

Minutes*

Senate Committee on Finance and Planning
Tuesday, June 7, 2011
2:00 – 4:00
238A Morrill Hall

- Present: Russell Luepker (chair), Jon Binks, Gary Cohen, Will Durfee, Lincoln Kallsen, Kara Kersteter, Lyndel King, Kathleen O'Brien, Paul Olin, Terry Roe, Michael Rollefson, S. Charles Schulz, Mandy Stahre, Jeremy Todd
- Absent: Devin Driscoll, Judith Martin, Fred Morrison, Shruti Patil, Richard Pfitzenreuter, Gwen Rudney, Karen Seashore, Thomas Stinson, Michael Volna, Aks Zaheer
- Guests: Associate Vice President Michael Berthelsen (University Services), Jerome Malmquist (Director, Energy and Utilities Management); Peter Radcliffe (Executive Director, Office of Planning and Analysis)

[In these minutes: (1) energy management infrastructure (steam plants); (2) instructional expenditures and state allocations; (3) draft report]

1. Energy Management Infrastructure (Steam Plants)

Professor Luepker convened the meeting at 2:05 and welcomed Associate Vice President Berthelsen and Mr. Malmquist. He turned to Vice President O'Brien for an introduction of the agenda item.

Vice President O'Brien noted that she and her colleagues have been before the Committee many times to discuss issues related to utilities and their costs. She asked for time at this meeting because there could be a capital project related to utilities on the upcoming capital request to the legislature. (Next year, the even-numbered year, is typically a bonding year; no one knows if there will be a bonding bill this year.) The University has received a letter asking for the preliminary capital request for FY12; Vice President Pfitzenreuter has spoken with President-designate Kaler, who will bring a preliminary request to the Regents in July. The final request will have to be approved by the Board in October. This is, she reminded the Committee, the normal process for review and adoption of the capital request.

She thought it would be prudent to discuss with the Committee the possible request being presented today, Vice President O'Brien said. If there is no bonding bill this year, presumably some or all of the items that were presented to the legislature earlier this year would be included in the capital request next year, but so might also this item.

Mr. Berthelsen distributed copies of four pages of information. He began by recalling that he has spoken previously with the Committee about the Twin Cities campus 2009 Utility Master Plan and, more specifically, boiler capacity. The Utility Master Plan anticipated a shortage in "firm boiler capacity"; Mr. Berthelsen noted that firm boiler capacity will be at its limit beginning in about 2014. The general test for firm boiler capacity for utilities is $N + 1$: In order to ensure reliability, have all the boilers needed to meet peak capacity, plus one, because things happen (that is, there needs to be redundancy in the system).

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

(And "things have happened" to the campus boilers.) At present the campus meets the N + 1 rule because the current and projected peak demand, through about 2014, is at the level of steam that can be produced by N-1 of the boilers. But there is need to retire two boilers, one dating from 1941 (not used now) and one dating from 1949 (which is used now), and once they are both retired, the campus would be at risk of losing steam if any one of the three remaining boilers had to be shut down. Part of the need to replace the boilers is because of age, part is because of fuel usage, and part is because demand will almost certainly increase with the addition of the new cardio/cancer facility, a new physics/nanotechnology building, and other new facilities that will likely come online in the next decade.

Mr. Berthelsen noted a line on a graph indicating peak demand on campus, from 2008 and projected to 2030. The peak demand of about 473,000 PPH has been steady since 2008 and is projected to remain so through 2013. After that, and if the boilers are retired, there will be a significant gap between capacity and demand (N+1). Their objective is to drop the peak-demand line on the graph, and they have been able to hold it down as the campus has added new buildings. The campus is using less energy than it did in 1996, but the campus has grown. If the campus were using energy now at the same efficiency level as it was in 1996, the annual utility bills would be \$24 million higher than they are. They will continue to work to hold the peak-demand line down, but they do not believe they can reduce it to the level that would be required to retain the necessary reliability if the two boilers are retired.

