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TRANSCRIPT OF PROCEEDINGS OF
ORANGE COUNTY CLEANTECH SYMPOSIUM SERIES

Date: November 5, 2008
Time: 8:00 a.m. - 11:55 a.m.
Location: UCF Executive Development
Center
36 West Pine street
Orlando, Florida
Reported by: Leslie Richmond, RPR

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Symposium # 1: Defining and Attracting Cleantech in Central Florida

November 5, 2008
University of Central Florida
Downtown Executive Development Center
Orlando, Florida

8:20 – 8:30am – Opening Remarks

Orange County Mayor Richard Crotty

8:30 -8:40am – Overview and Definition of Cleantech

John Lewis, Orange County Economic Development Administrator

8:40 – 9:00am – Announcement of Cleantech Study & Symposium Series

- UCF Venture Lab – Kirstie Chadwick
- UCF Institute for Economic Competitiveness – Dr. Sean Snaith

Acknowledgement of Symposium Series Supporters & Partners

- AEA – Maryann Fiala
- Metro Orlando EDC – Amy Dinsmore

9:00- 9:50am – Presentations by UCF Centers & Institutes Involved in Cleantech Development

- UCF Florida Solar Energy Center (FSEC) – Philip Fairey
- UCF Incubation Program – Carol Ann Dykes
- UCF Nanoscience Technology Center – Jeff Anderson
- UCF Advanced Materials Processing and Analysis Center (AMPAC) – Louis Chow
- UCF Center for Advanced Turbines & Energy Research – Jay Kapat

9:50 – 10:00am – Networking Break

10:00 – 11:00am – Cleantech Company Presentations

- Planar Energy Devices, Inc. – Scott Faris
- AquaFiber – Tom Bland
- STE, Inc. (Stormwater Treatment Environments) Marty Wanielista & Mike Hardin
- Petra Solar – Khalid Rustom

11:00 – 11:45am – Keynote Address

Sena Black, Vice President for Marketing and Strategic Planning, Enterprise Florida
“What Enterprise Florida is Doing to Grow the Cleantech Sector”

11:45 – 11:55am – Closing Comments

Agenda outline for the next three meetings – Sean Snaith & Kirstie Chadwick

P R O C E E D I N G S

1
2 MS. CHADWICK: Good morning everybody, and welcome
3 to the first of Cleantech Symposiums. We welcome all of
4 you and we're glad you came this morning. This is the
5 first of a series of symposium events that are being put
6 together by Orange County to focus on the Cleantech
7 sector and with a particular focus on economic
8 development efforts therein. As we'll see this morning,
9 there's a broad range of topics and an array of
10 technologies that all funnel under the broad definition
11 of Cleantech, and we'll talk this morning a little bit
12 about what Cleantech means, and I'm sure it means a
13 little bit different things to all of you here in the
14 audience. But today you'll hear from folks in the solar
15 industry, the battery industry, green roofs and some
16 other water retention type technologies, all of which
17 fall under this umbrella. But the broader mission of
18 these particular events is to bring all of the
19 stakeholders together that would potentially be
20 interested in helping define the Cleantech sector here
21 in Central Florida and participate in the definition and
22 creation of policies and programs and what not that will
23 promote economic development efforts in this particular
24 sector.

25 My name is Kirstie Chadwick. I'm the director of

1 the UCF Venture Lab. I have been asked by Orange County
2 to have my team charter these events. The main reason
3 that is the case is because the venture lab focuses on
4 very early stage technology companies, and we'll talk
5 more about what the venture lab is later on, but so much
6 of the economic development around the country, around
7 Cleantech, involves early stage companies, and that is
8 why the venture lab and incubator and some of the other
9 agencies at UCF are involved as well.

10 Closely related to this series of events is another
11 initiative being chartered by Orange County, and that is
12 a Cleantech study. For those of you who were around and
13 involved with our community back in the late '90's,
14 there was a comparable study done by Angela Angeloos
15 focusing on technology in general and clusters therein.
16 This is something somewhat comparable to that but with a
17 specific focus on Cleantech. That particular study is
18 being spearheaded by the UCF Institute for Economic
19 Competitiveness, which is led by Sean Snaith here in the
20 audience, and he'll be talking about that study a little
21 bit as well. The key point I'd like to make is both of
22 these efforts, both the series and the studies, are
23 being spearheaded by Mayor Crotty here in Orange County,
24 and today Mayor Crotty is here to share with us a few
25 words on why he feels so strongly about the Cleantech

1 sector and why it's important to our community. And to
2 introduce the Mayor, I'd like to bring on George Radon
3 who is the Mayor's chief of staff and also leads the
4 Center for Economic Trade and Tourism here in Orange
5 County.

6 George?

7 MR. RADON: Thank you, Kirstie. Thank you very
8 much. It's always easy for me to introduce my boss, the
9 Mayor. I have to do it right. If not, it may be the
10 last introduction I make. But many of you know Mayor
11 Crotty. He's been in office now eight years as the
12 Mayor. We've got two years left in the term. And I had
13 some notes prepared, but let me just talk from the heart
14 to you this morning. I remember when the Mayor was
15 first appointed by Governor Bush to replace then
16 Secretary of HUD, Mel Martinez, who went on to
17 Washington, and then now became, of course, Senator
18 Martinez. By the way, the Mayor has run twice since
19 then gaining over 70 percent of the votes, so it's safe
20 to say he's a popular mayor, but at the time he had been
21 appointed by the Governor and I went to see him, my job
22 as Director of Economic Development was an appointment
23 by Mel Martinez, and I told him, I said, this is a job
24 that Mel Martinez created. So I hinted about leaving
25 and going with the Senator or then Secretary Martinez to

1 Washington. And he said, no, no. You stay here and you
2 do what you've been doing but you do more of it. And I
3 had no idea that he really meant it. And now I am
4 honored to serve as his chief of staff. But a day
5 doesn't go by that Mayor Crotty doesn't come into my
6 office and say to me, what are we doing for economic
7 development, economic diversification. What are we
8 doing to help our local economy do better in these
9 trying times. I'm very lucky to have with me in my
10 office John Lewis who is really responsible for putting
11 this together, and for that, I thank you, John. But we
12 are lucky to have a mayor that really gets it in regards
13 to economic development. He talks about economic
14 diversification and he talks about his long tenure in
15 the Florida legislature when he was involved with the
16 early programs at UCF having to do with laser and
17 photonics and then the institute of modeling and
18 simulation. He goes that far back. He really is a lot
19 younger than the years suggest that he's been around.
20 But he has been involved in economic development a long,
21 long time. He's a graduate of the University of Central
22 Florida, a proud graduate of UCF. And I have probably
23 talked too much already, but it is my honor and pleasure
24 to introduce one of your biggest supporters in the area
25 of economic development, Mayor Rich Crotty.

1 Mayor?

2 MAYOR CROTTY: Well, thank you very much, George,
3 for that very kind introduction. I too have some very
4 nice notes here that I think that I will, like George
5 did, set aside and greet you by saying, good morning to
6 you. I have to admit, I'm a little tired this morning,
7 and you all probably are going to think that's because I
8 was up worried about or celebrating last night's
9 election results as the case may be, but that's not
10 really true. What I was celebrating last night was my
11 anniversary of being a public official for 30 years. It
12 was 30 years ago yesterday. And what a great run it has
13 been. So when I come here this morning in the spirit of
14 collaboration, in the spirit of partnership and working
15 together, I kind of have to think back to some of those
16 days of when I arrived in the state legislature. Of the
17 120 house members that were there, 28 were Republicans,
18 my party, so you had to collaborate, you had to be
19 bipartisan, and you had to reach across the aisle to
20 work with others. And that's what we have done as a
21 community, in my mind. So we thought that it was
22 fitting to put this group together, this partnership
23 together, to have a series of symposiums to talk about
24 where this community's going in the days ahead, building
25 on those great successes that we've had.

1 So the two -- there's two subjects I'd like to talk
2 about just for a few moments this morning, and that is
3 the area of collaboration, the partnership, and the
4 other is to single out one partner and talk a little bit
5 more about that and the role that that partner plays in
6 this community partner with Orange County Government.
7 First, we have had, it's safe to say, remarkable
8 successes, particularly the first seven or so years of
9 my administration, because that's when the real estate
10 market was booming, times were good, local government
11 was very dependent on property taxes and we just were
12 able to knock them out of the park in terms of
13 partnership. The life science cluster of the medical
14 city at Lake Nona was a partnership between the state,
15 the city, the county, the university, the Burnham
16 Institute, the federal government in terms of the VA
17 hospital. Not one partner could have done these things
18 without that kind of collaboration and partnership that
19 takes place. Same is true with the downtown venues and
20 a lot of the work that's done at the University. So the
21 list just goes on and on.

22 We are a region that is actually recognized across
23 the country as having something very unique. We have a
24 very fragmented structure here with two mayors, with
25 convention visitors bureau separate from the chamber,

1 separate from the economic development commission. It's
2 very fragmented. And yet we pull it together in that
3 sense of cooperation, in that sense of partnership. And
4 that's really what today's symposium is about is working
5 together on future successes. And as we look at our
6 community, we know that we have become internationally
7 famous as the No. 1 tourist destination in the world.
8 That is something that as mayor, I celebrate. In fact,
9 there was a headline lately quoting me saying that
10 tourism is king. And that remains true. But we are not
11 to be the great community of tomorrow unless we
12 diversify the economy. And we'll tell you that two
13 weeks ago a delegation came here from San Diego where
14 they have had some great successes in the high tech life
15 sciences type industries, not so much of a focus on
16 tourism, but they were truly amazed at the network
17 partnership that we have here. There were members of
18 the California assembly, a mayor, heads of their
19 economic development commission. The end meeting of the
20 trip was a benefit featuring the former governor, Jeb
21 Bush, and over and over again what we heard was this
22 thing about partnership that you've got going, we'd like
23 to bottle it up and take it home with us. That's really
24 what a symposium like this is about is how to explore
25 those partnerships.

1 The second thing I want to talk about -- I'll be as
2 brief as I can -- is that as you go through that list of
3 successes in Orange County, you really have to look on
4 this placard in front of me, the partnership with the
5 University. So many great ideas start in the academic
6 environment, and we have seen our university grow,
7 although not as mature as a lot of older institutions
8 with a lot of research grants and a lot of national
9 merit scholars, and the list goes on, but we are on the
10 road to becoming and emerging as one of the nation's
11 great universities because of that partnership component
12 that exists there. As you look at that medical city,
13 it's the medical school that really was one of the key
14 things to launch the partnership there. The economic
15 impact is huge in terms of almost a billion and a half
16 dollars just for the medical school alone, and its 6
17 billion dollar overall economic impact to the life
18 sciences there. George mentioned my days in the
19 legislature, and going back a long way, I worked for an
20 organization that actually did a lot of visioning
21 studies for the east side. That morphed into Innovation
22 Way. I was involved, and it's -- sometimes it's better
23 to be lucky than good, but I was very fortunate to be on
24 the house appropriations committee. When the University
25 approached me in the 1980's and said, we've got these

1 two little amendments we'd like to you slip into the
2 budget, one created something called Creole and one
3 created something called the Institute for Simulation of
4 Training. Who would have known back in the middle
5 1980's that we would have such huge successes in those
6 areas. Who would have known when I worked for STEP,
7 Solutions To Effective Planning, and we were talking
8 about east side high tech development and what amounts
9 to new urbanism back then, that we would have actually
10 now created a canvas on which to fill in the blanks or
11 fill in the space, I think, between the University
12 Activity Center with the Research Park and the Airport
13 Lake Nona Activity Center with life sciences.

14 So what's the next big thing? Where do we go from
15 here? Life sciences, simulation, laser research,
16 aerospace and defense, aeronautics. The list goes on
17 and on. I believe it is Cleantech. I believe that if
18 we are to truly diversify our local economy further than
19 we already have, and me -- what I called in my first day
20 of the county speech, the statement that we needed to
21 raise the average wage in Orange County to above the
22 average wage in the national level, that we need to
23 continue that push forward with economic
24 diversification. I think that's what's going to make us
25 the community of tomorrow. And Cleantech is right at

1 the top of the list. So as you all talk about the
2 various sciences that are there from solar, wind, the
3 list goes on and on, you know what it is, have a keen
4 eye on the role that the University can play first. I
5 would hope that just as the University led the way in
6 simulation, led the way in photonics and laser research,
7 that it would partner with us as we're going today. In
8 terms of Cleantech, I really do think we're on to
9 something here. I think that we can make our mark as a
10 community to further diversify our local economy,
11 further go down the road to greatness in the days ahead.
12 We'll do that with you all's help. So think hard, work
13 hard, collaborate, talk to each other. These are going
14 to be, I think, exciting meetings that you are going to
15 have and I personally want to thank you for the role
16 that you are playing because I think this is very
17 visionary of you all to be here today and talk about
18 what our future is going to look like for our kids and
19 grandkids.

20 Good to be with you today. God bless you.

21 MS. CHADWICK: At this time, we're going to do some
22 logistical changing here, but while we're switching
23 slides, I would like to recognize some folks that are
24 with us. First of all, you may have noticed our camera
25 men. We have Orange County TV videotaping all of these

1 series and, obviously, today as well. And then in
2 addition, we have Leslie here in the front row who is a
3 stenographer who's taking copious notes. I don't know
4 how they do that. That is very impressive. Somehow
5 they get every word in there. But all of the series of
6 these events will be videotaped and dialogued and
7 documented and what not. In addition, the ones -- the
8 three that are coming up, they'll be fully facilitated
9 and what not. We are proactively garnering input from
10 all of you as well.

11 At this point, I'd like to introduce John Lewis.
12 For those of you who don't know John, John is an
13 incredible resource for us out at UCF. He has so much
14 to do with the partnership between Orange County and
15 UCF. I could probably spend the entire morning raving
16 about John and all of his efforts therein behind the
17 scenes at Orange County. John is going to come up this
18 morning and chat with all of you about some of the
19 details of Orange County's Cleantech efforts and talk a
20 little bit about his definition of Cleantech, and,
21 hopefully, we can work that out as part of our agenda
22 today.

23 John?

24 MR. LEWIS: Thanks, Kirstie. It's wonderful to see
25 so many people out for this first symposium. We are

1 launching two initiatives today. One is the Cleantech
2 study that Shaun Snaith is going to be talking about.
3 The other is the Cleantech symposium. A lot of cities
4 -- I won't say a lot of them. At least 10 or 12 cities
5 from San Diego and New York State and California have
6 completed Cleantech studies looking at their assets and
7 capabilities. One thing they didn't do, though, is
8 begin round tables and discussions about how to
9 implement some of the steps in the plans that they
10 developed until the Cleantech study was done. We looked
11 at those communities, we learned from them, and what
12 we're doing is doing the Cleantech study and the
13 symposium series simultaneously so that the study can
14 benefit from the input from the symposium participants,
15 and later on, the study can present some ideas for
16 discussion in the symposiums. So this is done a little
17 differently. I think it will be a lot more efficient
18 and we'll have a lot more product.

19 I want to say one thing before I begin my formal
20 remarks. I've been here 15 years, and 15 years ago,
21 economic development meant the metro land of EDC, the
22 Research Park at UCF. There was a Department of
23 Commerce at the state. That was about it really, and we
24 didn't have much support in terms of economic
25 development from the Department of Commerce at the time.

1 Over the last 15 years, we've added a lot of
2 organizations and entities as integral parts of the
3 Orange County development strategy. This includes the
4 venture lab, the institute, the technology incubator,
5 the advisory board council that you might know about,
6 the Disney entrepreneur center. The list goes on. The
7 High Tech Corridor Council. As we move ahead to sort of
8 the next stage of economic development, there is another
9 whole list of organizations and entities that need to be
10 brought in as an integral part of our efforts. They've
11 been out at UCF for a long time, they just haven't been
12 integrally involved in our economic development efforts.
13 I'm talking about the Nanotechnology Center, the Center
14 for Advanced Materials Processing and Analysis, the
15 Stormwater Management Center, all those institutes and
16 entities at UCF that are so important to us if we really
17 want to grow Cleantech in this community. So we're
18 expanding the involvement in our economic development
19 efforts.

20 This is a very important meeting for us today.
21 When Mayor Crotty asked us to undertake these
22 initiatives in February, I honestly never heard of the
23 word Cleantech. I went looking around and was surprised
24 that I saw a study from San Diego where they had done
25 their study. New York, Boston, Austin, everybody seems

1 to be talking about Cleantech. We're a little bit
2 behind actually in terms of getting on the bandwagon for
3 this, but as you see from the technology incubator and
4 other entities in Orange County, when they started,
5 other cities also had those things. But our technology
6 incubator, as an example, rose to become the No. 1
7 business incubator in the United States in 2004. So we
8 may be starting a little bit late, but we, in doing
9 that, have the benefit of looking at all the work in the
10 other communities that have come before us and learning
11 from that so that we can do better, and we will move
12 ahead.

13 I want to start with the definition of Cleantech.
14 There is an organization called the Cleantech Network.
15 It's the premiere organization for Cleantech in the
16 world. Most of the definitions of Cleantech are taken
17 from the Cleantech group's definition, and there's a
18 long description of that on their website. There is one
19 sentence that stands out, and it's important to kind of
20 read it and think about it because it is -- there is no
21 SIC codes for Cleantech. It's kind of everywhere. It's
22 kind of mercurial. It's across all economic sectors
23 and up and down the ladder. The Cleantech group defines
24 Cleantech as new technologies and related business
25 models that offer competitive returns for investors and

1 customers while providing solutions for global
2 challenges. That's fine. That was about the most
3 concise definition of Cleantech that I saw, except that
4 I wondered about things when I looked at this
5 definition. Competitive returns. What does that mean?
6 Providing solutions to global challenges. What does
7 that mean? One other thing that you read about as you
8 look through all the literature and studies on Cleantech
9 is the word innovation. I really don't see that in this
10 definition. So there is another definition by Ernst and
11 Young that really is the same as this but I think is a
12 little more explanatory. And that definition reads --
13 it is from Cleantech Matters Publication for Winter
14 2008. Cleantech encompasses a diverse range of
15 innovative products and services -- keyword, innovation.
16 And as I read through there, I underlined the keywords
17 like innovation -- that optimize, that reduce negative
18 environmental impact of their use, improving efficiency
19 or providing superior performance. So I see green in
20 there, optimizing our use of natural resources, reduce
21 the negative impacts on the environment. I see
22 innovation in there and I see value added. So I can
23 start to remember that. You want to come up with a
24 definition of Cleantech that you can kind of remember
25 and say to people as you go along. So looking at the

1 keywords in this sentence, what I came up with is this
2 definition of Cleantech, an easy to remember definition,
3 a formula. Cleantech is equal to green plus innovation
4 plus value added. Clean is more than green. So that's
5 what I kind of carry around in my head, and that might
6 be useful to you.

