

2017 SENATE APPROPRIATIONS

SB 2196

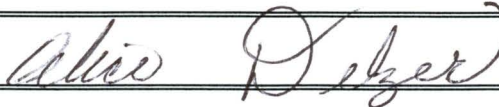
2017 SENATE STANDING COMMITTEE MINUTES

Appropriations Committee
Harvest Room, State Capitol

SB 2196
1/25/2017
JOB 27397

- Subcommittee
 Conference Committee

Committee Clerk Signature



Explanation or reason for introduction of bill/resolution:

A BILL for an Act to authorize this issuance of revenue bonds for the purchase of land and construction of an integrated carbon plant at Valley City State university; to provide an appropriation; and to declare an emergency.

Minutes:

- 1.Senator.Lonnie Laffen Testimony
- 2.President Dr.Tisa Mason Testimony.
- 3.Activatefd Carbon Plant/Heat Plant Integration
- 4.Dr.Rick Tonder Testimony
- 5.Dr. Steve Benson & Dr. Mann Testimony
- 6.Nick Hacker Testimony

Chairman Holmberg: called the Committee to order on SB 2196. All committee members were present. Brady Larson, Legislative Council and Stephanie Gullickson, OMB were also present. Welcome to Senator Laffen.

Senator Lonnie J. Laffen, District 43 in Grand Forks (0.00.24 – 0.07.41) testified in favor of SB 2196 and provided written Testimony attached # 1. I am here to introduce a very exciting idea- to create activated carbon.

Senator Dever: Would this be the first of its kind? Has it been developed at some smaller scale in research or something?

Senator Laffen: This technology was discovered at the UND while working with some private research people who took the project a different direction and so what's left here you can do with what you wish. Yes, it's a new technology that has been proven out in the lab and the next step to do it at this scale.

Chairman Holmberg: And to prove it to the bonding company. That was confirmed.

Dr. Tisa Mason, VCU President (0.08.44-0.10.17) testified in favor of SB 2196 and provided written Testimony attached # 2 in support of the carbon plant at VCU. And provided Testimony attached # 3 – Activated Carbon Plant/Heat Plant Integration: VCSU & UND are in support of the implementation of the Carbon Plant. The people here today that you will hear from after me have made this project for Valley City to consider. She continued reading from her written testimony. She said thank you again and wanted to acknowledge Senators

Laffen, Cook, Gary Lee, Robinson and Representatives Sanford and Delmore for sponsoring the bill. I will now turn the podium over to the experts.

Rick Tonder, Director of Facility Planning for the NDUS (0.10.38-0.16.06) testified in favor of SB 2196 and provided written Testimony attached # 4, information regarding the request for the authorization of the sale of revenue bonds for this project. I will add a few brief points and a couple of small corrections in terms of understanding the technology and my colleagues today here, Dr. Mike Mann and Dr. Steve Benson have much greater insight into the detail but I wanted to mention that the technology to make activated carbon exists today. They're making a lot of activated carbon out of lignite in Texas. It's not as good as our lignite. It's not as adaptable. What they don't have is to know the way to use that hydrogen rich gas that we distill off effectively so that bringing these technologies together, the steam plant which would burn the gas and provide steam, and the carbon plant, which will distill the lignite and provide the gas and use some steam, is an integration of the efficiencies. What we get to do is to deliver the milk for a buck less a gallon, so that's where we make the money. So that's the whole idea, using the proven technologies to develop a new style steam plant for our institutions that provide a product as well that can be used for a multitude of reasons. In addition to that, VSCU and UND are working together on this and that is an important thing for me because it develops those bonds between institutions where we grow new research and grow new education. Activated carbon production is a proven technology that will be enhanced by our project because we will be using this as a platform for new research for North Dakota lignite. I am a cheerleader for North Dakota lignite. I believe it is one of the most wonderful mineral products we have in the face of the earth. This process will help us even build more and new technologies for the use of lignite as a side stream to that valuable char. He then read from paragraph 3 regarding the authorization of the sale of revenue bonds **(0.13.51)** For those of you who are familiar with revenue bonds sales we have to convince investors that these bonds are worth buying. And they won't be worth buying unless we have a complete business plan that says, yes, this works. We've analyzed this and it works. Plus we have an investor or a vendor who is under contract to take your activated carbon and has the capacity to sell it at the revenue we've specified in order for us to return that payment to the bond holders. We must have that before we can sell. So although they did approve of this, it's not the last step in this process and there is by no means a date to move forward. This is just the next step. As I was talking to various vendors over the last months, one of the issues was that "Would you be willing to enter into a contract with us"? I said that we need to get authority to buy the money to build the plant and when that's done, yes. Call us then because they are afraid to go out there with the idea, and say we will buy your carbon, and they are currently purchasing carbon from another entity. You can imagine what it would be if you got out there as an employee, saying, yes, you will take this job if it happens and your employer gives you a bit of a cold shoulder the next day. So there is a hesitation to come forward and sign on the dotted line before we at least had your approval to actually borrow the money, to sell the revenue bonds. **(0.16.06)**

