BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NO. UNDOCKETED

In the Matter of

FLORIDA RENEWABLE TECHNOLOGIES ASSESSMENT.
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BEFORE:	CHAIRMAN LILA A. JABER COMMISSIONER J. TERRY DEASON COMMISSIONER BRAULIO L. BAEZ COMMISSIONER MICHAEL A. PALECKI COMMISSIONER RUDOLPH "RUDY" BRADLEY
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REPORTED BY:	TRICIA DeMARTE Official FPSC Hearings Reporter FPSC Division of Commission Clerk and Administrative Services (850) 413-6732
APPEARANCES:	(As heretofore noted.)

(Transcript continues in sequence from Volume 1.)

P R O C E E D I N G S

CHAIRMAN JABER: Commissioners, on you agenda you'll see that Mel Jones was supposed to be next, but because of flight arrangements, he's agreed to allow Katie Cullen with the Municipal Solid Waste Facilities to take his place.

MS. CULLEN: Hello. I'm very glad to be here. I'm Katie Cullen, and I'm with the Integrated Waste Services Association. We're out of Washington D.C. We represent the companies and vendors and also all the municipalities from around the country who partner to build and operate these facilities. I'm getting old, you know. My eyes aren't what they used to be. I hate that. Glasses are in the future. There we go. Does that -- it works? Excellent.

So I'm just going to briefly just do an overview where we are in Florida. It's not working that way. Don't you roll it? I'll just do page then. There we go. This one will work?

COMMISSIONER PALECKI: Yeah.

MS. CULLEN: Okay. Great. Anyway, the focus of the presentation is, what role does waste energy play in Florida? How did we come to play this role? And what are the different approaches that states are using? And of course, lessons learned, as a lot people have that. You know, waste energy, I'm not sure, I'm assuming that most of the people know what it

is. There are 13 facilities in the state of Florida. And after stringent recycling at curbside, the rest of the garbage, which is about 80 percent biomass, is then put into these facilities. They're either direct combustion ash burn or they're RDF, refuse-derived fuel. Those are the two main in the state.

Fifty percent of Florida's population is served by these facilities, and of those communities that have waste energy, a third of the waste is disposed that way. The rest of it is, most of it is recycled. And Dade County does a 50 percent recycling rate. The rest of it is burned and also made into a biomass fuel that is sent up to the Okeelanta plant and very little is landfilled.

There are over 500 megawatts in the state of waste energy. Obviously, it's the largest renewable source in the state, very sustainable. I can't see garbage going away any time soon, especially the biomass portion of it. And there's also within these facilities, most of them in Florida are owned by the municipalities, and there is still a lot of public bond debt to these facilities. So whatever happens to renewable energy in the state not only affects the vendors but it also affects the citizens and the municipalities, and it affects your garbage costs.

These are the counties that are served. As you can see, there are 13 of them, all the way down to Key West. And

all of these -- most of these municipalities not only have waste energy, they also have stringent recycling, a lot of curbside recycling. Most of them have landfills. Most of them are ready to do landfill gas projects if there are incentives there. And most of them also take the tree trimmings and produce a biomass fuel for the cane facilities. So Florida is very progressive in what it does with its municipal solid waste.

And again, you know, a lot of these facilities -- we haven't really talked about pollution control. This industry was the first under the 1990 Clean Air Act to actually retrofit all the facilities around the country to the tune of over $1 billion, most of that shared by the municipalities from around the country. We implemented these rules and regs in 1995. All the facilities were in compliance by year 2000. The EPA has just put out a new database, because I know that there are some questions about dioxin and mercury and some NOx emissions. And in fact, because of the combustion control for dioxins, we are now 99.4 percent on dioxin. So it can be done. The fabric filters, the scrubbers, you know, the nitrogen oxides control, mercury control, the carbon injection, and also the recycling mercury has brought those emissions down 95 percent. So we're very, very proud of it. Retrofits work. And I wish more facilities and more industries in the country would actually put on pollution control. It's just my little thing. We've

done it; we're still surviving.

We've all gone through this. I truly believe, however, that a state and the government in order to truly incentivize and develop renewable energy, it's not just one of these. You need portfolio standards. You need electricity funds, green pricing programs, disclosure of fuels and emissions, tax credits. I mean, you need a wide variety of incentives to actually make this go. One of the reasons wind has been so popular is because not only do they enjoy 1.8 cents tax credit federally, but they also have portfolio standards, for instance, in the state of Texas where they're mandated to put 2,000 megawatts of wind power in. They already have about 1,000 in the ground there. So if you have a mandated marketplace plus tax incentives, you can actually make some of this stuff go, which is, you know, biomass and wind and a whole variety, and also you're merging some of the -- more of the emerging technologies that was talked about before.

I think everybody understands. I happen to believe that portfolio standards work, and they're very, very good for promoting it. Again, people have said this over and over again today. Credit trading, I didn't realize that there was going to be one on this, but we've already heard a very, very good presentation on credit trading. Green pricing you've heard. You know, it's good. A lot of utilities from around the country are using it. Example, some of the biggest ones are

Wisconsin Electric, TBA, Madison Gas & Electric, and I know Florida Power & Light are starting to.

This is sort of an interesting poll here. These polls -- a poll was done by the Union of Concerned Scientists. And this kind of goes against the idea of a voluntary approach to renewable energy because, in fact, people want renewable energy, and they're willing to share in the cost if everybody else shares. But in green pricing programs, frankly, they just don't provide the type of incentive. I think they are more sort of look good, feel good, but they really don't provide an incentive to actually develop and build new facilities. And in many of these states and cases here, when people are asked, they are willing in their bill if everyone shares to -- if it costs an extra dollar or two a month, or whatever it costs, I think most people are willing to do that.

And again, the last part of this is lessons to be learned. There are portfolio standards and electricity funds around the country. And if you all decide to recommend that to the Legislature, I would just want you to be pragmatic. There are portfolio standards which are too large, and there are portfolio standards in some states which are too small and they don't fit the need of the particular area. For instance, Connecticut's. They actually didn't give the utilities and the people enough time to comply, so they delayed it for three years because they realized they couldn't get that kind of

renewable energy in the ground so they have delayed it.

Same thing in Massachusetts. In Maine, the opposite. Their definition is so broad there is actually 45 percent renewable power in the state. Their portfolio standard only covers 30 percent. It doesn't cover the existing renewables. So what has happened in Maine is, a couple of biomass plants and a couple of wind facilities have shut down because there's no market for them.

And I think that's -- my last point is when you're considering this is to also consider the existing facilities. To me, it doesn't make any sense. They were all formed under PURPA. They all had a government incentive. That is going away under the Federal Energy Bill. There will be very few long-term contracts signed under PURPA anymore. And that the existing facilities, while they are commercialized and running, without long-term contracts, a lot of them still are a little bit above power. Don't forget the existing base, I think, in your state, that those facilities also need to be protected. It really doesn't make sense to ignore the existing facilities and only try to invest in new when you may shut down 40 megawatts of renewable power only to build 20, so you're actually going backwards and not forwards. And again, thank you very much.

CHAIRMAN JABER: Thank you, Ms. Cullen.

Questions, Commissioners, of Ms. Cullen?

Okay. Thank you. Commissioners, we need to take a ten-minute break for the court reporter, and then we'll come back with Mr. Cunilio of the Center of Sustainable Agroforestry.

(Brief recess.)

CHAIRMAN JABER: We're going to go ahead and get started. Our next presenter is Thomas Cunilio with the Center of Sustainable Agroforestry.

MR. CUNILIO: Thank you, Madam Chairman, and thank you to the Commissioners for getting us together. It's my first chance to do this. My name is Tom Cunilio. I'm going to read some comments into the record. I don't have slides, and I hope you're grateful for that. I'm an agronomist -- and I walk around a lot when I talk -- because I produce biomass energy, or I produce biomass crops. So I'm sort of a farmer. And I also have done research with the University of Florida. In fact, the Center of Sustainable Agroforestry, which was established in 18 -- 1989, I feel sometimes that old, was incepted at the University of Florida in the office of Dr. Gordon Prine (phonetic) who is here present. And I'm proud to know him as an agronomist, as an educator, as a teacher. Dr. Prine and I have worked together on publishing three papers on biomass species which I particularly have fallen in love with since getting my degree at the University of Florida. And because the Center of Sustainable Agroforestry is so small, I'm

going to tell you a quick -- give you a quick bio.

I received a degree in political science from John Carroll University which is in Cleveland. It's a Jesuit school, so I had the rigour of a Jesuit education. I went to the Peace Corps in 1968. I almost joined the U.S. Marine Corps because my dad was a marine. In 1972, I returned from the Peace Corps, went to work as a student again to get a degree in agriculture in agronomy at the University of Florida, and then I worked in biomass development at the University of Florida when the Gas Research Institute had a lot of money flowing there in Gainesville and they were studying biomass species.

We were screening for methane production, actually fermentation. Some of you might remember that. I had to become a teacher after Jimmy Carter was not reelected, so I taught. I got a Master's degree in Spanish. I consider the Center of Sustainable Agroforestry a company that is interested in social entrepreneurship, and by that I mean, we take -- we've transferred some interesting species, some crops from Gainesville, and we turn them into businesses owned and operated by farmworkers. That's where I use my Spanish.

We have a tremendous population of willing and able workers in this state who are currently looking for work, specially in central Florida. They're called farmworkers. So I'm going to read to you my comment, read them into the record, and leave them for the Commissioners.

In the summer of 1999, the Clinton Administration announced a new policy that made great sense to many of us in agriculture. It stated that in view of the dangers posed by both global warming and a petroleum supply that is increasingly based on imports, and given the growing federal deficit coming in part from a very greatly expanded farm program, and finally given the need to preserve farmland and increase its employment potential among Hispanic farmworkers, federal support would be given for incentives to farmers to grow energy crops. As a result of this new policy, several programs were in fact developed that still continue even under George W. Bush. The USDA, for example, has an office for global climate change where new dollars are apparently available.

The Sunshine State, our great state of Florida, has really not received, in my opinion, a lot of attention from too much quarters when it comes to program development in this particular area. The Department of Energy has three feedstock programs for every area of the country but ours. IFAS does not even recognize renewable energy as a program priority, though its vice president for agriculture, Mike Martin, wishes it were -- wishes it would recognize it. The best research IFAS has done -- and IFAS, by the way, is the Institute of Food and Agricultural Sciences of which I am a graduate at Gainesville which is the land grant school in the state of Florida where we produce our agricultural expertise. IFAS has done in the area

research which was sponsored by the Florida Institute of Phosphate Research. This research has not resonated within the agricultural establishment. The Farm Bureau, which is a big statewide entity, its policy desk does not even accept the global warming evidence. Part of the problem is that there is no accounting method to measure the cost to society if the CO2 concentration is doubled by the end of the century. Biomass, we are told, must be given free to the utilities.

Yet the best soils in the state of Florida for energy crop development, and this is biomass, a form of renewable energy, energy crops are in fact the least expensive since they cannot be sold for development houses. These are the clay settling pond soils of the former mined lands, phosphate mining, of central Florida and the place, I believe, that this battle must be fought if it is to be one. COSAF, my not-for-profit corporation, NGO, is the only corporation that has persisted with a project in that part of the state. The first demonstration planting of a biomass crop on the clay in 1998 was also by chance accompanied by a NREL, National Renewable Energy Lab, sponsored study done by Polk County and IFAS which verified what we at COSAF had been saying for years, which is, you have to approach biomass energy as agronomists and not as foresters. This means species must be used that are, one, planted from seed; two, are perennial in nature; three, will produce in the second year; and four, can be

harvested, and this is the most important one, can be harvested with conventional farm equipment.

Conservation yield figures applied to the 100,000 acres of settling pond clay soil now available would net 1.5 million tons per year or more than enough to run Polk Power on biomass alone. I won't go into the content or Btu content, but I look at it and compare it to $44 a ton coal.

The effect of a large scale demonstration planting on the rest of the diminishing farmland of the state could be pronounced. For the GRUs, Gainesville Regional Utility, and the JEAs of the state to feel comfortable with green biomass energy crops, the same species characteristics successful on clay will have to be applied to the sandy soil. Depending on the species planted, wood may be merely a by-product. There are trees, for example, whose leaf is equivalent to alfalfa which sells in this state for $150 a ton. To my knowledge, multipurpose small tree species are not being effectively studied by the U.F. College of Forestry. To make biomass as inexpensive as possible, co-products will have to be considered before thermal combustion or fermentation, which has really not been mentioned today very much, is applied to the carbon.

