

**UNIVERSITY OF MASSACHUSETTS AMHERST
OFFICE OF THE FACULTY SENATE**

From the 665th Regular Meeting of the Faculty Senate held on October 4, 2007

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“CLEAN ENERGY FOR THE COMMONWEALTH – POWERED BY THE UNIVERSITY OF
MASSACHUSETTS – UPDATE ON UNIVERSITY-WIDE CLEAN ENERGY WORKING
GROUP”**

A PDF version of his PowerPoint presentation is available at:
http://www.umass.edu/senate/fs/minutes/2007-2008/kostecki_powerpoint_665_10-4-07.pdf

Thank you for giving me this opportunity. I want to report on something that I think is pretty exciting for this campus with regards to our place in the state of Massachusetts. This is a working group that was convened by the President's Office. It was modeled after a working group that was developed just before this one which some of you may have heard about in the Life Sciences area. The idea for the working group in the Life Sciences area was to take advantage of the opportunities that were going to present themselves by Governor Patrick's \$1 Billion Life Sciences Initiative. The President's Office took it upon themselves to lead the charge to show the Governor's Office that the University of Massachusetts, as a system, has a lot to contribute to helping and providing resources and energy to the Life Sciences Initiative. It was a good idea. I have to say there have been some contentious relationships between the campuses and the President's Office, but this is a great thing. This is what we would look to the President's Office to do to the benefit of all the campuses as well. We want to make that case to the Governor and to the legislature of why the University of Massachusetts should be in their forethoughts when they have the initiatives and money available. They should come to us because we do a lot of great things.

With that said, energy is another area that we have heard Governor Patrick talk about. It has not been talked about in the same resource context. There is no \$1 billion fund that he is going to develop for energy research in the state. But, it is a priority, and there will probably be resources developed as it goes along. Unlike Life Sciences, there are actually pots of money already: there is a Renewable Energy Trust; there is the John Adams Fund; there is the Department of Transportation and so forth within the state that has money dedicated to energy research. So, the concept is the same.

What I am going to give you today is a quick overview, and I am going to have to go through it quickly. I am going to have to do two things at the same time to get through in fifteen minutes.

This is my report to the Board of Trustees back in June on the Renewable Energy Working group. Now I should tell you that the Amherst campus took the lead on this. As you will see as we go through this, we do about eighty to eighty-five percent of the work in energy system-wide. Unlike the Life Sciences Initiative, where the Worcester campus is the 800-pound gorilla, we are the 800-pound gorilla in energy. Worcester really has no play at the table with energy, so it is basically us leading it.

The purpose of this group was basically twofold: One, to show the state of Massachusetts that the University of Massachusetts can help them develop and lead education, training and technology development in the state of Massachusetts. Secondly, we can also help the state become a global leader in those areas as well. The intended audience that this group is playing to is not only to the Governor's people, to the legislature, but also to other funding agencies. A good activity should not just play to one audience but should have two or three different outcomes possible, maybe all at the same time. UMass has critical mass in the areas I have alluded to. We have a hundred faculty system-wide – and I will give you some numbers in a minute – that work in the area. We have the stuff. We have the people. We do a lot of work in the various areas of the different types of renewable energy.

You can see here the working group members. You will see we have representatives from each campus. We have the relevant themes from the UMass campus. Steve Goodwin is on there as well as

Mike Malone and George Langford. We have participants from the President's Office, and I chair this group. The work is actually being done by Marla Michel and Loren Walker out of Research Liaison and Development. You always need people to actually do the work, and those are the people who are supporting this.

We have to find out what we do. What it is that we do? What can we contribute to the formula, if you will? We have to find out what resources we have available that we can utilize as well as going after the new resources. Certainly we have to engage the economic development community in Massachusetts, and we have been doing some of that on each campus – some campuses better than others. But, we have to be able to tell that story and show how we can build upon that as well.

The ultimate purpose of what we are trying to do is try to help the Governor in the state of Massachusetts develop a strategic plan for energy research and development in the state. If you are in the game early, and you can be part of the team, then you should have a lot of influence on what comes out of this.