Chairman Holmberg: You've had quite a bit of experience with revenue bonds and working with bankers and the bond folks. What is your experience, I am guessing you were around with the Wilkinson project which is a huge project? What kind of reaction do you get from North Dakota trying to sell the bonds?

Director Tonder: When you are dealing with auxiliary service revenue bonds, you have a captive market where you basically have students lined up to pay to rent rooms or to buy meals. You have a way of illustrating your revenue clearly. In other words, you're coming in your performer looks good as far as where you project your enrollment and so the number of students staying in your resident halls, the number of students signing up for board contract, based on your existing debt today looks good. And you get a pretty high bond rating and your credit's been good. In other words, you've been making your payments and haven't had any problems. But in contrast to that Dickinson State University today has authority to borrow money to sell revenue bonds to renovate their resident's hall. They put the brakes on. Right now, the bond rating agency can't give them the rating they need in order for them to successfully sell bonds that they can retire. So you can't go forward unless the institution has all the nuts and bolts in terms of the dollars lined up. And for this particular project it is not just the simple matter of having students. It's demonstrating that you have a product and that product is unique to the institution, which it is, because we have district heating system and subsequently we have a vendor in place whose got, not only the ability to sell the product but also has to have the deep pockets that says you can support this operation.(18.12)

Senator Mathern: Does passage of this bill make the bond company look to what you say, we will pay this back like a person who will buy the carbon. Or is it looking to the full faith and credit of the state of ND. There are some other projects at UND that are kind of tough in terms of bonds hanging out there now, who's going to pay for them. Is this bill structured in such a way that the University or the state of ND would really not be on the hook?

Director Tonder: The university would be on the hook for the payment of the revenue bonds. There is no question because they're the owner of the asset. As the legislation says, on the first line of the bill referring to the type of the bond. It says they are not general requirements of the state so the state has a certain arms-length of it but it still resides with VCU, a part of the state. We include that in the bond sale, for instance, if there's insufficient appropriations to make the bond payment, this money would be appropriated, this revenue bond, the proceeds from the sale are all appropriated. There is a distance created based on the statute. We can't enter into an agreement unless there is an out for us in terms of that. Does that mean the people buying the bonds would feel that's a risk for them? In part, that is offset if we have an extraordinary high bond rating and they feel there isn't a risk of that. Yes, VCSU is on the hook.

(20.32) V. Chairman Bowman: Is this the first kind of project like this?

Director Tonder: There are probably projects that are similar in a much smaller scale. In terms of sale of product, the institutions currently that produce enough steam cell steam, in other words, to other entities around the university. This is the first time we ventured out to where there is an actual product developed as a result of that's used for other purposes.

V. Chairman Bowman: said he was interested in this, but if it should break down are the parts and service available. He asked if it was researched enough so that would not be an issue.

(0.21.37) Director Tonder: When we evaluated the process of rendering the lignite down into the char product we looked at a number of systems. Or essentially a machine that's very

similar to what's using right now to make lignite in Texas into char or cement to make out of clay, existing machinery, existing parts, all it available, it's a very servable plant that doesn't create something that we can't fix.

(0.22.14) Chairman Holmberg: Senator Bowman has worked with a bonding company because these are some of the questions that they would want the answers to, you might convince us, but if you can convince them, they are the tall hurdle.

V. Chairman Bowman: How much technology is involved in this venture? I am referring to machinery that I am used to where you have to have a certain person come out that you can't find for a week to fix your combine because the computer is going haywire.

Director Tonder: We included 20 FTE's for operating and maintenance in the budget and those people are scared that we put the wage at a place where we can attract competent people from around the country. For the most part this is straight forward servicing technology, plus we currently have staff operating the steam plant in Valley City. We can take those folks and perhaps train them and some of the new ones so the carbon plant can create even more efficiencies.

