are doing - is working on recommendations which will happen over a three year period to raise it to the code level. The energy efficiency level on the code by 30 percent, we want to accelerate that process as fast as possible. Traditionally that has been a rather slow process, Brian's office made changes in the code. We hope we will accelerate them and get it done in three years or less so that the 30 percent will fall where it is now. Remember this is the minimum level that we allow buildings to be built in the State of North Carolina. This is the bottom floor. So if you raise that floor up you have immediate impact on all new homes. Theoretically if it is implemented (inaudible) throughout the state so that would be good right now in these 60,000 homes constructed, we've been in levels as high as 80 or 90,000 that immediately would go into place and those savings would be there for the next 30 years or longer for the life of the facility. So this is the (inaudible) play without a lot of cost extended to it to raise the efficiency of the residential sector.

Representative Harrison: Thank you Larry I'll just point out Representative Wilkins to your comment and this is only (inaudible) because I've got my green construction project going on back home. The builders who are involved in that trade actually seemed to have not been hit like the others. It's a very conventional building, but that's just antidotal but that is what I understand. We are still working on those and we are going to see before the next meeting. Joel Olson drove up here from Charlotte to speak and talk to us under the category we are now on to all the recommendations about (inaudible).

Mr. Joel Olson: I would like to introduce myself – my name is Joel Olson. I am the Director of Business Development for SENCERA. We are manufacturing solar modules in Charlotte. I would also like to thank Representative Harrison for allowing me to speak and also Ms. Susan Tompkins for encouraging me to speak today. I would like to talk to you about renewable energy feed in legislation. This is a mechanism for North Carolina to become the regional leaders in merging green economy and to reduce our greenhouse gas emissions. This is nothing new unfortunately there is only one city in the United States that has implemented it. But there are four states that have legislation currently up for vote and there are 32 countries that have implemented it. Among which the largest renewable energy markets in the world. I made a presentation and you have the information here (EXHIBIT Q) but I am going to speak a little bit freely since my time is short and I know lunch is near. So keep that for reference and I hope it makes sense after my speech. I would like to talk a little bit about why – why renewable feed in legislation? I think we all know that 40 percent of our greenhouse gas emissions come from electricity generation. That can certainly be addressed two ways – both with energy efficiency as well as with implementing electricity generation that doesn't emit greenhouse gases. We call that renewable energy. We made an important first step. I think we distinguished ourselves in the southeast by being the first state to enact a renewable energy portfolio standard in December last year. That was impressive for the southeast but it doesn't necessarily make us a leader in the United States. But it does put us ahead of our neighbors and it has already created jobs for our local economy. But then there are some problems with our renewable energy portfolio standard. I'm just going to jump ahead a little bit – there is a lot of uncertainty in the market in terms of how to make this really happen. It is not just for the developers or the installers or the manufacturers but it is for the banks which we are a leader of in the United States. We are the second largest banking industry. We are just sitting on the side trying to figure out how we can invest in this industry. It's the utilities that are owned by

investors that have to show a revenue growth, a profit growth every year. But when they are expecting a mandate to implement renewable energy they often bulk at it or say how can we generate a growth in our company and our profits when we have to almost as a charity pay extra for renewable energy.

This uncertainty and it really comes down to developers and banks, what are we be paid for the renewable energy we generate. How much am I going to get paid for the cost per kilowatt hour that I sell to the utility? And for the utility they need to know how am I going to recover the cost that I paid for this electricity. And we have a little bit of a complicated way to reduce the cost of investment. Everybody knows about tax credits – we have federal tax credits that are recently being extended. We have very generous state tax credits that are due to expire next year. But these create uncertainty. It is very difficult for a developer to go to a bank or utility to go to a bank and say – let's go back to the developer for example and say I am going to develop this much energy and the bank says well how much of that federal tax credit can you monetize? How much value can you actually get out of that? How much value of the state tax credit can you actually monetize yourself without using a third party that would take 20 or 30 percent of the value so that you can reduce the cost of your investment? But again it comes down to the question of what is your income for this project going to be? How much are you going to get paid for the electricity you generate? That problem has created a hesitation in the market. Again, certain things are being forced but it is not a consequence - it is making our banks sit on the side, it is making a lot of people, construction workers or contractors - kind of wait to see what is going to happen. In this renewable feed in legislation, this is how this is the mechanism to make it simple. To make the market clear, to make it transparent, and to define exactly what you are going to get paid for the power you generate. Make no mistake it is going to be more than what the average grid price is for electricity. We are going to have to make an additional investment into what this power is being purchased for. But if we make that investment now there are a lot of economic benefits that are going to come from that. How are we going to do this – the silver bullet for this renewable energy feed in price that is going to be paid, we need to establish certainty. For each renewable energy source, we define this as the price that you will be paid. One the developer or the investor knows what they are going to be paid - all the equation works out from there. There is certainty in the market so that they can get a loan and the banks can start to participate in this economy. The developer knows what the return on his investment and effort will be. The utility know that they are going to be able to recover their cost for buying this power and putting it into the grid in addition to maintaining their profit margin on the power that they buy.