As far as carbon itself goes, while there are dozens of proposed strategies to remove CO2 from the earth's atmosphere, the real opportunity for Florida is to take advantage of biological fixation via plant growth. A recent

approach is to consider carbon accumulation in the soil, in the root systems of fast-growing perennial tree species and carbon 4 grasses.

So in conclusion, we at COSAF, the Center of Sustainable Agroforestry, a small NGO headquartered in St. Leo, Florida, suggest then, Commissioners, that R&D design be incorporated in pilot projects employing multipurpose species for aboveground biomass and carbon sequestration in the root system. Experience justifies growing selected species as agronomic crops on settling clay pond soils of central Florida for such R&D. Thank you.

CHAIRMAN JABER: Thank you, sir.

Commissioners, any questions? Okay. Thank you for your presentation. I have that Frederick Murrell from Biomass Development is next.

MR. MURRELL: Good afternoon. My name is Fred Murrell, and we're delighted to be here. The last time I appeared before the Public Service Commission I was sitting there as vice president for electric fuels in March of 1984. That's been a few years. Biomass Development Company is a division of Carbon Development Corporation, and we're coal guys. We've got a friend whose been in the biomass business for 15 years, and when we told him we were very interested now in this particular segment of the industry, he said that we were coming in out of the dark side. And I guess maybe there's

something to that, but we're happy to be here.

Our operations are in Indonesia, Chile, and here in the good old United States. We do about 30 million tons of coal a year in our various operations. We're experienced in energy projects. We're involved in the construction of a 1,200-megawatt energy -- power plant in Indonesia. And we have done a number of different things. Our principals have produced coal fiber pellets which is a form of biomass infusion, and we've got quite a bit of Section 29 project experience which leads us to an interest in some of the projects that are pending before Congress right now.

One of the things that we like about the prospect of biomass here in Florida is that we believe we have a good development -- or we've developed a good delivery system for getting biomass into existing utility boilers without any kind of a derate and we hope without any kind of a negative impact upon the boiler itself. We do think that that's a good way to get a substantial amount of biomass into a utility boiler. We spent a lot of our own -- our personal money developing a delivery system in the form of a very inexpensive gasifier called the Ashworth combustor. It's developed by one of the companies that we're principals in called ClearStack Combustion Corporation. And it was developed initially and primarily as a coal delivery technology on the combustion side.

We're in demonstration right now in Lincoln,

Illinois. We've got our first commercial size plant up. And we're expecting to get SO2 reductions on a front-end basis down by 70 percent or more, we hope. We reduced NOx emissions down to 0.15 percent or less, and we get particulate capture from somewhere between 70 to 80 percent. So that means that we capture 70 to 80 percent of the particulate matter before it goes into the boiler. And we're very excited about this technology. We think it has an application in the biomass arena, and we believe that by delivering a hot combustible gas to the utility companies and other users, including industrial users, we can provide them with a competitive very, very clean, very environmentally-sensitive feedstock.

We like very much the fact that the biomass offers a lot of benefits. We think that it's -- we know it has very low sulfur. In most instances, it has extremely low sulfur. If we put it in with our delivery system, it will have even less. We offer very low NOx with our delivery system than biomass in general typically does. Biomass often offers low mercury. We have to be somewhat selective about how we go about our feedstocks, but there's no question, you can adjust and you can affect mercury production by your feedstocks, and we think biomass offers some good things there. And biomass is often carbon neutral. So to the extent that the issue of the Kyoto type of carbon tax issue becomes important, then that's going to be an important issue.

What can the states do? This has been discussed a lot, and I'm not going to spend very much time at all here except to say that those of us who are putting our own money into these type of projects are very interested in seeing what the states do. And the one thing that we'd like to point out is what's incredibly important to us is predictability, dependability of a system so that we can know that it's going to work for us long enough to satisfy our lenders. While you might be able to satisfy us with a more flexible program, we need to be satisfying our lenders.

The last projects we put together we had to borrow $190 million to put those projects together, and of course, we had to satisfy our lenders, our investors on those projects. And that's the kind of thing we need. We need dependability and surety from the state. And that's what we -- we recognize that you're not sitting here as a legislative body, but you're going to be giving some recommendations to the Legislature. And so we think there are lots of things that you can tell them. And we're looking forward to the output of this event and others like it when you respond back to the Legislature. And we're very excited to see so many people show an interest in this.

A renewable portfolio standard is one thing that can be done. We like that idea. We think it's worked well in other states. The state can increase restrictions on power

plant emissions. We're not here to lobby for that, and I don't want my power company friends to think we are, but certainly it is something that can be done and has been done. And we'll have a little slide on that later in this presentation. And encourage green power programs and what I didn't put up here which I really needed to put up here, because I think of it more on the basis of a federal program, is very much in the area of tax programs, where you get a tax incentive program, a Section 45 type of program, a Section 29 type of program to encourage biomass. We think that a lot of that is pending in the Senate energy bill which is in conference with the House bill. And we'll have to wait and see how that comes out.

States with renewable portfolio standards are listed here. You've seen this a couple of times today. States that have reduced emission standards for power plants, it's listed here: Connecticut, New Hampshire, New York, California, Texas and others are in the hopper right now. We're moving currently 1 million tons of coal from our coal mine in Indonesia which has got the lowest sulfur coal in the world, 0.1 percent sulfur. We're moving that all the way to Connecticut right now as a result of the changes in statute in Connecticut. So that has an impact on buying activities. And if something is done to encourage renewable purchase activities, then that could also have a positive impact on renewables.

Green power programs, you've heard from better people

than me on this, so I'm going to not waste your time. Florida's biomass fuel, we've got an extended growing system here in Florida. Florida is a great state. The principals of our company are located here in Florida. I was born in Florida, and I guess I'm now a fourth generation Floridian. We really believe in it. We'd love to do some business here in this good state. So we've got an extended growing system. We have a growing population. We have increased waste streams coming as a result of that. Existing population of manure producing feedlots which interests us very much with our technology as does human sewage.

Now, biomass fuel, we believe, is getting close to being competitive. Direct firing of biomass has been touched on here, but the point to be made is the second point here, and that is that when you take wood and you chop it up and you stick it into a coal-fired boiler, it's just not -- it's not designed to accept that. It hangs up in the pulverizer. It can create some derating issues. The good folks from Gulf Power this morning mentioned something that I was not even sensitive to and that is the potential of poisoning selective catalytic reduction reagents or those chemicals that are needed to make the SCR process work.

There are some adverse qualities. Moisture is one of them. Slagging and fouling indices can have another impact on it. So it's something we have to be sensitive to. It's one of

the reasons we like the ClearStack delivery technology. We think as a result of that and of course it's -- we're obviously beating our own drum here, but we think that our preferred method of presenting biomass into a coal-fired unit or into any -- also oil-fired units. We think that if you produce biomass gas, you can also displace oil, which is a very exciting prospect for us. You can produce it as gas, put it in coal-fired and oil-fired boilers. It eliminates many of the problems you find with direct firing of wood and allows for a much higher percentage of biomass to be us introduced into the power production process than if you just tried to dribble in 3 percent by energy of wood into, say, a coal-fired unit.

No adverse impact on the boiler if biomass system is down for maintenance. In other words, we can provide a hot gas stream that when we're down, it doesn't have any impact on the unit. We go down; it doesn't hurt the unit. They can still stay up on their native fuel, whether that's coal or oil.

The pending energy bill, which we're spending a little time and effort and money on to try to give it some guidance from our side. The Senate version of course is greener. I'm sure you all have been through that. It provides for more tax credit programs which are much more friendly to the renewable industries. It emphasizes renewable energy much more than does the House version. It expands qualified biomass fuels and expands the Section 45 production tax credit, which

is very interesting to a lot of us.

What's needed? We got -- biomass is getting better and better. It's getting more affordable every day. Natural gas pricing for February, if you're looking at your -- if other people have been following, natural gas futures peaked over $4 an MCF in -- this is last Friday when I put this slide together. So natural gas is moving up. Biomass needs some help. It needs a little bit -- a little nudge here, RPS and some other nudges, some other programs from the various states to make it work, but it's very close to being in the position to work. And we think that the fact that it offers tremendous environmental compliance and a lowering of emissions should be a great sales point for helping to make biomass a success. And that's it for us. Thank you very much. I'm delighted to take any questions.

CHAIRMAN JABER: Thank you, Mr. Murrell.

Commissioners, do you have any questions? Okay. Thank you very much.

Rich Zambo.

MR. ZAMBO: Hi. My name is Rich Zambo. I'm here today on behalf of the Florida Industrial Cogeneration Association. I want to thank you, Commissioners, for allowing us the opportunity to make the presentation. The Cogeneration Association is a trade group of Florida industries. Today, I'm here specifically on behalf the phosphate fertilizer members of

that group. Phosphate is an indigenous mineral resource to our state. Our fertilizers are crucial to the production of grain and food crops, maybe the biomass crops also based on what I heard today.

Some of the largest phosphate deposits in the U.S. are located in Florida. And Florida is one of the largest domestic producers of phosphate fertilizer. So you might say, what's this got to do with renewables? Well, phosphate processing requires large quantities of sulfuric acid. Sulfuric acid is typically manufactured at or near the site of fertilizer, and it's highly integrated into the fertilizer production process. And it therefore is -- it becomes an indigenous energy resource because sulfuric acid manufacture is an exothermic reaction which releases lots of waste energy. In fact, it produces so much energy that it can't all be captured and used in the process. Some of it is used for process needs. Some of it can be converted into higher energy steam for electric generating applications.

Currently in Florida, our waste heat power and electric generating capacity is in the range of 430 -- it's probably a little higher than that. I think I may be a little conservative on that number. It may be closer to 500 megawatts. The vast majority of that capacity is used to reduce or replace electricity purchases, what we call net billing. We generate it; we use what we need for our process;

we sell the excess onto the grid. When we need to, we buy power back. Typically, it operates at very high availabilities and capacity factors, typically in the 90 percent range.

We estimate that we've reduced the firm demand on utilities by 250 to 300 megawatts. And if we applied the latest technology to our existing plants, there's approximately 140 megawatts of additional generating capacity that could be produced. It's a mature technology. It uses basically steam turbine generators. It's been around for a long, long time. In fact, the fertilizer industry in its infancy in Florida generated its own power because the transmission lines weren't available to take power out into the fertilizer areas.

And this is a slide. I took this out of Tampa Electric's ten-year site plan which was just filed with the Commission earlier this year. And you will see that Tampa Electric relies on self-service cogeneration currently as 20 percent of their demand-side resources which amounts to about 250 megawatts, I think. And although the percentage is a little bit lower in 2011, on a megawatt basis, they are expecting an increase.

Okay. This is the summer on a summer basis that because of the difference in the peak, we have a bigger percentage or difference in the programs, actually. It constitutes a much bigger percentage of Tampa Electric's demand-side resources. I'm sure there's a similar effect with

Florida Power Corp and maybe Florida Power & Light, but I didn't have the data available from those utilities. There's essentially no environmental impacts from the use of this energy source. The waste heat is captured -- the waste heat is there whether we capture it or not. It's a part of the manufacturing process. So we actually have no fuel combustion, no greenhouse gas combustion, no incremental heat load or heat release, no air or waterborne discharges, no incremental water consumption.

The main reason I'm here today is because House Bill 1601, which is the reason you all have convened these proceedings, for some reason, left waste heat out of their formula. They included pretty much every other source of renewable. And so the rest of my -- or part of this presentation is to convince you that in your wisdom you should include waste heat recovery in your recommendation to the Legislature.

And I would just point out that the Federal Energy Regulatory Commission has determined that energy produced from the recovery of waste heat does qualify as a small power producer, along with wind and biomass and wind and solar and hydro. And in fact, your definition, the Commission's definition of a small power producer which is included in your rules refers to generically waste, and we believe that that would include the recovery of waste heat from the industrial

process. This is the definition that was included in 1601. And we hope that in your -- after you are familiar with our technology and what we can do, that you'd be willing to include us in that "included but not limited to" phrase, which is where we think we belong. Our recommendations --

CHAIRMAN JABER: I'm sorry. May I interrupt you?

MR. ZAMBO: Yes.

CHAIRMAN JABER: But I was looking at that definition, and frankly, it seems broad. Do you have reason to believe that the statutory intent was to leave waste heat out?

MR. ZAMBO: Absolutely not.

CHAIRMAN JABER: Okay.

MR. ZAMBO: No, absolutely not. I believe it was intended to be there, and it was an oversight that it was not included.

CHAIRMAN JABER: All right.