(0.24.06-0.27.54) Dr. Steve Benson, Associate Vice President for Research, Energy & Environmental Research Center at UND here to speak in favor of SB 2196 and provided written Testimony attached # 5, a Technical Overview of the Activated Carbon Steam Plant Process.

Senator Kilzer: asked if the lignite across the state is pretty uniform in yielding these products or is it different. He was told the lignite coals in ND produce a very good activated carbon and there shouldn't be a significant difference in the locations. **Senator Kilzer:** so the equipment and the machines that you need for this we will be able to use this lignite from all over. He was told it is designed so it can do that.

Senator Mathern: Asked about the micro products in the air following these processes and particles that are going into the air that that might be negative to college students. He asked in terms of air quality, what does the research say.

Dr. Benson: There are fine particles produced. The system is designed with a filter that takes out those fine particles. There is also a Sulphur scrubber on it so it will take out some of the Sulphur species, that will also take out those. So it's equipped with the state of the art equipment.

Senator Dever: Are their patents involved in the development of this process that need to be protected? He was told yes, and that UND owns that patent.

(0.31.16- 0.36.48) Dr. Mann, Executive Director of the Institute for Energy Studies at UND testified in favor of SB 2196 and provided written Testimony attached # 5 – (bottom portion of #5 testimony on page 1 and all of page 2 of the testimony)

V. Chairman Bowman: When this project is completed and shows it can pay for itself, is this something that can be incorporated into our other campuses if it reduces our heating bill and

generates income for the colleges? If you look out into the future is there something there that brings possibility for that?

Dr. Mann: That is very much in our vision of our plan. Mr. Tonder mentioned the different campuses that he thought as live ones. Even one to the state penitentiary, for example, the state hospital resources.

Director Tonder: I would add we are looking at a performer where we would replace the entire plant. Not just a carbon plant but build a whole new heating system integrated at once that replaces existing heating plants.

(0.37.47) Chairman Holmberg: we do have that over the next years there will be other campuses that have heating plants that will need to be replaced.

(0.38.45- 0.41.10) Nick Hacker, Higher Education Board Member testified in favor of SB 2106 and provided written Testimony attached # 6, stating the board authorized VCSU to request funding from the North Dakota Legislature through revenue bonds or other sources. We are looking for your approval to move forward.

Dr. Mason: stated she is excited about the project and expressed her gratitude to the Senators and others that are supporting this project.

Senator Mathern: asked if in your negotiations you are sharing the risk with UND. He was told they are working on this and we are all on the same page.

(0.48.01) Senator Hogue: It seems like an exciting project. When I realize that I think of bond holders and to them this is going to be unconventional and so I am wondering if the university has explored an alternative financing cost because it seems to me that the transaction costs for going through bond financing could be, or perhaps higher than, let's say if we authorize the Bank of North Dakota to make the loan, or even conventional financing, so has the university explored what the transactions costs for going with revenue bonds versus another approach?

(0.43.54-0.44.35) Dr. Mason This is one of the avenues so some of our advisory board members also had conversations with the Bank of North Dakota. We've talked to some other people who might be interested in working with us in operating the plant. So we are still, even though we have a good financial model we are looking at a variety of financial opportunities. In fact some of the people on our advisory board were specifically selected because they had some well- established backgrounds with Angel funding as well.

Senator Hogue: What was the Bank of North Dakota's response?

Dr. Tonder: When we were looking at the financing package and we proposed this legislation we're kind of limited today in what you have in terms of the revenue bond financing. And Brady, maybe you can assist us in terms of the Legislative Council in terms of what opportunities we can request based on what the board is authorized to do for Chapter 15. Our original was to say " Yes, we would like to proceed with other form of financing that would be equally as attractive but is limited to just the bond financing in this measure. If it is possible

for us to include alternative financing, let's say from the BND, and there was some interest expressed at some point and time, and I can't quote names, that looks attractive to us, we would gladly go that route. The main thing for us is to take the finance people with a clear attitude that demonstrates we can do the work. The money that it takes to kick off the revenue bodns would be much better spent on an alternative form of financing. But again that's the way we can proceed today as to what we can request

0.46.08) Senator Robinson: Senator Bowman asked about the scalability of this project and to reinterate, very much so. We are very small in terms of the scope and size of this operation. It is my understanding that the University of ND is very close to needing a complete renovation or replacement of their heating system. So, hopefully we could be a pilot that could be replicated. The other comment I would make, I've been privileged to serve on the Advisory Committee. It has been a real joy to work with Rick and the board office and Dr. Tonder and Dr. Mann. We are very thankful for their expertise and the time they put into this project. About a year ago we were privileged to hear from students at UND involved in the research process and I was impressed to see how sharp these students are. It gives you a lot of confidence in what the system is doing and this next generation that's coming on board.