7 By the way, you don't have to write anything down
8 from this. It's all on a resource guide that I think
9 you all received when you came in. This has over 800
10 links to Cleantech related websites organized by topic
11 and category with narratives at the beginning of each
12 section sort of summarizing all of it. There's a list
13 of Cleantech companies in Metro Orlando that we know
14 about and the organizations that support them. There's
15 a list of all the videos on Cleantech lectures and
16 conferences and seminars on U-Tube. So there is quite a
17 lot of information on here that I think you'll find
18 useful as you participate in this seminar series. There
19 are also 46 studies and reports in pdf files on this
20 disk. So a lot of it is right here when you want to
21 look at Cleantech a little further.

22 Going beyond the definition, you ask yourself, what
23 is Cleantech economic development then? What's the
24 definition of that? Well, I skipped a slide. These are
25 the industry segments of Cleantech, and you can see

1 that, as I said, it covers every sector in the economy
2 and it ranges from, looking just here at Metro Orlando,
3 the latest solar technology that's being developed,
4 green roofs. I even ran across a company here the other
5 day that manufactures conversion kits for dryers that
6 reduces the energy use of dryers by 50 percent and
7 speeds up the drying time by 41 percent. I thought
8 that's a good example of Cleantech. Sort of a different
9 kind of Cleantech company.

10 When I shared this with some people in our
11 environmental protection department, they said, well, we
12 ought to -- when we go to seminars, we hand out clothes
13 pins. So we have a lot of different perspectives going
14 into this area that we're talking about. But the
15 definition of Cleantech that I propose as a starting
16 place is for economic development purposes, attracting,
17 creating and growing the innovative high value companies
18 that produce the products and provide the services that
19 will allow us and the rest of the world to go green. I
20 think that says it. That's sort of our mission when it
21 comes to economic development. You may have a different
22 slant on that. If you do, even just a simple note, a
23 comment, I think on the back of one of the forms you
24 received this morning, there's a space for you to write
25 that. Write down some comments as you go along this

1 morning and pass them to us. We'll incorporate that all
2 into the study in the symposium series.

3 I added the words high value because when it comes
4 to economic development, we are looking at companies
5 that potentially will have a decent capital investment
6 so that we can increase our tax base. We're looking at
7 companies with high wages. Economic development is not
8 everything, it's focused, and this is one way to focus
9 our efforts. If you look at this definition, then
10 probably retail and wholesale outlets that sell
11 Cleantech products would not be considered Cleantech.
12 And people who are PV installers, a PV installer company
13 that goes out and installs them, they might not be
14 considered as Cleantech according to this definition.
15 The company that makes the solar panels actually would
16 be considered Cleantech. When you want to see what's
17 coming in the area of Cleantech, according to the
18 experts at Cleantech.com and other places, you look at
19 venture capital, because that, according to the experts,
20 is a lead indicator of future flows of mainstream
21 investments. It also predicts rapid growth and entirely
22 new sectors and industries. Cleantech has been growing
23 at the rate of 50 percent since 2001. A report just
24 came out this month, this past month, with another
25 record breaking quarter for investments in Cleantech.

1 Another indicator of the importance of Cleantech is
2 something called the Cleantech index, which I didn't
3 know existed up until several months ago. It's the
4 index of the American Stock Exchange for Cleantech
5 Industries. And this is a chart that I took off of --
6 or made, developed, out of my E*Trade account, and you
7 can see the Cleantech index compared with the S&P 500
8 and the NASDAQ. I could have put the Dow Jones on
9 there. It says the same thing. But looking at the
10 starting place in 2004, zero, where would you have
11 rather put your money along the way during the past
12 year. I mean, all along the way, Cleantech is valued
13 and is growing at a much higher rate than everywhere
14 else.

15 Now, I went back and looked at a book I have called
16 How To Lie With Statistics to see if I was really doing
17 something that I should do here, and this is accurate,
18 but it really doesn't tell the whole story because you
19 notice I ended in March. As of today when you look at
20 Cleantech, that's the whole story right there. But, I
21 mean, looking at this chart, when things turn around and
22 start to grow again and looking at the record
23 investments that even quarter by quarter up until now
24 are going to Cleantech, I mean, where would you put your
25 money going forward coming out of the recession and the

1 downturn. I think Cleantech.

2 There's a lot of things we can do when it comes to
3 Cleantech economic development. These are just a couple
4 of quick ideas that in future seminars you'll be
5 presented with some of these through the Institute for
6 Economic Competitors at UCF, but here's a couple of
7 things in the future as we get a handle on understanding
8 what Cleantech is that we might do. In San Diego, for
9 example, they have a fund, a Cleantech initiative fund,
10 where they offer researchers at the university there to
11 come up with some promising ideas in Cleantech. And
12 it's -- the money can be used to develop a prototype or
13 a proof of product study, and they just this month
14 handed out three \$50,000 grants to the researchers.
15 This would not be something very expensive that we would
16 have to do. 100, 200, \$250,000 funds that would provide
17 some start up assistance to our Cleantech companies.
18 That's a possibility. Should we do that instead of some
19 other things? But there's a lot of things we could do.
20 This is one of them. Another one is the solar cities
21 program. You'll hear more about this as the months
22 progress here. Orlando was selected as one of only 25
23 cities in the United States as a solar city. And the
24 purpose of the solar cities program is to encourage the
25 early adoption of solar technologies. And there will be

1 a whole group led by Jennifer Zarro (ph.) at OUC that
2 will be going down this path and responding to the grant
3 money that they received to do this. And they're going
4 to be coming out and looking at different policies that
5 might be implemented that would encourage the growth of
6 Cleantech and sometimes, in effect, determine a demand
7 for Cleantech. That's one thing. That's another thing
8 that we could do.

9 Finally, we could build a Cleantech city down in
10 Research Park South. I mean, I've heard people at UCF
11 talk about the need for a dedicated incubator building
12 for years. They're building Cleantech business
13 incubators now. Some of them are incubators with
14 (unintelligible), like in Austin, some of them are
15 actually Cleantech business parks as in Finland and
16 Singapore. This is actually a 1.8 million square foot
17 building. So we need to think big, I guess. And
18 actually this building is Infomark in Dallas, which is
19 really sort of a technology oriented environment if
20 you've ever been there. A lot of telecom and technology
21 on display. And one of the things we hear from
22 Cleantech companies is that, in addition to everything
23 else we can do, what they want and what we hear is a
24 place to showcase their technologies. Why can't we
25 build actually a showroom facility to display

1 technologies in a new Cleantech city in Innovation Way
2 at Research Park South. That's just an idea.

3 The first idea that's from San Diego is a little
4 less expensive. This maybe is a little long term, but,
5 you know, this is something that makes sense. We need
6 to think about it, start talking about it now. The idea
7 from San Diego just didn't pop out of anywhere, the idea
8 for this Cleantech initiative challenge grant program,
9 it came from their Cleantech study, and that's the cover
10 of the study to your left. But other cities in place
11 also have done Cleantech studies creating the California
12 Cleantech cluster. It's a statewide study. It's been
13 updated twice since it was first published in 2004. San
14 Jose's green vision. Some other ones. In case you
15 can't read it, the one in the middle is capitalizing on
16 green. Fostering Canada's Cleantech entrepreneurs.
17 That actually was an effort that resulted in a whole set
18 of recommendations to promote Cleantech in Canada. So
19 there's a lot of ideas that can come out of all these
20 studies, and Shaun and the Institute will be presenting
21 some of them to you as we move forward. But looking at
22 the promise of Cleantech and looking at what we can
23 accomplish, it would be a new economic cluster. We have
24 entertainment in a convention cluster, simulation in
25 training, we're developing a biomedical cluster. This

1 could be the next new economic cluster. This certainly
2 advances our goal of economic diversification. If you
3 look at Cleantech jobs and green jobs, anything you
4 read, look through the resource CD, it's going to create
5 thousands of jobs, and the important thing about those
6 jobs is that they are jobs at all levels of the economy
7 and all geographic areas throughout Orange County and
8 Metro Orlando. So this has a great potential for the
9 future economic development of our area.

10 So, in closing, just remind you that the buzz word,
11 the wash word, is Cleantech. It could be our next new
12 economic cluster. We have a lot of partners involved
13 with this. Others that we just didn't have room on the
14 slide to put everyone's logo on it, but I think you get
15 the idea. So I hope that gives you a capsule of just
16 kind of what Cleantech is, how important it is, how do
17 you look and see what the potential of it is by looking
18 at what is happening in the venture capital area and
19 looking at some of the ideas that we might be talking
20 about in the coming weeks and months. So it's very
21 exciting for us in Orange County to be able to do this
22 and it's exciting for us to have a lot of you involved
23 in this. And we are listening to what you say. It's
24 all being recorded by Orange TV. There will be a
25 written transcript of every word of this symposium that

1 will be provided to Shaun for input into the Cleantech
2 study. So we're trying to do things right, and with the
3 venture lab and the institute at the center of things, I
4 know it's going to work.

5 Thanks.

6 MS. CHADWICK: All right. Next up would be Shaun
7 Snaith who is spearheading the study that we've been
8 chattering about now here for the last half hour or so.
9 Shaun's going to come on up and provide some further
10 details of what the study's all about and then also
11 share with all of you some of the things he potentially
12 needs from all of you as we go through these series of
13 symposiums here over the next few months as well. So
14 with that, Shaun Snaith.

15 MR. SNAITH: Thank you. Good morning. While the
16 economy's slipped into recession most certainly and I
17 think that makes the mission of what we've all gathered
18 here to do today that much more urgent, the importance
19 of diversifying the economy to continue to grow various
20 sectors will allow us to endure not only the current
21 downturn but future downturns, and I think that's one of
22 the great things about being part of this Cleantech
23 initiative is it is the next big thing, I think, for
24 Orlando. We've seen wonderful things that have
25 transpired with the biomedical cluster, and the notion

1 of partnerships, you know, just to reiterate what the
2 Mayor said, I speak all over the state and in different
3 parts of the country, and people are singularly amazed
4 at what's gone on here in Orlando and how the university
5 and the county and the private sector have combined and
6 catalyzed one another to lead to just really some
7 amazing progress on the economic development front,
8 which typically you might think of as glacial or very
9 slow moving, decades-in-the-making type process. You
10 know, what people see here in Orlando is really more
11 cataclysmic than it is glacial, so we're happy to be
12 part of this.

13 John's provided you with the disk. He said there
14 was 800 links or documents. If anyone has a chance to
15 go through those and happens to be looking for work, see
16 me after.

17 The Cleantech study is basically a primer, a
18 starting point, a benchmark document that all of us are
19 going to collaborate on and produce, and it will be
20 something of a starting point to launch us into this
21 economic development initiative. And there are a
22 variety of components to this study, and as we go along,
23 we'll present, you know, this work in progress, get your
24 feedback to it, your input, your suggestions, and it'll
25 be something that I think we will both collectively

1 shape into something that hopefully will be quite useful
2 when it's complete.

3 About the institute, this is our mission statement.
4 We're kind of always forward looking, trying to figure
5 out what's around the horizon, which has become
6 exceedingly difficult as of late, but we're pleased to
7 be part of this effort in trying to shape and understand
8 what's next for the region's economy.

9 I have a couple of students here, Amanda and Laura,
10 who have been working very diligently on Cleantech and
11 trying to educate me as to what Cleantech is and what's
12 going on in other parts of the country, and we've broken
13 down the study into phases. These are not necessarily
14 temporally sequential, I think some of them are going on
15 at the same time, but to give you some sense of what the

16 components of the study are at this point, at the point
17 of conception. And that certainly could change. And we
18 might find as we go through the symposium that we do
19 need something else in there, another section. And the
20 definition is a starting point, and John pointed to it.
21 We pulled this one here from the Cleantech group that
22 John alluded to. And it's not in the dictionary. The
23 definition of Cleantech does vary, and it is a work in
24 progress, and we need to decide on what exactly it might
25 be, but, you know, this diagram, I think, solidified

1 some of these notions that, at least for me, were a bit
2 fuzzy in terms of what is the relationship between green
3 and Cleantech. And you can see, and the print's pretty
4 small, there is an intersection in the two, and both
5 have to do with the environment and ecological concerns.
6 But clean technology, as opposed to just green
7 technology, clean technology is market driven, profit
8 motive, the thing that I know as an economist I can
9 always count on being there; whereas, you know, green
10 efforts might be driven by regulatory issues, and we
11 know those can change from one administration to the
12 next.

13 So Cleantech has that market component to it that I
14 think this time around -- and some of us were chatting
15 earlier on, you know, unlike the '70's when, you know,
16 there was the first talk of all these alternative
17 energies and ways to wean ourselves off of foreign oil,
18 kind of crumbled away. I think there's a real market
19 motivation this time around that's going to make --
20 despite what's happened recently to oil prices, that
21 we'll see some permanent affects from the recent spike
22 in energy prices. And I don't think this is going to be
23 a passing fancy. Cleantech investments, venture
24 capitalists, John mentioned, is an indicator of -- a
25 predictive measure of what's to come. Globally, 6

1 billion in the U.S., 3 billion in venture capital
2 investments in Cleantech industries in 2007. John
3 mentioned several of the Cleantech clusters that exist
4 around the U.S. You know, various programs and policies
5 which we will jointly hope to form and suggest and take
6 the best of what's going on in other areas and make it
7 our own. The California million solar roofs initiative,
8 3,000 megawatts of electricity by 2017 is an example of
9 one of these Cleantech initiatives.

10 What are the constraints that we see upon our
11 initial examination in existing Cleantech hot spots?
12 Well, one has to do with financing, and I guess that's
13 probably not a constraint that's unique to the Cleantech
14 industry, but because of the nature of some of these
15 technologies and the long time horizons that might need
16 to be played out, there may be some unique needs here
17 for Cleantech when it comes to acquiring venture capital
18 that might typically seek a more faster return on
19 investment. And that may be one of the areas that we
20 want to focus on to try to ameliorate that problem for
21 Cleantech start ups.

22 You know, what are the Cleantech jobs? What -- you
23 know, what are the current ones, what are future
24 occupations that will be created hopefully under this
25 initiative. And as John said, it doesn't map very

1 neatly to a list of industrial codes. So it's something
2 we're going to have to work with and think about and
3 come up with on our own. And here's just an example of
4 some Cleantech jobs there. You know, the guy picking up
5 vegetable oil that's going to be converted into
6 biodiesel, or a green building manager. Whereas, you
7 know, in the past, a hammer and a ladder might be all
8 that person needed, well, they're going to have to have
9 some more sophisticated skills in the future to handle
10 the systems that might be involved in green buildings.
11 Green collar jobs. This was a notion of maybe
12 traditionally blue or white collar jobs, but that are
13 tied in somehow to the Cleantech industry. And, you
14 know, the trucks that are driving around installing
15 direct TV satellites now that you see everywhere in the
16 future, you know, we would expect to see similar type
17 fleets but they're installing solar panels on homes.

18 In the study, we're going to kind of analyze the
19 market, see what's here, talk -- you know, figure out
20 the companies that are involved in the Cleantech
21 industry, whether they're located here, basic companies
22 that are exporting product and creating jobs, or if
23 they're just working here from outside of our region and
24 doing business and could be classified as non basic.

25 We want to look at what the potential growth is for

1 Cleantech, look at the resources and the environment,
2 what it is about the region that can help this industry
3 flourish, what it is about the region that might be a
4 potential constraint. And that, too, will be part of
5 the study.

6 We also want to have a listing of the Cleantech
7 companies that are working in the region and provide a
8 database that will continue to update as it evolves, and
9 this is, again, one of those areas where we'll need to
10 get some feedback from the community to make sure that
11 we -- you know, no Cleantech company is left behind and
12 is not on this list. And the institute will maintain
13 that and update it as we go through this process. We
14 also want to provide a list of resources for current and
15 future Cleantech companies. Banks that might have
16 specific missions that are amendable to the Cleantech
17 industry. Organizations like the EDC, of course, or the
18 high tech council corridor that provide other resources
19 and support for these industries going forward. So
20 we'll want to have that in this reference guide as well.

21 And just in conclusion, we do look forward to
22 working with the county as always, but also with you in
23 the community in making this study something that's
24 going to be a very valuable resource going forward.

25 Thank you.

1 MS. CHADWICK: Thank you, Shaun. I'm actually
2 next, so while my slides are getting queued up, we'll
3 take this moment to recognize two of our sponsors. I
4 would like to say that I was greatly helped more than
5 you can possibly imagine by several folks that are here
6 in the audience and also running around here, but I
7 would like to start off by thanking Maryanne Della with
8 the AeA. AeA was founded in 1943 by the founders of HP.

9 It's a trade association that protects the interests of
10 the technology industry of the government, at all levels
11 of the government. For the purpose of time because I've
12 got this nice big old long dissertation of what they do
13 here in front of me, but with respect to Cleantech in
14 particular, they do quite a bit of public policy and
15 lobbying in three key areas. First of all, they focus
16 on technologies that are in the -- related to
17 efficiency. So in particular, technologies that support
18 the improvement of the use of natural resources while
19 maintaining and improving performance of cost of those
20 resources. This includes things that we all probably
21 use everyday but don't think about. Things like
22 teleworking, broadband deployment, energy efficient
23 semiconductor chips, all of these -- save gas because
24 people aren't driving, they're working from home and
25 things like that. So those sorts of technologies.

1 Second area of focus for AeA is energy, which is an
2 obvious given here with the Cleantech sector. In
3 particular, they focus on R&D tax credits and those
4 sorts of programs and policies going on, again at all
5 levels of the government. They focus on technologies
6 that -- for later stage of energy efficiency and
7 exploration of alternative and renewable energy
8 technologies. That includes, of course, battery, solar,
9 wind, water, fuel cell technologies. And, lastly, the
10 AeA focuses on policies that focus on our environment,
11 and specifically the AeA supports industry and
12 government initiatives and responses that increase
13 responsible environmental recycling and offer proactive
14 environmental design initiatives on behalf of the high
15 technology industry throughout our country.

16 I don't believe Maryanne was able to make it today,
17 unfortunately. I do want to articulate that she was an
18 incredible resource. All the registrations that you
19 guys went through online, all the website support, all
20 of the e-mail blasts, those were coming from her team.
21 So thank you to her. I'm sure she'll be at the next
22 one.

23 The next organization I'd like to recognize would
24 be the Metro Orlando Economic Development Commission. I
25 believe here I see Amy. Hello, Amy. Thank you. Amy

1 worked very closely with Christa Santos who's over here
2 who I am graciously thankful for. Really all of this
3 came to be because of Amy and Christa and Maryanne's
4 efforts.

5 Also here, I believe, is Mike Bobroff, he's back
6 there, the executive vice president and COO of the Metro
7 Orlando EDC. The Metro Orlando EDC is a not-for-profit
8 public private partnership that serves Orange, Seminole,
9 Lake and Osceola counties, as well as the City of
10 Orlando. EDC is dedicated to meet the needs of today's
11 industries in creating a competitive and economic
12 climate where businesses like all of ours here in the
13 audience today can thrive. To meet this goal, the EDC
14 provides key services and support, which range from
15 relocation and expansion expertise, to export counsel in
16 long term planning with community partners. Again,
17 thanks, Amy, thanks, Bob, for providing your resources
18 and your team, and we're really glad you guys are
19 helping us out here.

20 So with that, I'm going to kind of flip over into
21 my other role, which is now the director of the venture
22 lab instead of the MC of this event. And I will try to
23 blow through my slides because we're a little behind,
24 obviously. For those of you who don't know who we are,
25 you can catch up with me here on the back end to learn

1 more about us.