MR. ZAMBO: Recommendations for strategies to increase the use of renewable resources, one, is defined waste heat generation as renewable energy; second, some exemptions from the Florida Electrical Power Plant Siting Act. What happens is, you get to a situation where one or two of our members are at the point now where they could recover some additional energy, maybe add another 10 or 15 megawatts to their site, but that would put that site over the 75-megawatt limit of the Power Plant Siting Act which requires the Power

Plant Siting Act process and requires a need determination. And although we think we would be exempt from the need determination because we would have the need ourselves, that's an issue that is likely to generate some controversy. So it, frankly, is preventing people from doing some of those things right now. There could be some additional generation added but not for the -- were it not for the threat of the Power Plant Siting Act.

I think in any strategies you need to recognize the relatively high capital costs involved in installing these facilities. So if you were looking to this as a long-term contract of supply to the utility, it would have to be the type of a contract that would allow them to recover their capital costs. Our energy cost is very low, but our capital and our maintenance and carrying costs are fairly high. And the other thing is, you need to maintain a ready market for waste heat electricity. If someone has the ability to produce additional capacity, there needs to be a market. And there are times when the utilities are not in the mood to purchase power and that has a chilling effect on the development of additional capacity. That's a summary, and I'll just skip through that. It's in the slides that I handed out to you. So I appreciate the opportunity to speak with you.

CHAIRMAN JABER: Thank you, Mr. Zambo.

MR. ZAMBO: You're quite welcome.

CHAIRMAN JABER: Commissioners, do you have any questions?

COMMISSIONER BRADLEY: Yes, I have a question.

CHAIRMAN JABER: Commissioner Bradley.

COMMISSIONER BRADLEY: On Page 11 under your recommendations, one of your recommendations is to exempt you from the Florida Electrical Power Plant Siting Act. What is the intent of that statement, or what would the impact of that be?

MR. ZAMBO: Well, currently, if we get above 75 megawatts, we need to apply for permitting through the Power Plant Siting Act. Typically, these facilities, a cogeneration plant at a phosphate fertilizer company is just a little dot on a huge map. I mean, the facility has already been permitted under every other state and federal and local requirement. The power generation is just a very, very small piece. There's no environmental impact because all we're doing is recovering heat off the process, but yet the threat of having to go through process, that lengthy 18-month process, we then have to come to the Commission for a need determination, and there may be some questions as to whether or not we're a qualified applicant. There may be some questions as to how you determine the need for that capacity, and ultimately, there's potential for an appeal to be filed. So whatever plan we may have before us, you have to add in a 24- or 36-month delay, and oftentimes,

other opportunities come up and so we'll spend our money somewhere else instead of -- did that answer your question, Commissioner?

COMMISSIONER BRADLEY: Yes.

CHAIRMAN JABER: Thank you, Mr. Zambo. Okay. Our next presenter is Mel Jones from Sterling Planet. And thank you, Mr. Jones for accommodating another presentation.

MR. JONES: No problem. Let me set this up, and I'll be ready to go. It's getting to be a long day, isn't it? I don't know if you all have ever watched this new T.V. show called American Idol. Well, this panel looks like that.

CHAIRMAN JABER: That's cold. I don't take that as a compliment. I don't know about the rest of you, but I have caught that show a couple of times, and I don't think we were complimented just now.

MR. JONES: Thanks for your time.

CHAIRMAN JABER: So your presentation is over. Thank you.

MR. JONES: I do have one joke before it's over, but I'll save it. Thanks again, ladies and gentlemen. Can everybody hear me now? My name is Mel Jones, and it's probably not obvious, but I'm not from the same place that Ashley Houston is in Boston. I'm from Atlanta, Georgia. And I was privileged for 19 years of my life to work at the Southern Company and learned a lot about power generation there. But

also what I learned is, we decided to form a company called Sterling Planet about three years ago. I was fortunate enough to open up this company with our founder. At the time, he was treasurer at one time with Southern Company and help set up and was chief financial officer of several of the subsidiaries and helped set up Mirant and ran that for five years. Of course, at that time, it was called Southern Electric International.

But what I want to do to talk today is not talk much about our company or much about renewable energy technologies. I want to talk about renewable markets. And I think what you saw when Ashley spoke, she talked a lot about what's happening in other parts of the country. I want to center this presentation on what's happening right here in Florida. And what I want to do is give about three or four slides that kind of tell you what our company is doing, so it can translate as you go forward and review whatever kind of policy you want to set forward, what it may be that helps utilities actually make them work at work.

First of all, Sterling Planet's sole mission in life is 100 percent focussed on renewable energy, and that means not only the marketing and the categorizing of whichever type it is. We can focus on all five renewables, but we also believe the only way to actually make the market happen is work with the most credible group of people. If you think about electricity, is your local utility. And our model for years

has been a local utility, so we think we know a good bit about the issues they deal with every day.

We also have a green partnering program that I was fortunate enough to hear Gary say very kind words about what we're doing, but it's really a partnership with a utility, under their auspices, under their brand, and under their control. But because it is very expensive nowadays to hire a bunch of people and start a focus around something that may not be a large amount of revenue, we have a revenue-sharing model. And what I wanted to talk about today is not so much about supply marketing but how to make renewable certificates work. And I'm going to give you some real world examples, not theory of what certificates are. So I think in some ways you'll get a kick out of some of those concepts.

Also, two of our clients are represented right here. We partner with utilities on the scope of work that they want us to work with them on. The City of Tallahassee we do in partnership with them their renewable energy program, not because they are not committed. I believe they are one of the most committed group here, but they don't have a lot of extra resources to focus on that. Whereas, JEA, another local utility, has asked us to help them monetize a lot of their large commitment on supply into other markets.

We also -- starting Friday, which is interesting -- it's an exciting time for us, is rolling out a renewable energy

program for Niagara Mohawk which is a fairly large investor-owned utility in the state of New York. And we've partnered with Austin Energy. From a municipal standpoint, it probably has one of the most credible green programs out there. So we are working in a deregulated state of Texas. We're working in a deregulating state of New York but yet has not really offered much choice yet, and then we're working right here close to home. And what I want to try to do through this presentation is talk a little bit about how the markets really work.

Now, I'm from Georgia, and just a few years ago we deregulated gas. And I'm not saying they got it right or wrong, but what was nice about that, no one really didn't have gas supplied to their homes or business, but there was some technical glitches. What I want to talk about is our model, how it uses renewable supply and how to work with utilities, so they can actually -- if they invest in renewable technology, they actually have an ability to get their money back with a rate of return.

And so what we do, we partner with utilities. And of course, these slides are available to look at later, but there is a large number of companies out there that would like to buy renewable energy, but they may not have a local utility that offers green energy. They may not have a desire to go out and put a PV system on their building. So 59 different companies

nationwide is signed up with something called the EPA Green Partnership Program where they're making large commitments. And one of the ways they can deliver that commitment is buying renewable certificates, especially like Kinko's and other places that may have a thousand locations across the country. The transactions costs are too expensive to do it one at a time. So they in a lot of ways go nationally and buy bulk.

And then second of all, the generators down here, many of them are good business people, but they do not have access to customers up here that want to buy. So what we do is use credible capabilities that we really want organizations like the Public Service Commission to understand and legislate ways so that we don't have fraud or any kind of other bad players in this market because it's a very intangible product we're selling. And I think Ashley did a great job of describing how other markets are trying to deal with these transactions.

Another thing is, our model is not just to market green energy, it's to develop green energy nationwide. And what happens is, when you work with an independent power developer, they are looking at ways to make their projects viable. Today's capital market, if a utility only offers avoided costs, these projects cannot make it. So they do not have market mechanisms unless they work under something called renewable certificates to get a second revenue source.

Now, our company is green-e certified. Some of you may have heard of this organization. They have done an incredible job of setting up rules, and I sure don't want to use the concept of accounting firms in today's world. But it's like an accounting firm coming in and reviewing your contracts and all the work you do and hope that that particular group has credibility. And so far, the Center for Resource Solution has what I call the de facto standard for renewable certificates but also for green power. And there's a little bit different definition. The term green tag renewable certificates you will see in the legislation. Up in Washington, they call it slightly different, but they're all the same thing. It's a concept of bundling attributes together and power together.

And what are these green certificates? What they are are actual ways that you can monetize an intangible product like green power. And the trading units call 1 megawatt of power. So the whole concept is when I -- I'm going to go through some pricing structures to let you understand that one trading block for solar may be vastly different than one trading block for, say, biomass or landfill gas. And I'm going to give you some real world examples of how this is working.

Just as Ashley said, what happens is, electricity is not really changing anything different. The laws of nature have not changed because this put is put in place. But what has happened is, if I don't live next to a nuclear plant, I

don't care how many marketers try to sell me green energy, I'm probably still going to get nuclear electrons. But what the concept is, if I make a commitment to that and moneys go to that on a bilateral or some type of contract to a generator that is not nuclear, over time the mix will become right. And that's how this really works.

I want to take kind of an oddball example, and I've heard this said before, but we're in a very early marketplace with renewable certificates. And none of us were around here, but probably back in -- if I had to gather, there was an Indian tribe here called the Seminoles a few years ago. And probably when they traded, they traded things like hides and pottery and whatever, and that was the way they had the economy work, but then all of a sudden something came along that I would call a certificate.

I don't know if you have ever seen this, but this is put out by the U.S. Government. And a lot of people work very hard for this every year. They don't work for beaver hides, they weren't for pottery, they worked for something that is nothing other than a piece of paper that probably costs less than a penny to print, but it is a certificate. A football coach in Atlanta about a year ago wanted to become the head football coach for Notre Dame. He worked his whole life working his way up, and he got selected as a football coach at Notre Dame, but he had a problem with their certificate. He

had articulated that he had a Master's degree but he didn't. So what happened, there was a great backlash because he did not have the certificate. He was not legitimate or he had mistrusted the public.

So what I believe all certificates have in common are a few things. They have to bring credibility. They have to be accepted by all. They have to have perceived value by all parties. Now, a dollar to me might be a lot less valuable than my five-year-old kid, but they do have perceived value on both ends. And also, they can be used with or without the normal formal paper. So you can actually go to your bank and transfer money without physically taking a piece of paper and walking it over to that company. So that's the common things you see with certificates. Many renewable certificates are never physically printed out; they're done transactionally. So I wanted to kind of give you examples. You probably could think of five or six other things. When I go into a doctor, I sure want to see he or she has a certificate that got him or her out of med school. So I want you to think through legitimacy.

Another thing certificates allow you to do is, if you have a biomass project, and I heard several good ones here, and the local utility is not offering a green option, that person is not shut out. It allows him to have a secondary market. And what -- also, this allows you to sell them without it being instantaneous like power. And I'm going to go through some of

the certification rules that allow us to make sure this is credible.

Also, several states, Texas, Massachusetts and Connecticut, are using certificates as what I call again the dollar bill, the currency for green energy. If you don't have the certificate, you don't get credit. There's a process to go through to do that. What that allows when you set up an RPS, like the government is looking at doing nationwide, you have to have some type of tracking mechanism so you know you were correct and you were not. And I think that's what the APX was talking about. They have a best practice up in New England, and if you go anywhere down the path of any kind of RPS, I highly recommend you look at how you actually get people to commit and track the stuff, and don't rely upon just the seller or the buyer to do it, have some independent group do it.

Also, what I think you'll find, there's a whole emerging market that's not quite obvious, especially in my city, but in Atlanta there's a lot of air pollution issues, and a secondary set of attributes is around emission control. And you'll start hearing greenhouse gases and all those things. What you'll find is, a lot of the renewable certificates here may have more value in other markets than the certificate market.

Just from a value standpoint, I want you to look at the value of these certificates. We have experience in working

with this nationwide. I've worked with our landfill gas friends over at EDI. They are experts in landfill gas, and they do a great job. But the market tends to value landfill gas less than solar, not that it's not a good technology. It's a market issue. So add the price of power plus their certificate and you start seeing some value. Now, I know this is not exactly what's happened, but I have -- our company has actually sold solar certificates around the country between $20 and $80 a megawatt hour. Think about that. If you buy a certificate for $80 a megawatt hour, that's 8 cents per kilowatt hour produced for something other than exactly what you're actually getting. So people are willing to pay real money for this. And as credibility is built, I think what you'll find is it will allow suppliers to bring the cost of some of this down without taxing people, without making people. This is all voluntary.

And this just shows you different price ranges around the country. The most important thing to keep in mind, laws of supply and demand. The groups that get the highest prices are very near the end of some settlement period where they're short. So what happens in a state where you set up an RPS, you will find the prices tend to be very low until very near the calculation phase. And also, a lot of states have set up what they call solar collars, where they say, we're going to have an RPS and a certain percentage is going to be solar, and that

immediately adds value to that because in fact it's an RPS within an RPS.