Chairman Holmberg: We have heard this. We won't act on it this moment. We will take it under advisement. I am not sending it to a subcommittee. It is separate from the university system budget. The power plant is an existing plant. Thank you all. The hearing is closed on SB 2196.

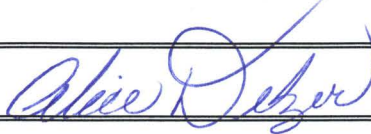
2017 SENATE STANDING COMMITTEE MINUTES

Appropriations Committee
Harvest Room, State Capitol

SB 2196
1/27/2017
Job # 27516

- Subcommittee
 Conference Committee

Committee Clerk Signature



Explanation or reason for introduction of bill/resolution:

Valley City State University – Revenue bonds for construction of carbon plant

Minutes:

Chairman Holmberg: called the Committee to order on SB All committee members were present except Senator Wanzek. Adam Mathiak, Legislative Council and Becky Deichert, OMB were also present. SB 21096 The board of Higher Education did unanimously urge the continuation of this effort. It might end up at the end of the day with different funding mechanism, including the Bank of North Dakota, etc. Even with the BND you have to convince them it is a decent investment.

Senator Robinson: Moved a Do Pass. 2nd by V. Chairman Krebsbach.

V. Chairman Krebsbach expressed it's an unique idea and a way to utilize the research that has been done and will benefit areas of the state if they can do it and prove it successful.

V. Chairman Bowman: stated he supports it too because it shows it could be a news idea that can generate money for our campuses.

Senator Grabinger: We still have coal burning up at the state hospital, and I am wondering if this does work, we may have an opportunity there too and many other sites.

Chairman Holmberg: That is going to be the reason why the board has been very supportive because they know are some serious heating plant issues coming down the pipe.

Senator Mathern: The only concern I have about this bill that we didn't put in some alternative financing efforts. But it seems like the folks are promoting the bill. Just want to get this paper out of here in its present shape to show investors we have an interest.

Chairman Holmberg: by the end of the day, and have more of those options. This is the vehicle we have. Call the roll on SB 2196. **A Roll Call vote was taken. Yea: 13; Nay: 0; Absent:1. Senator Sorvaag will carry the bill.** The hearing was closed on SB 2196

Date: 1-27-17
Roll Call Vote #: 1

2017 SENATE STANDING COMMITTEE
ROLL CALL VOTES
BILL/RESOLUTION NO. 2196

Senate Appropriations Committee

Subcommittee

Amendment LC# or Description: _____

Recommendation: Adopt Amendment
 Do Pass Do Not Pass Without Committee Recommendation
 As Amended Rerefer to Appropriations
 Place on Consent Calendar
Other Actions: Reconsider _____

Motion Made By Robinson Seconded By Krebsbach

Senators	Yes	No	Senators	Yes	No
Chairman Holmberg	✓		Senator Mathern	✓	
Vice Chair Krebsbach	✓		Senator Grabinger	✓	
Vice Chair Bowman	✓		Senator Robinson	✓	
Senator Erbele	✓				
Senator Wanzek	A				
Senator Kilzer	✓				
Senator Lee	✓				
Senator Dever	✓				
Senator Sorvaag	✓				
Senator Oehlke	✓				
Senator Hogue	✓				

Total (Yes) 13 No 0

Absent 1

Floor Assignment Sorvaag

If the vote is on an amendment, briefly indicate intent:

REPORT OF STANDING COMMITTEE

SB 2196: Appropriations Committee (Sen. Holmberg, Chairman) recommends DO PASS
(13 YEAS, 0 NAYS, 1 ABSENT AND NOT VOTING). SB 2196 was placed on the
Eleventh order on the calendar.

2017 HOUSE APPROPRIATIONS

SB 2196

2017 HOUSE STANDING COMMITTEE MINUTES

Appropriations Committee
Roughrider Room, State Capitol

SB 2196
3/14/2017
29181

- Subcommittee
 Conference Committee

Buggenist

Explanation or reason for introduction of bill/resolution:

Act to authorize this issuance of revenue bonds for the purchase of land and construction of an integrated carbon plant at Valley City state university

Minutes:

Attachments 1-6

-12:45 Senator Lonnie J. Laffen, District 43 Grand Forks: (see attachment 1)

2:25 Chairman Delzer: Where would the electricity go when it's produced? (page 1 of attachment 1)

Senator Laffen: It would go out on the general grid and then we would get the credit and be able to use it whenever they need.