(Referring to the slides)

Just a broad matrix here to show you the campuses and where work resides. I will get a little more detailed in a minute. But, you can see the applications, a broad range. We have grouped it by six application areas, and you can see the different campuses and how they play into this. You can see that Amherst is a player in all of those areas.

This is the UMass system matrix by application area and then research input going down. You can see that we do a lot of work system-wide in those areas and the research activities that are found there. You will notice on the bottom what I call the policy part. That is kind of a catchall. It is financial analysis; industry analysis; resource economics; environmental policies; public policies. You will see that all campuses do a little bit of that.

If you look at Dartmouth, you will see that their strength is in, as we guess, the oceans, ocean power. That plays to their development of the Center of Excellence. Also, because of their marine focus, they can contribute to the environmental impact as well.

Boston does a little bit more than Dartmouth. They are very strong in analysis. The School of Management there does industrial analysis, looking at what climate change will do to industries, market share, and so forth. They are also doing some work in the fuel cells/batteries area as well.

Lowell does a little bit more. As you can see from their work in nanotechnology and material sciences, they cut across several of those application areas, certainly more than the other two campuses.

When you come to Amherst, you can see that we are pretty much – and it was not just because we developed the matrix, by the way – a player is all of those areas. The thing that you can see up at the top is that the material science and the nano piece transcend all of those application areas, and we are very strong in those areas as well. You can also see that in biofuels, we are strong, and very vertically strong. They like to say, from feels to wheels, development to biofuel stocks to the efficiency of combustion and product development. We are growing in that area as well. In the biofuels area, some of you have heard about Susan Leschine from microbiology and SunEthanol. That was a spin-off company that we did. I think they have gotten play all over the world, in *The New York Times* and *The London Times*. It is one of our first spin-off companies, and we have an equity share in that.

One of the points I tried to make to the Trustees, tried to educate them to, is it is easy to see applications. You say, "Oh, you developed a fuel cell, and that is great for the Energy Initiative." But, what I wanted them to understand is that basic research, fundamental research, is the building block for all of these applications. And, by telling a little story about Sue Leschine, I think I got the point across. They all say, "Wow, she has developed a process to create more ethanol. Isn't that neat?"

Well, they have to understand that Sue Leschine is a microbiologist. She has done a lot of basic microbiology. She was looking at bacteria that did certain things that she could study and report on. It had nothing to do with ethanol. She looked all over the world for the bacteria. You know where she found it? She found it in the Quabbin Reservoir. It is called the Q bacteria. So, I think that is kind of neat that it was just down the road after she had looked all over the world.

Secondly, she was not looking for it to produce ethanol. It was for other things. But, when ethanol, biofuels, became in the public's interest, in governmental interest, in clean energy, when opportunities arose, Sue Leschine was there and said, "Wait a minute. I think my microbe can help in the production of ethanol." So, I wanted them to understand that basic building blocks are pretty much any application, and I think they need to know that. I think they are getting it as well.

We have so many things going on on-campus in the energy area. We have, not just Sue Leschine's work, but Derek Lovely's work in microbiology, looking at biofuel cells. His bacteria produce energy while they are cleaning up hazardous waste. We have the group in biochemistry dealing with some biofuels issues. The polymer science people, as well, are working in that area. We have MRSEC, a center we have had for thirty years, working with basic material science that now has things that are easily applicable to the energy area. The NSEC was the Center for Hierarchical Manufacturing. The Nanotechnology is a \$24 million center we just got about a year and a half ago. We have applications that almost tomorrow could be applied to the energy areas as well.

We are well positioned to lead this, and I think we have a lot to offer. Again, we have got the stuff, we have got the people. We can show you where it resides on campus and within the system as well. We are already working with different campuses. I think the Boston Group, out of the School of Management, is working with Erin Baker in our Mechanical and Industrial Engineering department to look at resource economics and how decisions are made in the energy area. We have cross-campus pollination already going on. Actually, this is growing because we are finding that even the new hires that came onboard last month play into the Energy Initiative as well.