COMMISSIONER BRADLEY: Would you go back to that?

MR. JONES: Sure. This one?

COMMISSIONER BRADLEY: No.

MR. JONES: That one?

COMMISSIONER BRADLEY: That one. Okay. I'm trying to understand what this really represents because it says solar, 80-megawatt hours; wind, 15-megawatt hours; small hydro, 4-megawatt hours; geothermal, 4-megawatt hours; and biomass, 6-megawatt hours.

MR. JONES: Those are ranges. Those are ranges. If you translate them to cents per kilowatt hour, the top 2 would be 2 cents to 8 cents per kilowatt hour plus the cost of power. You can see our biomass which also includes landfill gas would be .2 cents to .6 cents. But let me tell you, when you have a lot of power produced that adds up to real money. So that's just kind of a national average. It does matter the closer you are to a location, the more value, and supply and demand laws work.

I also believe it's very important for us to build credibility. We are working with the City of Tallahassee and other utilities, and we believe if you don't have a third party that does some type of verification or certification that has the same rules for all parties, not a special rule for me or

special rule for somebody here, it builds credibility. And there's a national program called Green-e Certification. Last month, I think one of the people spoke from there. What that does is have a third party say, here's the rules. If you follow the rules, you become certified. You don't follow the rules, you can have your certification removed.

One of the worst things to happen is to say you're certified and have it pulled. So there's a lot of incentives for people once they join to stay involved. And what happens, they have different programs for what they call electricity products and tag products. Very similar but there are differences.

CHAIRMAN JABER: Well, with respect to Florida, how productive -- I guess efficient is the better word. How efficient can a Florida market using certificates really be when we are limited perhaps in the renewable choices we have?

MR. JONES: Well, I will disagree that you're limited. The way the green-e rules are being set up, and Jim Presswood that runs some of these programs, they have set up a fairly flexible set of rules. The rules, you disclose everything to your customer. You have to disclose where you're buying it and what type. On power, the definition is right here. The definition on green power is if the power is produced within the power pool, and their certificate is sold within the power pool, it's called green electricity or green

power. And I honestly believe it's no different than the way our large investor-owned utilities or whatever, the way they move power.

But if you decide to do the power locally and the tags from another -- I'll call another power pool, then it becomes what I call a transaction that may not pass certification. In Florida what the -- the Florida Stakeholder Group has agreed that if the power is generated in what we call the SERC or the Southeast and the tags are sold within the Southeast, it's a legitimate product. It's still a legitimate product if you buy it from Oregon, it's the environmental groups would not support it as well. It's still a legitimate product.

Now, if the federal legislation passes, they're going to make the nation, just like my dollar bill, good everywhere. And I think that's good, honestly. I think it creates a situation that you will have companies like JEA that may decide to be renewable suppliers, gross suppliers. In certain ways, they may get a lot more money by being a supplier than a buyer. But the rules have been well thought through on that.

I'm about through, but also, it's very important, is never tell your public that you're offering A and delivering B. And so there's ethical guidelines and disclosures that if you become green-e certified -- and I recommend to all our companies that you ought to try to become green-e certified.

If you aren't green-e certified, you ought to do what they say you should do because it's good business practices. And what that does, it's just like Attorney General kind of rules. Don't offer something unless you really have it. Don't double sell it. And what I have is leaving this presentation. They have a label that's on our Web site and any other green-e certified Web site that's very similar to a cereal box. Don't know much about cereal, but I can look on there and see this cereal has so many grams of fat and this one. And it's a way to compare. And so we believe, especially up in the New England area, they have strong disclosure rules. And I think that's very valid. I think if you implement something, you set rules for everybody. Green-e rules seem to have already been set, and they have been well thought through.

Also, certificates are different. And one other thing, they don't have to follow power paths. So, for example, one of the reasons you keep price low is, just in a peaking period, you don't have this crunch for certificates. The green-e certification, if you sell something in 2002, the previous six-month certificate is valid and the next four to three months is valid. Now, it doesn't mean those certificates aren't valid otherwise, but people believe the value drops greatly. So if you're going to sell a product, it needs to be near the time it was generated.

And then finally, the final checklist. I only saw it

one time. Mortal sin if you do something different than that. It's a good way to account -- if you're going to get into -- start monitoring RPS and stuff, it is a very difficult thing to account unless you have some set of rules like this.

And then finally, I believe and I'm not -- I work very closely with a lot of different firms. I believe the concept of what they're doing at NEPOOL and in Texas, if Florida decides to do this, you ought to also adopt some type of tracking system because otherwise you will have people wanting to try to say, I did this. And it's very hard to do it unless it's automated and in some ways tracked so multiple people can see it, not just the buyers and sellers.

I wanted to also point out, I was very pleased that we're working closer with a couple of utilities in the state. And Gary showed kind of an organization between an environmental group, and we have a lot of work we've been doing with Deb Swim. And we're working with the City of Tallahassee, and we feel we're an integral part of this cog or this machine. But the basis of making something like this work, we believe, is well-designed public policy. I'm not going to put policy out there that's been failed, but for a while California policy became jokes on the Jay Leno show. That's not what we're trying to do. We're trying to do sound public policy that's been implemented across the country. And by talking to people, I think you can find sound public policy.

And with that, I wanted to summarize with a couple of points that I have seen. We have been doing this for a while, but since I was 21 years old, I've been in the energy business, and I really believe what you'll find, renewable certificates even in Texas where they're building wind plants and delivering in that power pool, it becomes the currency, just like the concept that we move forward to a currency. You want something that everybody respects and trusts. Also, I believe you need a verification process sometime that everybody in the room agrees with. And you are the only group in this state that can set those rules and be legitimate about it.

Also, we have seen throughout the country RPS and system benefit programs have been successful public policy programs. A lot of them are different, but there's a lot of people that have seen the good and bad in each of those programs. We also believe renewable certificates are a great accounting mechanism that's been implemented in three or four states. And I think if you call those people, you can learn a lot about how it should be implemented. Certificates for green power does not work unless you have a willing seller and a willing buyer. If the willing seller can't make a profit or do well, you won't have supply. But you can't offer something so expensive that a willing buyer won't have. And a lot of times I have seen -- if you think about electricity, I've seen a lot of programs that have been undersubscribed and people wonder

why. If you're going to charge someone 30, 40, 50, 60, 100 percent more for renewable energy, you're not going to get a lot of people excited about that commitment. It has to be competitively priced.

And then finally, we believe certificates are an excellent backstop, that whenever a utility -- because sometimes it takes a year or longer to build some of these plants to use them and make them credible, that they can fulfill their mandates and want to be supported by doing a simple transaction but that also rewards utilities that made the investment up front. They can get paid by other people. And finally, we believe certificates are endorsed by environmental groups, the U.S. government agency, EPA, the DOE, and if those people who believe in what we're doing support it, we as lay people and people in public policy ought to try to understand, is this something we ought to try to do. With that, I want to thank you for your time.

CHAIRMAN JABER: Thank you, Mr. Jones.

Commissioners, do you have any questions? Mr. Jones, I think I would give you a seven, and tell you with a little bit of practice, you may get a ten next time.

MR. JONES: You're the Paula Abdul of the group over there.

CHAIRMAN JABER: Herbert Williams with Florida Hydro.

MR. WILLIAMS: Thank you, ladies and gentlemen. We

will try to make our presentation brief. We know the hour is late. My name Herbert Williams with Florida Hydro Power & Light. We're the newcomers on the stage. We have a company called Florida Hydro that was incorporated three years ago. The purpose of our company is to explore the Gulf Stream energies as a hydro project for the state of Florida.

A few of the facts that we'll cover today are -- we'll speak briefly on what's out there in the world of hydro. We'll tell you where we're at. We'll talk about the cost of our project, and then we'll have some conclusions. Ocean hydro is broken down into about three classes. Basically you have thermal, you have wave energies, and you have currents. The currents involve, of course, tidal and ocean currents and the actual movement of water through some sort of a propeller and some sort of a blade. Our technology we'll be covering today is ocean currents. We're going to concentrate on the Gulf Stream because this is where our project focuses.

This is a map from NASA. It shows in red the thermal differences of the water off the coast of Florida, and it's a very good indicator of exactly where the Gulf Stream is and what it looks like. As you can see right here in Palm Beach to Miami, the Gulf Stream is very close into shore, approximately three to six miles. It has a current that's very continuous. We have an energy that doesn't fail. It's been here forever and ever, and we expect it to continue to be forever and ever.

It's very dependable.

We got all our information on the Gulf Stream from NOAA, a national weather service in Miami. And the way they explained the Gulf Stream to us -- and they have some new Doppler sensors that they have placed from Palm Beach across to the Bahamas, and these sensors indicate we have a current similar to a big river. It's one-third of a mile deep and it's 45 miles wide. You can see how wide the current is compared to the state of Florida. It has enough inherent energy to replace every power plant in the United States, and maybe Canada and Mexico. But we're faced with a situation. If we could use the energy from the Gulf Stream in Florida, we still have the bottleneck to transmit it out of the state of Florida.

We have the Southern Company lines that come -- the big 500,000-volt lines that come in from the north that actually end in Palm Beach. The ideal place in the state of Florida to produce massive electric is Palm Beach County, Miami, because now you're putting power back into the 500 k-volt lines that are predominately coming south. So as you put power back into a power line, utility people, you know this is a very good thing. So if a plant could be put in the Palm Beach County, Dade County area, all of the power it produced as it worked its way back into the big line it would just supplement power that's coming in north out of Southern's line out of Georgia.

Florida right now, as you know, has about a 40, 45 gigawatt need, and we expect that to grow about 2 percent every year. We have reason to believe that the technology we're going to show you now can -- if it were started next year, we believe in five years we could produce enough energy for Dade and Palm Beach Counties. We believe in ten years we could take the energy from Tampa south, and we believe in 15 years we could replace all the power plants in the state of Florida with totally green, totally renewable energy.

The systems that we use are floated off the bottom. They're 150 feet below the surface. They are out of sight, out of sound. You never know they're there. They have buried cables coming to the hill that connects to the grid. The depth of the Gulf Stream is an ideal depth where we plan to put our first one. The water starts at 3 miles outward, about 80 fathoms. At 12 miles out, we're about 180 fathoms, and that's the plateau we plan to use, and that's the plateau we're currently under permitting with DEP to put 15,000 turbines in starting around Christmas of this year with our first one.

CHAIRMAN JABER: You said 1,500, didn't you?

MR. WILLIAMS: 15,000.

CHAIRMAN JABER: Oh, 15,000.

MR. WILLIAMS: We expect our turbines to be -- from the indication we're getting now, our prototypes are indicating to us that our turbines will run from 2- to 5-megawatt

turbines, which would mean a 2-megawatt turbine, the 15,000 would do Florida.

This is our technology. This is a small turbine. It was our second prototype that we built and tested. This picture was taken here at Mayport when we took this turbine to Palm Beach County and demonstrated it June 25th of last year. It produced approximately 100 kWs. Now, bear in mind, this is a baby turbine. This is 1/152 scale to what the bigger turbines would be, but it still was quite a producer.

A lot of feasibility studies have been done on the Gulf Stream current. There's no secret, the energy has always been there. The problem has always been, how do you get it and get it back to the bank? One of the challenges that we took on six or seven years ago was to study every feasibility study we could find and see what's the problem. We've got this tremendous energy source that's perfectly green, but why can't we use it? And basically here's the problem. The Gulf Stream is a slow current. It's like a big river. To get a reasonable amount of energy from a propeller blade, you have to have a very big blade.

Now, if I were to take a very small propeller blade and put it in four and a half knots of current, it would turn fairly fast, maybe a couple hundred RPM, but as this blade gets bigger, the tips of the blade continue to turn the same speed because the water is still four and a half knots. But what

happens, the shaft of this turbine turns slower and slower and slower. If you design a turbine, say, for a megawatt, you're in the range of a 25-foot blade which has a shaft that turns maybe 300 or 400 RPM. As your megawattage (phonetic) gets higher and the demand, your blades get bigger in diameter, your shafts get much larger.

We're told the shafts are now turning slower and slower to handle the torque to take this very slow movement of energy to a 3,600 RPM so we have electricity. And that I felt was the problem with all of the feasibility studies I could find. They were taking existing technology, Kaplan, Frances, Imping turbine runners, and trying to adapt them to the Gulf Stream current. And they were ending up when they would come up with a power plant that would be just a 50 megawatt, they would end up with a shaft that was four or five feet around and a gearbox as big as this room. And now, they had to anchor this in the Gulf Stream in deep water, and it just wasn't practical.