3:45 Let's look at the economics (page 2 of attachment 1)

6:00 One last overview (page 3 of attachment 1)

7:30 Chairman Delzer: Were there any discussion about what would happen if it failed? How would they pay the bond back?

Senator Laffen: It really could only fail in one of two ways, the system wouldn't produce that activated carbon or if we didn't have a 10-year contract to sell the carbon.

Chairman Delzer How long before they would be active, until we would be making money?

Senator Laffen: I am not sure, it would be determined by when they start to sell the bonds, when they start construction, all of that.

Chairman Delzer: Was there any discussion on what is going to happen to the 2.5 and the 4.3?

Senator Laffen: We have not had that discussion.

Representative Boe Who is putting up the collateral?

Senator Laffen: I don't know if they would need more collateral than a signed contract to buy the activated carbon. I would assume the revenue bond sale would be dependent on having that contract.

Representative Martinson: Isn't the state ultimately responsible for those bonds?

Senator Laffen: I would assume we would be, yes.

Chairman Delzer: There is language in there that states; *evidences of indebtedness issued pursuant to this section are not a general obligation of the state.* (lines 9-10 of the bill) But I am not sure that we would ever let the state name not be used.

Representative Streyle: It would be a revenue bond.

Representative Brabandt: Is this project number 1 or are there examples of this elsewhere?

Senator Laffen: Yes, this is project one, this in new technology that was discovered at UND, between engineering side and EERC. I believe EERC holds the patent. They have tested this on the research side at that scale but the next step is to ramp this up to a pilot size.

11:30 Chairman Delzer: How many times is it going to be copied? And what will that do to the price of carbon?

Senator Laffen: If it ever gets copies at least we turned a 600 thousand dollars' loss into a 4.3-million-dollar gain.

Chairman Delzer: If it works like you say it will be copied, probably within the state and in many other places and if the patent can be bought it will go many other places where the coal might work. Then it gets to be a question on if the activated carbon is worth that.

Senator Laffen: This is the product that cleans the coal combustion, I think it's a growing industry and if we can find a better way to burn our lignite coal and have it produce these useful things.

12:55- 16:15 Wesley Wintch, VP for business Affairs, VCSU (see attachment 2)

14:55 Chairman Delzer: As VP of business affairs, what do you think about the 2.5 and the 4.3 million?

Mr. Wintch: It would be revenue that we could reinvest in things on campus. It would show up at a debt on our books and then as a revenue.

Chairman Delzer: But that would come before the legislature, it would be a separate line item if it so develops.

16:30-20:40 Tammy Dolan Chief Financial Officer NDUS (presenting testimony for Rick Tonder) (see attachment 3)

17:35 Chairman Delzer: I understand that we had the discussion about the debt not being obligated to the state but Brady are you aware of anytime we have a default on a bonding thing such as this and did the state step up and covered it?

Brady Larson, Legislative Council: I am not aware of a bond that has fallen through but there are instances where loans or other financing that has fallen through and the state has had to take action.

Chairman Delzer: We'll have to check into this further and see if this language protects the state.

18:20 Mrs. Dolan: Goals and Concerns (attachment 3)

20:45-37:50 Dan Laudal, Major Projects Manager, UND (see attachment 4)

23:00 Chairman Delzer: Would the activated carbon that is sold be moved by rail?

Mr. Laudal: That would be up the vender that we partner with, it would be bulk packaged and there would have to be some type of agreement with the vender.

Chairman Delzer: Have you been part of the process and the replacement of the boiler?

24:15 Wesley Wintch: We have not, we are in the loop, they have done it so this process will work.

Chairman Delzer: Do you have any kind of a design that you can show us how big of a process is this and what's it produces per day?

Mr. Wintch: A lot of that is in the last attachment (attachment 2) and I can get a complete detailed design to you.

Chairman Delzer: Is the current plant producing heat for Valley City?

Mr. Wintch: It is not yet producing heat but it should be by June of this year and the boilers are on site and the building is constructed around it. It's very near completion. As far as a time line I think with permits and all that it would be 6 months and then maybe 2 years after that to build it.

Representative Monson: I keep hearing about hydrogen rich gas, what is that exactly?