Mr. Berthelsen noted, on a campus map, the location of the SE Steam Plant, the Old Main Plant, and the major steam distribution lines. The Old Main Plant is largely decommissioned, but almost all of the main steam distribution lines run through it from the SE Steam Plant. They have analyzed three options (adding a boiler at the SE Steam Plant, re-energizing the Old Main Plant, or building a new steam plant in the northeast area of the campus), and Facilities Management worked with Capital Planning and Project Management, two engineering firms, an architect, and a contractor in doing the analysis. Their conclusion is that reactivating the Old Main Plant is the best option; Mr. Berthelsen explained the reasons. (In essence, it mitigates the risk of relying on only one steam plant—identified as one of the campus' top two risks by property insurers—can meet the peak demand at a lower cost than a new steam plant, and can serve as a facility for steam, electricity, and the next district chilling plant without building additional facilities. Moreover, they can't get rid of the existing building because of its role in the steam system, and it cannot be converted to any academic use.)

What they are proposing for the Old Main Plant is the addition of two 7.0 megawatt combustion turbines with (new) Heat Recovery Steam Generators (HRSG), Mr. Berthelsen reported. (An HRSG is basically a boiler that, in place of using a fuel to burn to make steam, uses the waste heat from the turbine generator, which is basically a jet engine used to turn an electric generator. Most times the HRSGs are fed additional heat to generate the amount of steam needed by the addition of "duct burners" that burn additional fuel in the ducts between the turbine and the HRSG.) This solution benefits the University in several ways: meeting peak steam demand; self-producing a portion of electrical demand producing a hedge against purchased electrical pricing; and reducing the campus carbon footprint by using the same BTU twice (creating both electricity and steam). He noted for the Committee a graph indicating the electrical profile and capacity, with three lines: peak electrical demand, average demand, and minimum demand. Their target is to reduce the line indicating the peak demand. They want the new turbines in the Old Main Plant to run all the time, which is peak efficiency, and it puts the University in a good position vis-à-vis electrical costs (which they expect to go nowhere but up). This is also the right thing to do from a sustainability perspective.

Professor Cohen inquired about the purchase and sale of electricity and the amount of electricity that is self-generated on the campus. Mr. Malmquist reported that at present Xcel Energy purchases energy from the University but that the campus generates very little of its own electricity. It has not been

economical to do so, but with the new plants it would be. The power that is generated is used on the campus. It offsets the University's purchase of electricity from Xcel. (Currently it saves just over \$200,000 per year. To get the power to the campus, the University basically ships it to Xcel's grid and then they send it back to the campus. It is a complicated contract. The day of this Committee meeting was a day when Xcel needed as much power as they could get from the various power generators on their grid. That day, they needed the University's power—but the campus did not have to curtail the campus load. On high demand days, in some ways, it is like the University is selling it to Xcel and then buying it back.)

Mr. Berthelsen noted that the projections of load growth and proposed capacity also call for a replacement package boiler in 2025.

Professor Roe asked if the University could produce electricity more cheaply for itself than it can buy it. That depends on a lot of variables, Mr. Berthelsen responded. They have tried to answer that question using sensitivity analyses of fuel sources (trying to project costs), making projections about the cost of electricity, and raising questions about how much debt the University is prepared to carry. The University must first decide about debt. (There may be federal grants available to help lower capital costs but these grants are VERY hard to get. In the last round there were over 700 applications for just over 30 awards!) If the capital costs are lower, it is more likely the University can produce electricity more cheaply. In addition, Xcel faces more and more capital costs, and the Xcel fuel use looks more like the University's pattern, so that again suggests the University could produce it more cheaply. There is a lot more natural gas on the market and it looks to be cheaper [than recent historical levels] and therefore more competitive with fuel alternatives for the foreseeable future. In the past, Mr. Malmquist reported, it was not cheaper for the University to produce electricity, but with escalating electrical costs from Xcel (including capital costs for production and distribution and increasing fuel costs), it becomes more and more likely the University can produce its own power for about the same or less cost than what can be purchased from Xcel.

