

Minutes\*

**Senate Committee on Finance and Planning  
Tuesday, December 2, 2003  
2:30 - 4:15  
238A Morrill Hall**

- Present: Charles Campbell (chair), Stanley Bonnema, David Brown, David Chapman, Steve Fitzgerald, Thomas Klein, Joseph Konstan, Yi Li, Timothy Nantell, Terry Roe, Charles Speaks, Alfred Sullivan, Kate VandenBosch, Susan Carlson Weinberg
- Absent: Calvin Alexander, Brittny McCarthy Barnes, Daniel Feeney, Michael Korth, Cleon Melsa, Richard Pfutzenreuter, Rose Samuel, Thomas Stinson, Michael Volna, Susan Van Voorhis, Warren Warwick
- Guests: Jerome Malmquist (Director, Energy Management), Associate Vice President Steve Spehn (Facilities Management); Vice President David Hamilton, Assistant Vice President Win Ann Schumi (Office of Oversight and Accountability in Research), Assistant Vice President Tony Strauss (Patents and Technology Marketing), Greg Brown (Office of the General Counsel)

[In these minutes: (1) energy policy/energy master plan for the Twin Cities campus; (2) technology parks/incubators for start-up businesses]

**1. Energy Policy/Energy Master Plan (Twin Cities Campus)**

Professor Campbell convened the meeting at 2:35 and welcomed Messrs. Malmquist and Spehn to the meeting. Mr. Malmquist conducted a slide presentation for 45 minutes.

Energy management includes electricity, steam, chilled water, water, sanitary sewer, and storm sewer. The energy management team consists of 9 engineers, 4 energy efficiency experts, 18 individuals in the electrical trades and 19 in the pipefitter trades. They cover 18 million square feet with a budget of \$70 million. The mission is "to manage the procurement and distribution of energy and provide facility engineering expertise to support the University's mission of research, teaching, and outreach."

They have three goals, Mr. Malmquist explained: reliability, cost control, and standards. Reliability means the utilities are functioning 100% of the time, 365 days per year. Cost control includes fuel flexibility, sound maintenance programs, planned capital renewal, and conservation. In some cases, it is more efficient to replace something than it is to repair it, he observed. Standards include the notion of N + 1: if any one piece of the system goes down, the University can still operate. They also include safety, environmental concerns, and life-cycle costs.

Mr. Malmquist touched on various elements of energy management on the campus.

-- Steam: For both Minneapolis and St. Paul, the available steam capacity exceeds the peak usage amounts, but the system experiences pressure drops at the ends of the distribution network during periods

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\* These minutes reflect discussion and debate at a meeting of a committee of the University of Minnesota Senate or Twin Cities Campus Assembly; none of the comments, conclusions, or actions reported in these minutes represents the views of, nor are they binding on, the Senate or Assembly, the Administration, or the Board of Regents.

of high steam use. The Minneapolis campus boiler is 7 stories tall; the plant produces about 2 billion pounds of steam per year, enough to heat more than 50,000 average-sized homes. The steam distribution system has over 8.5 miles of underground tunnels.

-- Electricity: As with steam, the capacity exceeds the peak demands, although there is an occasional problem in balancing demand among the various feeder lines. Mr. Malmquist showed the Committee a map of the upper Midwest and southern Canada indicating where the University gets its power. The distribution system on the St. Paul campus needs rebuilding, he also said. The University is Xcel's 7<sup>th</sup>-largest customer (in a 12-state region) and third largest in the state. If the University were to buy all green power, it would cost about \$7.8 million more per year.

-- Water and sewer in Minneapolis are owned by the city and by the University in St. Paul. They are expensive.

-- There are 29,500 tons of chilled water in the campus system. St. Paul is getting a new system; the Minneapolis system has six central plants that are all pretty efficient.