There is one other point that is important – and that is we need to provide a long term return on the investment for these investments. If there is uncertainty of how long you are going to be paid the rate for the renewable energy that you generate again that will make investment in this market hesitate. So providing certainty for how much you are going to get paid and number two for how long you are going to be paid are two important tenants of the feed in rate legislation. I am going to come back to paying for this. I said there was going to be an additional cost – there is going to be an investment that needs to be made and it is going to need to be made now. The recovery mechanism, basically the additional cost that is paid per kilowatt hour of renewable energy is spread across the entire rate base. It is as simple as that and the additional cost is actually minimal. Germany has been able to become the largest renewable energy market in the world by increasing their overall rates no more than a half of a penny. They have tripled the amount of renewable energy we have in the U.S. with that investment. That is relatively minimal. The key

here is also when the utility pays an extra amount or the renewable energy feed in rate that is defined. They also need to be able to put their profit on top of the rate they pay. This gets a little complicated so that the paper shows that but basically the utility has to interconnect these resources. They have to transmit this distributed energy, they have to secure a safe and stable power and they should be able to have their average profit for that not just taking what they bought it for and recurring that. So there needs to be a definitive cost recovery mechanism for the utilities. I think the result of this is most important if we start now and I don't mean that we wait for a federal RPS or a federal feed in rate system or we wait for Georgia to do it. But if we start now being the first one in the southeast we can actually start to see some of the benefit that Germany saw as being the first country in Europe that did this.

Now if you look at the graph in the picture here of the economic development opportunities for North Carolina this is an example that Germany did. When they started it there were 67,000 jobs in the renewable energy industry. Last year nine years later, there were 250,000 jobs in renewable energy industry. It grew from six billion euros to 32 billion euros. That's a 50 billion dollar industry that was created with the political will to establish a price for renewable energy. Now these jobs were created at utilities without a doubt they were created at up stream suppliers. Suppliers that make glass that make packaging at which they were created at manufacturers that make turbines or solar panels like SENCERA. They were created at insulation companies that installed these technologies, project managed these installations. Probably more important than anything and I think this is very key to recognize (inaudible) benefited tremendously from this legislation. The banking system in Germany the financial services, this was as sure a bet as any loan you can make. So this allowed the German banks the European banks really to lead the way and now we see even in the U.S. a lot of the financing done for renewable projects are not done by Bank of America. They are not done by Wachovia. Those banks are sitting on the side. It is done by the German banks and the European banks they got in this early. So this opportunity does not only provide jobs in the renewable energy industry but it is going to provide jobs in the construction industry with contractors and banking. We are going to need to train these workers at our community colleges and we are going to need to become centers of excellence at our universities for developing these technologies. The question really comes down to when do we do it – do we wait on somebody else. We know that 70 percent of the renewable jobs right now in the U.S. are in California. But we are on the east coast – this is where all the people live in the United States. We have the opportunity to be the Mecca for renewable energy in North Carolina but we have to start now.

I just want to say a couple more things – we have the resources in this State. Look at where we are located. We are located 650 miles from 65 percent of the population in the U.S.. We are not in the middle of the California deserts. We don't have to transport energy all the way across the country to the east coast. For transportation reasons we are fantastic – we have colleges and universities that are second to none across this country that could really become centers of excellence. We have workers we have the bank and financial industry that if we could put them to work for something as safe as this, it would be great for the Charlotte region at least. We've got Duke Power headquartered in North Carolina. If we have legislation that allows them to become leaders of all the utilities in the U.S. you know Duke Power and Progress really start to export this knowledge and the practices that we started here in North Carolina. And we've got the political world we've done it before. Look at what we've done when we've had to transition from textiles to the future economy at the Research Triangle Park or the Biotechnology Center. The opportunity is

now and this is something that again has been tried and tested and done in 32 different countries we know it works. But do we want follow and make a small splash in a cup or do we want to be the rock that is thrown in the middle of the pond and all the ripples come after us. If we do it now we've got the confidence, we've got the workers, and we've got the technologies that will spread to the states around us. If you look at this graph there is no question whether you are utility or bank or manufacturer or an insulation company, this is the silver bullet that can get these things started. That's it.