2 The venture lab is a joint effort. Again,
3 partnership is a founding value of the University of
4 Central Florida and it's been brought up many times.

5 We are a great case study of partnerships coming
6 together. It was a joint initiative, we're four years
7 old this year, between the UCF office of research and
8 commercialization, the college of business, Orange
9 County Government, of course, and the Florida high tech
10 corridor council. These agencies came together and felt
11 there was a need for some supplemental support for early
12 stage, the earliest, earliest stages of companies. We
13 finally call it the primordial soup stage of start ups.
14 And our mission is to provide early stage entrepreneurs
15 with access to experienced business coaches that have
16 been there, done that, that have been in the shoes of
17 start up entrepreneurs, and we're here to assist these
18 folks in the early stages of their businesses and walk
19 them through the steps that are critical for the success
20 of their firms.

21 Our team consists of two separate -- well, not
22 separate, they're obviously a team, but they're two
23 types of folks. First of all, we have a group of what
24 we call been there, done that, start up executives. We
25 have -- the number that we have ranges. We call it the

1 Hotel California model because coaches come and go as
2 they leave to go run companies and they come back for
3 their next adventure. But right now we currently have a
4 team of seven coaches. Between us, we've founded or
5 been in the earliest stages of executive teams of 15
6 technology companies. We've raised over 200 million
7 dollars of venture capital collectively. Between us,
8 our companies have done IPOs, we've done MNAs, and we've
9 all failed at least once, which is pretty much required
10 to carry the wounds, if you will. All of us have
11 engineering degrees. That seems to be the norm for
12 technology start up executives. And we also have in the
13 venture lab, and we'll talk more about that in a minute,
14 specific expertise in fuel cells, hydrogen energy and
15 Cleantech.

16 In addition to our coaches, we have a group of
17 student interns and we do carry the banner of UCF
18 because that was our founding organization, of course,
19 but I would like everybody to understand that we have
20 students from Barry University and Rollins now on our
21 team as well. These students are the workhorses of the
22 venture lab. They do all the market research, they do
23 competitive analysis, they do patent searches, they do
24 all kinds of stuff to help new entrepreneurs make sure
25 that their business plans and, you know, their

1 strategies and what not are the best they can be.

2 Basically what we do, we spend an awful lot of time
3 rolling up our sleeves with entrepreneurs. We help them
4 write their business plans, we help them, you know, vet
5 their financial statements. We teach them how to do
6 this stuff, we teach them how to pitch investors. We do
7 focus only on technology companies, and we specifically
8 focus on companies that are going after angel or venture
9 capital. Those are those high growth companies. If
10 they can attract that sort of capital by definition,
11 they're a high tech company that can create jobs in the
12 region. On the side note, we also put on workshops.
13 SBIR is a big source of dollars from the federal
14 government. We put on workshops twice a year and we
15 also put on educational seminars for angel investors in
16 our community through the Kaufman Foundation as well.

17 Our profile is pretty much any early stage
18 technology entrepreneur. We spend a lot of time with
19 the faculty, of course. Not just at UCF, but anywhere
20 in the high tech corridor, so that would be the
21 University of South Florida, Gainesville, what not.
22 Obviously, students are a key focus for us as well. The
23 backs of many -- most of the major playing start ups
24 that you guys have heard of, Google and Deck and what
25 not, those all came off the backs of students from

1 university and innovative economies throughout the
2 country.

3 And, of course, we focus on entrepreneurs that have
4 nothing to do with UCF. I don't think people realize
5 that. Actually, the majority of the folks have nothing
6 to do with UCF. They are just entrepreneurs out there
7 starting companies.

8 In addition to our team -- I'm sorry, the -- yeah,
9 the services that we provide with our team, we have been
10 very fortunate to have garnered a relationship with the
11 Winter Park Angels, which is a relatively new investment
12 angel group here in Central Florida. The venture lab --
13 I am now also the executive director of the Winter Park
14 Angels on behalf of the venture lab, because we
15 basically do all of the screening of companies, we vet
16 those companies, we do market research, we do
17 competitive analysis, we select which companies go in
18 front of the group. We do not make the decision to
19 invest in them, that's what the group does, but should
20 they be interested, then we'll run all the due diligence
21 and negotiate term sheets and run the transactions
22 through on behalf of the group. So a lot of work
23 therein. And all the interns spend quite a bit of their
24 time also helping in that capacity.

25 Since we started this relationship in January,

1 we've already brought 15 technology companies in front
2 of them, in front of the group. We focus all over
3 Florida in this particular capacity, not just Central
4 Florida. But the first investment happened just a few
5 weeks ago. It was in the paper. And there's two or
6 three other deals now going down the path as well. All
7 of them, by the way, in Central Florida.

8 Okay. So our metrics, real quick. Since we
9 started, we've assisted over a hundred technology
10 companies. Remember, we're very, very early stage, so
11 many of these are folks that are in the most earliest
12 stages of their business planning. But four of the ones
13 that we're currently helping today are established,
14 doing around a million dollars in revenue. The majority
15 of them are in the idea or contact stage, and seven of
16 them are UCF faculty spin outs. We have assisted these
17 faculties in winning over 3 million dollars in SBIR
18 funding, and we now -- again, it takes 12 to 18 months
19 for companies that come in with an idea to come out the
20 back end with their first round of funding. We're proud
21 to say that the first two finally came through in the
22 last month or so with their first round of seed capital.

23 With respect to Cleantech, which is what we're all
24 here for, the venture lab is specifically coaching and
25 mentoring six very early stage Cleantech companies, all

1 of them, again, in the early stage and looking for the
2 first round of capital.

3 Winter Park Angels also has a preference for
4 Cleantech. They have clearly stated that. So when
5 Cleantech companies do come through the venture lab, we
6 put quite a bit of effort around them trying to get them
7 ready and to be looked at by investors in the region.

8 I'd like to also introduce Dr. Shaun Christianson.
9 He's here in the audience. He's my partner in crime in
10 the venture lab as well as several of the other folks
11 here in the audience. Shaun joined the venture lab
12 team, what, a couple months ago now. He has specific
13 expertise in fuel cells and hydrogen energy. He was
14 helping Governor Bush a few years back in his hydrogen
15 policy initiatives, and he was part of the Florida
16 Energy Commission Advisory Group as well. In addition,
17 Shaun is a member of the Winter Park Angels, so he's
18 always looking at things with a glass is half empty
19 mentality. I'm going, go, go, go. So it's always good
20 to have that sanity check.

21 The venture lab is also the agency that is the
22 member of the Cleantech network that you have been
23 hearing about. It does cost money to participate. We
24 put on some great events and what not and we attend all
25 of those, as well as get access to all their data and

1 research which we're providing Shaun's group with.

2 With respect to the series, there are four events
3 scheduled, this one being the first one, for the next
4 four months. Please mark your calendars. December 10,
5 January 21, and February 18 are the next three. I
6 realize this is a time consuming process and all of you
7 are very busy, but we really, really need you to come
8 and we need you to invite your friends. You have a form
9 in front of you where we're asking you to jot down any
10 other folks that are involved with the Cleantech sectors
11 here in Central Florida so we can get them on the
12 invitation list, because these are for you. We are
13 gathering here to set up interactive dialogues and
14 interactions with all of you so that we can hear from
15 you what needs to be done to create and grow this sector
16 in our economy. So without your input, we're running in
17 the dark. So please, please, please, we encourage you
18 to show up and we encourage you to invite your friends.

19 And with that, I'll hush and let the other folks
20 have their time. And we are a little behind, so if
21 folks could pay attention for those of you who are up
22 next on the queue, that would be super.

23 Philip Fairey is here from the Florida Solar Energy
24 Center, and Philip is going to not have slides, which is
25 throwing me off right now, I apologize. But Mr. Fairey

1 has been the deputy director of the Florida Solar Energy
2 Center since 1990. He also served as the interim
3 director of the Center from 2002 through 2004, and prior
4 to assuming his duties as deputy director, he spent 10
5 years at FSEC conducting research in buildings and
6 energy efficiency. FSEC is one of our key centers, as
7 you might imagine, out at UCF that is actively involved
8 in research and commercialization of technologies in the
9 Cleantech sector, so we're very glad that Philip came
10 over from Brevard County to spend time with us this
11 morning.

12 Thank you for coming.

13 MR. FAIREY: Thank you very much, Kirstie. I
14 really appreciate that. It's a pleasure to be here. As
15 Kirstie said, I'm with the Florida Solar Energy Center
16 and I have the tie to prove it. This is a tie that was
17 actually created for the Florida Solar Energy Center by
18 the leader of the Solar Technologies Group at the
19 National Renewable Energy Laboratory in celebration of
20 our 30th anniversary as UCF's research institute for
21 renewable energy and energy efficiency. So we've
22 actually been around since the time Dr. Snaith was
23 talking about when solar in the 70's was considered
24 something that wasn't cost effective. But what has
25 happened since then, much to our pleasure, is that we've

1 seen energy costs rise. That's not to our pleasure, but
2 that was inevitable. And we've seen the cost of
3 renewable and alternative energy resources decline as a
4 result of that. And so now the field that I have been
5 involved in for over 30 years is coming into the
6 economic marketplace with much more realism than it has
7 ever had a chance to do in the past.

8 The Florida Solar Energy Center -- and the name is
9 a little bit misleading because we do much more than
10 solar energy -- has been around for 32 years. We were
11 created by the Florida state legislature as the Energy
12 Institute of the State of Florida. We're currently the
13 largest and most active state supported energy research
14 institute in the nation. We have a little over 140 full
15 time employees who spend 24 hours a day, 7 days a week,
16 365 days a year worried passionately about how we can
17 improve the energy economy of both the state of Florida
18 and the nation. We operate in a number of key research
19 areas. We are roughly split into three different
20 research divisions. The first one is one we call
21 Advanced Energy Systems Technologies. This research
22 division focuses on research activities that we consider
23 to be fairly advanced research opportunities. The kind
24 of things that we focus on in this division include
25 production, storage and utilization of renewable

1 hydrogen technologies and systems and fuel cell
2 technology, and, more recently, a lot more work in the
3 area of gasification and pyrolysis of biofuels,
4 potential biofuels. And this is critically important
5 because, as we move towards different types of
6 alternative fuels, the gasification and pyrolysis of
7 biofeedstocks, I'm going to call them, contributes both
8 to the petrochemical industry as well as the
9 agricultural industry within the state of Florida, and
10 particularly within the state of Florida. The fuel cell
11 activities are also vitally important. We currently
12 oversee the 19 million dollar DOE effort with U.S. cars
13 to develop the proton exchange membrane that is likely
14 to be used in the automotive industry and the
15 transportation sector to power electric vehicles that
16 are driven by -- that are powered by fuel cells. Now,
17 there are a number of different fuel stocks that can go
18 into the powering of these automobiles that range all
19 the way from methanol to pure hydrogen.

20 The second research division that is very active at
21 the Florida Solar Energy Center is our solar energy
22 research division. And this division concentrates on
23 two areas of renewable energy. What is called
24 photovoltaics energy, where you have semiconductor cells
25 which produce directly from sunlight electrical energy

1 in the form of direct current energy, and then that
2 energy can be inverted into alternating current energy
3 that can be used in conventional applications.

4 Now, what we've seen with photovoltaics over the
5 last 30 years is a rather dramatic decrease in the cost.
6 One way to look at the cost of photovoltaics is the
7 equivalent cost per kilowatt hour out of the wall. You
8 currently in the state of Florida pay about 12 cents per
9 kilowatt hour of electricity when you plug into that
10 outlet in the wall over there. The current cost of
11 power which is produced by photovoltaic electricity, on
12 the other hand, is higher than that. It's on the order
13 of 24 to 28 cents per kilowatt hour. We are seeing
14 many, many programs throughout the United States, not as
15 many in Florida, but some in Florida, which are buying
16 down that initial cost of photovoltaic systems by as
17 much as half.

18 Dr. Snaith mentioned one program that is considered
19 a Cleantech program in California, the million solar
20 roofs program that is being sponsored by the State of
21 California. When you buy down that cost, you can get
22 the cost per kilowatt hour out of the wall to the actual
23 consumer of the products down to where it is very
24 competitive with power out of the wall.

25 The other kind of things that we're seeing in our

1 economy is that conventional power sources, the cost of
2 conventional power sources, due to a number of things,
3 are going up. There is an increase in the cost of fuels
4 to produce the power, there's a general increase in the
5 cost of doing business within the electric industry. We
6 recently over the past year have seen proposals from two
7 major utilities in Florida to construct two nuclear --
8 two new nuclear power facilities in the state of
9 Florida, and the estimated cost of these new nuclear
10 power facilities is on the order of \$7,000 per kilowatt
11 of power production capability. This is dramatically
12 higher than the usual conventional cost of electricity
13 production facilities in Florida. And so with those
14 kind of costs going forward and with the serious
15 historical decline, I will say, in the cost of
16 photovoltaic power production, which we don't see
17 stopping, we see the cost of photovoltaic power
18 production modules continuing to decline in the future.
19 We're clearly going to come to a point where the cost of
20 conventional power and these solar power alternatives
21 meets in the economic sector and the renewable energy
22 alternatives become as inexpensive as the conventional
23 alternatives, and at that time we will no longer call
24 solar technologies alternatives, we will call them
25 conventional because they will be cheaper in the

1 marketplace. And we see that happening. There's a
2 number of reasons for that happening. The declining
3 cost in the technology along with the increasing cost of
4 conventional technologies, and the rather serious effort
5 on a global basis to account for the cost of carbon with
6 respect to global warming. Clearly, the types of solar
7 renewable energy power production technologies that we
8 work on don't produce any pollutants that need be
9 accounted for within any kind of carbon trading programs
10 that might go on internationally or nationally.

11 The third area that -- and don't let me short
12 change the solar industry because we have countless uses
13 for solar hot water in our industries, in our homes, and
14 far and away the cheapest, easiest and cleanest way to
15 make hot water, in this state, at least, is with the
16 solar hot water system. The amortized cost of solar hot
17 water systems compared to electricity out of the wall is
18 between 8 and 9 cents per kilowatt hour, so it is
19 already less expensive than production using electrical
20 means, and so we should -- we should see more and more
21 and greater and greater use of this technology within
22 the state, and one of the other things that this
23 research division, the solar energy research division at
24 the Florida Solar Energy Center, is responsible for is
25 the certification, the rating, the testing and the

1 certification of all solar systems which are
2 manufactured or sold within the state of Florida, and
3 that is a function of our original charter that was
4 created by the legislature in 1976 as a way of
5 protecting consumers from fraudulent solar systems and
6 devices. And so we've seen that effort that just simply
7 the testing and certification of solar systems improved
8 the performance of these systems by over -- from about
9 an average of 30 percent to more than 60 percent
10 efficiency. That's doubling the efficiency of the
11 systems that are in the marketplace compared to what was
12 in the marketplace 30 years ago when this effort first
13 started.

14 The third area of research that we have very active
15 involvement in is buildings research. And we are very
16 involved and that is our largest research division, the
17 buildings research division. We're very involved with
18 this, and the major reason for this is that in the state
19 of Florida, many people don't know this, but 84 percent
20 of the electricity consumption in the state of Florida
21 goes to building energy use. That is a gigantic piece
22 of the electricity pie. We know from the research that
23 we've conducted over the years that we're fully capable
24 of reducing the energy use very cost effectively in the
25 building sector for all of the buildings that currently

1 exist by between 25 and 30 percent. And so if we could
2 take 25 to 30 percent of the existing building energy
3 use and convert it to efficiency, that would be 25 to 30
4 percent of 84 percent of the electricity that the state
5 produces. And we can do this cost effectively. And so
6 in terms of Cleantech technologies, this is the most
7 cost effective place to go right off the bat. The
8 center is involved not only in research in buildings
9 energy efficiency but also in all of the allied stuff
10 that is associated with that, including very significant
11 involvement in both the state and national building
12 energy code making processes. We have individuals that
13 serve on these code making bodies, as well as we provide
14 services on things like the governor's action team, the
15 technical working groups that are associated with the
16 action team, the committees of the Florida Energy
17 Commission over the last couple of years. And so we are
18 seen by many people as the expertise that can be counted
19 on within the state to tell you what's actually
20 happening rather than what people claim to be happening.
21 And so that's one of the other services that we provide.
22 And energy efficiency is, as I said, critically
23 important and particularly in the building sector.

24 And so with that, I think I'll stop so that I don't
25 eat too much of your time, and thank you very much, and

1 we are very excited to see this Cleantech initiative
2 take off in the Metro Orlando area.

3 Thank you.

4 MS. CHADWICK: Thank you, Philip. Next up we have
5 Carol Ann Dykes with the UCF Incubation Program. I
6 wrote seven, but I actually think Carol Ann has been
7 with us at least eight years.

8 How long have you been with us?

9 MS. DYKES: Six and a half.

10 MS. CHADWICK: Okay. I was close. Seven. Carol
11 Ann's been the manager of the UCF Technology Incubator
12 out at Research Park, which was named the 2004 incubator
13 of the year by the National Business Incubation
14 Association. Before she came to UCF, Carol Ann was a
15 faculty member of the College of Engineering at the
16 University of Florida where she also served as the
17 associate director of the Southern Technology
18 Applications Center. In this role, as well as several
19 others that I know she's held over the course of her
20 career, Carol Ann has supported many, many companies,
21 federal laboratories and universities across the
22 southern United States in a broad range of technology
23 commercialization activities.

24 We're so glad you are here, Carol Ann.

25 MS. DYKES: Thank you, Kirstie.

1 Well, there are a lot of familiar faces in the
2 audience, so for a few of you this will be some new
3 information. For many of you it will be an update of
4 the incubation program at UCF, which is a good thing
5 probably. As many of you know, as Kirstie said quite
6 eloquently, we don't do anything at UCF unless it's in a
7 partnership with our local community, and the incubation
8 program, just like the venture lab, is another example
9 of that. We truly do represent an economic development
10 collaboration with our local community, and you see the
11 local government entities that are listed there that we
12 would not be able to keep our doors open without their
13 financial help, as well as many other forms of help that
14 they give us. But I think what's important to
15 understand about the incubation program at UCF is that
16 we complete the economic development strategy for the
17 community. Just as the venture lab contributes to
18 growing companies here from the ground up, the
19 incubation program is one of those next steps. We have
20 companies coming out of venture lab programs into the
21 incubator, and our job is to help grow those companies
22 here. Economic gardening is a term that you may hear
23 these days, so we work very closely in concert with
24 groups like the Economic Development Commission, which
25 is a incredible partner with us. They focus extensively

1 on recruiting and retaining companies that are here in
2 the community, and we work hand in hand with them to
3 help the entrepreneurial side.

4 The incubation program did open its doors in
5 December of 1999 after Dr. Tom O'Neal, who is Associate
6 VP for Research, spent a couple of years trying to
7 convince a number of individuals at the University and
8 the community that we needed an incubator and what an
9 incubator really was. Some of you remember that. And
10 it did start with the technology incubator, which is
11 located in the Central Florida Research Park adjacent to
12 UCF.