-- Conservation: They are involved in commissioning new buildings (verifying that the systems work as required), re-commissioning existing buildings (as a rule of thumb, they can do this every 4 years and justify the costs because of building use changes and improvements to systems), programming buildings, energy code and new construction standards, and updating existing systems (this is what people would do at home as well--a new furnace, new thermostat, insulate the attic, cleaning ducts, etc.). They are also moving to control systems that allow shutting down parts of a building if it is not being used--it is very expensive to keep entire buildings heated when parts are not being used.

-- The total number of BTUs used on the Twin Cities campus (in both gross terms and per square foot) has been declining for a number of years, even though there are new buildings and more people. Gross consumption, however, rose last year, primarily because the renovated Walter and the new Molecular and Cellular Biology building were brought on line. Vice President O'Brien commented that there have been continuous improvements in energy efficiency that show up clearly on the graph Mr. Malmquist displayed. (In a separate bar graph, Mr. Malmquist compared KWH of energy consumption in Walter in 1999, before it was renovated, and then in 2003; the renovated building consumes approximately three times as much energy as the old one did.) Did they know ahead of time that would happen, Professor Nantell asked? They do make projections for each building, Mr. Malmquist said, although they might have underestimated in the case of Walter. Is the increase primarily due to computers, Professor Campbell asked? That, increased use, and better ventilation, Mr. Malmquist said. He also noted that everyone receives with their home heating bills information about the number of heating degree days; that number is based on 65 degrees (that is, if it is 65 degrees, homes will not need to be heated or cooled). For University buildings, they use 55 degrees, because so much heat is generated within the building that they do not need to turn on heating until it gets below 55

-- Threats and Opportunities: (1) The University relies on third-party providers (Xcel is sole provider of electricity, Centerpoint Energy provides gas to Minneapolis, another company, Dominion Oklahoma Texas Exploration & Production Inc., along with Xcel's distribution, provides gas to St. Paul, and Foster-Wheeler manages the steam plants). The University loses direct control with third parties. (2) The University must work with many interest groups in the environmental permitting process. (3) Neighbors surround the steam plant, and there is a proposal to build new high-rises nearby that are above the steam plant stack height. Buildings are getting very close to the steam plant.

-- Mr. Malmquist reviewed data about the number of hours the electrical system has been down the last three years. In 2002-03, the campus lost power 13 times, for 250 hours, or an average of about 19 hours per outage. The reason the average was so high is that a transformer was lost in the Ecology Building in St. Paul. It was a special order. The building was back in service in relatively short order but not functioning as completely as it would be with the right transformer. Every minute the building was compromised is counted as time down in this metric.

-- Energy procurement is a commodities game. The University buys futures to control costs and protect the budget. If they see an opportunity to lock in energy costs below the budget, they will do so. In one case, they locked in a price when the costs were expected to continue to rise dramatically; the prices did rise for awhile, but then began to drop. Even so, they saved \$2.1 million over what the price would have been if the University had bought on the market at the floating price, and they have saved \$1.38 million so far this year. Who decides on the decision to lock into a price, Professor Speaks asked? Mr. Malmquist said it is a group that includes himself, Vice President O'Brien, and Messrs. Pfitzenreuter and Spehn, after consulting with their energy experts. They heard at different times this year from two different national experts on energy. One made predictions about supplies and costs that were scary. Another offered a view 180 degrees in the opposite direction--don't panic, prices are not going up. So it is tough to decide when to lock in prices.

-- Decisions must be made with balance. The factors driving University decisions are cost, reliability, and the institution's standards.

-- In terms of steam plant emissions, the University has dramatically reduced emissions between 1996 and 2001. The reductions, however, do not necessary follow fuel changes one-for-one: The University reduced its reliance on coal from 79% to 21% (a 72% reduction) in the five year period, but carbon dioxide emissions decreased only slightly more than one-third.

-- In terms of new technologies and fuels, the University is doing a number of things. It is experimenting with oat hulls in Minneapolis, which have almost as much energy per pound as coal; so far this alternative has been very successful. They are working on a biomass plant at the Morris campus. There are solar cells on the new Architecture building (which actually return a very small amount of power to the grid). They are working with fuel cells and hydrogen. Oat hulls, which come from the General Mills plant that manufactures Cheerios, could offset fuel costs by as much as \$2 million per year. So eat your Cheerios! Mr. Malmquist commented.