So that's been our quest, how to find a technology that can deal with this current. We came up with what we think is maybe not the answer for the future. This may not be the turbine we'll see 20 years from now, but it's the turbine that has opened the door to the Gulf Stream. And the reason for that is, we're getting our energy off of the tip of a propeller. As you can see, there's a hole in the middle. You

see the workers standing on the other side. This technology allows us to get a blade bigger and bigger and bigger, and all we're doing is making a hole bigger and bigger and bigger in the center. So the actual little blades right here that's doing the work stay the same size. So you don't have the problem of moment that the engineers have, you don't have the problem of torque because the blade tips, regardless of the size of the turbine, will all turn the same speed in four and a half knots. So, in essence, by making the hole bigger, you can get more power. So you don't have the bottleneck that we're limited to a 100 kW propeller shaft or 1 megawatt or 2 megawatt.

We're of the firm opinion that these turbines can easily go from 2- to 5-, 10-megawatt units and conceivably be 100-megawatt units, 500-megawatt units because you have the water depth necessary, you have the energy flow necessary, and you don't have the engineering problems you have with the existing technologies that have to deal with shafts.

So I think the key to the problem Florida has talked about here all day is the Gulf Stream. We've had it forever. We just haven't come up with a way until now that we can make energy from the Gulf Stream, bury a cable to the shore and have a perfectly green renewable source of energy that's there forever.

Our blades because of the hole in the center came up

with some unexpected pluses. Every turbine blade we could get information on from TBA, every Frances turbine, every Kaplan turbine, every runner we could find, including the turbine in Iguassú Falls in Brazil, was getting a blade potential of about .25 kilowatt per cubic foot. And we're showing .3.

We had put challenges to a number of manufacturers to challenge our statistics. And we believe the hole in the center has added something we didn't expect. It appears that on a conventional propeller of any type when the wind or the gas or the water or whatever goes through this propeller, you have this area at the center that's doing no work at all. It's actually filled with a shaft and a hub, and it's actually hurting you. It's actually doing damage because you have turbulence, you have effects behind the propeller that's taking away the energy from the tips which is the only place on a propeller that has any energy.

What we think is happening is, when the water flows through the middle of the turbine -- let's just say it's going through the middle at four and a half knots. The water going through the blades has to be slowed, or we haven't taken energy from the blade. Well, when this water is slowed let's just say to two knots, when it goes through the blade at two knots and the right side of it is this large open hole at four and a half knots, this water is converging, and the four and a half knots is helping to pull this two and a half back to the four and a

half where it came from. So this blade is not just getting energy as water hits it like a conventional turbine. It's getting energy as the water passes it which is pulling it downstream. Every study we can find has shown that we're 20, 20, 20, 22 percent more powerful than any turbine we can find.

Scalability is very important, and we mentioned that earlier. We don't know where the limit is on the size of the turbines. Futuristically, we could see one turbine that would replace a 600-meg coal-fired plant. I don't know. They can get very big, we believe.

COMMISSIONER PALECKI: When you have a regular turbine with a shaft, you have a tremendous amount of friction at the shaft. On your design, wouldn't you have a problem dealing with the friction at the tip? I mean, you have this outside area that's moving at a great amount of speed and power. How do you deal with the friction?

MR. WILLIAMS: On this particular turbine, to get into more how the turbine works, around the perimeter of this turbine is a series of hydraulic pumps. This turbine is designed something like an automatic transmission. As this big blade turns, it turns this series of hydraulic pumps, and they also hold the turbine on location. And they eliminate a lot of that friction.

COMMISSIONER PALECKI: So it's turning in water rather than bearings or other --

MR. WILLIAMS: That's right. There are no bearings on the unit. That's one thing we'll get to later on this turbine. The service of this turbine happens once a year. Once a year, you go out; you pull it up. You replace every moving part. You put it back down, and it's unmanned for another year. That's part of what we'll cover a little later.

But every propeller you can imagine that you've ever known in life had a shaft. I doubt there's a person here that's ever known of a propeller that didn't have a shaft. That's quite obvious because we have -- we're working on our eighth patent on this concept. We're getting everything we're asking for on this open center concept of being able to get a double whammy on the energy through the blade and the fact that we're getting energy on the periphery of the blade.

What that does, it simplifies a process of taking energy directly to a high RPM, because with a hydraulic system, you can have a very low input and infinite speeds on the other end because its nature is a hydraulic system. So we can put these hydraulic pumps around the outside, and this is where all the speed is happening, and that's where the power is really at. And we can go directly to a 3,600 RPM generator with no gearbox. We don't have that gearbox as big as this room. We have a very light -- as you can see this rim, we just -- it's a very light turbine. So we started with a shaft-driven turbine, and it was a very complicated machine. The more we get into

the open center, the less complicated it gets.

Now, I don't know what I've done to get that up. Here's basically where we're at. About six years ago, we built a nine-foot diameter turbine blade, and we simulated the flow of the Gulf Stream. We towed it beneath the barge in the St. John's River, numerous trials, and that turbine in 9 feet produced about 17 horsepower. Two years ago, we built a 10-foot blade, which is this blade you see, and these are various photographs of the 10-foot blade. And through the lessons learned by the 9-foot blade at 17 horse, this turbine has produced almost 100 horsepower.

We're now in the process of building a turbine that we expect to put in the Gulf Stream at Riviera Beach. We hope by Christmas to have it on-line and lighting up some lights that we anticipate will be around 150 megawatts -- I mean, 150 kilowatts, I'm sorry. We're using one of the blades that was built for this turbine that we didn't use, and we're putting it in an actual commercial machine. And this will be the first machine that will actually be anchored. It will be ballasted. It will be tied into the grid, and it will actually produce commercial electricity into the grid at Riviera Beach.

Now, we're -- we think we're about halfway done on permitting. We have got our finances together. We expect this venture to come along, and by Christmas we can all see the real world of what we can and can't do.

Here's why the turbine is cost-effective. All of the other technologies that we can find that involves ocean hydro has large concrete pilings, or it has a dam, or it has pump station storage. It has something very expensive to build. And these turbines just simply are anchored to an anchor. They are unmanned. They have no personnel that sits here with it everyday. It runs totally unseen on its own a hundred feet below the surface way out in the ocean.

They are conducive to mass production. They can readily be made on a large scale very quickly. And here's the key, the ability to achieve large scale deployment. The design doesn't really change on this turbine if you were to elect to go from a 20-megawatt machine to a 25-megawatt machine. So all the parts and the components -- for example, the hydraulic pumps, you just buy more of them. The blades, you just build more of them. And so the components don't really change. So when we gear up to build, like we've already built the two, I can take the same form, and I can take the same blades, and I can just keep making bigger and bigger turbines. So that makes it very inexpensive to do.

We have zero fuel costs. We have an extremely constant energy source, no sun, wind, no any of that to deal with. We know exactly 20 years from now what we have in the Gulf Stream to deal with. We have a targeted design. We don't have to build a turbine that can run a gauntlet of RPMs, a

gauntlet of different horsepower ratios. It doesn't start and stop and all of the things you have to be able to deal with in regular turbines. So it's a fairly simple design on the turbine unit.

We believe -- and I know everyone here is going to say, yeah, sure. We believe that we can produce electricity on the very first turbine we put in the Gulf Stream for about three cents a kilowatt. We believe in just a couple, three years we can reach a penny a kilowatt for perfectly green renewable power, almost unlimited amount. Now, time will tell that. But if you were to take away the cost of building a power plant, take away the cost of the personnel to man the power plant, and take away all their fuel costs -- what did the fellow earlier say, 90 percent fuel costs on natural gas -- if you take away all of these costs, why won't you be around a penny? We're showing a penny. And we've had numerous engineers to look at the project, and they agree with our findings.

This is not rocket science here. The only technology involved is the way we're building the blade, but we're just a large propeller in the water that sets here day and night. It turns with no fuel. And we're projecting an O&M cost of 2 percent of our production, lower than any O&M cost ever.

COMMISSIONER PALECKI: What do you expect the life of the units to be, given the corrosive effects of saltwater?

MR. WILLIAMS: The unit is about 95 percent fiberglass and composites. The Kevlar fiberglass and other composites compose around 90 percent of the unit. We expect it to just last with maintenance indefinitely. We costed them out at 30 years to come up with our prices, but every year the plan is to take a large service vessel out, to pull up ten of these turbines, or however many. You unplug the turbine unit, put on a rebuilt unit, put it back in the water, test it, and let it go for another year. Then you bring the -- every moving part of the unit comes back to land, and on land, it gets worked on. It gets rebuilt and reserviced, and it goes in the stack of turbines to go back out. So we don't see them as a machine we're going to use 10 or 15 years and it will wear out. It's a machine every year we build and every year we keep replacing hydraulic components, which is the only moving components on the machine other than the generator.

In conclusion, we recognize we're still in early R&D. All ocean power appears to be. The Gulf Stream is a source of energy that we have overlooked. It's unfortunate we have overlooked the Gulf Stream. It's unfortunate that 75 years ago when Florida Power & Light or whoever fired up that first diesel machine, it's unfortunate they didn't just put a paddle wheel in the Gulf Stream. Hindsight is great. Hindsight is great. We see that now, but that didn't happen. But 75 years ago fuel was given away and pollution was not

something to deal with. The environment was not so high on the agenda. It's unfortunate we don't have 75 years behind us in working with the Gulf Stream energy, but we don't.

The information that we have on the Gulf Stream equivalates (phonetic) it to 30,000 Mississippi Rivers. You can take a river the size of the Mississippi and you can understand the hydro power of that river. And we're talking 30,000 Mississippi Rivers in size. DEP loves this project. Three times we've met with DEP, and they love this project. The Corps of Engineers has approved this project in every way we can imagine. I can't imagine the Sierra Club or anybody not loving this project. I mean, I don't understand what's not loveable about this project.

COMMISSIONER PALECKI: What about the effect on fish?

MR. WILLIAMS: The blade -- because of the four and a half knots, it's a fairly slow-moving blade, and the hole is much bigger than it looks in this little one. In a typical 100-foot diameter blade, the hole would be 80 feet. So a submarine can go right through the middle of this machine. It's hard to imagine that we have a fish impact. When we presented this problem to National Marine Fisheries and they looked at the turbine design and they looked at the area off Palm Beach, their take on it was, let's just wait and see. You know, let's don't open something that's not necessary. If the problem occurs, we'll deal with it at that time, but right now

just kind of pass us by. That was the National Marine Fisheries' position on it.

The Corps of Engineers' position is, we have a submarine zone in this area, and contrary to what you might think, the submarine is almost from the surface to 150-feet deep. Submarines run around on the surface, not down where the turbines go. So by going 150 feet, we're below where the submarines are allowed to go.

CHAIRMAN JABER: Mr. Williams, let me interrupt you here and ask if there are Commissioners that have other questions.

COMMISSIONER DEASON: One quick question. Three cents per kilowatt hour which you quoted, does that include transmission costs or transmission costs in addition to that?

MR. WILLIAMS: That's what we call an all-in cost. That's the cost of the cable buried to the grid and the transformers at the grid to go on-line.

And that's the end of my presentation.

CHAIRMAN JABER: Thank you, sir.

MR. WILLIAMS: Thank you.

COMMISSIONER PALECKI: Thank you.

CHAIRMAN JABER: Okay. Our next speaker -- I hope I pronounce this right -- Richard Breitmoser, U.S. BioPower.

MR. BREITMOSER: Good afternoon. I've got about 60 slides to go through, so I'll be very quick. Boy, we're

awake out there, aren't we? No, we're going to do this very briefly. There's a few slides that I have, and I'll skip several of those. First off, my name is Richard Breitmoser representing U.S. BioPower located here in Jacksonville. I wanted to thank the Public Service Commission for the opportunity to introduce this project, and also, I wanted to commend you on establishing the renewable technology workshop concept. I think it's a great way for you to receive information and the general public. And I was quite pleased to hear that you were setting up a workshop here in Jacksonville which is where I'm located.

I'm not going to go through this. You can read this in your material. I do want to say that U.S. BioPower does intend to be the first coast provider of green power, if not the largest first coast provider of green power. And general statements on the environmental and community aspects of the project. Earlier today, we heard comments from Florida Crystals, and up until then, we heard information that was very technology-oriented. And I was glad to hear Florida Crystals talking about the community aspects of these projects and biomass project. And certainly this one that we are proposing is very much a community-oriented project. And we'll talk about that in just a few minutes. So there's a human element to this, too, as opposed to just a technology element.