Professor Luepker said he assumed that the University cannot depreciate the steam/electrical facilities and that they will wear out at some point. Mr. Berthelsen said they operate utilities as an Internal Service Organization (ISO), so it includes its costs in its utility rates that are billed to units in the University. ISOs are not allowed to depreciate capital investments in order to "save up" for future costs, but they can pay debt service, so they will have to take out additional debt when more needs to be done. The total cost of the project (reactivating the Old Main Plant, buy and install equipment, and so on), is estimated to be about \$80 million. This is, he concluded, a substantial project.

The cost would be recovered by the ISO, Professor Luepker said. Any debt service would be part of the rates, Mr. Berthelsen confirmed. There are some efficiencies that would be achieved, and some of the costs can be put in steam and some in electricity.

Vice President O'Brien recalled that in the past, when a large project has loomed, they have asked for two or three faculty members of the Committee to serve as an ad hoc subcommittee and become expert on the project. It is now 20 years since the University was engaged in planning and analysis for its last major investment in a steam plant, and it may be next year that another one will be considered. Would two or three faculty members be willing to delve into this proposal? Professor Luepker said the Committee would discuss the possibility.

Mr. Berthelsen affirmed, in response to a question from Mr. Rollefson, that the costs of the project would end up in the cost pools, in the electricity and steam rates. It is for that reason, Vice President O'Brien explained, that the administration may want to add the project to the capital request, in

order to reduce the internal charges that would be necessary. So they would include it as part of the 2012 capital request in order to complete it by 2016, Professor Durfee asked? And push it off later if the project is not part of the capital request until 2014? It would either be delayed for a future capital request or the University would have to look at a different financial plan Mr. Berthelsen said. The 1949 boiler still being used will not disappear, and there is room to maneuver; they can extend the life of that boiler to a certain extent but cannot plan to do so indefinitely—and they also begin to run into regulatory issues as they do so.

Professor Cohen wondered if the Committee has had a report about energy conservation, heating and cooling efficiencies, and the like. It has had several such reports, Professor Luepker said; Vice President O'Brien noted that they provide a report annually in the spring. Mr. Berthelsen reported that there is a Facilities/Energy Management website titled "It all Adds Up" (<http://www1.umn.edu/italladdsup/>) where one can see a great deal of information about buildings, can compare them, and can see time-series data on energy use. He also said that the new Combined Heat and Power plan would reduce the University's carbon footprint by about 68,000 tons per year.

Vice President O'Brien thanked the Committee for the opportunity to present the proposal and said she would return later to talk about potential bonding bills. Professor Luepker thanked Vice President O'Brien and Messrs. Berthelsen and Malmquist for the report.

2. Instructional Expenditures and State Allocations

Professor Luepker welcomed Dr. Peter Radcliffe, Executive Director of the Office of Planning and Analysis, to follow up on the discussion the Committee held earlier about the data on instructional support prepared by the Delta Project. Dr. Radcliffe distributed copies of a set of tables analyzing publicly-available data on educational costs at the University of Minnesota.

Dr. Radcliffe briefly reviewed longitudinal data (nominal dollars, not inflation-adjusted) on state appropriations 1997 – 2011 (\$493 million in FY97, \$604 million in FY01, \$591 million in FY11). The Governor's proposed budget would take the University to the FY01 level, the House and Senate proposals to slightly less than the FY98 level of \$540 million. He also reviewed data from inflation indices (Consumer Price Index, Higher Education Price Index, and Disposable Personal Income). Using 1983 as the starting point of 100, the CPI in 2009 was 218, the HEPI was 279, and the DPI was 320. The HEPI uses factors that higher education faces rather than the factors that a household faces.