-- There are several strategic questions to be addressed:

- Where should the University be in the energy market? (What position should it take on deregulation? Should it wholesale power? What should be its role in promoting new technologies?)
- How do we strategically plan for campus expansion and replacement of aging systems? (In 30-40 years, where should a new heating plant be located?)
- What is the right utilities infrastructure life cycle model for the University?
- What should be our standards for reliability and redundancy ?
- How does the University make financial decisions regarding utilities?

Professor Konstan commented that he very much liked the mission statement; it is exactly what units should be doing to serve the rest of the University. He asked what mechanism will trigger a change in user profiles (e.g., they currently let some faculty and graduate student offices with extensive computer equipment get as warm as 85 degrees on summer weekends because the original profile didn't anticipate

the equipment needs and usage schedules)--what is the process to make changes to a buildings energy settings, given that the building's use may have changed and adjustments are needed. Mr. Spehn said that the process is to contact the zone. The zone interfaces with Energy and Mr. Malmquist's group, and an energy specialist is assigned to each zone to work through these issues.

How close a linkage is there between what the energy management people are doing and faculty who are doing research on energy, Professor Konstan then asked? Mr. Malmquist said that they had done the work on oat hulls on their own and had not involved the faculty, but the faculty are involved in work on solar panels and fuel cells. They are trying, with demonstration projects, to prove whether approaches will be viable if they are part of the power grid.

In older buildings there is no central air conditioning and not enough electrical power to put in window units, Professor Speaks observed. Mr. Malmquist said they have completed a master plan to add a chilled water plant for the Knoll area of the campus, but he said he did not know when that would happen. It would not be cheap. The study indicates that it would take \$37.4 million to upgrade all of the utilities in the Knoll area when chilled water is installed. It is strongly preferred that this be done before the Knoll buildings are updated.

Vice President O'Brien reported that there is an initiative for renewable energy, led by a number of deans, and she has gotten Mr. Malmquist appointed to the working group for the effort. She also noted that he is a U of M graduate, in Mechanical Engineering, who worked at 3M for 24 years before coming to the University three years ago; she said the University is fortunate to have his expertise and leadership.

Professor Campbell thanked Mr. Malmquist for his presentation.

## **2. Technology Parks/Start-Up Business Incubators/University Enterprise Laboratories**

Professor Campbell now welcomed Vice President Hamilton and his colleagues to the meeting to discuss technology commercialization.

Dr. Hamilton distributed copies of two handouts and said that he would have preferred to have provided the information in advance to the Committee and then talk about it; he said he was always annoyed when he was a committee member or chair and an administrator would present something at a meeting and ask for a response at the same time. He said he would like to return to the Committee in two weeks to talk more about the issues. The two items he handed out were presented to the Board of Regents at their November meeting.

The University, under the provisions of the Bayh-Dole Act, is required to commercialize its intellectual property. It does so now and does a good job of it, Dr. Hamilton told the Committee. Its rankings nationally and in the Big Ten demonstrate how well it is doing:

<u>National Rank (all reporting institutions)</u>	<u>Big 10 Rank</u>
12 <sup>th</sup> in research expenditures	5 <sup>th</sup>
7 <sup>th</sup> in intellectual property disclosures received	2 <sup>nd</sup>
12 <sup>th</sup> in total U.S. patent applications filed	3 <sup>rd</sup>
10 <sup>th</sup> in license & options executed	2 <sup>nd</sup>
6 <sup>th</sup> in licenses & options yielding income	1 <sup>st</sup>
12 <sup>th</sup> adjusted gross license income received	3 <sup>rd</sup>
21 <sup>st</sup> in U.S. Patents issued	5 <sup>th</sup>