Representative Harrison: Thank you – do we have any questions. That was a really quick presentation on SENCERA (inaudible).

Dr. Boyles: I like your comments on Progress and Duke – it's a good idea. Is this is the silver bullet?

Ms. Choi: We don't believe in silver bullets (inaudible). One thing has to be to not just renewable energy generators (inaudible) that cost can pass to the customer. I certainly would like to know the cost to that.

Mr. Olson: Let me just respond to that a little bit. A lot of the difficulty for utilities related to renewable energy is the cost recovery mechanism. We've recently seen that Duke is trying to do something related to solar. Have gotten a solar farm approved but not the cost that it would take to pay for it. It is very difficult for utilities to move forward until they have certainty. And this would also provide certainty for them to move forward on this. One more thing, utilities again need to have profit on the kilowatt hours they buy. Today those costs are just transferred to the rate payers without an additional profit on top. They make profits on what they own on their assets. So naturally they earn credits to own as much as possible but we want to create economic develop opportunities in the states for the utilities which employs thousands of people in the states but also for manufacturers, installation companies, contractors, energy services, you name it.

Dr. Andrews: There has been some literature that emerged about feed in rate. Also in Denmark which I think is very (inaudible) comparing it with… like that I believe I saw a reference to a comment that really net metering is a small scale version of this in a way so that although it was captioned rather low level in North Carolina. But that might be one to consider a starting module for us to think about it and think if it is not something totally alien for news. From the experience we've had already but it would require some serious thought about what kind of an adjustment would be appropriate and what the balance would be between the overall economics benefits of growing those jobs and the status within the potential jobs that would be affected by the impact of the higher rates.

Mr. Olson: I think that is a very good point. We do have both net metering but we have something in North Carolina even more similar to a feed in rate system and that is North Carolina green power which Progress, Dominion, Duke are all members of, which sets a specific rate of 15 cents per kilowatt hour plus the avoided costs that is paid to residential owners. It is a very small, a very voluntary fund but it is an infrastructure which exists, which can be expanded and I believe it is relatively effective. The cost of this program and what is beautiful about this is it started in Germany in 1991. Several countries have made additions there have been revisions so there are

a lot of the learning curve that others have paid for. So our implementation could be quicker than those who were before us in other countries.

Mr. Slocum: But the bottom line is, while I don't know whether it is the silver bullet for anybody, the bottom line is rate payers pay more.

Mr. Olson: The bottom line is whether it is the feed in rate system or what we are doing now or which mandating – yes these costs will be recovered over the rate base. Now with the feed in rate system the difference is there is more certainty for how the hours that the utility pays for renewal energy are going to be recovered. There is a cap every year for example, large industrial users will not increase over a certain amount for low income. There are mechanisms to balance this out based on the political and economic conditions that exist. But yes sir it is not a tax but it is an energy rate increase that pays for this.

Mr. Howard: In Senate Bill 3 we had a lot of discussion and a lot people who were active in working on SB 3 are sitting in this room about the cap issues, some certainty for homeowners and industry and about what this was going to cost them. We established certain caps – have you looked at the caps that are in SB 3 and tried to equate that to what your rate would be what your FIR? Have you done some analysis to see – I am not suggesting I am just want to know is there a level at which you can set that rate and it would be the same as caps and cap and trade?