13 In recent years, we have been fortunate that our
14 local government partners have stepped up to the table
15 to enable us to expand the incubation program to
16 multiple locations in Metro Orlando, and, therefore,
17 expand our ability to serve a wider variety of companies
18 in addition to those that are developing new
19 technologies, and you can see where those locations
20 currently are at this point. And I can tell you that
21 location No. 6 will come online next year in the city of
22 St. Cloud due to funding that the City of St. Cloud has
23 already committed and Osceola County will also be
24 contributing to that funding. So we're looking forward
25 to being able to serve Osceola County.

1 I want to just put in perspective where we fit in
2 the university arena. As Mayor Crotty indicated, much
3 of the technology sector here in the community has
4 started with the University and the research that goes
5 on there, and across the country, universities are
6 creating incubation programs and other entrepreneurial
7 support programs because it is a key element of growing
8 a local economy, particularly a technology based
9 economy. So we have tremendous research at UCF, and you
10 will hear from a number of our representatives, the
11 Solar Energy Center, the Nano Technology Center, our
12 Materials Processing Center, and that's just the tip of
13 the iceberg at UCF, really. We have a very active
14 technology transfer program and entrepreneurial
15 education program that are not on the program here
16 today. But all of that is designed to help create
17 something useful out of that research and get it across
18 the transom, if you will, into a company that can
19 actually take it into the marketplace in products and
20 services that can impact the economy. That happens
21 through licenses that go to existing larger companies to
22 commercialize. It happens through UCF spin off
23 companies, and you will hear from one of those today.
24 Khalid is here and will talk to you about Petra Solar
25 and what that company is doing in commercializing some

1 UCF research. One of our clients in the incubator
2 that's in the Cleantech space, Novasol, who is on this
3 list of invited companies, they weren't able to be here
4 today, they are commercializing some intellectual
5 property developed by Dr. Sudipta Seal. So that is
6 another UCF spin out company. And then just new
7 companies from the community that are in a variety of
8 technology sectors, one of which is Cleantech. Two of
9 our clients are represented in the audience today that
10 are in that space. Acudine. Darren, back of the room
11 back there, raise your hand, developed being some
12 incredibly innovative microturbine technology that I know
13 he'd be happy to tell you about if you want to corner
14 him, and Novasol, Haseeb, right there, who's in the
15 solar energy space. So I invite you to talk to both of
16 them if you have a moment. And one of our graduates,
17 the facilitator who is in the environmental engineering
18 field and does an extensive amount of work in water
19 management and water reuse and water resources as well.
20 And all of that and much more that we do is intended to
21 fulfill our mission as the UCF incubation program, which
22 is two things: Diversification of the local economy and
23 high wage jobs. Everything that we do and every company
24 that we helped is designed to fill that mission.

25 So what do we do? I'm not going to go through this

1 list in the interest of time. You can read that, and I
2 don't think there will be anything there real surprising
3 to you, but suffice it to say that what makes us an
4 incubator, not a real estate operation, although we have
5 a lot of real estate space that we manage and we
6 sublease, is all the value added services that you see
7 on here. You heard the venture lab story and what they
8 do over there, and, as you might imagine, they're an
9 incredible partner and resource to us in helping our
10 companies in market research and getting ready to go in
11 front of investors and reviewing of business plans and
12 all those things they do so well.

13 The primary thing that we do for our clients that
14 brings them to us actually brings some of them back. We
15 have two CEOs that graduated from the incubator when
16 their companies were acquired and are actually back with
17 us. We have a number of serial entrepreneurs that are
18 with us because they all have benefitted from and
19 realized the value of the connectivity to the community
20 and the university that we can provide in the incubation
21 program. Some of you in the audience who have very
22 valuable business expertise, entrepreneurial resources,
23 a huge and growing pool of individuals from this
24 community who donate an incalculable amount of time to
25 come out and just help us mentor and advise and educate

1 and guide these entrepreneurs through the start up stage
2 of their company because that's where we are focused.
3 Our companies are with us one to three years for the
4 most part and our job is to get them quickly and
5 successfully through that start up stage and then move
6 them on out into the community where they can diversify
7 the economy and create high wage jobs.

8 This is all on our website. I encourage you to
9 write that website down. You will find a lot of
10 information about the incubation program and our clients
11 there, all of our contact information. I purposely did
12 not put my individual contact information in this
13 presentation actually because our whole team is on the
14 website for all the locations, so feel free to spend
15 some time on there.

16 Our excellence in entrepreneurship course, I will
17 point out, that is a unique element of the application
18 process for the incubation program that we have not
19 found exists in any other incubation program in the
20 country. And there are specific reasons we do that, and
21 it's proven to be quite extraordinary in educating our
22 potential clients to be and also helping us sort out the
23 number one thing that we look for in companies that we
24 bring into the program, and that is, are they coachable,
25 do they know they want help, are they going to be

1 willing to take help, because, otherwise, we can't add
2 value.

3 Have we succeeded? Well, as you heard John and
4 some other folks say, we were named top incubator in the
5 country a few years ago and that was based on our
6 success at that point. To date, we have 70 companies
7 across the five locations in the Metro area. We have 41
8 companies that have graduated from the program, at this
9 point mostly from the technology incubator location and
10 Research Park. Six of those were acquired, which is
11 going to happen a lot in the tech sector, and the
12 majority of them are still here in Central Florida
13 thriving and growing, many of them in Research Park, and
14 you can see the rest of the data there that I think
15 says, thanks to our community support and partnerships,
16 we are successful.

17 That's it. Thank you.

18 MS. CHADWICK: Thank you, Carol. Next we have Dr.
19 Jeff Anderson who is the associate director of our
20 Nanoscience Technology Center out at UCF. Jeff's
21 research involves-- oh, I can't even explain this,
22 translational research utilizing engineered neuronal
23 networks and neuroimaging. Holy smokes. However, in
24 addition to being a brilliant scientist, I happen to
25 know that Jeff is a very entrepreneurial person. We've

1 had many conversations. He shows up at the venture lab
2 almost regularly at our weekly staff meetings to hear
3 about what we're doing. With collaborators, Jeff helped
4 create his own company. He was collaborating with
5 Harvard Medical School up in Massachusetts, of course,
6 and created a spin off company that secured over six
7 million dollars of SBIR funding and a whole series of
8 contracts to follow on with that. Today, Jeff continues
9 to combine his interests in interdisciplinary research
10 and commercialization of technologies towards the goal
11 of creating innovative companies in Central Florida.

12 With that, you're on, Jeff.

13 MR. ANDERSON: Thanks. Hi, everybody.

14 AUDIENCE: Morning.

15 MR. ANDERSON: I'm going to try to be really
16 succinct, but it's hard because we've got -- we have a
17 lot going on. I'm going to talk about nanoscience. I'm
18 a big person, but what we work on are small things, and
19 the thing is, in the last 10, 20 years, we have received
20 and discovered tools that allow us both to visualize the
21 very small level and also manipulate that. And so the
22 question is, what can you do with these new abilities,
23 and it really is an amazing new frontier. in terms of
24 the economic impact of this, right, because that's the
25 overall question, the federal government puts an

1 investment, what kind of return is it going to get.
2 Well, you can look here in terms of the joint economic
3 committee reviewing this. I mean, just to read, these
4 changes will generate large amounts of wealth, enforce
5 wrenching changes in existing markets and institutions,
6 they are going to impact across all these different
7 areas: Communication, IT, transportation, and energy.
8 And the thing is the United States is in this game and
9 there are lots of other players. In the United States,
10 through the leadership, actually, of Bill Clinton who
11 started the National Nanotechnology Initiative, the NNI,
12 right now that's been continued by George Bush, and in
13 FY '08, 1.4 billion is being allocated to it on the
14 federal level, and there is just as much in the
15 commercial space as well. You can see here, it's not
16 just us, but also Europe and Japan, China are also
17 putting in equal amounts of money. And, again, it's
18 going to hit all these different industries.

19 Today we're going to be looking at energy. This is
20 just a take home message. This is from nature a couple
21 years ago, but it really details. This isn't going to
22 be an easy thing. It's not going to be like IT where
23 you hear cyber and -- it's going to take a great deal of
24 work and effort and research to really garner the
25 commercial opportunities that are there. But they are

1 there. And biotech energy, really we're going to have
2 utility that we never had before.

3 Again, I'm the associate director of the
4 Nanoscience Center. We have about 18 faculty members.
5 We've got a little over 3 million dollars of state
6 funding. We exceed that in external funding that we
7 attract from NIH, from a whole group of NSF. We have
8 people from very diverse fields. We have chemists. We
9 have people in imaging, computer scientists, engineers,
10 mechanical engineers, biologists, all working together
11 to solve these difficult problems. Cancer,
12 photovoltaics, increasing the efficiency of those.
13 These are difficult problems that are sort of -- the
14 easy problems have all been solved. Now we're on to the
15 real attractable ones. Again, here are some of our
16 partners. We have -- this year, we have three NSF
17 career awardees and one DARPA Young Faculty awardee, and
18 that is unusual in one academic unit to have them all
19 together. We have lots of toys. This is an XTS in
20 terms of characterizing different surfaces, but what I'm
21 going to talk about here is a little bit about energy.

22 This is the breakdown now in the U.S. energies,
23 what we use. 85 percent is from fossil fuels. You can
24 look down there in terms of the solar photovoltaics,
25 it's just a small -- you know, a very small addition.

1 Now, that -- and you can see burning all these fossil
2 fuels, it's controversial in terms of what is the actual
3 impact that's going to occur in 50 years, a hundred
4 years, but everyone knows it's a bad thing. You know,
5 we're just dumping this stuff in. It's not a good thing
6 for the environment, and what we have, we know now is
7 it's a very bad thing for our economy to have this money
8 drain going out of the country.

9 Many different ways that you can tap into these
10 sources. What I have been looking at here is sunlight,
11 and based on direct electricity from solar cells,
12 there's a tremendous amount of energy that hits both the
13 atmosphere of the planet and the surface of the planet.
14 So you can see here about 1,300 watts per square meters
15 hits once the sun is out. And then you go through the
16 atmosphere, it's, you know, 900 watts about by the time
17 it gets down to the surface of the planet and filters
18 through the atmosphere. And, of course, there is
19 regional variations depending upon the cloud cover. And
20 this is kind of the take on this. You can see there in
21 terms of the production of electricity from
22 photovoltaics, you can see the upsweep there. Now, it's
23 coming from a very tiny market, but it shows the
24 interest that is occurring in this market space. And as
25 mentioned before, these new technologies are allowing

1 greater utility in bringing down the price in these
2 systems.

3 What I am going to discuss very briefly are just
4 three different generations of photovoltaics, or solar
5 cells. The first is what we all know, is the silicone
6 based. The second are polymer or thin film
7 technologies. And the third are these, you know, if you
8 will, more advanced systems. And the take home message
9 is the silicone systems are -- they're fairly efficient,
10 but they're expensive because you are actually using
11 silicone that you can make computer chips from. The
12 thin film are less efficient, but they can be made in a
13 less -- it's less expensive to actually make them
14 because you are actually making these plastic rolls.

15 And the third has the potential of being both efficient
16 and easy to make, and that's why we're putting a lot of
17 effort into that.

18 So just to briefly review, the silicone that which
19 we know, you can see there is about 25 percent
20 efficiency of converting sunlight directly into
21 electricity. The second is this thin film. You can
22 actually make -- you can think of just rolls of these
23 sheets being applied to replace shingles. So you
24 actually protect your roof, but also you can get a gain
25 from this -- the charge that's produced by these systems

1 when sunlight hits the surfaces.

2 Now, some of the problems a lot of research is
3 going into, it's polymers, it's plastics. There's a
4 degree of which, you know, bleaching. They may not be
5 as durable as the silicone, but, again, they are so much
6 less expensive that they're very attractive. And you
7 can see here now the efficiency now is around 15 percent
8 less efficient. But, again, if you can produce it for
9 far less, then, you know, it's a very attractive option.

10 The third is what we're kind of putting our bets
11 into, and that is -- not to get into all the details,
12 but now the traditional photovoltaic cell is a single
13 layer. Now what we want to do is make it multiple
14 layers so it can pickup the spectrum of wave light
15 that's coming in and, if you will, efficiently grab
16 those electronic charges that are occurring by
17 essentially creatively looking at these different
18 variables. How can you use nanoelectronics in terms of
19 the wiring, the actual pickup there. Make them very
20 tiny, make them fibrous, fuzzy, so it's just more
21 efficient in that little -- in that small space of the
22 fuel cell. How can you link these together to more
23 efficiently gather that electricity? Currently, now you
24 are down to about 10 percent, so the system, the
25 functional systems, the prototypes, they are not as

1 efficient as the other two systems. So you think, oh,
2 you know, it's a waste of research money. But,
3 actually, the theoretical efficiency is far higher. 40
4 percent, 50 percent, even 60 percent is envisioned and
5 possible, again, through tweaking these systems. And
6 once these systems are created, then from our
7 perspective as a research center, we create patents, we,
8 you know, share those licenses, those great spin off
9 companies, we have disclosures that occur all the time.
10 You know, five, six patents established a year from our
11 center and more. We're growing now. We'll probably
12 take up in the next couple years 8 to 10 more faculty
13 members to pursue these kinds of work. So here's kind
14 of the group that we're working with, and, yeah, it's a
15 team based approach. Looking at the basic mechanisms,
16 the design of the plastics, the nanoelectronics, and
17 then integrated device development and partnering with
18 others to meet these energy needs of the country.

19 Well, thanks for your attention, and thank you for
20 putting on this program.

21 MS. CHADWICK: Did you guys get all that? He did a
22 great job of keeping it in layperson terminology. I
23 like the fuzzy hair thing.

24 Next up, we have Dr. Louis Chow. Dr. Chow is with
25 the Advanced Materials Processing and Analysis Center

1 out at UCF, also known as AMPAC for those of you who are
2 out in our neck of the woods. Dr. Chow received his
3 Ph.D. in mechanical engineering from UC Berkeley. His
4 research interests include heat transfer, computation
5 and power systems, miniaturization of electrical
6 engineering systems, spray cooling, thermal control, and
7 many other focus areas. In addition to his research,
8 Dr. Chow also serves as the chair of UCF's mechanical
9 engineering department and he's conducted research that
10 has been part of the foundation of some of the most
11 promising technology start ups coming out of UCF.

12 Dr. Chow?

13 DR. CHOW: Thank you. I'm here to represent AMPAC.
14 I want to -- the goal is I have 10 minutes. I have
15 about 35 slides, so you are going to see ship, ship,
16 ship, very quickly. I just want to get you a feel, but
17 at the end, I want to point out a couple of technology
18 that look very promising that has a lot to do with Clean
19 technology.

20 Now, AMPAC is a center, and also it is an
21 educational unit. It handles material science and
22 engineering program, graduate and Ph.D., and, actually,
23 AMPAC has a lot to do with somebody sitting right there,
24 our former dean, Marty Wanielista. I think I can safely
25 say this would not happen without his help and he was

1 really a wonderful supporter. I can say that because I
2 was working for him. I was the chair of the mechanical
3 and materials and aerospace department, and he was the
4 most supportive dean there I know.

5 Let me just go through quickly. Okay. I just want
6 to maybe spend 30 seconds on it. UCF wants to be a
7 international leader in material science and
8 engineering. Actually, we are very good. This is one
9 of the strong disciplines at UCF. The missions, I'm not
10 going to read them, we want to do education as well as
11 research. And we have nine faculty. That's all we
12 have, nine faculty, but then we also have 16 people.
13 I'm one of them, and there are some people in here.
14 Jacob Hart is one of them. We also do some research
15 related to materials. And we offer 27 graduate courses
16 and 14 undergrad, so you can see we're really not just
17 doing research. We participate a lot. We really
18 basically lead the material science, MS&P program, and
19 we also as a facility, we provide some materials
20 characterization facility. This happened mainly because
21 of boosting technology and searing technology at that
22 time and I-4 and also we -- actually impact has a lot to
23 do -- have a lot to thank I-4 for as well. We also have
24 some clean room facilities and other things.

25 And these are the faculty. There are nine of them.

1 These are the main -- these are the ones that are funded
2 by the AMPAC center. The other 16 were funded by
3 others, like college of science, college of engineering,
4 and I will spend maybe about 10 seconds on each of the
5 research areas on each of them. And I want to conclude
6 with two or three that are promising for, especially
7 related to, Clean technology.

8 This is the first one. L. An works on ceramics.
9 And there are a lot of very, very good stuff. He's very
10 well funded in this field by a lot of agencies,
11 including NSF. He has two pretty big NSF contracts
12 going on right now, and there's a tremendous application
13 in this. I don't have time to go through this.
14 Actually, I don't know a lot about it anyway, so.

15 J.U. Fang does a lot of biomolecular materials,
16 self assembly, very fascinating things. Since I was the
17 intern director, I learned a lot from these guys. I was
18 really impressed by them.

19 And Heinrich is a TEM person. He's really an
20 instrument person and providing the third dimension of
21 high resolution TEM. If you have anything you really
22 want to look and visualize, he's the person to go to.
23 And that's the second slide he gave me.

24 And then Klemenz is a crystal grower on the
25 compound semiconductor as well as connectivity. Well

1 funded as well.

2 And we have a modeler, Dr. Schelling, Patrick
3 Schelling, who can do molecular simulations. These are
4 his couple of slides. Funded by NSF as well. He just
5 recently got a pretty good sized grant from NSF.

6 And Yongho Sohn does a lot of things, among them
7 thermal barrier coatings so that gas turbines can run a
8 little warmer than otherwise.

9 And the other thing is nuclear. Maybe nuclear is a
10 Cleantechnology, too, but I did not pick that one as
11 something I wanted to talk a little bit more. So this
12 is it. This is the one slide on nuclear.

13 Kevin Coffey does thin films energetic material,
14 efforts in NSF funding, as well as I -- I guess I want
15 to point out -- I know that there's a talk later on on
16 thin film batteries. The thin film battery is really a
17 very much needed technology. It's really, really not
18 catching up with the needs of all this other technology.
19 Really, this is a very difficult problem and I look
20 forward to listening to what they have to say. And I
21 guess Planar Energy Devices also has been funding Kevin
22 Coffey's work, and you can see the other one is a
23 nanoenergetic material. He just sent a proposal
24 yesterday. I was just reading the abstract. Very
25 impressive stuff.

1 Then we have Raj. Raj is a very -- he's a
2 outstanding faculty, and now he has a consortium of two
3 universities and several funding agencies from NASA,
4 especially Grant and Kennedy Space Center on shape
5 memory alloy. I think he is trying to develop something
6 with the medical center through some medical doctors to
7 have a company to commercialize the shape memory alloy.
8 I guess State maybe is one of them. But perhaps one
9 thing that I think has -- you can consider that to be
10 Cleantechnology is that he is using -- SMA here stands
11 for shape memory alloy. You see this little triangle
12 shape called chevron (sic.). This thing promotes
13 mixing, okay, between the intake air and the ambient air
14 and also the source, and to control it properly such
15 that there's a tremendous reduction in noise. So there
16 are a lot of applications how to control those gaps,
17 those shapes, those mixing, so that there's a huge
18 reduction. This is very important because you have --
19 if 787 does not get the noise code down, they cannot fly
20 into the airport after 10:00 p.m. You can see this is
21 something that Boeing is very, very keen on. So Boeing
22 is one of the partners, and Dr. Raj got funding, I think
23 it was 600,000 from NASA, just to solve this problem of
24 noise reduction.