Let's talk about the project scope. What we're doing

is taking the old Jefferson Smurfit paper mill and the power boiler and turbine generator in that facility and are converting that to a renewable energy facility. I have an aerial that you can look at at your leasure after the meeting. That is an old technology. That's an easel over there for -- if don't remember what that was.

What we're going to do is convert wood waste biomass to electrical power using existing and new equipment that we'll have to add there. This is on-site. We have a wood-fired stoker boiler, and we're going to co-fire that, which is what we'll have to do for this particular boiler with fossil fuels. And right now, we're looking at coal to use for that, maybe 25 percent coal and the balance being a biomass. As opposed to some projects, this biomass will be not commingled with the coal. It will not be pulverized with the coal. This boiler as a paper mill boiler was designed to burn bark before. In this case, we'll burn biomass, but it will be supplementally fired with fossil fuels in order to stabilize the burning of the biomass.

We will have to refurbish the turbine generator. If you're familiar with paper mills, they use an extraction type steam process. A lot of the steam goes into the paper mill making process. We will have to redirect the steam path within the turbine. It's not set up as a condensing turbine. We'll have to change the steam path to do that. We'll have to put a

condenser in there to replace the very small condenser that is there now. We'll have cooling towers to condense that steam, and there is pollution control equipment already at the mill that we will use.

What we want to do is produce green power for sale using the existing biomass facility, and we expect to get a net power generation of 40 megawatts. It's a 45-megawatt turbine generator. About 10 to 15 megawatts will be produced by coal, the balance will be biomass.

This is a line diagram of the flow process at the plant. You can look at that at your leisure. And also, we could meet with your staff if you'd like to go into that in more detail, but it's pretty conventional. The only thing it doesn't show on there clearly is that we will be firing with a stability fossil fuel on there and probably coal is what we're looking at right now.

Some project benefits. Certainly we want to assist companies to achieve their corporate green power objectives. We will be consuming well over 200,000 tons of biomass, probably closer to 400,000 tons. The plant is -- this is the community aspects of the plant. It's located in an enterprise/empowerment zone here in Jacksonville. That's a depressed economic area. We're going to help revitalize that area. We'll create 30-plus high-paying jobs. And things that we've thought of on a qualitative basis, the Florida Crystals

folks talked about quantitatively, the quantitative economics of it. Not only will you have the direct paying jobs for this facility, you're going to have literally hundreds of other jobs within this region collecting wood and bringing into the facility. So there's a lot of direct and indirect aspects of this project that one should consider.

And we're looking at providing minority employment. We anticipate 50 percent of the jobs be filled by minority workers. If you didn't catch the earlier slide, this is a minority firm. And we also want to configure our cooling water system so that we can utilize the JEA's Buckman wastewater treatment plant reclaimed water when that becomes available. That's a 50 million gallon a day facility, and they do have a program in place to reuse that water, and we can certainly use that in condensing steam at our plant, perhaps up to 2 million gallons a day. That's it in a nutshell.

Any questions?

CHAIRMAN JABER: Commissioners, do you have any questions for Mr. Breitmoser?

COMMISSIONER PALECKI: Just one quick question.

MR. BREITMOSER: Sure.

COMMISSIONER PALECKI: I'm familiar with the Florida Crystals' Okeelanta plant, and they have recently converted their plant to co-fire with natural gas. Have you considered using natural gas as a fossil fuel to co-fire your --

MR. BREITMOSER: Yes. Yes, we have, and we can do that.

COMMISSIONER PALECKI: Thank you.

CHAIRMAN JABER: Thank you, sir. Our next presenter is Mark van Soestbergen.

MR. van SOESTBERGEN: I noticed there's a different audience than there was in Tallahassee. Is everybody different?

CHAIRMAN JABER: Well, we're here, if that's what you mean.

MR. van SOESTBERGEN: Well, yeah. Yeah, I don't -- well, thank you, of course, for coming all the way over here. Last time I talked a little bit about the type of software we make. We're basically an IT group located in Gainesville, and we make software to inventory greenhouse gasses. But today, I'm going to talk a little bit about the types of things that I found out by talking to various clients that are actually interested in renewable energy and some of the hurdles that they have encountered, you know, in trying to implement renewable energy projects to sort of illustrate what are some of the barriers that are in place currently.

And so I came up with this title, "Opening State Electrical Contracts To RE Activities." There's many types of contracts that the states either directly or indirectly through other agencies engage in. There are many types of contracts.

Some are rate-based and other ones, you know, will be cheaper, for example, at night or are more expensive during peak times and that sort of thing. And we find that there's contracts, for example, you know, for schools and there's also for transportation matters and for operation of bridges, for example, and government buildings. And there's actually thousands of different types of contracts that really are on behalf of the state, and they're with most utilities because they're spread out all over the state.

So already the state of Florida is engaging in paying electrical providers in various ways for electrical services. And what they all have in common of course is that, you know, in the end it's the taxpayers that pay for it. And so there's an opportunity there to leverage, you know, some of that client and supplier relationship for the benefit of renewable energy. An example I'm going to give, it seems to be not quite working out with the projection, but it's going to be about universities because I'm a little bit familiar with that.

So there's 11 state universities, there's 28 community colleges, and there's 27 independent colleges and universities, for a total of 66. This would have been nice if it was bigger. Is that the projection or is that --

CHAIRMAN JABER: We can see fine.

MR. van SOESTBERGEN: Yeah. Well, basically I'm giving an example of just three. The University of Miami is on

the left. They spend about $6 million a year on just kilowatt hours, the University of Central Florida about $9 million a year, and the University of Florida about $20 million a year. And each university seems to do it in a different way. Some of them -- the people that actually manage energy are being paid a salary, and they just handle the energy as one of the components. Of course, they buy purchased power and various other types of energy as well. In some cases, like in the UF case, the physical plants will actually purchase the energy, mark it up a percentage to cover their own costs, and then send the invoice to Tallahassee. Tallahassee in turn writes a check.

So -- and if you compare the annual budget versus how much they spend on electricity, for the University of Miami, it's $470 million per year is the annual operating budget. I know 6 million is their electrical, so about 1.3 percent. For UCF, you know, 1.6 percent, and for UF about 1.4 percent. So typically, you know, the electrical components end up being, you know, less than 2 percent of their annual operating budget. So if you were to, for example, increase it by, say, 20 percent, then in the University of Miami's case, it's a public university -- oh, sorry, it's private, it's not public, but, for example, for them it would go up from 1.3 percent, it would go up to 1.56 percent, you know, if you were to increase their electrical costs by 20 percent of their total budget.

So speaking with the physical plant directors, the people that actually, you know, manage on a day-to-day the operations -- and actually, you'd be very surprised because, like, for example, the University of Central Florida, that's like 35,000 students, you know, 12,000 support personnel, and it's like a little city, you know. And the physical plant in the end -- and there's a lot of personnel, but in the end there's really only a handful of people that run the thing. And they have got buildings and students and they manage this.

And so speaking with this, like, director guy, you know, UM really wants to do something with renewables but thinks it can't. Apparently they tried and, you know, at the time I guess because there was no net metering allowed, maybe it's still like that. I don't know if Florida Power & Light is still here. So they're still, you know, under the impression that they're not allowed to do any kind of renewables on campus.

UCF, which is really, you know, a part of the Florida Solar Energy Center, would like to do it but is under the impression that it's way too expensive. And just sort of talking about it, so have you heard about this program? Like, last year, there was this incentive program and so they have no idea. So, you know, and the point of it is that, you know, all together you have 66 institutions in which literally, you know, almost half a million people go to school in which you only

have to approach, you know, a handful of people with whatever incentive programs there might be to get sort of the ball rolling.

UF tried to implement fuel cell a couple of years ago and, you know, I think were kind of engineering something. They thought it was neat. They want to buy a fuel cell, put it on-line, but apparently they're not allowed to because of the typical -- their contractual relationship they have with their power provider.

And then last year, the building construction -- School of Building Construction made a new building, you know, which is a green building, and it's, like, lead (sic) certified. And all together, the way it's being built, they anticipate that it will consume about one-third of the energy that a normal other building, you know, with similar square footage would consume. And to sort of top it off, they want to put on 10 KVA of photovoltaics but no. They were not allowed to put on even a single little solar cell on the building because of some obligation. And so we asked them, well, how long does this obligation last? Well, it's lasting until, you know, 2017. So until 2017, even though it's a big university, kind of a flagship university of this state, they can't have any kind of renewable -- any kind of cell generation, you know, implemented on campus, but they're willing to. They're willing; they have got money. They want to, but they can't.

So what formula could work? You know, I asked them, so what would be good for you? For the University of Miami, you know, he says, well, some kind of grant opportunity where there is money available where different universities may be vying for it. You know, how can they best incorporate it into a new building and that sort of thing, so everything is sort of a grant-oriented type of program.

UCF is happy with any economic rationale. They said it's doesn't care as long as they could validate it to their, I guess, administrative staff, and say, well, sir, the panels lasts so long, or this technology lasts so long, and really, it ends up being, you know, a reasonable cost to us.

And the University of Florida is a little bit more sophisticated, and they say, well, we don't care if we pay for the system, integrate it and maybe sell the reductions. They are actually putting together sort of this carbon neutral plan. And they don't have any problems actually, you know, achieving the reductions and then transferring them off their balance sheet in exchange for money. So on various levels, there's interest in doing this.

So why is the academic setting kind of nice? Well, for one, it's expanding size and membership. I don't know if you've ever been to the University of Central Florida, but it's like a construction zone. And they're adding, you know, I think 20 more buildings in the next 5 years. Same for the

University of Florida in this next 10-year master plan. They're expected to expand by more than 15 percent, and they already have 17 million square foot. So, you know, it's expanding in numbers of buildings, so every day there's an opportunity. And these buildings -- state buildings have, you know, a lifetime -- expected lifetime of 50 to sometimes 100 years.

They're very motivated clients in the sense that not just only administrative level but also for the operational level like physical plant, and also the students would like to see these kinds of things happen. In their overall budget, it's a relatively small impact, you know, and the students are actually willing to pay for it. You speak to student government and say, would you like to -- how would you think about, you know, affording, you know, the members of the student body the opportunity to study, for example, without having an impact on climate change? And they say, well, that's something we'd be willing to look at. And the comparative costs that are involved, and they say, well, that's something that's reasonable. That's something they could pass, the student government itself could pass in their own legal framework and add it on. And relative to, you know, the tens of thousands of dollars it costs for you to go to school these days, the 40 bucks ain't going to matter that much. So we can even have a lot of this paid for by students.

And then another idea is, of course, you could count the renewable energy assets that take place in the campus setting towards the utility's renewable portfolio standards. The University is not necessarily interested in owning and operating the PV system or whatever technology is in place. They don't really have a -- they just want it there. And if you look at, for example, just these three universities we just now looked at over the next 10 years, we'll spend $540 million on electricity if the cost remains constant. It's over $1 billion if you take all 66 institutions. You know, and that's all taxpayers' money. That's me; it's you. It's everybody who lives in this state, you know, participates in this except for the private ones.

So how much does it really increase? The outlay is about 4.5 percent if you were to, you know, say it's two and a half cents per kilowatt hour, which a number you commonly hear, which is about equivalent of 20 cents -- or $20 per ton CO2. If you look at the greenhouse gas portion, that's about the value. If you look at the green tag portion, it's about the number. And that's if you, for example, do 10 percent of all of, say, these universities and college contracts. That's with the 10 percent renewable objective. That's about -- you know, the total impact would be an increase of 4.5 percent.

And so in dollars per year for the renewable energy community, that would be about $14.5 million per year, you

know, at the end. You can scale it out. Of course, you can't have 10 percent overnight, but you could sort of work towards that, but that could be a goal. And that may, you know, need some participation for you if you are providing comments to legislators, that, you know, that it makes it more easy for campuses to incorporate and to have the ability to -- in this case, for example, for UF to perhaps go back to the table and renegotiate this contract.

I think it's Florida Power Corp, but they were very adamant about not changing it. That would be really a pity. I mean, until 2017 they would be, you know, cut away. We wouldn't have -- you know, I'm thinking this is learning centers. Students go to school there. It's a fantastic opportunity. It's also a place where you can actually put PV in. New buildings are being built every day. So maybe through you-all's involvement, something like that can be achieved. So thank you very much.

CHAIRMAN JABER: Thank you.

MR. van SOESTBERGEN: And that was it.

CHAIRMAN JABER: Thank you. Commissioners, do you have any questions? Okay. Our next presenter is Steve Gorman with the Florida Solar Energy Industry Association.