Mr. Olson: That is RIFR actually but anyway…. That mechanism is certainly there and I think SB 3 is and again I don't want anyone to see that these are two conflicting bills. The RPS really sets this is how much we need. But it really uses traditional mechanisms to get there related to developers tax credits and again for utilities to go to the Utilities Commission and try to get bright and prudent cost reimbursement. But absolutely you can have cost caps you can have mega watt caps. And again there are a lot of examples of what has worked and what hasn't worked that we can pull from. But if you look at the presentation that was handed out and again I apologize for such small print but this really goes through it and this says if we had a 20 percent RPS by 2025 using plenty of just made up numbers that the kilowatt hour rate increase would never be more than half of a penny over a three year period. This is less than a two percent increase overall which a lot of the new generation whether it be renewable energy, generation, nuclear or coal we are going to have rate increases. The heads of both utilities have said that but the goal here is that renewable energy can get down to be cheaper than coal, cheaper than other sources and it can be just as profitable and can provide just as many jobs. This goes into a lot of detail, which I would love to take. My email address is on the presentation. One other important point here which I think is important to know – tax credits take away revenue from the state. I really don't believe the Japan solution was that they threw two hundred million dollars up to a fund which they would support installations all over the country. In California they have done similar things too with a 3.2 billion dollar account. If we can have a mechanism that provides clarity, transparency, certainty for the stakeholders to get paid for this and also for the rate payers to know that we will not increase our costs more than this, I think it is fantastic if we don't have to dip into the reserves of our State which is already suffering from a three billion dollar budget deficit going into 2009.

Ms. Choi: I (inaudible). Is this work in conjunction with the RPS or did the (inaudible) fall under the cap and then be part of or we will have to take away the cap of the RPS?

Mr. Olson: The RPS is a fantastic first step. This is an additional mechanism which provides certainty to attain those targets. The RPS today right now states 12.5 percent has to be reached by 2021. So the feed in rate legislation could keep those the same or they could be increased. Those are issues that can be discussed in detail later but again I don't want you to see this as conflicting against the RPS. The RPS sets the goal. This is a mechanism to provide certainty for developers, utilities and banks to really make this an industry for North Carolina.

Representative Harrison: We are running out of time but Representative Underhill you have a quick question?

Representative Underhill: What would be the first step to implementing what you are suggesting when we have to explain this very complicated thing to the other members of the General Assembly? We have to go out and it takes me sometimes a great deal of time to absorb information that we are provided here. A lot of people in the room come from a background… So what is the first step to make this happen?

Mr. Olson: I am working for a private company that is making these modules so it is hard for me to give the first step legislatively as how to make this happen. But I think having me speak here today and allowed to speak is a first step. We have the Emerging Issues Forum on February 9th and 10th Ms. Harrison and I will also talk about different future regulatory plans that could address this. In terms of how we address it legislatively I would have to defer to Representative Harrison.

Representative Harrison: We are having a lot of one on one meetings, it is very complicated.

Representative Underhill: The question actually is do we have a regulatory barrier (inaudible)? In other words, this is not possible to do what you are suggesting in North Carolina, we have to do something to make that happen. What do we have to do?

Mr. Olson: Again to be honest with you I don't know. But I don't think there is any barrier that cannot be crossed within a very short period of time.

Dr. Smith: One thing that we may want to do is ask that the North Carolina Utilities Commission open its docket and let us build a case on this – exploring a lot of the things that you're doing and get into this particular issue of feed in (inaudible) inside the docket let the folks join and work through them with that. That might be an easy first step to accomplish this. I don't know.

Representative Harrison: And that's a suggestion and we really need to move on because Mr. McKinstry has to leave and he needs to make a statement. Mr. Givens did you have something to say?

Mr. Givens: The observation is a good one. I think I would probably start with the general counsel over there Mr. Dennison and find out what (inaudible) if it is a question of something that they can do and they can open a docket or if it is a question of something that needs legislation, somebody needs to bring us a draft.

Representative Harrison: Actually I think I asked this very question at the ERC and I think that they didn't feel like they had the statutory authority so they would need some sort of encouragement or mandate.

Mr. Givens: Well I consent for all of these things that however poorly and pleased they need a first start. We want a first start a draft that we can work with.

Representative Harrison: Thank you and I didn't mean to cut off the debate but I know it is way past when we wanted to end this discussion today. Mr. McKinstry has to catch a plane. The next recommendation relates to the use of coal and so he is going to talk a little bit about what other states are doing so that he can catch his plane and I am sorry to do it in reverse order but it is on Ms. Tompkins recommendation. So if you want to come on up here.