6<sup>th</sup> in start-up companies

2<sup>nd</sup>

In spite of the fact that the University has been successful in patent and technology marketing, there is always room for improvement. Dr. Hamilton said he proposes to set up, in the Office of the Vice President for Research, an Office of Business Development (OBD) that will have three primary functions. They will be (1) to nurture University startups (provide help in developing business plans, management plans, finance plans, legal plans, etc., and market surveys; (2) education of faculty and staff on the benefits of technology commercialization, and (3) provide a point of entry for outside businesses that want to interact with the University and with University entrepreneurs. The first item is very important; he has often found that companies form too quickly and forget they need a business plan and management plan and the like, and may be a company without a product. The University has about 10 startup companies per year. Mr. Strauss said there could be perhaps as many as 20-30 others that people want to start. The OBD will partner with the Carlson School's Carlson Ventures Enterprise, an MBA program in entrepreneurial development, so students will work with companies to help them design business plans and do market surveys.

Vice President Hamilton then turned to University Enterprise Laboratories (UEL). This is the brainchild of Dean Robert Elde, he said. There have been a number of faculty in the biosciences who have started companies, which is the majority of the proposals they see coming through their office. Dean Elde was instrumental in setting up UEL as a 501(c)3 organization. Dr. Hamilton proposes to house the Office of Business Development in UEL so it is convenient to startups and also lend presence to UEL, which will be distant from/not a part of the University but which will need the imprimatur of the University.

What he is proposing is a mechanism to provide funding to organizations like UEL in order to enable them to increase the potential of commercialization of University intellectual property. The question came up, what happens at other public universities? The answer is that they are so far ahead of Minnesota that it will have a hard time catching up, Dr. Hamilton reported. He provided a summary of what some others are doing:

-- **Northwestern University** provides business development assistance through an organization called ITEC-Evanston, which is a partnership with the Illinois Department of Commerce; they also have a modest grant from the State of Illinois to do early seed funding of start-ups on the order of \$25,000.

-- **The University of Illinois** wholly owns and funds (\$1.7 million per year) Illinois Ventures LLC, which provides developmental grants to startups (\$25k to \$150k) and is close to completion of a \$10m Emerging Technology Fund.

The University of Illinois also owns incubators, supports staff positions at these incubators, and provides at-cost or competitive rate services to tenant companies (including research facilities, recreational facilities, and libraries). Actual support of the operation comes through:

- University Central Stores purchasing,
- University Chemical Stores purchasing,
- Fee-based access to:
  - University shops and facilities
  - University research equipment
  - Hazardous materials disposal
  - Laboratory support services

Access to the University Library,  
Access to University sporting events at faculty rates, and  
University telecommunications.

-- **University of Wisconsin**--The University Research Park (URP), which includes incubator facilities, is owned by a nonprofit organization closely affiliated to the University of Wisconsin and managed by its Board of Trustees. The University of Wisconsin provided URP with 350+ acres of land. This land has been leveraged to secure financing for research buildings as well as for an incubator. As URP developed, the land and buildings were leased to the park tenants, which provide a long-term stream of cash to the program and is used to support their operations, salaries, etc.

-- The **University of Iowa** has also supported directly the creation of their incubator program by the donation of 42 acres of land (with the same result as outlined for the University of Wisconsin).

-- **McGill University**--teamed with Sherbrooke and Bishop's universities to create the MSBi venture fund to support startups coming from those institutions; the fund manages \$26m (Canadian) which came from the pension funds of the funding institutions and a ministry of the Province of Quebec.

These institutions are able to "invest" (provide infrastructure for the commercialization of intellectual property). In almost every state that has a Big Ten school, the state is contributing to these kinds of efforts, Dr. Hamilton reported. The State of Minnesota is not contributing to the University's efforts, although there is murmuring at the state that it might be a good idea. The University will need to move first, however.

What should be the principles that guide the University in any involvement with a technology park? Dr. Hamilton outlined four:

-- **University Mission.** The University of Minnesota's fundamental teaching, research, and public service mission is foremost and cannot be subordinated or diverted to other private/for-profit objectives or other objectives unrelated to our mission. In this sense, then, the University of Minnesota cannot invest scarce State resources in a venture such as a Technology Park, but may invest in research infrastructure that benefits the research and teaching missions of University faculty and students, and that, in an agreed-upon manner, will be of value to startup and other companies that might occupy space in the Technology Park.