MR. GORMAN: Perhaps we saved the best for last. It's late in the day. I do have the capability of talking fast. I plan to utilize that skill to my fullest. Thank you,

Commissioners, for allowing me to be here today. My name is Steve Gorman. I'm here on behalf of the Florida Solar Energy Industries Association, FlaSEIA. And we would simply like to point out to you some of the opportunities we see we have with solar opportunities here in Florida.

For definition purposes, we're going to be talking about two technologies. We're going to be talking about solar water heating and solar electric. So we have solar thermal, as indicated there on the roof, there on the roof, and solar electric. Who is FlaSEIA? We are the trade association here in Florida. We were established in the 1970s. We consist of licensed contractors, manufacturers, installers, research centers. Many utilities in the state are our members. Over 100 members currently and of those 100 members certainly many of the 300,000 solar systems installed in the state of Florida were via our membership. We have growing manufactured capacity right now. We're adding about 18 to 22 percent of output capacity annually. And we believe our industry offers to the state of Florida quality, safety, and performance in energy products.

I'm just going to give you a quick overview of a scenario that we're looking at. Let's assume that we have 500 -- or 5 million residential customers. We've heard a lot about willingness to pay today, willingness to buy. We made an assumption of half of 1 percent of people offered a solar

opportunity would buy. What that represents over a ten-year period is approximately 250,000 solar systems being installed. There is also a large economic development component to this. Those 250,000 systems would realize approximately 25,000 new jobs. Utilizing a ripple effect of 7 to 1, we're going to put about $5 billion into the Florida economy. This is not unlike relocating or establishing an automotive manufacturing facility here in the state. Very similar numbers in economic jobs benefit.

The energy contribution, well, we're working at about 730-million-kilowatt hours per year in energy delivered. Pollution, you've heard about it earlier. I won't go through. You can see that I have not given a value, but that has to be considered, we believe, in the analysis. We believe it's a number greater than zero, but we'll leave that to someone else.

Currently, there are a number of utility solar programs underway in the state of Florida. The IOUs have some; the munis are involved. One in particular that I would point out is a Lakeland program which is a very interesting, very unique program in the United States in that they are metering both solar thermal as well as solar electric. So they are billing the customer for generation. There the customers site on their rooftop.

Opportunities for Florida. It's good business. We've heard about it today many times. Customers and

shareholders of the IOUs, they want to see it. They will buy it. There are security issues that we as an industry, the solar industry, can address. We are the purest form of distributed generation you can have. And of course, there is huge environmental attributes that we as an industry can contribute.

Our recommendations to the Commission: We would like to see the property tax exemption reinstated. We would like to see the removal of the sales tax expiration passed. We certainly would like to see more use of solar on state facilities. One thing that would make a huge difference to the industry, and we have been battling it for over 20 years, is perhaps the elimination of the RIM test for solar. Perhaps that's something that we can look at. And you, the Commission, perhaps the utilities need to be, you know, rewarded. We need to be looking at new business models. They need to be incentified (phonetic) for moving into this new era that we're in. And call it what you want, RPS, whatever, but certainly again, it's something that I think that the state of Florida should consider.

That's my presentation. In closing, I would simply suggest that the state has made significant contributions in solar for over 20 years through the Florida Solar Energy Center, through licensing, through product certifications. We have the infrastructure. We are rapidly deployable. We have a

seasoned industry, and we believe that we have a certain component to play in Florida's energy future. So thank you very much.

CHAIRMAN JABER: Thank you, Mr. Gorman.

MR. GORMAN: Questions?

CHAIRMAN JABER: Yes. Can you tell me a little bit about the City of Lakeland program? You said it's one of the -- the only one in the country.

MR. GORMAN: It is the only program like it in the country. It is being funded through -- in part through the Department of Community Affairs' energy office. And it is a solar thermal program to where the utility puts the solar thermal out of sight. The solar thermal energy is metered and sold.

Many times people don't understand. They always think of a solar water heater, solar thermal system as a demand side. Well, in fact, it's not. It's the supply-side technology. And the Lakeland program, I think, is a dynamic model, proven model now, that clearly shows that it can be a supply-side technology.

COMMISSIONER PALECKI: Are these solar hot water heaters you're referring to or what --

MR. GORMAN: Solar water heater, yes.

COMMISSIONER PALECKI: Solar water.

MR. GORMAN: Correct.

COMMISSIONER PALECKI: And so that is paid for by the customer on his bill as if it was electricity that was heating the water. Is that how it --

MR. GORMAN: That is correct, with a slight deduction because of the efficiency. I mean, there -- because of the no fuel cost. So the customer is getting a value, the City of Lakeland is getting a value.

CHAIRMAN JABER: Commissioner Bradley, you had a question?

COMMISSIONER BRADLEY: No, he answered my question.

CHAIRMAN JABER: Okay. Any other questions?

MR. SMITH: Yeah. Does -- my name is David Smith. Does the Lakeland get green tags for that? Would that be something that they could capture and sell? Do you have any idea?

MR. GORMAN: I do not know. I'm not certain. And the gentleman was here earlier today that administers the program, but unfortunately, he's gone now. So I do not.

MS. SWIM: This is Deb Swim from LEAF. And I don't think they do get paid for the green tags, and that might be, you know, one of the next things Mel is trying to do.

MR. GORMAN: I will point out that in the green-e certification program that is working its way through. One of the first things that were done months ago, which was really not controversial at all, was the fact that stating that the

solar water heating system will qualify as a green-e product, so to speak.

MR. SMITH: I have one other question. Several times, I saw where people were putting up slides where they were saying solar thermal was very expensive relative to what I thought the cost was, and that must refer to solar thermal that's trying to create electricity as opposed to try to heat water. Do you have any idea of the cost per Btu or kilowatt hour?

MR. GORMAN: Well, that's why I show the -- for a solar water heater, typically your delivered energy cost is going to be between two and a half and five cents, and that depends upon climatic conditions, where you are within the state, Key West or Pensacola, system size, which is dependent upon either bedrooms or family or what have you.

CHAIRMAN JABER: Thank you.

MR. GORMAN: Thank you.

CHAIRMAN JABER: Commissioners, we have two final speakers. David Wentworth.

I was told you had brief comments.

MR. WENTWORTH: No, I do. I e-mailed things yesterday, but I don't know if they made them here or if I can get the computer working.

CHAIRMAN JABER: Why don't I let you all work that out informally, and if you don't mind, I'll let Mr. Ryan go

next.

MR. WENTWORTH: That's fine.

CHAIRMAN JABER: Mr. Ryan, do you want to make your comments?

MR. RYAN: Yes. These comments are -- for the record, my name is John Ryan; I'm with the Sierra Club. I also sit on their energy committee. These comments are basically mostly dealing with the presentations and some of the questions that some of the Commissioners had. As far as the donor program is concerned, much like you suggested, putting a checkmark and donating $5 to a particular utility for projects, the only comparable project that I'm aware of is in Gainesville who has a donor program relative to renewable -- I believe it was renewable or solar power in Gainesville Electric's district area. You'd have to contact them to see how successful the program was, but if you do, I would also check to see how good their marketing was too.

The other thing that I wanted to disagree with on, we in Sierra Club would never consider MSW a renewable power. A standard mass burn facility has so many attributes that are -- it would be virtually impossible even if we were supportive of that to get the public behind an MSW plant considered renewable. However, there is some emerging technology coming out there where it was syngas -- MSW to syngas technology that looks promising, but it's too early to tell whether in fact

that would be a good thing.

The other thing is energy crop production. Sierra Club has spent the past year looking at biomass and has developed some standards that we use for evaluation of biomass facilities. I will be glad to provide that to you later. I only have one copy. I'll give it on the record but send a copy to staff later.

We did some thorough review of what we think is a good biomass project and developed standards accordingly. One of the supplemental documents goes to some of the comments that were made earlier. The supplemental document was a guidance document on energy crops. It essentially stipulates that you need to take -- we have an invasive plant problem in the state of Florida that is costing millions and millions, hundreds of millions of dollars in the state of Florida to local governments all the way to the state and federal government.

There has been efforts to introduce new species in Florida for energy crop production. We are strongly concerned about that, and we developed a guidance document that requires a perspective energy crop developer to send their information about the crop to IFAS, their invasive plant working group. Dr. Stockard (phonetic) with the invasive plant working group has agreed to do an initial evaluation because their evaluations tend to take two to three years. And by then, we already -- and only when the invasive species is already

introduced will they normally evaluate it.

If an energy producer wants to evaluate an energy crop, he has to agree to develop a system and has developed a system by which an energy crop producer can quickly, easily go into IFAS and evaluate the invasive characteristics of that plant. And the costs would be enormous.

The other thing is, is a noticeable comparison in scale of renewable projects and distributed generation. I think most of the projects, except for some of the co-firing projects, fit the scale of DG. DG is not a commonly used technology in Florida. Renewable does fit the DG portfolio pretty well. I would suggest whatever encouragement in connection between distributed generation and renewable power be considered because of the additional efficiencies to the system that could ultimately argue for better, more efficient delivery of electricity at whatever the original price is. The loss factor may accomplish a reduction in the overall cost because a simple line loss is reduced because of DG.

I also -- on the PV systems, one of the things that's missing that has been an awful big issue, and some of the people are endorsing some of the approaches that some other people brought up here, it might be a very good idea for the Commission at least on the policy level or -- to advise the Legislature to consider that there is a market out there for essential services for PV. Whether you're speaking of

governments, emergency services, whether you are speaking of telephone systems, whether you're speaking of communication systems of any kind, cellular systems, there might be a very good incentive -- there might be a good way to develop an incentive to the PV industry to use that not only for green tagging and the benefits associated with renewables but also from a policy level to avoid some of the security issues associated with the power system and the communications associated with homeland security, for lack of a better term.

Okay. There is also a -- sorry, I'm looking at my notes. Oh, okay. There are also -- the last item is that I would also like you to take a look at, when you're looking at the cost-effective approaches of biomass when it considers urban wood waste, much of that cost structure is already accounted for on the front and on the delivery system for production and delivery. There may be additional costs to produce a product that is consistent with the firing of that renewable energy, but that when you analyze the costs of renewables, I think that you are looking at the gross cost, and on some of these urban wood waste projects that gross cost -- a portion of the gross cost is already covered under other programs. And you may want to look at the delivery of the actual delivery costs rather than the total costs associated with that because a tipping fee is already being paid for delivery.

And that's it. Thank you. And I will forward to the appropriate people our biomass standards and also that guidance document that IFAS has agreed to.

CHAIRMAN JABER: Staff will give you the appropriate e-mails, Mr. Ryan.

MR. RYAN: Thank you.

CHAIRMAN JABER: And thank you for your comments.

Okay. Mr. Wentworth.

And just for my knowledge, is there anyone else in the audience that would like to make comments?

MR. WENTWORTH: Folks, I'm David Wentworth. I appreciate the opportunity to speak and be heard. And I recognize I'm in the unenviable position, I think, of being last, so I will be brief. I had an opportunity to speak to you at the Tallahassee staff event, and I appreciate the opportunity just to quickly revisit some issues on landfill gas to electricity development. I am a vice president of development with Energy Developments, and we are landfill gas developers. That's pretty much exclusively what we do around the world.

Just some quick industry basics. As I think everybody knows, landfills generate methane through anaerobic decomposition of waste. That produces landfill gas which is nominally about 55 percent methane, which is the fuel value, about 40 percent carbon dioxide, and 5 percent other balance

gases, oxygen, nitrogen, and some non-methane organic compounds, primarily. And most Florida landfills, most of the ones that I've seen that are large enough to support projects already have landfill gas collection systems in place or plan to be in place either because of Title IV and NSPS Federal EPA standards or because they're, frankly, environmentally motivated, and they're trying to be conservative in their planning.

So from a time-to-market standpoint that capital investment has frequently already been made either by the private landfill owner or the municipality that owns the site. And as somebody mentioned earlier, in round numbers about a million tons of waste in place, MSW waste, putrescible waste, not construction and demolition debris, not ash, produces around a megawatt of electricity. And I apologize, I don't know why this is -- oh, I know why.

And the technology for generating power from landfill gas is mature, it's reliable, it's been done for a long time. There are 220 sites in the country, and it's growing every year. I don't know if I can get up there. I don't have a pointer. Fundamentally, the power generation from landfill gas is very simple. The landfill gas typically is drawn into the landfill by a blower module that comes off the site through a series of collection wells and headers. That blower module puts a positive pressure on the landfill. The gas comes in

usually fully saturated with water. The condensate separator knocks out that water and as much of the water-soluble compounds as you can take out. The gas then goes from there to a series typically of IC engines, and these are -- in EDI's case, we have done containerized IC engines with an engine generator set inside a container, a cooling apparatus on top. And from this arrangement power is generated. The medium Btu engines are fueled by the landfill gas. We produce electricity.