25 Dr. Seal is our -- I guess our star. Very proud of

1 him. I actually have something to do with his hiring,
2 too, about 12, 13 years ago. He's very fantastic. You
3 can see this guy does not sleep so he works all the
4 time. You can see all these topics that he does. One
5 of them, I think I'm going to spend maybe a couple
6 minutes on, one of them is the construction of material.
7 This is -- there's a company already doing this called
8 Nanoholding. The subcompany under Nanoholding is called
9 nSolGel. What that does, the specific work -- maybe I
10 should just go ahead and show the slide -- is to create
11 a cement based on fly ash. This is really junk, right.
12 This is byproducts that go to the landfill anyway. So
13 he can take those and do some nano scale surface
14 modifications using the solgel technique and can make
15 them comparative and can replace cement. And I think
16 one thing I wanted to point out is that we see the
17 cement industry produce 6 to 8 percent of the world's
18 CO₂, CO₃ emission. So this is a big thing. So the
19 replacement of this cement has zero carbon emissions.
20 So I guess that's the relevance. He gave me a lot of
21 slides. Let me just try to point out a few things. I
22 guess you see a lot of big numbers, millions, tons, to
23 kind of give you an impression that this is very -- has
24 a lot of potential. And also it is ready. He has all
25 the equipment to make it into the industrial scale,

1 large scale production. These are all the number of
2 metric tons that is needed. The world needs 2,270 tons
3 of cement and the current price is at the hundred
4 dollars. He gave me a slide why it is so important,
5 what is the premium. He thinks that even though he
6 cannot make it at a hundred dollars a ton, it still is
7 competitive because there are some other benefits. I
8 think you can get actually money by producing this with
9 no carbon dioxide emission. Okay. So I think he told
10 me that he can make it for under a thousand dollars a
11 ton, which is about 10 times more than the concrete that
12 we can buy from Home Depot. But anyway there are some
13 markets that can be competitive, and, of course, that
14 solgel process is a cheap process, and it's a matter of
15 time to get it done much cheaper, much cheaper. So this
16 is -- these are some of the samples he gave me. All
17 right. So that's one thing that he's doing.

18 The other thing he is doing is he and another
19 faculty member who has -- who's now at Texas A&M, they
20 put nanoseria, which is a nanoparticle. Nanoparticle
21 has a very large surface to volume ratio, and on top of
22 that, the surface has a tremendous amount of oxygen
23 vacancy so it can absorb a lot of oxygen. So they use
24 it for a lot of things. For example, make people live
25 longer. That means delay aging because it can -- it can

1 absorb the antioxidants. But one other application is
2 to reduce soot emission. Soot is the formation of
3 incomplete combustion, so if you -- I don't understand
4 how exactly the thing works. I guess it must be very
5 complicated kinetics. Everything is very complicated,
6 but somehow if you put this nanoparticle, which is very
7 cheap, put it in gasoline or diesel fuel, you can get
8 the emission down.

9 So, for example here, they put this nanoparticle in
10 diesel fuel and put it in a truck. This is a real live
11 measurement coming out of a source of a diesel engine.
12 You can see that this is a -- I guess a IR laser that
13 comes through, and the more soot particles, the more
14 absorption. If you have less absorption, that means you
15 have less soot. That means the nanoseria was
16 responsible for the soot emission reduction.

17 And I guess I really need to stop here. This is
18 what it looks like in the gasoline, this is what it
19 looks like in diesel fuel. So this is a patent that he
20 just got recently in September, and I guess he is
21 interested to see investors trying to promote. So the
22 idea is that this will save -- this will really -- this
23 is really green because it'll save -- get the smog down.
24 Okay.

25 MS. CHADWICK: All right. Our final speaker with

1 respect to the UCF centers is Dr. Jay Kapat.

2 Anyway, I'm going to introduce Dr. Kapat while we
3 go track down a laser pointer.

4 Dr. Kapat received his doctoral degree from MIT,
5 and is a renowned expert in research areas that include
6 miniaturization of engineering systems, micro-scale
7 fluidics, heat transfer and related sensors with
8 applications to memory devices. I assume that's what
9 MIMS is, right?

10 DR. KAPAT: I did not write that.

11 MS. CHADWICK: I'm pulling this stuff off your bios
12 on the website. I didn't get it off these bios. I was
13 late last night. Is it right, though?

14 DR. KAPAT: Yes.

15 MS. CHADWICK: Okay, then. Anyway, he also does
16 quite a bit of research in aerodynamics and heat
17 transfers for gas turbines and other turbo machineries.
18 In addition, he's the associate director for the MES
19 initiative at UCF and is here today to introduce UCF's
20 Center for Advanced Turbines and Energy Research.

21 DR. KAPAT: Well, I guess I need to kind of a
22 little bit explain what I'm doing here, because
23 typically people do not associate turbines with clean or
24 Cleantech. So I have to go a little bit of introduction
25 first before I get to my point.

1 Now, there are two pieces of information here.
2 Turbines are involved in generation of about 98 percent
3 of all electricity that is that close to U.S. grid.
4 Now, how did I come up with that? I have used studies
5 so you see the difference, and if you look at the pie
6 chart on the left-hand side, that kind of breaks down
7 all the little pieces, and the sector called renewables
8 is actually farther magnified on the right-hand side.
9 Now, if I go around the block on the left called -- that
10 is typical steam turbines, or it could be a combined
11 cycle, one of the cleaner ones which is close to clear
12 water on the typical. It could be natural gas, either
13 standalone gas turbine, or combined cycle with steam
14 turbine. Nuclear, there has to be a steam turbine,
15 which ultimately produces the shaft that clears the
16 power. And the small pie, which is really not turbine,
17 which is actually diesel jet sets, obviously extreme
18 quality, and I'm not going to be talking about that.
19 Now, if I look into the renewables, which is 9 percent
20 of the whole pie, and that is further magnified on the
21 right, hydros, that is a turbine, and that is very
22 clean, and geothermal, again, there's a steam turbine
23 there. Biomass is mostly turbine, although there are
24 some jet sets that are not on biomass and biofuel kind
25 of thing, so I really cannot claim all 7 percent of the

1 9 percent is turbine. Wind, again, that is turbine.
2 The small line that you see between biomass and wind,
3 that is -- that represents a solar thermal and solar
4 thermal being the larger of the two in terms of power
5 production. And, again, that is turbines. So this is
6 how we got the 98 percent. And actually the last 2
7 percent is the small line on the left-hand side, which
8 is a diesel engine mostly.

9 Well, you may say, that is today. What about in
10 the future? And we have to do some predicting to go to
11 the future, and there will be lots of different
12 predictions. I have picked up, again, DOE's EIF
13 predictions.

14 By the way, before I go to the next slide, I'd like
15 to also point out turbines pretty much power 100 percent
16 of commercial turbines in aviation in the country.
17 Every single plane that you fly is powered by a gas
18 turbine. So if we -- so that actually handles a lot of
19 the technology.

20 Now, obviously, we need to have a crystal ball.
21 Whose crystal ball should I use? And there will be a
22 lot of controversy. I have used here the one from,
23 again, EIA, which is part of U.S. DOE, and they claim
24 that will be the picture down the road. Whether that is
25 going to be true or not, I cannot say, but that is what

1 they say. Don't get me wrong. Between the last picture
2 and this picture, the photovoltaics has got a hundred
3 times increased, so that is going to be a tremendous
4 amount of increase. But that also could be the portion
5 of the pie left that we need to think about. For
6 example, if you think of 2 percent, a hundred per -- 98
7 percent is turbines, and you have a hundred cars on I-4,
8 98 of those are polluting really bad smoke. If I just
9 change one of those with a clean car, still 97 of those
10 will be producing real bad smoke. Maybe some of the
11 resources should be how to cut down that emissions from
12 those 98 persons. We may have a better impact. In
13 other words, there is not a silver bullet. We have to
14 make sure we do not put all our eggs in one basket.

15 Now, when we are talking about this topic of
16 energy, we cannot be just talking about consumption. We
17 have to think from the left to the right, from sources
18 to ultimate consumption, because a person could be 98
19 percent efficient, but what about the light bulb in my
20 house is only 5 percent efficient. It is a product that
21 makes the most important thing.

22 Second thing, one more aspect I'd like to point out
23 as an example. Many times, we have so much carried over
24 with very specific technology, we forget about the whole
25 picture. One example is a company called Envirofuels,

1 which is based close to Tampa, they're supposed to be
2 producing internal and they submit a permit to the
3 County for their plan, and overnight they became one of
4 the largest water producers of the whole state of
5 Florida. So we have to be careful. Are we going to be
6 trading our fuel -- or our water for fuel. So we have
7 to look at the whole picture as a whole from sources to
8 ultimate consumption and see that the carbon footprint,
9 water footprint, utilization in every step of the way.
10 That way, we have the complete picture.

11 Now, obviously, a lot is at stake. That is why we
12 cannot put all the eggs in one basket. Now, I wanted to
13 have the last column. These are all the current power
14 generation technologies. The ones in bold are the
15 primary sources of energy that we have got. Obviously,
16 coal, oil, natural gas, nuclear, solar, and over there,
17 there are some X's, means what kind of sources are being
18 used, and you see non turbo machines are a few of those,
19 but they are few and far between on all of those. But
20 one thing I would like to point out is that some of the
21 derived fuels we cannot mine from nature, like hydrogen,
22 we cannot mine hydrogen, but that could be derived from
23 coal, and coal, there are a few hundred years of
24 supplying the country. So what about we take out all
25 the bad stuff, we capture the carbon, we sequester it

1 underground, and bond the pure hydrogen, and we could be
2 powering all those gigawatt turbines at Florida Power
3 and Light and Progress Energy that they use to supply
4 our electricity. So we don't have to give up too much.
5 We just have to innovate more clear technology. And
6 that could be done over here.

7 Similarly, syngas. That is basically synthetic gas
8 out of carbon, out of coal. And, again, we can probably
9 think about carbon capture technologies that we could do
10 over here.

11 Now that we have talked a little bit of turbines,
12 I'm just going to have a slide where I think that this
13 combination of three is what is important to make what
14 you're talking about today to clear new innovations.
15 Obviously, we are here. That basically says that there
16 is lots of those and I don't have to talk about the
17 bottom pie there, but I'm going to try to say a little
18 bit. The industrial foundation that we have to make all
19 of this possible and that kind of institution that
20 actually produces masters that actually can innovate
21 that we are hearing from many speakers so far that also
22 we have and I'll be trying to make some cases about the
23 top two pies because it is foundation that really helps.
24 If there's a foundation, it is much easier to build
25 something than if there is none. Then we would have a

1 lot more.

2 This is a picture that many of you have seen
3 before, some of you have seen before. It is a whole map
4 of U.S. I have put all the major power generation
5 companies that produce -- that people like Florida Power
6 and Light and Progress Energy have placed electricity in
7 our houses, they buy their machines from typically
8 mostly one of those four companies, and two of them are
9 in Florida. Two of them are in Orlando. How many times
10 we see such a big concentration of large industrial
11 conglomerates with global reach in one place. That is a
12 big opportunity for us and we'd better use it.

13 Now, just if you talk about -- if you are arguing
14 about the dollar numbers, they are up there. Annual
15 reports, and those numbers are fluctuating, so you might
16 be targeting whether it's 100 billion, 20 billion, but
17 those numbers are big, and without big numbers to
18 support us, we can really take our technology a whole
19 lot. If you add up the energy sector of the three
20 companies, right away Siemens is across the street from
21 UCF, Mitsubishi is in Lake Mary and in Sandlake, and
22 Alstom, they are in West Palm Beach, and going through a
23 grand expansion and Mitsubishi and just opened a new
24 plant on Sandlake Road. So there's a lot of activities
25 happening on these. If you add up the three, that

1 counts about 120 billion, 2. That is the foundation I'm
2 talking about that we can use to move further. And all
3 of them are investing heavily in diesel. We have a
4 cluster of companies and we need to use that.

5 Now comes the other side of the whole circle. We
6 need to have people with that kind of expertise that can
7 compete on a national level. Now, this chart is based
8 on a chart that is done by DOE at their national
9 technology lab which is based in Morgantown,
10 Pennsylvania and Pittsburg, and this lists all the
11 proposals that have been funded over the last 20 years.
12 I do not have the 2008 number. Well, they fund 2008
13 ones last year. I do not have that. But not counting
14 those, we are doing pretty well against the big boys.
15 So one thing is we have a national foundation and we
16 have got the technical expertise and we need to do a
17 little bit more about it. And that was pretty much the
18 starting point of this center, which is kind of talking
19 about the college of engineering, the department of
20 mechanical and engineering.

21 The main portion of this is basically we started
22 with the Siemens Center of Excellence. They have been
23 funding us for sometime and, again, I have to really be
24 thankful for the high tech corridor, because without
25 them, we would not be here. What we have done over the

1 last six, seven years, the lab pretty much built up with
2 help from Siemens and help from FHGC, and that really
3 started the whole thing. Then we had the big NASA
4 project that just ended, and UCF is leading that among
5 the whole state of Florida. So we are recognized as
6 somebody who can do this turbine and energy systems
7 research in the state of Florida, and probably perhaps
8 more.

9 Now, I should also point out Florida Center for
10 Advanced Aero Propulsion that is one of the two newest
11 state funded center of excellence that just got
12 announced, and FCAAP is full university center, UCF is
13 one of the -- of those four. And that is also kind of
14 geared toward all of this.

15 Now, obviously, the real technology, that is
16 people, that is faculty, and there are students. I
17 could have gone over each of those boxes and mentioned
18 all the professors' names, but that would be taking too
19 much time. But the point is we are capturing a huge
20 amount of expertise, and this is the collection that
21 gives us the niche. It is not one of those boxes. The
22 companies can go out. Other universities find one box.
23 We can put a system together. We can think of a system.
24 Some of the professors Dr. Chow talked about in his
25 presentation, they are also working here. It is just

1 not one unit, it is a broad base, the coalition under
2 the university and the college of engineering and
3 computer science.

4 Now, what can we do based on all that I have talked
5 about so far, how is it related to Cleantech, and these
6 are some of the topics that we are talking about right
7 now. Now, for example, there is a graduate of ours who
8 got his Ph.D. Actually, I was his supervisor. He was
9 working in Siemens, went up, opened his company in
10 Greenville. Now he's a major supplier for retrofitting
11 of all those old power plants in China. That could be
12 here. Meaning we may not have coal but we can produce
13 the technology that can go all over the world and
14 retrofit all existing and current power plants so that
15 no single carbon goes out of the atmosphere. This is
16 carbon neutral technology. And then somebody else can
17 come up with the technology apart from the carbon. It
18 could be, for example, sequestered into the ground. So
19 it could be hydrogen. Well, those are the primary
20 source. So it could be hydrogen turbine with
21 precombustion carbon capture. It could be oxyfuel with
22 carbon capture. I could be retrofit of existing or new
23 plants with post combustion carbon capture of the plant
24 which is on Alafaya. Well, we can put the carbon
25 capture technology and make it zero carbon, and that

1 carbon could be sequestered into the ground. So that is
2 how we can also have Cleantech based on the fuel cells
3 that we have lots of in this country. It could be
4 offshore wind turbine. For example, the wind requires
5 the same kind of technology that the boat industry
6 requires, composite based. We have got a good bit of
7 boat industry in the state. We can actually use their
8 help to have manufacturing of the wind turbines, and
9 there is some talk going on right now, and some other
10 time I can mention more about it. We can have solar
11 thermal storage, and all of those, that is where the
12 turbine technology can play a very strong role.

13 Now, this is -- the next slide is my end slide, and
14 what I will say is that I would end with some
15 paraphrasing. The CEO and president of solar and
16 Siemens Energy over here, and he was present in the
17 dedication ceremony of Siemens Center, he just came
18 online earlier, October 8, and he said in his statement
19 at the end that he -- just the proximity of the
20 companies and UCF, he thinks that there is potential for
21 us to be a silicone valley of energy. He also said that
22 America in the future will go through Alafaya Trail.
23 And I will paraphrase that statement with one statement
24 that, let us make Alafaya Trail to be America's energy
25 avenue.

1 That is it. Thank you.

2 MS. CHADWICK: Okay. I think we all probably need
3 a quick break. For the sake of time, if we could
4 probably expedite that to maybe five minutes since we're
5 way behind, and I'm going to bank on my entrepreneurs to
6 catch us back up, so we'll see you right back in five
7 minutes.

8 (A break was taken from 10:23 a.m. until 10:48
9 a.m.)

10 MS. CHADWICK: The next four speakers are with some
11 of the Cleantech companies here in the Orlando area and
12 we're very excited to have all of them here. They're
13 going to present their companies, and if they have put
14 some thought into, I've asked each of them to chat just
15 a slide or two on beginning the dialogue on things we
16 can do to promote this sector here in Central Florida.

17 Our first speaker is Scott Faris. Scott is the CEO
18 of Planar Energy Devices. Scott's a serial
19 entrepreneur. I've known him for a long time. He's an
20 amazing guy. He has almost two decades of operating
21 venture financing and commercialization experience.
22 Planar is the first spin out of the U.S. Department of
23 Energy's National Renewable Energy Lab, also known as
24 NREL. Before founding Planar, Scott held positions as
25 both an executive and an investor in a range of early

1 stage companies and investment firms. Scott was the CEO
2 of Waveguide Solutions and a founding director and COO
3 of Ocean Optics. Scott's investment roles include being
4 the director at Florida Seed Capital Funds and the
5 founder of Enterprise Corporation, which is a technology
6 accelerator. Scott was also a partner of MetaTech
7 Ventures and Zero Stage Capital. And with that, Scott
8 Faris.

9 MR. FARIS: I've been told I've got eight minutes,
10 which for me is a real challenge, so good morning. I'm
11 going to skip some of my slides, but as Kirstie
12 mentioned, I'm the CEO of Planar Energy Devices. We're
13 based here in Orlando. Somewhat unique company in terms
14 of how we came to be. I've spent most of my career
15 working in either the venture side or the operating side
16 of technology companies. Planar is a unique company in
17 the sense that this was a company I co-founded with the
18 venture capital arm of Battelle Memorial Institute.
19 Battelle Memorial Institute is the -- I believe the
20 largest not-for-profit R&D organization in the world.
21 They have their own labs. They also manage seven of the
22 national research labs, including the National Renewable
23 Energy Lab. As Kirstie mentioned, Planar is actually
24 the first spin out of NREL. NREL has been around for
25 about 30 years in different phases. This is the first

1 time we've actually taken technology out of NREL. We've
2 taken research staff out of NREL and formed a company
3 around it. We happened to do it here quite simply
4 because (a) I live here, but also there are tremendous
5 resources in this community. A lot of the
6 infrastructure that was left behind in terms of people
7 from the old Agere facility and the active Triquint
8 facility up in Apopka are key reasons that we decided to
9 locate this company in Central Florida. And, quite also
10 honestly, it's a great place to recruit people. We have
11 a staff now of about 12 Ph.D.'s and we have absolutely
12 no problems bringing people into this community from
13 places like San Jose and other research centers across
14 the country.