-- **Student/Faculty Benefits.** A major benefit to the University of a Technology Park will be the opportunities afforded to both undergraduate and graduate students to work and learn in a 'real life' environment. For faculty it is important to be able to establish startup companies close to the environment of the University and to bring to fruition sometimes years of work resulting in commercialization of their inventions. In addition, opportunities for collaboration with startup and other companies will be of benefit to faculty and to the University as a whole.

-- **University/Technology Park Synergy.** The Technology Park should be organized to form a synergistic relationship between the University and Minnesota businesses. The proposed technology park should be attractive to companies doing many types of research, including but not limited to:

Medical devices,  
Biotechnology in its broadest sense,

Convergence between medical devices and biotechnology,  
Other life sciences, including agriculture,  
Computer sciences and other digital technologies, particularly related to bioinformatics,  
Nanotechnology and the convergence between nanotechnology and the life sciences,  
Chemical engineering, and  
Materials sciences, including building materials and polymers.

-- University/Community Interactions. The University is part of a larger community, and it is imperative that whatever development occurs in the Technology Park is done in a manner that is compatible with needs both of the community and the University. The architectural character of facilities (including building scale) and environmental considerations must be compatible with not only the adjacent University buildings, but also the community. In this sense, the developer (or developers) must maintain on-going contact, through formulation of the development plans, financing, marketing, construction and leasing phases, with individuals at the University designated to lead the institution's efforts.

At present the University cannot invest in an incubator; all of the royalty revenues go into the general revenue stream. One question was whether the University should use tuition revenue to invest in a biotech incubator; the answer to that question is clearly "no." And there will have to be approval from the Board of Regents for investment of any kind.

What is the magnitude of the investment being envisioned, Professor Campbell asked? About \$500,000 for four years, Dr. Hamilton said.

The University is about to sign agreements with Minneapolis and St. Paul about mutual cooperation in attracting businesses to the Twin Cities area. The University is focused on one area, near the grain elevators on the East Bank. The question to go to the Board of Regents is this: Should the University be able to invest in entities such as UEL, as is done at other places?

Professor Speaks noted one slide that Dr. Hamilton had presented:

#### Technology Commercialization Comprises Significant Activity at the University

- The University spent \$5.4 million in FY03 to commercialize University technologies (comprising gross staffing costs, operating costs and patent expenses).
- The University collected over \$38 million in licensing revenues in FY03.
- Companies that licensed University intellectual property sponsored inventors' (faculty) research at the University totaling \$3.7 million in FY03.

He suggested that the \$38 million would be a logical place from which to obtain funding for an incubator. That is what is being proposed, Dr. Hamilton agreed. He noted that the \$38 million is gross; one-third goes to the inventor, one-third to the unit, and one-third to the Office of the Vice President for Research. Professor Konstan said it should be made clear that this proposal is not about using money that currently supports teaching and research, but instead about allowing the Vice President for Research to spend funds already in its budget for a new purpose that is not explicitly allowed under current policy

Professor Roe inquired about the functions of the OBD (outlined above). Why does it emphasize University start-ups? Are these firms owned by the University? They are not, Dr. Hamilton said. A University start-up is a company formed by one or more faculty members from the University but it is completely independent of the University. It will use University intellectual property, patented through Patents and Technology Marketing, and ask the University to license it to the company. Generally the University does so.

Must they be University faculty, Professor Roe asked? And the effort is to be not-for-profit; it should also be not-for-loss, he said. Royalty income has opportunity costs. These costs should be examined if the University uses the royalty income for this instead of some other purpose. Dr. Hamilton agreed. Mr. Brown pointed out that the tax-exempt restriction means that the University can only spend money on commercialization vehicles, not on companies. It will partner with non-profits. He also said that the start-up could be broader than faculty ownership or control; there could be non-faculty owners, but the company must be focused on an invention conceived at the University.