Dr. Radcliffe then noted a graph indicating state expenditures in Minnesota on higher education per \$1000 of disposable income. From 1961 to about 1980, the line rose, from about \$5.50 to nearly \$16.00. In 2009 the line had dropped back to about \$6.00. This is "the state has other priorities" chart, Dr. Radcliffe commented. He also provided a graph showing, from 1991 forward, state and local government revenues as a share of personal income; at 16.6% in 1991, it peaked at 17.9% in 1994 and has since declined to 14.8%. So the "price of government," compared to personal income, has been creeping downward, Dr. Radcliffe observed—and that puts pressure on tuition rates.

The next table detailed tuition rates (e.g., full-time enrollment, Twin Cities campus, undergraduate Minnesota resident, also non-resident rates and graduate resident and non-resident rates); from the 1960-61 academic year to the 2010-11 academic year. In 1960-61 Minnesota resident undergraduate tuition was \$213; in 2010-11 it was \$11,094. For non-residents it went from \$540 to \$22,724. These, Dr. Radcliffe observed, were the sticker prices.

The cumulative percentage increase per student, 2001-2010, in Cost of Attendance, grant/gift aid, and Net Price were quite different from the increase in tuition sticker price, Dr. Radcliffe explained. The cost of attendance increased by 50% during these ten years; the Net Price increased only 34%. The primary reason that the Net Price is increasing more slowly than the Cost of Attendance is because of significant increases in the size of the mean grant/gift award. The Net Price, he said, is tuition minus financial aid. His focus is on the net price; while the sticker price is relevant for some students, it is not for most.

Dr. Radcliffe turned next to Delta Project data on average "education and related spending" per Full-Time-Equivalent (FTE) student at public research universities, by state, in 2008. The Delta Project takes federal data (IPEDS) on instructional spending, student-services spending, and a pro-rated share of other institutional costs in an attempt to create a "fully loaded" instructional cost. One result of their use of the data suggests that Minnesota is unusually expensive. The Delta Project "education and related spending" numbers are also broken into two parts, a "net tuition" portion and an "average subsidy" portion. The latter is "everything else" except tuition, and while it is not necessarily state support, that is what most refer to it as. The U.S. average total spending (public research universities) is about \$15,600. Minnesota is at the top, at approximately \$24,100; very close to Minnesota are Washington, Vermont, California, and New York. The five public research universities with lowest expenditures (per the Delta Project data) are Florida, South Dakota, New Mexico, Arkansas, and Montana, the last at about \$10,600.

Professor Schulz said he understood, as did the other Committee members, that this is a controversial graph. Does the "average subsidy" portion of the spending per FTE student include gifts? It does, Dr. Radcliffe affirmed. How much of it is state funding, Dr. Schulz inquired? Dr. Radcliffe explained that revenues do not enter the data; they are costs minus tuition, and there is no easy way to identify what state revenues contribute to the costs. The University (as with most universities) cannot say where specific dollars go. (The University's budget model does allow for some analysis of where state and other funds flow, but few institutions have that capability.) Professor Schulz commented that Minnesota and its peer institutions face a significant crisis; if one looks at the amount of money being used for operations, does it suggest the institution should raise money for student aid? Dr. Radcliffe said it has been the strategy of the University—and virtually every other institution—to try to raise money from donors for financial aid to offset rising tuition, and for state-supported institutions, falling state appropriations. The urgency of that strategy continues to increase, but it is a long-standing strategy.

Dr. Radcliffe provided more extensive data on Minnesota public higher education and comparative national data. For 2008, the education and related costs per FTE students for Minnesota public research universities (i.e., the University of Minnesota) were \$24,138. Nationally, the figure is \$15,619. One problem with the comparison, however, is that in Minnesota, the University is the only public research university; in many other states, there are institutions comparable to the flagship (e.g., Michigan and Michigan State, Indiana and Purdue, Iowa and Iowa State). Moreover, the University's number will be higher than most because it offers all of the most expensive programs an institution can have, such as veterinary medicine, medicine, engineering, and so on. If one looks at a graph of the University's education and related spending per FTE student 2002-2008 and compare it directly with its peer group and the Big Ten (there is overlap between the two), the University's line on the graph is quite ordinary; it tracks and is consistent with the expenditures of its peers. The same ordinariness is apparent when comparing net tuition revenue 2002-2008. Dr. Radcliffe also provided the data for the institutions in the peer group and the Big Ten; Minnesota is slightly above the average. But even after one calculates the per-FTE average, Dr. Radcliffe observed, Minnesota is likely to be higher because it has more graduate and professional students than most of its peers—and those students are more expensive to educate than undergraduates. The conclusion, Dr. Radcliffe said, is that it is not accurate to compare