15 Some of this has been covered before, but I think
16 one of the things I wanted to mention this morning is a
17 lot of people talking about Cleantech, they get very
18 focused. Cleantech is much more than greentech, and
19 where we fit into that, this came from, again, the
20 Cleantech organization. Most of the emphasis right now
21 on Cleantech is in the energy area. In fact, if you
22 look at the venture capital dollars that are flowing
23 into Cleantech, the vast majority is going to solve the
24 energy problem. The energy problem transcends a lot of
25 issues, environmental issues, economic issues, security

1 issues, the bulk of the resources going into energy, and
2 it's going into energy because quite simply the fuel
3 that we're using to get our energy is running low. We
4 heard some presentations this morning on different fuel
5 technologies, but ultimately what really is going on is
6 we're moving into an economy worldwide that's being
7 increasingly driven by electrification.

8 Electrification is the energy our cars will be run
9 by electricity. Much, much more of what we rely on for
10 our quality of life is going to be driven on
11 electrification. The question of how we create the
12 electricity is one issue, but the other issue and the
13 reason that I'm here today and the reason that Planar
14 exists is there is one little problem with the whole
15 electrification problem, and that is you can't store
16 electricity efficiently. Batteries, quite simply, are
17 the Achilles heal to the whole equation, whether it's
18 solar, whether it's geothermal. A lot of these
19 renewable energies are driven by what I call
20 opportunistic energy generation. In other words, when
21 the sun's up, you can have photovoltaics, but you need
22 to store some of that energy so that you can use it at
23 night when you need to turn your lights on. So Planar,
24 quite simply, decided to focus on the energy storage
25 problem. We believe it's the weak link. It's also one

1 of the most significant problems and the one that has,
2 quite honestly, received the lowest amount of attention
3 in terms of investment experience. So Planar is focused
4 on solid state energy storage. If I had to paint an
5 analogy of where we are today in energy storage, we are
6 quite simply in the vacuum tube era. The batteries that
7 we use in our devices today are vacuum tube type of
8 technologies and what Planar is focused on is moving the
9 energy storage world into the solid state world. In
10 other words, into the transistor kind of technology.
11 And the way we do that is by focusing on materials and
12 processes and device designs that allow us to get us
13 there.

14 We didn't make this up. The DOE issued a report in
15 2007 that effectively said the same thing. Looking
16 ahead, looking at the demand for energy storage across
17 all applications, the Department of Energy did not see a
18 single platform that would address the future energy
19 storage requirements, and, in fact, began to start
20 looking at what they need to do and what the federal
21 government needs to do to start driving resources to
22 address this really critical headache. Because not too
23 dissimilar to what we saw back in the bubble when web
24 2.0 fizzled out, not because we didn't have creative
25 programmers, but because the broadband didn't exist to

1 get the content out into the marketplace. Same issue
2 we're seeing with renewables. Lots of great innovation
3 going on in the energy capture side, but unless we
4 address the energy storage side, we're going to have the
5 same kind of headaches. It's an attractive market, so,
6 again, we're a venture backed company. We look at big
7 markets with big growth opportunities.

8 Energy storage, the secondary energy storage
9 market, is a 10 billion dollar growing market. If you
10 look at the verticals that we're focused on between
11 network applications and transportation applications,
12 these are very rapidly growing applications. Quite
13 simply, what our approach is, we want to get the living
14 out of these devices. Most batteries that you use today
15 are batteries that have multiphase materials. They have
16 liquids, they have solids, they have gels. These
17 materials behave differently. That's why your
18 rechargeable batteries don't last very long. These
19 batteries will change. They're living devices. Planar
20 is focused on solid state. Again, technology is driving
21 the semi conductor industry. We're taking those
22 technologies and we're applying that to the energy
23 storage problem and we're applying it in three specific
24 areas.

25 On the design, the process technology, and the

1 materials technology. Companies based on a number of
2 platform technologies, the strategy here is that we
3 believe that the solution to the solid state energy
4 storage was really a collection of many technologies
5 that didn't reside in one location. We developed a
6 patent portfolio of nearly 40 patents in the last six
7 months from multiple national labs, multiple private
8 companies, multiple research centers around the country,
9 brought that all together. The three enabling
10 technologies are this notion of the way we build a
11 battery. We build a battery upside down. Seems like an
12 obvious thing to do, but when you start building
13 batteries anode side up, it changes the whole dynamic of
14 how a battery is built.

15 Multi layer electrolytes. Basically, we can build
16 a battery with very durable guts to them. And this
17 liquid phase deposition is a technology that is a local
18 homegrown technology that we ran across that has the
19 promise to not only change the economics of how we make
20 batteries, but has the ability to change many
21 industries, from the semi conductor industry, the flat
22 panel display industry, even in the solar industry.
23 This is a very robust technology we're investing a lot
24 of money in on a local basis to help become part of our
25 technology platform.

1 What this allows us to do is we can build small
2 batteries to big batteries. This has never been done
3 before. Each kind of battery, each size of battery is
4 usually made with a different chemistry, a different
5 manufacturer, a different part of a role. For the first
6 time, we're able to get scaleability. In other words,
7 we can make small batteries to go into little sensors
8 and large batteries that go into vehicles. We can do
9 that at all one production platform. This gives us
10 tremendous economy to scale. And more importantly, this
11 allows us to set up the notion that we can do this
12 domestically and we can bring battery production back
13 into the United States. Almost all batteries in the
14 world are made either in Southeast Asia or in China
15 itself. The U.S. has lost the ability to build energy
16 storage devices. It's all gone offshore. In the end,
17 if we switch to electric vehicles and we don't get into
18 the business of building batteries in this country once
19 again, we've simply switched our energy dependency from
20 the Middle East to Asia.

21 Real quickly, some of the products we're working
22 on. This is our first generation solid state battery.
23 It's a very small battery. What you take away from this
24 light is, if you look at the chart down here, the
25 traditional rechargeable battery is only good for a

1 couple hundred cycles. This battery has already cycled
2 over 300,000 cycles and has had no degradation. That's
3 the value of a solid state battery. What it means in
4 terms of devices like this, you don't have to build the
5 battery in with a trap door, you build the battery in
6 with the circuitry. The battery becomes part of the
7 electronic system. More importantly, when you have this
8 kind of functionality, you can do neat things, like in
9 this case, I apologize, we're having some resolution
10 issues, but what we're able to do is actually collect
11 ambient energy so all these signals floating around in
12 this room that your cell phones are receiving, we can
13 actually collect that energy and charge a battery using
14 that methodology. We can integrate it into a solar
15 cell. So what we've now done is married not only the
16 energy generation to the energy storage, but we can take
17 this into higher and higher levels of integration where
18 the devices get smaller and smaller.

19 In terms of our local impact, again, Planar has
20 been around for about 18 months now. About half of our
21 staff are UCF grads, the other half are researchers we
22 brought in, Ph.D. level researchers we brought in from
23 throughout the United States. This was sort of
24 foreshadowed earlier. We've invested heavily in Kevin
25 Coffey's work out at UCF. A lot of our prototypes are

1 being built out at UCF. Just about two weeks ago, we
2 turned on our R&D facility over on Michigan Avenue. We
3 have the capability of producing several million ships a
4 year out of that facility on a pilot phase, and we've
5 been very actively looking at additional technology
6 across the I-4 corridor. So, again, we're actively
7 engaging in these partnerships with universities to find
8 pockets of technologies that we can pool into this.

9 Most importantly in terms of what the future of
10 what Planar is about, this is our corporate
11 headquarters. When we talk about economic development,
12 we talk about retaining and growing companies, the
13 corporate headquarters is where the action is. That's
14 where the focus needs to be is building companies
15 locally. You don't move corporate headquarters, you
16 build corporate headquarters from scratch. You take
17 small companies coming out of the university or out of
18 different locations, and you put resources into them
19 from the community, from the outside world, and you help
20 grow those companies to be successful. Intel wasn't
21 recruited, Intel was grown locally. If you look at all
22 the success stories, these are companies that have
23 grown, their roots are in the community with executives
24 from the community, and that's what Planar's committed
25 to do going forward.

1 And I went over by a minute and 30 seconds.

2 MS. CHADWICK: You can always depend on start up
3 entrepreneurs to crank it out in 8 to 10 minutes.

4 All right. Next up, we have Tom Bland, who is the
5 chairman and CEO of AcquaFiber Technologies. Tom's
6 background includes more than 33 years of executive
7 management, finance, and economic experience. Mr. Bland
8 has held executive positions at Martin Marietta, Coleman
9 Research, International Analytical Corporation, and
10 Olinco (ph.) International. Mr. Bland also served as a
11 management consultant in a number of domestic and
12 international firms, with a specific focus on management
13 and financial affairs of those companies. Mr. Bland's
14 entrepreneurial career began in 1994 when he founded
15 TenderCare Assisted Living Services where he still
16 serves on the board today. In addition to his role of
17 CEO of AcquaFiber, Mr. Bland is a UCF alumni and serves
18 on the College of Business's Dean's Executive Council
19 and was inducted into UCF's College of Business Hall of
20 Fame in 2004.

21 Tom?

22 MR. BLAND: Thanks, Kirstie. I'd like to thank
23 everyone that's here for coming to this great first of
24 the series event. I'd also like to announce that I'd
25 like Dr. Fiber (ph.) to be a cosponsor for the rest of

1 the series and we'll do whatever we can do.

2 Basically, I'm going to make it simple. I was
3 going to start out by saying we excel in organic thin
4 film layers which we grow organic solar and carbon
5 capture cells upon. But I'm going to change that, is
6 that we're an algae firm. We grow algae. We harvest
7 algae. But what do we do with the algae and why are we
8 bothering? Well, basically, we're a water remediation
9 firm. We clean water. Primarily surface water. We've
10 been at this for eight and a half years. We have been
11 in R&D just about that entire time. We have bid on two
12 contracts and we've won both of them. Recently our
13 contract to remediate five metric tons of phosphorous
14 from Lake Jessup will probably begin the first quarter
15 of next year. And it's unique in that I opened my mouth
16 in 2003 in Key West at a water conference and said, I
17 believe that as a taxpayer I'm tired of paying money to
18 companies who say they can do things but end up not
19 being able to do them and we've wasted our money, so I
20 think we should go for pay-for-performance contracts.
21 Well, somebody was in the audience that listened to
22 that, and two and a half years later out came the RFP
23 that we responded to which said it's
24 pay-for-performance. They pay us for a pound of
25 phosphorus removed. We have to go to the DEP, the

1 districts, the Corp of Engineers, all these places. We
2 have to get all the permits, then we have to sink all
3 the money into the equipment in the ground, and then we
4 have to do our thing and we remediate the water, and we
5 only get paid when we take a pound of phosphorus out of
6 the ground, out of the water. Well, we love it. We're
7 going to excel, and we've had eight and a half years to
8 prove it to ourselves, et cetera. But we've gone
9 slightly beyond water remediation, even though that's
10 what we do.

11 We recently discovered that there are alternative
12 energy implications to our biomass. And do we produce
13 biomass. We produce tons and tons of biomass. Tons and
14 tons of biomass. As a matter of fact, when we first
15 came into existence, I was asked by a Fortune 200
16 company to start AquaFiber because they had a technology
17 similar to what we use, and their Achilles Heel, they
18 thought, was the fact that it made tons and tons of
19 biomass daily and they didn't know how to get rid of it.
20 Well, of course, I didn't know how to get rid of it
21 either. But we've learned. And alternative energy is a
22 key focus. Now, we have not made ourselves known to the
23 media. We have not gone out and spun ourselves. We
24 have a very low key website which basically is a woman's
25 skirt. It's short enough to cover the subject, long

1 enough to keep you interested. Or did I just say that
2 backwards. But as you can see, I've got a board of
3 directors which includes some very, very distinguished
4 members of the community, including Dr. Wanielista right
5 there, to include M.J. Swallow, who is UCF's head of
6 research and commercialization, Tom Kean, who is the
7 dean of college and business. Also includes Dick
8 Nunice, who's the former chair of trustees, and Tom
9 Yokum, vice chair of trustees. Bill Haymire, former CEO
10 of Progress Energy, and a number of other board members,
11 as well as a 150 shareholders. We've raised about 15
12 million dollars in the last few years, all on the QT,
13 nothing venture capital, et cetera, et cetera.

14 So how do we do what we do. Well, we use algae.
15 The problem is we have 23 patents in 20 countries,
16 including the U.S., and 21 patents pending, but those
17 patent pendings, we treat those as trade secrets. Of
18 course, when you're treating something as a trade
19 secret, it's hard to tell people what you're doing. So
20 when Kirstie asked me to speak today, I said, wow, what
21 kind of a tap dance am I going to do. Let me tell you
22 what we can do. On Lake Apopka where we have a facility
23 right now, the district, St. John's District, which is a
24 wonderful, august -- without the St. John's District, we
25 would have extreme problems with our water right now.

1 But they've worked on Lake Apopka for nearly two
2 decades, a decade and a half, and their system takes out
3 about seven pounds of phosphorus per year, per acre of
4 land that they flow water over. We've gone through many
5 iterations, but our latest technology flowing about the
6 same amount of water that they flow over there, 600 to
7 700 acres, we can take out about 53,000 pounds of
8 phosphorus on one acre. So seven pounds per acre, per
9 year. We can take out 53,000 pounds per acre, per year.
10 That's a fact. It's not a brag. So fast forward, what
11 do we do with all that biomass? Well, gee whiz, in 2001
12 we took biomass up to a Dr. Alex Green at the University
13 of Florida, and he pyrolyzed it. And, whoa, we had a
14 huge hydrogen yield. We didn't know what to do with
15 hydrogen. There wasn't a market for hydrogen.
16 Recently, we've gone to a number of utility firms here
17 in Florida and we've discovered that we can help
18 sequester their carbon, because the number one thing
19 that algae does is it consumes carbon, it consumes
20 phosphorus, it consumes nitrogen. Of course, we use
21 algae and all those good things in it to do something.
22 We have discovered that we can, for example, in a local
23 utility, which will go unnamed because we don't have a
24 deal with them, but we're in talks with them, we made a
25 presentation whereby we could sequester 25 percent or

1 more of their daily carbon emissions. We could then
2 provide them with more than 20 percent of their daily
3 energy requirements with our alternative energy source,
4 which is our biomass, through gasification and other
5 situations. We've also discovered that we can do some
6 pretty cool things with this biomass. We can make some
7 non petroleum polymers. And that turns out to be -- I
8 didn't understand the significance of that when I first
9 learned we could do that, but it turns out to be huge.

10 We also take pharmaceuticals out of water.
11 Pharmaceuticals are turning out to be a big problem in
12 water, and it's going to be worse and worse, especially
13 in marine environments. By the way, our system works
14 good in fresh water, better in brackish waters, and best
15 in marine environments because it proliferates better in
16 marine environments. We've also discovered that our
17 process can remove chlorides from water. I didn't
18 realize what that meant until my scientist told me, but
19 basically let's make it simple. In the brackish water,
20 if we can remove 90 percent of the chlorides in a very
21 economical and very land efficient methodology, that
22 enables lower cost and lower energy requirement reverse
23 osmosis membranes to work more effectively and have a
24 longer life. So we've been talking with another power
25 company about a nuclear effort they want to do, and they

1 want to be able to get less expensive water. Now, we've
2 set our company up to be able to use huge amounts of
3 water in land efficient areas. For example, soon you'll
4 be hearing about it, the first quarter of next year, and
5 you may not be hearing about us, but you might, but we
6 have a 10 billion gallon per day plan to work on a lake
7 nearby in the state of Florida to remediate phosphorus,
8 nitrogen and carbon, and we can make quite a bit of
9 power from that. At a local utility, we're talking
10 about a plan that will remediate about five billion
11 gallons a day where we would use water to help remediate
12 carbon, grow algae, and harvest the algae on a daily
13 basis.

14 My time is up. I greatly thank you and we look
15 forward to hearing from Dr. Wanielista.

16 MS. CHADWICK: Thanks, Tom. Next up, we have the
17 one who's been referenced by all, Dr. Marty Wanielista.
18 What do you call yourself, the grandfather of storm
19 water management?

20 DR. WANIELISTA: Something like that.

21 MS. CHADWICK: I think it's even here in his bio
22 that I swiped from his website. Dr. Wanielista has been
23 at UCF for 39 years, and previously served as the
24 University's dean of college of engineering. Today, Dr.
25 Wanielista is the director of UCF's storm water

1 management academy and is a professor emeritus at UCF.
2 He's completed over 70 projects in the areas of
3 hydrology and storm water, has over 250 publications,
4 and has written seven text books. He has been very
5 active in the creation of storm water policies
6 throughout our state, including a new statewide storm
7 water ruling that happened recently. In 2004, Dr.
8 Wanielista founded STE. I believe it stands for
9 Stormwater Treatment Environments which provides green
10 roofs solutions to commercial properties. I've seen
11 this system. It's actually got a live green roof out at
12 UCF. It's awesome. He's been identified, as I
13 mentioned already, as the grandfather of storm water
14 management and is credited with introducing the state of
15 Florida to green roof technologies.

16 DR. WANIELISTA: Hi, you all. Nice to be here.
17 Good to see you again. It's like old hometown for me
18 coming back and seeing folks that I have missed for a
19 few years.

20 I've kind of changed jobs from the university.
21 I've gone to the side of promoting a lot of the
22 technologies that we developed at UCF, and, certainly,
23 it was really great for me to listen to Jay and Louis
24 talk about all those things that really excite us, and
25 part of the motivation that I have had over the last few

1 years is to try to promote some of those products which
2 are Cleantech products. And a lot of things that we do
3 within the university is related to protecting the
4 environment while also enhancing economic opportunities
5 that are available to us.

6 We got our start, STE, got our start through the
7 venture lab and they helped us with a business plan, and
8 said, hey, you know, you all have something here that
9 has some value in the future, and possibly we should
10 encourage you to do something about that. So I am very,
11 very appreciative of the opportunities that we got for
12 from the venture lab.

13 Myself and Mike Hardin put this presentation
14 together. Mike is my partner in this and he's sitting
15 down here in the front, and he has some brochures he'd
16 be happy to share with you and also talk to you about
17 some of the ideas and some of the things that we have
18 going on within STE. Why we got started, again, is my
19 motivation, and I think the motivation of many here is
20 to protect the environment and our natural resources
21 while not having a strain on the economy. Our
22 background -- and when you want to get into this, you
23 talk about having some extensive experience, and the
24 need to bring some of the lab to real life world
25 projects. Right now, UCF has about 4 million dollars

1 worth of research in the stormwater management area
2 that's ready for commercialization and ready to go out.
3 We develop products. We develop services. We also see
4 -- and those of you who are not aware of this -- our
5 state is under a compliance with the federal EPA mandate
6 to clean up our waters. We have many impaired waters,
7 and we have to get out the nitrogen, the phosphorus, the
8 metals, the bacteria that is entering and degrading our
9 water resources around the state. So there's a need to
10 really come into compliance with laws and regulations
11 which also provide then a constraint on what we're
12 doing. We have to -- we have to do it. I mean, there's
13 no two ways about it. Otherwise, we'll get a reduction
14 in federal funding that comes to the state. There is
15 other dire consequences that we may have. So by
16 protecting Florida's economy and we derive from
17 solutions that are now solutions which are both
18 environmentally sound but also economically sound is
19 what we try to do.