Mr. Laudal: It does contain a lot of hydrogen but it's also the volatiles that would come off it. The lignite as you heat it, contains things like complex hydrocarbon, tars, as well as hydrogen and methane.

Representative Monson: So you would be burning hydrogen and the impurities as well as what else you get off there?

Mr. Laudal: Majority of the carbon is staying behind, we're taking the hydrogen fraction from the coal and using that as the fuel.

Chairman Delzer: I would guess you have done this as a mock up at EERC? Do you have any of the product with you?

Representative Holman: Have you done this with other kinds of coal?

Mr. Laudal: You can make activated carbon from just about anything that has carbon in it, the good thing about lignite is that it is actually a porous material to begin with. So when you activate it, it becomes more porous than some of the other coals.

26:45 Representative Brabandt: Has all the engineering been done on UND?

Mr. Laudal: Yes, on the carbon plant, it's a combination of fulltime research staff, and we did have a senior chemical engineering plant design group take this on as their project. They helped us with the cost and the economics and the plant layouts. Everything has been done with engineers either at UND or EERC.

Representative Brabandt: And when you talk about the vender, we are talking about the manufacturer that is going to manufacture the component parts?

Mr. Laudal: The vender is the person that is going to actually buy the activated carbon product, market it and distribute it.

Chairman Delzer: You guys hold the patent on this?

Mr. Laudal: EERC holds the patent on this. There's actually two technologies; you're making activated carbon and you are making steam or electricity. The patent is actually the integration of those two technologies.

Chairman Delzer: What's the royalties?

Mr. Laudal: I believe it's 2.5 cents per pound of carbon.

28:45 Representative Boehning: Your cost net of 22.5 million, who came up with that amount?

Mr. Laudal: I'll continue on to answer that question
(page 2 of attachment 4)

34:30 Chairman Delzer: What is the standard life time of the plant?

Mr. Laudal: Our analysis assumes 20 years, which is fairly stand for industrial plants although the plants that are operating right now have been around much longer than that.

Representative Monson: What's your source of water for your steam?

Mr. Laudal: It would just come out of the Shyanne.

Representative Monson: Cost to dispose of hazards waste, mercury or what else would be in the coal?

Mr. Laudal: The boiler system is going to have all the state of the art air pollution control components.

Representative Streyle: The royalties at \$1400 would be 300 thousand a year.

Chairman Delzer: How does that work? When the funds come in to you? You'll find that out for us.

Representative Pollert: Where exactly would this be located?

Mr. Wintch: It would be right next to the new heat plant, either to the east or the south, we will need to be able to connect to it.

Chairman Delzer: Do you currently own the land?

Mr. Wintch: We do not, the cost of the land is included in our numbers, we would have to buy out some homes.

37:55- 43:40 Nick Hacker, ND Board of the Higher Education (see attachment 5)

I know there was some testimony about the 2.5 million, this bill is structured those funds would go into fund until the entire debt that is outstanding is covered. So there won't be excess cash availed to the campus immediately and that was for risk purposes only.

39:50 Chairman Delzer: It would be available after the debt is covered? Was this part of the original request on you budgeting?

42:00 Representative Monson: Once all the debt is paid off, what are your intentions for the rest of the revenue?

Mr. Hacker: The intention other than the royalties, they would be returned back as a revenue source back to Valley City State University.

Chairman Delzer: But they do come before the legislature.

Representative Streyle: It would go into the general fund not an additional outside the formula revenue. This could be a huge amount of money discretionary funds to one institution and I would think we'd want to take a look at that.

Chairman Delzer: I think that's just fair warning, that's probably how the legislature is going to look at this in the future. Brady can you find out about the royalty money and how that will be handled?

43:45-52:00 Tyler Hamman Lignite Energy Council: (see attachment 6)

We think Valley City State has identified a good use for lignite. 27.8 million tons of lignite were mined last year; this represents 10s of thousands but every little bit that can be utilized is a good thing.

44:30 Representative J. Nelson: Could this be used if it was used in larger than what we are seeing today?

Mr. Hamman: I am not sure that with the current technology they could do this in a utility scale for example but in a place like this Valley city it's a great candidate.

Representative J. Nelson: You utilize activated carbon now for the clean coal technology that's being used? I understood that water filtration was the largest use, is this a growing industry?

Mr. Hamman: That's correct so they use activated carbon as a mercury control, it's kind of a binding agent that binds the mercury and helps to clean that up. Basically it's a control mechanism for any coal plant that is going in using traditional coal technology right now. That market is growing; it does have a number of other commercial uses as well.