This is consistent with other ways the Office of the Vice President for Research supports technology transfer, Mr. Strauss commented. It reinvests technology transfer money into activities in order to promote the chance that other University technologies will be developed.

The market is efficient at commercializing products, Mr. Klein said. The effect of association with a non-profit (the University) could be a less efficient mechanism than the market system that already exists. Funds are pretty scarce, Dr. Hamilton responded; Minnesota venture capitalists are cautious. The market is for University-research-level technologies that tend to be highly specialized, idiosyncratic, and not with a large market, Mr. Strauss added. There is a PARTICULARLY bad environment in Minnesota, both in terms of critical mass and perception, so the University must take extra steps and risks to tap into the market.

Professor Nantell noted that a previous dean of the Carlson School made a statement similar to this that did not get a favorable reaction; it must be prepared to deal with that reaction. Dr. Hamilton agreed. He said he socializes with venture capitalists; they ask when the University will do something and they are waiting for University leadership.

If the change is approved, Professor Speaks asked, what does he envision as the meterstick by which to measure success? Mr. Strauss and others have written a business plan, Dr. Hamilton said. The metric on UEL is out of the University's hands because it is a separate entity. But they will look at the number of companies that were successfully incubated, expanded, and moved out. That could be one metric. There will need to be interim measures, Mr. Strauss said; ultimately, they expect to have thriving, growing companies. That usually takes 5-10 years, however, so they will have to devise interim measures of success. One approach might be to look at how start-ups are dealing with problems, since the University already has some experience with start-ups.

It would be interesting to compare this effort with faculty in other states, Professor VandenBosch said. Is there a greater rate of success with more support? There is, Dr. Hamilton said. What amount of risk is involved, she asked? It is difficult to quantify, Dr. Hamilton said. They are trying to minimize the risk for companies that come out of the University. San Diego started with one company; now there are 200 or more biotech companies that provide 35,000 jobs. If the University had started 15 years ago, it



would probably be proud of where it would be now. But it is starting now; it must look ahead 10-15 years.

Professor Konstan explained that he was trying to understand what seemed to be several issues tied together. First, he thought there were four major "services" being discussed: (1) Access, for a fee, to the University's infrastructure, such as laboratories, but also other valuable computing and internet infrastructure. This also includes what some schools are providing in access to libraries, recreational athletic facilities, sports tickets, etc., for fees below those offered to the general public. (2) Business advice, which is primarily coming from Carlson Venture Enterprises and other partners. (3) Access to and connection with the University (i.e., access to faculty with expertise, advanced students who might be employees, etc.). (4) "Investment" through the University spending money--as it is proposing to do by paying for office and conference space in the UEL facility.

Many of these services could well be provided to ALL small businesses in the state, not just University-related early-stage ones. Mr. Strauss confirmed that many such services are provided more broadly. Prof. Konstan continued that he saw the current plan as too timid--it feels like the University should be proposing a "new Extension service" for economic development. The first and third services are certainly ones to be provided widely. And the funding source requested is too restrictive, he suggested. There could be small surcharges on access to laboratories, libraries, and other facilities to support this small-business-extension service.

The University should not pick winners, Professor Konstan said, such as supporting only biotech companies; others may not be successful only because the University did not invest in them. In particular, he was concerned that the fourth type of investment--in this case underwriting space costs for UEL--was being narrowly targeted at a venture that is described as being specifically for biotech startups. He would be very upset if the University spent a bunch of money there and was unwilling, or unable, to later provide similar support to non-biotech incubators.

These are all good points, Dr. Hamilton said; that is why consultation is important. The context for this discussion is UEL but they have tried to broaden the focus in the narrative, he pointed out. The individual responsible for commercialization at one of the University's peer institutions commented that even the English Department has intellectual property it did not realize it could commercialize. University Extension does not ask someone if they are using University seeds, Professor Konstan observed, and it should not do so here. It should not put all its funds into UEL and not allow support for other companies.

Professor Campbell thanked Dr. Hamilton and his colleagues and said the Committee would discuss the proposal again in two weeks. He adjourned the meeting at 4:25.

-- Gary Engstrand