Mr. McKinstry: I think coal is one of the difficult issues that are being faced by a lot of states and we actually see quite a few responses. I am from Pennsylvania and of course Pennsylvania is a coal exporter and an exporter of electricity generated with coal. So it is looked at as an economic development. But at least in the eastern part of the state where you don't have low population and it is mostly nuclear generated. There is a lot of movement for dealing with climate change as well as some of the other problems with coal. An approach that Pennsylvania is using and this is just the Department of Environmental Protection without any legislative authority, they are requiring offsets for all new coal fired power plants. In fact one of the things you want to do – you don't necessarily want to stop new coal fired power plants, you want to replace the existing power plants with much more efficient and carbon capture ready plants. I was talking to one company that had just permitted a plant in Pennsylvania under that policy and was shutting down three existing coal fired power plants putting in one new efficient coal fired power plant to generate the 20 percent electricity, more electricity with the same emissions and the same coals. Pennsylvania is perusing that under the table. There has never been a challenge yet because it hasn't gotten to the point where it could be challenged. Frankly I don't know that you could challenge it because you probably couldn't get financing to get to that point. I have to look at it for some clients. But the strategy that (inaudible) was actually trying to pursue with EPA was to try to encourage the shut down of existing plants and opening new plants. It would keep the demand there but get better efficiency and she was hoping to working with EPA and wasn't able to get a waiver for some of the requirements for installation of new SO2 and Nitrogen Oxide (NOx) control. A delay in return for the green to shut down the plant and replace it with a new gas generation combined cycle plant. So that is one possible approach. The other is more effective moratorium without moratorium. That is Washington State and California state have both based adopted load based emission limits. In other words you can't have new contracts unless the electricity is generated with a carbon dioxide emission no greater than what you get from combined cycle gas generation. There were a lot that went in before the grandfathering date in California but in fact California doesn't allow offsets or trading or any other measures. What is going to happen in the future to rates or to availability we don't know. In the case of Massachusetts and New Hampshire they simply have an emissions limitation based on coal fired power plants. I am not sure whether they allow offsets for that. There is effectively almost becoming a moratorium because of the litigation involving coal fired power plants and it is being bought by the Sierra Club and I've asked them one time well what happens if somebody came up and offered a (inaudible) and it was sort of like the dog chasing the rabbit not knowing what to do when he caught it. They said nobody has ever come to us with that proposal. So I think you really have to think carefully about what you do and certainly coal is going

to be the worst in terms of greenhouse gas emissions but old coal is a lot worse than new coal and we don't have the other electricity generating assets. I think probably the line along which Katie (inaudible) was thinking is probably the better way to go if you are looking at coal.

Dr. Everett: There is a hearing this week and one next week which intensifies the support of a coal plant to do just what you said.

Dr. Smith: What you talked about IPCC is one of your preferred routes….

Mr. McKinstry: I said what Secretary Getty was aiming at was to go to the way in existing requirements in terms of shutting down and putting in IGG6. The other example that I was giving is one where the company is shutting down three plants and putting in one plant – you're dealing with four plants so that they are entirely offsetting the carbon dioxide emissions and getting more electric generation.

Representative Harrison: Thank you so much for making the trip and for all that useful information. Ms. Tompkins if you want to come up.

Ms. Tompkins: Thank you – you want your last speaker to be your quickest and I will. Since we convened in February three years ago scientists and economists at our Commission proceedings have analyzed the causes, the effects and the cost of climate change on our State. Without exception, the largest slice of the charts and graphs indicated that coal is the biggest contributor to this State's carbon dioxide emission. Coal is the most intensive carbon fuel of all is our State's dominant force of electricity and coal powered plants as currently used create as much if not more greenhouse gases than all other sources of vehicles, trains, planes and (inaudible). We would have been privileged to hear first hand so many experts predict the cascading damages that climate change will have on our State must make the following recommendations. It is the most essential recommendation we can make to the General Assembly. And it is to prohibit construction of new coal-fired plants that do not sequester carbon dioxide and to set a time table for phasing out existing coal plants that don't sequester carbon dioxide. Each of the other recommendations are wonderful. They are inventive technologies and the great economic incentive. They are all crucial but any progress toward decreasing carbon dioxide emissions that these other recommendations make will continuously be offset by coal that is burning in our State and does not sequester carbon dioxide. We now finally get an embryonic stage of promoting energy efficiency by transitioning to renewal sources of power. Does it make any sense on one hand to pass legislation forcing the utilities to convert part of its generation to renewable but allow them to erase those reductions by permitting conventional coal fired power plants on the other? For example, we know by Duke Energy's own estimates that its new coal fired plant at Cliffside Unit 6 in Cleveland County will emit 5.5 tons of carbon dioxide every year for its estimated 50 years of its useful life as completed. How many (inaudible) energy efficiency light bulbs, bales of insulation and land planning policy changes will it take to offset that tonnage of global warming pollution? North Carolina has so much to lose – while we welcome growth it must find ways to prosper that do not increase the likelihood of the irrevocable consequences of climate change foreseen by our speakers. Last February Dr. Pachauri, Head of the IPCC urged us in our meeting with him to lead in reducing greenhouse gas emissions because of key vulnerabilities to this coastal state in the face of accelerating climate change. Dr. James Hanson our nation's foremost climate scientist at NASA warned that business as usual for another decade will be disastrous and he recommends that our State put a moratorium