47:40 Chairman Delzer Do they dry fine at Spiritwood or at Coal Creek? So they would ship from Coal Creek to Spiritwood and then truck it from Spiritwood?

Mr. Laudal: That's correct, we assumed it would be sent to Spiritwood and then trucked.

Representative Meier: Do we need any federal approval for anything on this bill?

Mr. Wintch: It does have to stand up to the EPA standards and it does, in fact because the carbon is captured as activated carbon so it actually improves the environmental impact.

Representative Boehning: How big is the generator going to be and how much revenue is going to be coming in off the electricity?

Mr. Laudal: I am not sure how big it's going to be and the electricity would be a small fraction, I think like 1/15 of the revenue is coming from there. The only reason we are making electricity is to make sure that we can run the carbon plant year round.

Representative Brabandt: How much money do we have into this so far?

Mr. Laudal: This work was actually funded through a ND department of commerce, a 100-thousand-dollar grant, it just recently wrapped up in the end of February, it's been going on for the last 12 months.

51:00 Representative Monson: I see you reference mercury; do you clean the coal when it comes in as dry fine or is it already pretty much free of mercury and other things before they would even get it in Valley City?

Mr. Hamman: The dry fining process reduces the mercury somewhat, so when the plants get it it's already down to that point.

52:15-54:20 Al Christianson, Great River Coal Mine: We think this a good project, we are one of the utilities that have continued to be the people that build serial number 00. Dry fining was a 00, it was never done before. This is a very good project, it's going to use ND lignite, it's going to fill a market, all the power plants in ND use some level of activated carbon for their mercury control. The market is in ND; we did about 10 years ago look at building a utilities scale activated carbon plant in Falkirk mine with a company. They came to ND wanted to see how much we would give them to come here and after other offers they went elsewhere. It's now being shipped a long distance to get here.

The dry fining process a question that was asked, it was patented and built in North Dakota, the only one in operation and it already reduces 50% of the mercury that is the lignite coal. At current time it is shipped to spirit wood, in a 50 car unit trains every three days, so the ability to get dry fining to this project would be by rail to Spiritwood, or there are trucks going back and forth carrying fly ash that could haul coal down.

That 1400 hundred dollars is a lot cheaper then what we are paying now. We did use quite a bit of it in Stanton, Stanton was a test bed for all different kinds of activated carbon.

Representative Boe: I think I would wait and see what the revenue would be.

Representative Monson: I think there needs to be a plan for the how this is entered into the formula.

Chairman Delzer: I think that's on the record, I think there needs to be reporting requirements.

Representative Streyle: Is there an emergency clause on that?


Chairman Delzer: Yes, Further discussion?

2017 HOUSE STANDING COMMITTEE MINUTES

Appropriations Committee
Roughrider Room, State Capitol

SB 2196
3/23/2017
29646

- Subcommittee
 Conference Committee



Explanation or reason for introduction of bill/resolution:

A BILL for an Act to authorize this issuance of revenue bonds for the purchase of land and construction of an integrated carbon plant at Valley City state university; to provide an appropriation

Minutes:



Chairman Delzer: Deals with the Integrated Carbon Plant in Valley City, we had a pretty good discussion on that. I think everybody felt pretty good about the discussion. Only thing that concerns me is that they are talking about having to buy out some homes. It's a revenue bond for 22.5 million dollars. The bonding agency will decide whether or not it goes forward. It is supposed to produce some integrated carbon that can be sold to capture the money. I don't know if we talked about where the money would go, I think it'll be a few years before we would have to worry about that. The payoff was about 10 years. I did send out an amendment with some of the things that we were concerned about. (17.0804.01001) Committee members, what are you wishes?

Representative Monson Moved Do Pass

Representative Pollert Second the Motion

Representative Brandenburg: After talking to some people, are we sure about the patent staying with the EERC and with the state and it's not going to disappear?

Chairman Delzer: It stays with the EERC not with the state.

Representative Brandenburg Some of these have disappeared and I want to be sure that this one stays.

Representative Streyle: I think it was 300 thousand for the royalty

Chairman Delzer: I thought that's how much we put toward them designing this? I think it's a royalty to per each ton.

Representative Streyle: Yea I think that amounted to 300 thousand. It was based on 2000 tons if I remember correctly.

Chairman Delzer: Further discussion on the motion to amend?

Voice vote, all in favor, motion passes

Chairman Delzer: We have the amended bill before us.