across sectors (e.g., public master's schools, public research universities, etc.) and, one sharply-differentiating factor in comparisons is the presence or absence of a medical school.

Finally, Dr. Radcliffe noted a bar graph reporting the results of a study by the State Higher Education Executive Office demonstrating "how costs vary by discipline and level of instruction, using data from public institutions in four states that maintain detailed cost data." The health professions accounted for 11% of instructional spending but only 7% of student credit hours, while the social sciences and history accounted for 9% of instructional spending but 12% of student credit hours. Dr. Radcliffe pointed out that there are substantial differences across institutions, but said he could, in addition to looking at the number of students at various levels, he could also do an analysis that would suggest a reasonable level of education and general spending. He offered to bring the analysis to the Committee in the future.

Professor Cohen mused about how he would use these data with his legislator, and concluded that because there are so many compositional differences across universities, the comparisons do not work, and that perhaps ANY such comparisons are not very useful. There are ways to adjust for the compositional differences, Dr. Radcliffe responded, but the question is whether the analysis becomes so complicated that the data aren't useful for public-relations purposes. That is why, Professor Roe commented, the University should do the best job it can with its own data. Mr. Rollefson wondered if there is any good way to identify the proportion of public research university budgets that come from the state. There is, Dr. Radcliffe said, but no good way to identify how they spend the state funds as opposed to other funds. He reported that one Big Ten president did a study of the amount of public money going to institutions, and learned that many private institutions receive more public money than do the public institutions.

Professor Luepker thanked Dr. Radcliffe for producing these data and noted that the questions will come up again and again. Ms. King commented that they are great data and need to be organized into simple talking points. Including, Ms. Stahre said, an emphasis on the fact that Minnesota is one of the only institutions that has dentistry, vet medicine, agriculture, engineering, and so on. It is also possible to do predicted costs, the way U.S. News and World Report does, based on the number of graduate, professional, and undergraduate students, Dr. Radcliffe said. The analogy to U.S. News is in the way they calculate predicted six-year freshman graduation rates and report the difference between their prediction and the actual rate as "over-performance" or "under-performance." To do that, they have a complicated regression model that they don't show, just as he would construct a complicated regression model predicting costs from the composition of student levels and programs. In the end, they could boil it down to the difference between predicted and actual costs, just as U.S. News presents the difference between actual and predicted graduation rates.

Professor Schulz agreed with Professor Roe that the Committee needs to look at the University's numbers and see how others are dealing with them, not just talk about averages. The University has to look at its own state—does it need more private dollars? Does it need to raise more money for scholarships? And so on.

3. Draft Report

Professor Luepker asked Committee members to review the draft report.

It was agreed the final report would go to the Faculty Consultative Committee, which requested it, and to the full Senate thereafter.

Professor Schulz commended the report and suggested an additional question that could be taken up in the future: Are units efficient, serving others well and fast? Or must their work be redone and does it take weeks to receive? There are things that can take months here that are dealt with within a week at other places. What is the output/throughput of the unit? Professor Luepker agreed the Committee could take up that question in the fall. Some units are incredibly efficient, he agreed, and some are less so.

Professor Luepker said that the Committee would also hear next fall from Vice Provosts McMaster and Rinehart, so their units would not be part of this report.

Professor Luepker urged Committee members to send him any final editorial changes and adjourned the meeting at 3:45.

-- Gary Engstrand

University of Minnesota