on non-sequestering coal plants. We would be derelict in our duty on this Commission if we do not put on record that we have learned that conventionally fired coal is a major man made source of global warming pollution. In the current economic crisis this recommendation is the most efficient, the fastest and the most cost effective of all recommendations that our Legislature can take to reduce this State's global warming emissions and time is of the essence because as we have learned in our study we are fast approaching the tipping point when the grime realities of climate change will be irreversible. Thank you.

Representative Harrison: Thank you did anyone have any comments? Dr. Boyles will be our last speaker.

Dr. Boyles: This will be short – my recommendations are incorporated with those of Bill Holman's. I will work with him to refine those and they will be presented next time.

Representative Harrison: Thank you and I believe there are a few recommendations in our January 2007 meeting that are proponents of beyond the adaptation piece including Tim Profeta, who had a recommendation relating to the carbon fund to convert looking at sprinkler systems on hog farms. He would like for that to be included and so that will be back before us at our January 27th meeting. That would be the use of the carbon fund to convert looking and sprinkler system hog farms and to try and come up with some money to get rid of those.

Dr. Smith: If we're wrapping up – I (inaudible) we are interested in other members of the Commission who would like to work with us in the coming days we need to further refine the recycling energy proposal. We are very eager to find others on the Commission who would be interested in doing that and look forward to continue to further define that and come back with hopefully legislative language at the next meeting.

Representative Harrison: Thank you and I will repeat my request if anyone has anything specific to offer about green jobs we know that we've got some federal stimulus money coming to the State for that and we are not sure our State is prepared to take that on. So if anybody has recommendations related to work force development, how the green jobs package might look, it would be good to include that into this considering our current economic situation. Unless anyone else has any more comments we will go ahead and adjourn and thank you for sticking it out and we will reconvene on January 27th in Room 643.

Mr. Givens: I want to remind you if you have recommendation that involves legislative action we need some draft language. No bill is going to go in just because (inaudible).

Meeting adjourned at l:55 PM.

Respectfully submitted,

Representative Pricey Harrison, Chair

Thelma T. Utley, Committee Clerk

APPENDICES

Exhibit A	Sergeant-at-Arms and Visitor Registration Sheets
Exhibit B	Agenda
Exhibit C	Draft Minutes April 22, 2008
Exhibit D	Mr. Robert McKinstry, Jr. – Slide presentation
Exhibit E	Ms. Janice Godfrey – Slide presentation and Comparison of Green House Gas Reductions Under California Air Resources Board Green House Gas Standards and Proposed Federal 2011-2015 Model Year Fuel Economy Standards for North Carolina Fact Sheet
Exhibit F	An Act to Amend the Water Resources Development Program to establish a cost share program to assist local governments to relocate threatened structures or demolish condemned structures that are located in the ocean or inlet hazard areas. Mr. Jim Stephenson
Exhibit G	Memorandum from Mr. Bill Holman, Director of State Policy – Mr. Jim Stephenson
Exhibit H	Coastal Hazards Mitigation Program – Mr. Jim Stephenson
Exhibit I	Recommendation to the North Carolina Legislative Commission on Global Climate Change – Dr. Stanley Riggs
Exhibit J	Preliminary Recommendations for Mitigating the Consequences of Climate Change Within North Carolina – Dr. Stanley Riggs
Exhibit K	North Carolina's Coasts in Crisis: A Vision for the Future – Dr. Stanley Riggs
Exhibit L	Shoreline Change Within the Albemarle-Pamlico Estuarine System, North Carolina – Dr. Stanley Riggs
Exhibit M	Dr. Eggers Proposal
Exhibit N	Mr. Michael Regan Draft Proposal
Exhibit O	Dr. Stephen Smith – Slide Presentation
Exhibit P	Dr. Stephen Smith – Memo, Energy Recycling Recommendations
Exhibit Q	Mr. Joel Olson – Slide Presentation