20 So we have many products. I'm going to talk about
21 only those products that are related to water pollution
22 control, and one of them is the pollution control media
23 that we've developed. We have this media which takes
24 pollutants out of the waste stream, it keeps or
25 sequesters those pollutants and then has -- makes these

1 pollutants available for the biological lives within our
2 system. We also show on this slide some of the type of
3 products that we're using or type of media that we're
4 using in these different applications, such as green
5 roofs, pervious pavement and water reuse. Water reuse
6 is one of those areas where we protect and remove
7 pollutants from stormwater, but also provide an
8 alternative water supply. I now have in this state over
9 300 water reuse projects using stormwater that are
10 actually in operation. The biggest one is in Orange
11 County. It's in southwest Orange County. 550,000 acres
12 of land that has a Florida Public Service Commission
13 franchised area. That means something. Okay? That
14 means they have the ability and the right to provide
15 water at a reduced cost. When you are providing water
16 at a reduced cost, we're talking about cutting the cost
17 of irrigation water from somewhere around a dollar, two
18 dollars, and even five dollars a thousand gallons, down
19 to fifty cents a thousand gallons.

20 Protecting the environment and making money. Who'd
21 ever think you could make money out of this. Right?
22 You can actually get yourself a franchised area. If you
23 don't want a franchised area, just go out and do it and
24 you'll save people money by water reuse and stormwater
25 reuse.

1 We also have many other areas that we operate.
2 Look at -- this is a stormwater system. Look at it.
3 That looks pretty attractive, doesn't it? Looks more
4 attractive than a pond which has all kind of debris in
5 it. We're designing these systems around the state and
6 the new state law is regulating that we put these
7 systems in. Right outside of this building, our
8 exfiltration system which was built in 1979 to put water
9 into the ground and help protect Lake Eola, our valuable
10 water resource and the city beautiful lake that we have
11 here. Now, isn't that great that we can protect that
12 lake, and we did so, and that lake is still functioning
13 and still working well since 1979 through a exfiltration
14 system design.

15 This is a stormwater reuse picture. These ponds
16 that we're building are very attractive. I like this
17 because can you see the little rainbow on that? You see
18 it there? That's a pot of gold underneath it. Many
19 people really do think there's a pot of gold. And when
20 you can reduce the cost of stormwater treatment and make
21 money at the same time, wow.

22 Also, the new American home only about a mile from
23 here has a green roof. It lives with photovoltaics.
24 Photovoltaics actually operate more efficiently on a
25 roof top when you can reduce the heat or you cool the

1 roof down. So green roofs save energy, save water, and
2 in this particular case we have a lot of our products
3 out here. Everything from bioswales to the green roof
4 to systems that collect water, treat the water, and the
5 water is reused back onsite. This house has never had a
6 discharge. Okay? No stormwater discharge from this
7 home. That's right here in Orlando.

8 Another way you can do it is by pervious concrete.
9 Now, you say, well, gee, pervious concrete costs more.
10 Yeah, it does. It costs about a buck fifty more than
11 regular concrete, about two dollars more than asphalt
12 per square foot. However, if you notice, the water goes
13 into the ground. There's no water there. Okay? You
14 can't see water at this site. We had a rainfall about a
15 half hour before this. The water goes through the
16 pervious concrete, goes into the ground. You know,
17 there's pipes that are needed when you don't have
18 pervious concrete. Pipes have to take the water from
19 the site. We just saved a developer here \$232,000 in
20 the development cost that he would have to pay for
21 stormwater management by the use of pervious concrete
22 and reducing the infrastructure cost. Some of the value
23 that the university has and the university is now
24 providing for the community.

25 We even provided computer programs. And those of

1 you that are in this field know that the water
2 management district has to improve this. If you notice,
3 this is a computer program that is available through the
4 water management district and also available through our
5 website, the stormwater management academy website, at
6 the university. But this allows you to design these
7 pervious pavements and then to reduce the size of your
8 holding ponds. And one site here in Orlando -- I'm
9 sorry, in Orange County, we saved the developer over a
10 million dollars in costs on that one development just
11 because of the fact that he put more water into the
12 ground and did not need as big a pond. The pond size,
13 you also have to pay for the land for that pond size.
14 That was where the major cost came.

15 Probably our crowning glory, we say we bring your
16 projects to life or we bring your roof to life. This is
17 the roof out at UCF, our student union green roof. That
18 particular roof has value in terms of energy
19 effectiveness but also in a conversation and in a
20 telecast from around the United States on energy
21 efficient operations, this was noted as one of the ways
22 of sequestering carbon by planting plants, sequestering
23 carbon from the environment, and then also saving energy
24 while you're saving stormwater for future generations.

25 We have a lot of sites that have received national

1 attention. USA Today said, Florida's showcase green
2 envirohome is the best designed, energy efficient and
3 water efficient home in the United States. We have a
4 green roof, and these are pictures of us putting a green
5 roof, five different green roofs on that site. We also
6 used all of the gray water from that site.

7 A residential development, our goal is only 35
8 gallons per person, per day. Does anybody know how much
9 the regular home uses per person, per day?

10 Yes.

11 UNKNOWN SPEAKER: 50.

12 DR. WANIELISTA: 50 to a 100 inside, and outside,
13 another hundred. We're talking about 35 for both inside
14 and outside use. 35 gallons per person, per day.
15 Florida's showcase green envirohome. We had the benefit
16 of tropical storm Fay went up the coast line not too
17 long ago. It dumped 25 and a half inches on this site.
18 We had no run off from the site. Zero. Zero
19 contribution from Florida's showcase green envirohome.
20 If you want to know more about this, talk to Mike and I
21 later. We'll get you a tour of this place. It's a
22 wonderful place and it's going to be open next January
23 for tours.

24 Our stormwater green roof, which Mike completed.
25 Plant selections. You know, we -- we definitely use

1 natives and we want to promote the native use of all
2 native plants within all 10 roofs, and have been doing
3 that.

4 Well, it's my pleasure to tell you that I think
5 we're -- I'm very optimistic, and even more optimistic
6 after hearing some of the talks today, and I think we
7 can control pollution, especially water pollution. We
8 have a bigger company -- it's called Green Smarts --
9 controls a lot of other things besides water pollution,
10 and we'd love to talk to you and to work with you and to
11 tell you that the venture lab really works and it's been
12 really helpful. I appreciate the opportunity. Thank
13 you.

14 MS. CHADWICK: Okay. Our final company to present
15 today is Petra Solar, and Dr. Khalid Rustom is here to
16 present the company. Khalid and I also go way back. He
17 has been in the venture lab here and there, and in the
18 early days, he was working at a UCF center called
19 Apicorp (ph.) and was one of the vice presidents there
20 and a product engineer. One day, he came in and said,
21 hey, I have this guy who wants to take our company and
22 thinks he can raise a whole bunch of venture capital.
23 Should I do it? And I was like, whoa. And today that
24 is Petra Solar. They have raised 14 million dollars of
25 venture capital, and Khalid is the cofounder of that

1 company, is currently leading all the development
2 efforts in their facilities which are located in
3 Research Park, and yet another great example of a
4 company spinning out of UCF and creating high paying
5 jobs and making things happen in Cleantech.

6 Khalid?

7 MR. RUSTOM: Thank you for the introduction and
8 thank you for allowing Petra Solar to participate in
9 this symposium.

10 I would like to start by giving you a short
11 overview about Petra Solar. We founded Petra Solar late
12 in 2006. This is where we actually start fundraising,
13 and the first thing we did is to talk with Dr. M.J. and
14 Dr. Tom here to license some of there ideas that's
15 relevant to our project. Then we started fundraising.
16 In six months we were able to raise 14 million dollars
17 from four different contributors. Among them, DFJ
18 Elements, one of the largest community funds in the
19 nation, Blue Run Ventures, which is our Nokia funds,
20 U.S. Government presented by On Point, a non profit
21 venture with the U.S. Army, and actually we wanted to
22 give the company an international dip and we raised some
23 money from the Kuwaiti government as well.

24 In order for solar actually to penetrate deep in
25 the electricity production, it needs to reach parity

1 with a grid and becomes comparative, and the first thing
2 we did is we looked at the solar value chain where we
3 can see that the solar panels from silicone to the
4 actual solar panel only contribute to 40 to 50 percent
5 of the cost and there is another 60 percent that goes
6 for installation and for the electronics part. We said
7 if we can reduce the installation cost by 30 percent and
8 reduce the cost of the electronics by 30 percent, we can
9 actually help the solar to penetrate more by actually
10 allowing a greater jump in the value. We know that the
11 development of solar panels themselves and billions of
12 dollars were invested to actually improve and make the
13 solar panels more efficient, but not much attention was
14 given to the balance of the system.

15 Here is just a quick overview about what a
16 traditional solar system looks like to the right side
17 and what's Petra Solar's concept of solar system to the
18 left side. And traditional inverters were called string
19 inverters. You have to put many solar panels and series
20 and connect them to a centralized inverter. Doing this,
21 actually you have to deal with a high voltage from the
22 solar panel approaching 600 volts. You need to design
23 the system to make sure that the size of the solar panel
24 matches the inverter. The orientation of the roof is
25 actually matched between the solar panels because they

1 act like batteries. If you shade one side, the other
2 side will actually get hurt as much as the other -- the
3 rest of the panels. In addition, the safety concern
4 with firefighters because of the roof and 600 volt
5 wires.

6 Our system actually works in a different way. We
7 took the central inverter and we chopped it down into
8 microinverters. This way we created a smaller
9 microsystems. You have the solar panels with the
10 inverter acting like a small microsystem that is ready
11 to go and produce solar electricity.

12 The application is wide and actually we have -- we
13 opened the door for more applications in the solar
14 industry. By taking the solar panel inverter in the
15 system, we can actually install one and add more in the
16 future. You don't care about the mismatch between the
17 solar panels because actually you have -- the solar
18 panel is a system by itself. You actually don't care
19 about the shading affect also because each one of these
20 inverters are maximizing the power of the solar panel by
21 itself.

22 In addition, we opened the door for hobbies, to buy
23 one solar panel this year, another one next year, buy a
24 different brand next year. It doesn't matter.

25 If you look at the parking lots, we can see that

1 there is a lot of lighting poles there. You can put the
2 solar panels there and you don't need actually to store
3 the energy in a battery, bulky and need maintenance.
4 You can just push the energy to the grid during the day
5 where it's mostly needed and take the electricity back
6 from the grid unit at the night.

7 So microinverters versus traditional inverters,
8 they have a lot of advantages. It's truly modular and
9 scaleable systems. System failure is a major concern.
10 When you have one panel down, you don't have to
11 disconnect the system. And more, if you have the
12 inverters down, you have to disconnect the system and
13 wait for service. Now you can do that in individual
14 panels. We have what they call maximal ballpoint
15 tracking which maximizes the energy out of the solar
16 panels. Traditionally, it's being implemented in a
17 string scale. Right now we are maximizing the power
18 from each solar panel individually. And our study shows
19 there are 10 to 30 percent increase in the energy that
20 we can harvest using the solar panels. We get rid of
21 the disconnect and wiring and fusing. Regular
22 electricians right now can deal with the system because
23 it's only 120 volts, and we hope in the future even
24 hobbyists can be able to install the system, buy it from
25 Home Depot and just try one or two solar panels. It's

1 an incremental low budget installation. If you cannot
2 afford to put a \$35,000 solar installation, you can
3 start with two panels for \$1,500. Also, the inverters
4 now we sell -- instead of selling one inverter, we sell
5 around 50 to 100 inverter installations. That would
6 allow us to go to mass production and actually to reduce
7 the cost more for the electronics. You don't need to
8 invest time or money in design itemization because the
9 system comes already installed and ready to be used.

10 The value for the Central Florida actually going
11 green is a culture of change and a vision. If we can
12 start adapting some green values and reduce the
13 footprints, this will actually help our future
14 generations.

15 Orlando was named a solar city by the Department of
16 Energy and the sunshine state. I think it is time for
17 Orlando to step up and lead the nation in terms of solar
18 energy. Environmental concerns and global warming
19 actually get affected big time. Dependency on foreign
20 oil is a national trend. Solar industry growth and
21 future employment we know that all that are hitting at
22 this time. One of the sectors that we know that's going
23 to keep growing in the future is the solar. We have a
24 joint research program with the university. Currently,
25 we actually invested more than a million dollars in

1 terms of research efforts and we are actually planning
2 to invest around 3 million dollars in the coming years
3 to develop our new generations.

4 And that's about it.

5 MS. CHADWICK: I have to brag about Khalid for one
6 second because in the early days back when he was --
7 when I first met him and he was working at Apicorp, I
8 remember him sitting at his desk going, I just want to
9 do my research. I don't want anything to do with
10 business. I'm very happy with my designs.

11 Do you remember that conversation?

12 MR. RUSTOM: Yeah, I do.

13 MS. CHADWICK: Well, look at him today. The other
14 day I saw him in the lobby. He's actually going to help
15 us with some technical side of the coaching. So there
16 you go. So good case study of entrepreneurship at its
17 best here in Central Florida.

18 Now I'm going to turn it over to our keynote
19 speaker, Sena Black. Sena is hiding back there in the
20 back. Come on down.

21 Sena is the senior vice president of marketing and
22 strategic intelligence at Enterprise Florida, the public
23 private partnership that's responsible for leading
24 Florida's statewide economic development. Ms. Black
25 supports EFI's mission to diversify Florida's economy by

1 overseeing the development of the statewide strategic
2 plan for economic development and the marketing of
3 Florida as a world class business location. Ms. Black
4 helps lead the development of Florida statewide
5 strategic plan, which is a road map for Florida's
6 future. A key focus of this plan has been to advance
7 Florida's innovation economy with new policy directions,
8 including the design of high impact and emerging cluster
9 strategies such as life sciences, homeland security, and
10 clean energy. Ms. Black also directs Enterprise
11 Florida's technology entrepreneurship and capital
12 committee which focuses on entrepreneurship growth and
13 strategies for the innovation economy. Sena has over 25
14 years of experience in economic development policy,
15 research, marketing and business development. She
16 formerly served at the senior officer at the South
17 Carolina Department of Commerce and is a lecturer at the
18 University of South Carolina's college of business. She
19 has been recognized for outstanding public service and
20 has won national awards for breakthrough research,
21 strategic planning and marketing. She is the author of
22 numerous articles and publications on technology based
23 entrepreneurship and economic development strategies.

24 Ms. Sena Black.

25 MS. BLACK: Thank you very much, Kirstie.

1 Appreciate it.

2 Thank you very much. It's a pleasure for me to be
3 here. And, also, you know, I really learned so much
4 this morning, and just listening to the presentations,
5 both the university and the company presentations, I
6 mean, this is really an exciting time and Orlando has
7 such a critical mass that it truly is exciting.

8 What I'm going to talk about today is really to
9 kind of share with you from an economic development
10 point of view, not so much a science, I'm not a
11 scientist, but really from an economic development and
12 policy point of view why we are so excited about this
13 whole area of clean energy, Cleantech. And we do know
14 that there is a difference between clean energy and
15 Cleantech. I'm going to kind of touch upon it a little
16 bit, but the key thing from an economic development
17 point of view is that, you know, very often in Florida
18 what we tend to do is we tend to kind of look at other
19 places and say, you know, they're leaders in this and
20 they're leaders in that, and we should do the same
21 thing. And so we tend to play catch up very often. And
22 when we play catch up, as we did, you know, though very
23 successfully in the whole life sciences area, you know,
24 we were playing a little bit of catch up out there. And
25 now, you know, we've been successful. We are one of the

1 top five regions now. We were nowhere on the radar, you
2 know, a few years ago. I think that this whole area of
3 clean energy is an opportunity from an economic
4 development point of view really to be on the leading
5 edge. To be as somebody else mentioned earlier sort of
6 the silicone valley approach for economic development
7 rather than the catch up model to economic development.
8 And that's really one of the things that I think is very
9 exciting about this whole area of -- let's see. How do
10 I do this thing.

11 Kirstie?

12 We are excited about alternative energy. We
13 understand fully the importance of alternative energy
14 from the environmental climate change point of view.
15 But, as I said, you know, kind of I'm coming at it a
16 little bit more from an economic development point of
17 view, and this is an incredible marriage where it's a
18 chance to establish technology leadership. And this is
19 truly very important technology leadership because we
20 really see the future of Florida in some work that we're
21 doing as really an innovation economy. That's where the
22 future is going to be. And if Florida wants to compete
23 and be a global leader, we're going to have to shift our
24 mind set to be a player on the innovation knowledge
25 based economy. That is going to be critical.

1 Otherwise, we're going to get further and further
2 behind.

3 And so it's in that framework of the innovation
4 economy that this whole clean energy, Cleantech area
5 plays an even more important role because it helps us
6 really get on the forefront of that particular area.

7 So at Enterprise Florida, we started from maybe
8 about two years ago starting to look at this whole area
9 of clean energy, and it happened to be parallel to the
10 time that Governor Christ was also expressing an
11 interest in whole climate change and this particular
12 area. So it dovetailed extremely nicely. And as we
13 look at the kind of research, and this is an updated
14 research up here, is the whole clean energy market. We
15 wanted to know whether or not if we put sort of our
16 resources, our economic development strategies there,
17 was this a growing area, was this declining, or was
18 there no market out there. And what we found was that
19 it really was a significant market and it was growing
20 very, very fast.

21 So here's some statistics, you know, with the
22 projected growth. Already in the time that we've
23 updated the information, we had the 2005, 2006 numbers,
24 we have 2007 here, and it's already grown by about 20
25 billion. And then we look at the next decade. You can

1 see that this is going to be a very, very significant
2 market, and the markets we looked at were, you know,
3 kind of data that we could get. Biofields, wind power,
4 solar, fuel cells. So it's a very -- it's a tremendous
5 growth opportunity.

6 The other chart on the right-hand side also kind of
7 really indicates, and this is something that somebody
8 else said earlier, is that that's where the VC money is
9 going as well. That there's a lot of VC money, there's
10 a tremendous opportunity up in that area. You can see
11 the growth of that chart has really been extremely
12 significant. So the growth market is there. So that
13 was the first question that we had to ask, and we're
14 very convinced that it's -- it's an important kind of
15 opportunity for Florida.

16 We did some comparative landscape analysis as well.
17 And we found that, you know, there's a lot of action out
18 there. There are a lot of global efforts. More than 50
19 countries, more than 20 states that one way or the other
20 are already beginning. And I think internationally, you
21 know, there was a lot more action. A lot of it was
22 fueled by government policies. And in this area,
23 government is a very important partner in economic
24 development because governments, to a certain extent,
25 government policies, energy policies, help create market

1 demand. They help accelerate the market demand. And
2 that is -- that's why that energy policy of efficiency
3 and use is extremely important in terms of the payback
4 and acceleration of technology. So there is a strong
5 partnership there. And we know -- we noted, you know,
6 some of the global leaders. Germany. Germany is
7 discovered, to our great surprise, many of you may have
8 known that but they're leaders in solar. And they have
9 significantly less sunshine than we do. And so, you
10 know, there is real potential here for Florida
11 particularly in solar and some other areas as well.