This was a Lowell example. As you saw at the beginning of the presentation, I did this primarily with Craig Armenato from Lowell as well. He gave an overview, a little more detail to that matrix that I gave before.

(Referring to the slides)

This is an example of what we are doing. What was nice about this initiative is we were already thinking energy, and we were already thinking of taking advantage of opportunities. We have developed an energy portal on campus that is available. It helps someone from the outside, whether it be a legislator or an industry partner, to see what we are doing on campus because we realize it is very difficult. If you call the physics department, you get part of the picture. If you call up Natural Resources, you get part of the picture. We thought it was important that we created a portal where people interested in energy could come to and see all the things we do. This gets them down to the faculty level. It may even get them down to the technology level to perhaps license technologies that we have developed on-campus through our intellectual property program as well. We brought this to the table at the President's Office, saying, "Maybe something like this should be at the systems level, too." We have already done it. It can be modified, but we are already on the road to knowing that there were opportunities out there.

It is always about the money. I wanted to give them an indication. This is Amherst funding. We did not have, at the time, the money from the other campuses, but it would not be a very significant contribution to what we see here at this point and time anyway. This is NSF. We have gotten almost \$10 million in sponsored research activity last year. You can see it has been growing. Those different colors give you the different types of application areas. You can see that nanofabrication really came into being around 1998 and continues to be a strong part of the growth of that. You can read those for your own edification.

When you look at DOE funding that we have received on campus, we have received a lot of funding. Derek Lovely's shop has received \$21 million over the last three or four years, but that does not include that because that is more hazard waste clean-up. This is purely the energy funding that we have on campus. You can see 1996/1997 seems to be a bump-up, and then around 2000/2002. I think that is only going to grow as we know energy is being spoken about everywhere in every sort of context.

The milestones that we have been looking at, complete the inventory, complete knowing what we are doing. That is ongoing. As I said, there are new faculty coming onboard everyday. We are having faculty who are now modifying their research programs – as wise researchers that are looking for funding do – modify them to now be able to be incorporated into the Energy Initiative as well.

We are meeting with policy makers. We have met with Secretary O'Connell. We have met with various legislators to try to tell our story. We have met with the President's Office. We have had some of them out here. Secretary O'Connell is coming out to campus October 29, and we will continue these energy discussions with him. We have made presentations to the Board of Trustees. Our timeline is to have a draft of a white paper for them, a deliverable by the end of November. I think we are on target to do that. What that will do is it will lay out what we have, what we can do, and how we perceive we could use resources to do better and ultimately how we can work into the Commonwealth strategic plan in the energy field.

We are also planning a Clean Energy Day. It has been put off from this October until next spring to try to, again, highlight the work we do here to industry, to the public, to the legislators. Some of the things we have done are just listed. We have done things in D.C. when appropriate. In the eastern part of the state, there is a Clean Energy Council being developed. I was part of the planning for that in the early stages, and I think the President's Office will take the lead as being a representative on that. Their meetings are too early in the eastern part of the state for me.

There is a list of the outcomes. We want to educate everyone of all the great work we do in this system. We want to convince them that we can be part of their plan. We can be successful. They will be better off working with us, and we will all be better off for that. We can educate the policymakers. We can educate the Trustees to all the great things we do here, and then ultimately it is to bring in more resources in the research area from my standpoint, whether that be in polymer science, chemistry, public policy, or wherever. I think this is going to work out well. I think I will be able to come back next year and give you some money numbers of why it has been successful.

One last thing, before I take questions. This was just brought to our attention in the last 24 hours. I don't know where it has emanated from, but there was something being reported in *MassLive* that Deval Patrick had stated he would like a Renewable Energy Center in Springfield. I do not know anything about that. No one has talked to me about that. But, on the face of it I would say, if he wants that, and he is going to put money in, we have already started telling the story of why we should be involved with that, and why we could make it better, and why we do actually work and help Springfield out.