The electricity is exported to the electric export module which has all the control mechanisms. That electricity is exported out to the grid. And any excess gas that isn't processed and/or any gas that would flow in a time either for scheduled or unscheduled maintenance would flow to a flare which destroys that gas and would otherwise be required to be in place anyway as part of the landfill's control mechanism.

Again, very straightforward, very mature technology. There is currently installed in Florida about 26 megawatts, and there is additional planned generation for about 32. Some of which I am proposing on, our company is proposing on. And the LFG generation capacity, that 143-megawatt number is -- it's better than anybody's guess, but it's less than perfect science. It really has a lot to do with waste inflow profiles, wind sites, and those sites that don't have collection systems, when they would install them, what the ability is to capture

incremental gas that may be processed now in an existing facility.

The environmental benefits are pretty clear. Avoided total emissions, displaced landfill emissions, avoided fossil fuel emissions, these are million tons of carbon equivalence and avoided mined coal, which I mentioned primarily because landfill gas facilities behave like base-load facilities. They are not dispatchable; they're must-run facilities. You can't store landfill gas at a landfill. So once you turn them on, you run them. And they are about 90 percent available typically, which is good for our industry. So they really behave like base-load coal facilities, and therefore, the ton of coal that isn't converted to power is also a ton of coal that isn't mined.

And as I mentioned before, I live in Pennsylvania, so coal mining has a lot bigger impact to us and West Virginia and the folks up there than perhaps it does environmentally here in Florida. As I mentioned, plant availability is quite favorable for a renewable resource with the exception -- well, I think without exception it's probably the best available renewable resource.

Total installed cost, $750 to $1,250 per kW. That would be for an economic project. The lower range would be for a very, very large project perhaps in a very favorable power market. I would say $900 to $1,100 would be about where the

industry is right now in most power markets. Time to market is also fairly attractive, 9 to 18 months, and I would say half of that time is represented by permitting uncertainty and interconnection uncertainty. If there are established tariff-based arrangements for doing interconnection, particularly for renewables, you can save a great deal of time that way. And similarly, as long as permitting is straightforward and is not challenged usually through public comment, 12 months is a very reasonable time to get these assets on the ground.

One of the things that a lot of people don't necessarily understand is that landfill gas permitting is a direct function of the landfill's permitting. The landfills have solid waste permits which specify, among other things, how they are to collect and destroy their landfill gas. A landfill gas facility requires a modification of that permit, which is very straightforward. And similarly, landfills have air permits. And those air permits also have to be modified or amended to account for a change in how you're destroying the landfill gas and if there are -- you know, the emissions that would be reduced through eliminating or reducing flaring and any emissions that would be generated through power production.

Zero water requirements, zero water discharge, pretty important in Florida. Similarly, siting issues. Obviously, no coastal siting issues, and with few exceptions landfill gas

facilities are on landfills which already have a known environmental impact to the community. Good or bad, it's known and it's understood, and therefore, typically generation facilities once people understand them are viewed positively as opposed to negatively.

Challenges to the market, and I may add a couple of other quick comments here, but financeable term power purchase agreements are critical. Seven to 15 years I would say are the bounds of the contracts that people need to put these kinds or any renewables on the ground and finance them. And one of the significant problems I think in this kind of market is, as a generator, I need to have that kind of contract on the sell side; rather, on the buy side for the utility. But the utility has little or no protection on the sell side with their customer. They certainly can't enter into a ten-year contract for a premium price renewable product. I'm not suggesting that you can solve that problem, but it's a serious impediment, I think, for the utilities to commit to go long on these kinds of renewable resources.

Interconnection issues are all over the map in every state, and in some places, they're very straightforward, in other places they're very challenging. If there's an opportunity to integrate the regional transmission grid even with respect to renewables, perhaps renewables deserve some kind of exemption simply because of their small scale and their

environmental benefit. To the extent that politically and technically people could get their arms around that, I think it would be a huge help.

In the absence of being able to do that, the issues that Mel Jones spoke about are absolutely critical. I mean, the opportunity to put a renewable resource into Florida's grid which is fixed in space and be able to sell it to -- if I put something in in south Florida and JEA wants to buy it, there really needs to be a mechanism by which to do that. And you can do contracts for differences, and you can do renewable tags and TRECs as long as there's an understanding in the marketplace that those are valid within the entire state.

And also, consumer education. I mean, a lot of people have spoken on it. It's absolutely critical. I've heard Green Mountain, who are very, very good marketers of these products, talk about it repeatedly. Market awareness is critical. And consumer protection is equally critical.

And just another kind of ancillary comment. As I mentioned Tallahassee, there's been a great deal of effort put forth in Florida by this CRS-sponsored stakeholders group for green accreditation of which I'm a member, and I've been a subcommittee member for biomass standards. And I think there are a couple of potential disconnects that at least the Commission would want to examine as to whether they're important or not. Some of them have to do with resource

content. If the Good Housekeeping seal of approval, as it where, includes or rather excludes explicitly, which it does, waste to energy facilities and existing facilities and the Commission were to include those in a recommendation to the Legislature, it does set up some confusion as to the credibility as to which of these resources are blessed as renewable and should there be some sort of hierarchy of, you know, what, good, better, and best, which gets very complicated for the consumer, I think.

Reliable standards is absolutely critical. And it's even more important if you sell tags as a way to get the renewable product to the customer because that's even more amorphus than electricity is. So there has to be some kind of standard that people can attach to.

A couple of quick pictures. This is a 2.7-megawatt facility which we put on the ground in Ohio last year. That requires about 1,000 standard cubic feet per day of landfill gas. For our company and I think for a lot of companies, that's the smallest project that an independent generator probably would tackle. On the other scale, this is a 14.8-megawatt facility also in Ohio commissioned last year, and this is on about 5,500 SCFM of gas. That's a very large landfill of which there are few undeveloped left in Florida.

Some quick propaganda about us which I needn't go over again. And I mentioned LMOP who was actually intended to

be here and speak in this spot today, but Chris Bole (phonetic) asked me to speak in his stead. They're an important resource. They're really the only entity that I know of that is an objective federal agency whose job it is to basically champion landfill gas as a resource and create and maintain a database for that information, which they're doing a very good job and a much better job of. And these two folks here are the people -- and I would urge you to contact them and provide you data and information that they have. And that is all.

CHAIRMAN JABER: Thank you, Mr. Wentworth.

MR. WENTWORTH: I appreciate your time.

CHAIRMAN JABER: Commissioners, do you have any questions?

COMMISSIONER PALECKI: Just one quick question. What is the effective life of a landfill, or do they just -- can you keep pulling off gas as long as garbage keeps being dumped on it?

MR. WENTWORTH: I'm glad you mentioned that because somebody mentioned earlier that these resources are sort of short-term resources. And I would actually take issue with that. If a landfill is open and if it's continuing to take in waste -- and I'll pick some planning numbers which we use. If a landfill is taking in 200,000 tons per annum of municipal solid waste and continues to do that, then it will continue to generate gas. Gas curves fundamentally grow over a certain

period of time for a unit of waste and they drop off. And a gas curve is a series of these little cells of waste creating this behavior. So as long as new waste comes, the light -- it really is arguably in perpetuity.

When you close a landfill -- and we have some projects on some closed landfills -- it's probably ten years. It may be 15, it may be 6. It's not a perfect science. There's a lot going on under there which nobody can really see, but as long as a landfill is open and taking waste, and I think that's where the real environmental benefit comes, then it's a very reliable -- certainly a 20-year from a planning perspective fuel source.

COMMISSIONER PALECKI: Thank you.

CHAIRMAN JABER: Commissioner Bradley.

COMMISSIONER BRADLEY: Yes. And what happens environmentally when a landfill discontinues to -- no longer continues to develop methane gas?

MR. WENTWORTH: Well, I can tell you what happens when a landfill closes. A landfill closes and EPA and DEP mandate certain postclosure requirements, which as I understand them are 30-year requirements, and gas collection and gas monitoring and air quality and all those things are incumbent upon the landfill owner and are bonded and all those sorts of things. As gas production drops off, physically nothing happens other than the methane emissions, if that isn't either

flared or processed, would decrease, but it takes a while, a long time.

CHAIRMAN JABER: Our final speaker this evening, Commissioners, is Deb Swim with LEAF.

MS. SWIM: Thank you, Chairman Jacobs (sic) for the opportunity to speak and thank you all for sticking it out all day. I'm really impressed and pleased. I just wanted to touch briefly two points. And we did make a presentation at the first workshop which I provided to you. I wanted to kind of make sure that you're thinking of both an RPS and a public benefit fund and not focus on one to the exclusion of the other. And the reason for this is that technologies vary in both financial readiness and technical readiness as well as, of course, environmental impact. And so you have to kind of be a tailor and fashion your policies to accommodate these variances.

For example, PV technology is technically ready but it's higher cost. And if you have it compete against landfill gas and an RPS without a set-aside for PV, you're not going to get any PV. PV also in terms of the environmental impact, you know, it varies too between biomass and PV. So, you know, a good tool for the less mature technology is whether they're less mature financially or technically is a public benefit fund because if does focus on transforming markets for those less commercially viable technologies.

For the more mature technologies, an RPS is a better tool because it basically, you know, captures -- allows competition between the technically ready technologies. Now, since PV is technically ready, you could include it in an RPS, but you would have to have a set-aside for it if you expected it to compete against the lower cost opportunities. So in terms of, you know, policy for technical readiness, RPS; financial readiness, PBF. And for environmental impact, there's been some interesting discussions about different tools, emissions registries, tradeable renewable energy credits, and, you know, I encourage you to consider these kind of mechanisms to be able to make -- to harness the market forces that we're all trying to do. That's my one point.

My second point has to do with money. Where are we going to get it from to move in a new direction? I encourage you to look at the potential for bill savings from energy efficiency investments. We can save money by improving building and equipment efficiency instead of building new power plants as we grow. We can use some of those money savings to help support these investments and clean energy that we all want to make happen.

If we can come up with a higher level of investment for state R&D and clean energy technologies -- and Florida is, like, the bottom of the heap with this. Our Florida energy office is pretty much depleted in funds. And the utilities

used to invite this a lot more, but with the pressures of restructuring, they really reduced their R&D budgets. And you can look at the measure. It's in the Energy 2020 experts' report. We're at the bottom of the heap nationally. If we can increase our federal -- or state R&D expenditures, we can then qualify for more federal R&D money. So I encourage you to consider that in the money arena.

And just to echo John Ryan's comments about distributed resource planning. Distributed supplies can be cheaper than central ones, and we as a state are not really doing that. We need to think about it more. And to echo the -- I guess it was Florida Sugar. You know, there are significant economic benefits from developing our in-state supplies. So I would encourage you to consider those money features. So thank you.

CHAIRMAN JABER: Thank you. Let me take an opportunity to close this out by thanking all of you, especially those that have stuck to the very end. You are in for a treat, though. Because you have stuck to the end, Jim can now announce what our future schedule is and our future intent for processing this initiative on behalf of the Legislature.

Thank you again. If you have any questions, the staff contacts are Jim Dean and Judy Harlow. I think you all know them by now.

Jim.

MR. DEAN: Yeah. Thank you-all for coming. I would like to just remind people to please sign up on the sign-up sheet, and we will put you on an e-mail list to notify you of the next meeting. We don't have a firm date yet, but staff's plan is to try to put something down as a draft document and let people have an opportunity to give us feedback. We're probably looking at the last of September to have that, but I need your name on the e-mail list if you want to get a notification of the time and place. So I'll leave it up here. And thanks again for coming.

CHAIRMAN JABER: Thank you.

(Workshop concluded at 5:45 p.m.)

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STATE OF FLORIDA)

: CERTIFICATE OF REPORTER

COUNTY OF LEON)

I, TRICIA DeMARTE, Official Commission Reporter, do hereby certify that the foregoing proceeding was heard at the time and place herein stated.

IT IS FURTHER CERTIFIED that I stenographically reported the said proceedings; that the same has been transcribed under my direct supervision; and that this transcript constitutes a true transcription of my notes of said proceedings.

I FURTHER CERTIFY that I am not a relative, employee, attorney or counsel of any of the parties, nor am I a relative or employee of any of the parties' attorneys or counsel connected with the action, nor am I financially interested in the action.

DATED THIS 12th DAY OF SEPTEMBER, 2002.

Tricia DeMarte

TRICIA DeMARTE
FPSC Official Commission Reporter
(850) 413-6736