12 Some of the things that other people were doing.
13 We took another look at what other states, what other
14 countries were doing, and we sort of said, you know, we
15 kind of were amazed at the -- a lot of different
16 initiatives, many of which we're beginning now to take a
17 look at and to deploy. Their technology demonstration
18 grants, seed capital funding, what is a very important
19 component, including debt capital. Dedicated technology
20 incubators, green venture funds, you know, particularly
21 that whole area is, in fact, an area where VC money is
22 migrating to and also what states are doing in terms of
23 incentives and the like. So this gives us a little bit
24 of the landscape of what we felt was very important and
25 a really good opportunity for Florida.

1 So the first question we asked ourselves is can
2 Florida be a player. And we knew that Florida had a
3 great deal of R&D assets, we had some natural resources,
4 we have a large consumer market, and we actually have a
5 large network of supporting industries. I think what is
6 interesting is the chart out there that our analysis,
7 and this will change over time, really shows, for
8 example, that some of the technologies kind of on the Y
9 axis there, we noticed, for example, that Florida's
10 industry strengths probably were in maybe just a couple
11 of areas. But what is very significant is that our
12 research strengths were in almost all areas, that we had
13 opportunities in all those areas. And that really told
14 us was that what is very important is that our R&D base,
15 which was going to be vital to this industry in any
16 case, was going to be especially important in Florida,
17 our universities and the partnership with our
18 universities was going to be especially important if we
19 were to be a player. And that we had opportunities in
20 almost all areas, and some of the verdict is out as to
21 what will happen. This is very much an innovation
22 driven area.

23 But we do have more than people think we do that
24 might think of in Florida. R&D centers are important
25 and we have some clean energy R&D centers. Some of them

1 are listed out there. Very, very important. I mean,
2 this audience out there is testimony to that, and UCF,
3 and much of what is happening here. We also have, even
4 though it's not purely in the clean energy area yet,
5 kind of a whole supply base, a supply chain concept, and
6 so we took a look at Florida and, as you can see, there
7 is really some strength in a potential supply chain.
8 And then most recently, obviously, there has been 50
9 million dollars in money for the university energy
10 research consortium, which will help kind of fuel this
11 as well.

12 So one of the things that we took a look at, and in
13 terms of strategy in the whole clean energy area, is
14 that we felt that some of the strengths that we had at
15 this time, it will change over time, were in some key
16 targeted areas. One is solar, biomass, and many of you
17 spoke to that, many of you have spoken to solar. Fuel
18 cells, and primarily because of a lot of DOE work here,
19 and ocean. We do, after all, have a fairly large coast
20 line and some rather significant things that are
21 happening in the ocean area. So the first thing that we
22 have done, and I've got a few copies here, is we have
23 really produced a Florida prospectus on clean energy,
24 you know, to really begin to kind of put our resources
25 in place in terms of, you know, what is our business

1 case out there. So I do have some copies here if
2 anybody would like some of that.

3 As we developed our strategy for really having this
4 as an economic development really for the innovation
5 economy, we see three strategy pillars which are very
6 critical. The first one is government is a very
7 important partner. Local governments, state
8 governments. Very important partner. Because by
9 setting up renewable fuel standards, efficiency
10 standards, other standards, that really helps to
11 generate demand and accelerate technology development.
12 It actually also helps to accelerate technology
13 deployment. The governors's -- recently, the governor
14 issued his action team, the clean energy action team,
15 report. And it's a fairly comprehensive document of
16 government policies, and, you know, last year there was
17 some legislation that was also passed and some standards
18 and the like, but one of the critical things is that
19 right now as we look at this economic climate, one of
20 the things we are facing is there's a downturn on so
21 many different fronts, but the governor's clean energy
22 action team really made one statement that I think is
23 very important, and that is that we should not let the
24 economic crisis, the economic downturn, really affect
25 and lessen the energy behind really government policy in

1 this area. I think that's a very important factor
2 because if it's government policies accelerate, it
3 actually will -- actually will create some demand. And
4 one other point about clean energy cluster in terms of
5 the overall economic context is, as we look, we do see
6 the economic climate having an impact on a number of
7 clusters in terms of, you know, kind of just
8 understanding the interest, business interest, leads and
9 things. But we see the whole clean energy area as maybe
10 not immune to these headwinds but a little bit more
11 resistant to the headwinds, which means that in some
12 respects, in this particular juncture, it is a time to
13 be more opportunistic in terms of the clean energy area.
14 It is a time, actually is a window of opportunity, not
15 to let up on this. And so I think I will kind of share
16 with you some of the things we're doing in marketing
17 because we think this is, in fact, the most important
18 thing that we could be doing in this particular economic
19 context and that we have a window of opportunity here.

20 So the first pillar is a policy pillar in terms of
21 use, and that is extremely important, and I think that
22 Florida is really beginning to -- and local governments,
23 you know, Orange County government, others are really
24 beginning to do a number of initiatives and those are
25 extremely important in the overall play of really even

1 an economic development side. The second big pillar is
2 really the innovation pillar, and there, I think, that
3 you know, yes, we -- I don't mean to say that, you know,
4 recruitment of companies, helping existing companies is
5 not important, but we do see that the kind of innovation
6 strategy, what we call the creation strategy, the
7 technology based economic development, as somebody
8 mentioned, you know, growing our headquarters of the
9 future is actually a very, very real opportunity and, in
10 fact, the best way to go about it in the clean energy
11 area. So innovation strategy is absolutely at the
12 forefront of this particular strategy here, and they
13 have somewhere different components. And I will just
14 spend a couple of minutes on some of these.

15 We know that R&D technology commercialization is
16 very critical. It actually is going to drive -- this
17 whole is a search for solutions, is a search for new
18 technologies that will solve real problems in cost
19 effective ways and that will later be deployed so. R&D
20 in our universities is a lynch pin, it's extremely
21 important, but technology commercialization is extremely
22 important because getting it to market is really the
23 name of the game. The energy center -- but there are a
24 lot of other efforts across. We do have a dedicated
25 energy technology incubator. It's in Gainesville. But

1 I think that, you know, a number of other incubators
2 will come to play. And so I think the whole ecosystem
3 is very important for R&D for technology
4 commercialization. There are a couple of other things
5 that are going to come into play. What is coming online
6 is an institute for commercialization that has been --
7 was established last year, and this institute for
8 commercialization is a one-stop shopping place, if you
9 will. It's housed in south Florida, but it really is a
10 network of all of the universities in order to be able
11 to really send a message out and to be able to kind of
12 agree. The venture lab has been doing great, the
13 service here in this area. So initiatives such as that
14 are going to be extremely important and we're putting a
15 lot of emphasis in terms of policy, the strategic
16 planning for the state of Florida, and we are also
17 working with the Florida Chamber in terms of really
18 doing a vision 20/30 for Florida which is really founded
19 upon being a top 10 innovation leader by the year 2030.
20 And that's a quantum leap in terms of one, but it is
21 based upon really an innovation economy. So that
22 ecosystem is very important. So R&D and technology
23 commercialization. More needs to happen, but it is on
24 the path.

25 The second area that we recognize is very important

1 and very important for this industry is seed and venture
2 capital. And Florida has never been a venture capital
3 hub, and for early stage venture capital, the seed
4 capital stage, we've done abysmally in the past. We
5 just have not done well. And so several years ago, we
6 really started to focus that area. Some good news on
7 that particular front. The first of all is there was a
8 piece of legislation that was passed called the Florida
9 Opportunity Fund, which is 30 million dollars.
10 Enterprise Florida is a fiduciary agent setting that up.
11 And what is going to come online in January is the
12 Florida First Corporation, which is a partnership
13 between Millcom and Credit Swiss. So that is going to
14 be a fund to funds. We really expect it to be more
15 early stage rather than later stage, and that fund to
16 funds is going to have a match on there so the amount of
17 money it has is going to double. So that is going to be
18 an extremely important development in clean energy to
19 help fuel that as well as other industries, but we think
20 that clean energy will benefit from that area in
21 particular.

22 So that's one initiative. A second initiative that
23 is going to come down the line is really for the first
24 time Florida is dedicating about 1.5 percent of its
25 pension monies into venture capital. And so that is a

1 huge amount of money. That's almost like 2 billion
2 dollars when it comes online. And so that is being
3 handled by the State Board of Administration, and the
4 State Board of Administration is going to really put
5 into VC. It remains to be seen whether it is early
6 stage or later stage. We don't know. But there is also
7 discussion of really having kind of a clean energy fund
8 as well at some point in the future. So there are a lot
9 of developments. So Florida is really beginning to
10 address this whole seed and venture capital, and one of
11 the key things about the Florida First Corporation, the
12 Florida Opportunity Fund Legislation is not only to have
13 the leverage factor in the fund to funds, but also that
14 VC companies that is going to be Florida companies and
15 VC companies who actually partner with the Florida First
16 Corporation also need to be domiciled, or at least have
17 an office in Florida. And that is going to be kind of
18 really -- what we want to do is to grow a VC community
19 because we know that is vital. You know, we know our
20 universities are really going to produce deals in our
21 companies, but we need to fuel it, and so we need to
22 grow a VC community. So that's an important area.

23 Another area that I want to touch very briefly on
24 is tax credits and incentives. We know that's
25 important. The legislation last year really did have

1 some renewable energy sales tax exemptions, corporate
2 tax credits, and then recently, we actually have now
3 designated clean energy, but primarily in the
4 manufacturing, what is called the high impact
5 performance incentive. Now, the high impact performance
6 incentive, HIPI, it's called, is really an incentive for
7 the very large manufacturing, like turbines and other
8 kinds of things. And it's been really kind of large
9 investments in certain minimum number of jobs, about a
10 hundred jobs, but, you know, the investment has got to
11 be about 80 million. So for the large, large capital
12 intensive projects, there are some additional incentives
13 coming online.

14 So this secondary of the infrastructure, the
15 intellectual infrastructure, the business climate
16 infrastructure for really growing the headquarters of
17 the future, really having in Florida all the pieces of
18 the ecosystem that are needed to really grow companies
19 and make us the silicone valley of clean energy for the
20 future is really in play, as you can see. There are a
21 number of things, and so that's a second big, huge
22 pillar of the policy that's very important, the
23 strategic planning that's very important.

24 Now, the third pillar of the strategy is we got to
25 tell our story. We have got to be able to make sure

1 that Florida is on the forefront, on the radar outside
2 of Florida, inside. We've got to make sure that Florida
3 is seen and perceived and branded as a clean energy
4 innovation hub. That's important because, you know, we
5 really want to have strategic alliances. University to
6 university all over. We want to be able to really see
7 this as a destination, as the place to be for clean
8 energy. So what are we doing. I want to just spend a
9 couple of minutes in terms of what we are doing because
10 we are a policy arm and we are also a marketing arm. We
11 also handle projects, you know, kind of where rubber
12 meets the road, but we also market Florida because we
13 know that product development and product marketing go
14 hand in hand.

15 So what are we doing in terms of branding Florida
16 as a clean energy hub. And, here, what we're doing is
17 we're really using what we call thought leadership
18 marketing. We're not doing marketing in the traditional
19 way of saying, you know, we're placing ads, we're just
20 doing -- you know, saying how wonderful we are, and just
21 touting us. We're actually taking a totally different
22 twist in what is called thought leadership marketing.
23 And thought leadership marketing is essentially saying
24 that we are in the forefront of new trends, because we
25 don't know where things will end up, but we're really

1 thought leaders, you know, here in our companies, in our
2 universities, new developments, and we're really
3 marketing our thought leadership. So we're marketing
4 all of you, in essence, as really people, the brain
5 power that is here in Florida. We have done -- we're
6 doing educational webinars. We recently did one and
7 we've created a partnership with Cleantech. We're the
8 only North American partner with Cleantech in this. We
9 did a webinar. If any of you want to see a webinar, it
10 is really about, you know, company partnerships and
11 different kinds of partnerships. And we had over 400
12 people from across the world in 20 countries included
13 who really attended this webinar. It's on our website.
14 You know, the slides are out there and you can listen to
15 it. It's www.EFlorida.com. So you can kind of see it.
16 But we have done it. We are also now creating a
17 partnership with Clean Edge, another think tank.
18 Cleantech is a think tank and an investment in the
19 community, the venture capital community, and that's why
20 it's very important because we want to make sure that
21 Florida is where the action happens. So we've got a
22 number of white papers that are going to be coming out
23 as well because we're really kind of positioning Florida
24 as an innovation hub for clean energy.

25 I've mentioned the market brief and the cluster

1 snapshots because we want to prove our bonafides, and so
2 we've done that as well. The other thing we're doing in
3 terms of our overall strategy is we are really using 2.0
4 technologies to really spread the word. We have created
5 a partnership with technology review. We have a
6 microsite that's on -- and, as you know, technology
7 review is MIT, but it's really become more of a global
8 platform. So there's a lot. I want to emphasize that.
9 We're really pushing out many of our university and our
10 company stories and our thought leadership stories with
11 a very proactive public relationships effort. And, you
12 know, we are placing them all over in a lot of science
13 magazines and major publications. We also have created
14 and invite you all to go in on our website and look at
15 our innovation center, where our innovation center, the
16 whole thing is, Florida's voices of innovation. What we
17 are featuring there is really all of you. We are
18 featuring companies, we are featuring university
19 research, we have an academic hall of fame, we have
20 really kind of a creative class, totally different kind
21 of mind set. We have part casts, we have expert
22 interviews, we have RSS feeds. Some invite you to
23 really look at that, and, you know, as you look through
24 this and if you have some of your stories that you would
25 like us to consider, this is a plea to say, the more we

1 can kind of tell the world about what's here, the better
2 off, and along with the policies, that's how we are
3 really going to accelerate. And we are also doing kind
4 of on your radar a newsletter that is specifically for
5 clean energy that is going to go out to over 18,000. So
6 it's a strategy that's really broad and, you know, then
7 we are also doing some traditional things, like print
8 ads and the like. But really the most important thing
9 is that an overall layered approach of telling our
10 story, making sure that we are a global center of
11 excellence for clean energy. The spike, so to speak, so
12 that really Florida is on a global radar, is an
13 important component as we develop policy in our overall
14 kind of strategy.

15 So finally, let me conclude by saying this area is
16 very important. Our partnership with you couldn't be
17 more important. We invite you to send use -- do send me
18 more information. You've got my website, my e-mail
19 there. We really looking to see how we can really
20 promote. And this is a partnership that's important.
21 And as we go forward, we know those statements made that
22 there was a difference between clean energy and
23 Cleantech. We recognize that. We are looking at clean
24 energy as the market of opportunity right now, and we
25 are also beginning to do some research in terms of

1 Cleantech which would include more environmental
2 technologies and the like. And so we think that there's
3 a morphing out there. And so this is a very dynamic
4 industry, very dynamic opportunity, but a true ground
5 floor opportunity. And I think that the tremendous, the
6 robust resources, both in terms of our universities and
7 the companies that totally even in this Orlando area is
8 truly very exciting, and we just simply want you to know
9 that Enterprise Florida is a partner with you in this
10 process, that we really recognize the importance and we
11 think that there is some very real potential that we are
12 very excited about it.

13 Thank you.

14 MS. CHADWICK: Thank you, Sena.

15 MS. BLACK: If anybody would like one of these,
16 I'll just leave them out here.

17 MR. LEWIS: I just wanted to recognize, Carson
18 Frazier and Melvin Pittman. I think there may be a few
19 other people here from Orange County. I'm very happy
20 that they're here. There's Carson right over there
21 hiding. Both of them are department heads. They serve
22 on Orange County's green team, and I think it's very
23 important that they are here today, not only so that we
24 can match government and business interests in these
25 areas, but whatever comes out of the symposium series in

1 studies in terms of action items and they've got to go
2 through Orange County. One of the steps in getting
3 funding from Orange County and getting the blessing from
4 Orange County is that the ideas and proposals have to go
5 to Orange County senior staff. We have to sell our
6 ideas and our proposals to other department heads in
7 Orange County because there is always competing uses for
8 money. One of the alternatives being not to spend any
9 money at all. So Tarzan and Melvin Pittman and other
10 senior people from Orange County are very important
11 parts of this seminar series and the study.

12 I also want to thank everyone for coming today.
13 It's an incredible amount of information. Most of today
14 was listening, and the next symposium there is going to
15 be a lot more talking. But don't forget that the title
16 of Shaun's study, the subtitle is Cleantech assets,
17 capabilities, the presence of Cleantech in our
18 community, its potential, and what we could do if we
19 wanted to promote the growth of Cleantech and move
20 forward. And there is just an incredible amount of
21 information that came out of today that we can feed into
22 each one of those categories and make for better
23 symposiums in the future. And I think it's safe to say
24 that we'll be able to e-mail each of you the full
25 written transcript of this symposium. I don't think

1 there has been any symposiums or forums that you go to
2 where you get a full written transcript of the
3 proceedings, and we'll do that.

4 Thanks for coming. And thank you.

5 MS. CHADWICK: Okay. Just a couple logistics for
6 closing. First of all, I think all of you -- if you
7 don't have it, they're out front, but you should have
8 the one pager. It looks something like that. Please be
9 sure to list any other folks that you think need to be
10 here. We are specifically looking for Cleantech
11 companies. You know, we know who the economic folks are
12 and the other folks are, but we are finding it a journey
13 to get a hold of the Cleantech companies because there
14 is no SIT code according to Shaun. Therefore, finding
15 them, it's people that we know that know, and it's going
16 to be a word of mouth, grass roots campaign. We're
17 going to need your help. So please fill this out, leave

18 it with us, add any comments about this particular
19 forum. But I want to articulate again what John already
20 mentioned, that is the next three that are left in the
21 series will be much more interactive. This one was just
22 trying to kick it off, let everybody get a sense of
23 what's already out there. The next one is going to be
24 in you all's court, which is all the more reason we
25 really need to get folks here and involved and engaged

1 so that we can let everybody know what we need to be
2 doing. I guess that's it, other than just note the
3 dates.

4 Shaun did you want to add any other comments?

5 MR. SNAITH: Thanks to everybody for coming, and
6 hope you can make it to the remaining series, and tell
7 your friends in Cleantech to join it.

8 MS. CHADWICK: Thanks so much, and look at that, we
9 ended on time. I know you are impressed.

10 (Symposium concluded at 11:55 a.m.)

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CERTIFICATE OF REPORTER

STATE OF FLORIDA
COUNTY OF ORANGE

I, Leslie Richmond, Registered Professional Reporter,
certify that I was authorized to and did stenographically
report the foregoing symposium; and that the foregoing
transcript, including 138 pages, is a true and complete
record of my stenographic notes.

Dated this 21st day of November, 2008.

Leslie Richmond, RPR and
Notary Public

(This signature is valid only if signed in blue ink.)

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