Representative Monson Moved Do Pass as amended

Representative Brandenburg Second

A Roll Call vote was taken. Yea: 15 Nay: 0 Absent: 6

Representative Streyle will carry the bill

PROPOSED AMENDMENTS TO SENATE BILL NO. 2196

Page 1, line 3, after "appropriation" insert "; to provide for a report to the budget section; to provide for a report to the sixty-sixth legislative assembly"

Page 1, after line 23, insert:

"SECTION 3. VALLEY CITY STATE UNIVERSITY INTEGRATED CARBON PLANT PROJECT - BUDGET SECTION REPORT - REPORT TO SIXTY-SIXTH LEGISLATIVE ASSEMBLY. During the 2017-18 interim, the state board of higher education shall provide a report to the budget section of the legislative management regarding the status of the integrated carbon plant project at Valley City state university. The state board of higher education shall also provide a report to the appropriations committees of the sixty-sixth legislative assembly regarding the status of the project."

Renumber accordingly

Date: 3/23/2017
 Roll Call Vote #: 1

**2017 HOUSE STANDING COMMITTEE
 ROLL CALL VOTES
 BILL/RESOLUTION NO. SB 2196**

House Appropriations Committee

Subcommittee

Amendment LC# or Description: 17.0804.01001

Recommendation: Adopt Amendment
 Do Pass Do Not Pass Without Committee Recommendation
 As Amended Rerefer to Appropriations
 Place on Consent Calendar
 Other Actions: Reconsider _____

Motion Made By Representative Monson Seconded By Representative Pollert

Representatives	Yes	No	Representatives	Yes	No
Chairman Delzer					
Representative Kempenich			Representative Streyle		
Representative: Boehning			Representative Vigesaa		
Representative: Brabandt					
Representative Brandenburg					
Representative Kading			Representative Boe		
Representative Kreidt			Representative Delmore		
Representative Martinson			Representative Holman		
Representative Meier					
Representative Monson					
Representative Nathe					
Representative J. Nelson					
Representative Pollert					
Representative Sanford					
Representative Schatz					
Representative Schmidt					

Total (Yes) _____ No _____

Absent _____

Floor Assignment _____

If the vote is on an amendment, briefly indicate intent:

Motion Carries

Date: 3/23/2017
Roll Call Vote #: 2

**2017 HOUSE STANDING COMMITTEE
ROLL CALL VOTES
BILL/RESOLUTION NO. SB 2196**

House Appropriations Committee

Subcommittee

Amendment LC# or Description: _____

Recommendation: Adopt Amendment
 Do Pass Do Not Pass Without Committee Recommendation
 As Amended Rerefer to Appropriations
 Place on Consent Calendar
Other Actions: Reconsider _____

Motion Made By Representative Monson Seconded By Representative Brandenburg

Representatives	Yes	No	Representatives	Yes	No
Chairman Delzer	X				
Representative Kempenich	A		Representative Streyle	X	
Representative: Boehning	A		Representative Vigesaa	X	
Representative: Brabandt	X				
Representative Brandenburg	X				
Representative Kading	A		Representative Boe	A	
Representative Kreidt	A		Representative Delmore	X	
Representative Martinson	X		Representative Holman	X	
Representative Meier	X				
Representative Monson	X				
Representative Nathe	X				
Representative J. Nelson	A				
Representative Pollert	X				
Representative Sanford	X				
Representative Schatz	X				
Representative Schmidt	X				

Total (Yes) 15 No 0

Absent 6

Floor Assignment Representative *Streyle*

If the vote is on an amendment, briefly indicate intent:

REPORT OF STANDING COMMITTEE

SB 2196: Appropriations Committee (Rep. Delzer, Chairman) recommends **AMENDMENTS AS FOLLOWS** and when so amended, recommends **DO PASS** (15 YEAS, 0 NAYS, 6 ABSENT AND NOT VOTING). SB 2196 was placed on the Sixth order on the calendar.

Page 1, line 3, after "appropriation" insert "; to provide for a report to the budget section; to provide for a report to the sixty-sixth legislative assembly"

Page 1, after line 23, insert:

"SECTION 3. VALLEY CITY STATE UNIVERSITY INTEGRATED CARBON PLANT PROJECT - BUDGET SECTION REPORT - REPORT TO SIXTY-SIXTH LEGISLATIVE ASSEMBLY. During the 2017-18 interim, the state board of higher education shall provide a report to the budget section of the legislative management regarding the status of the integrated carbon plant project at Valley City state university. The state board of higher education shall also provide a report to the appropriations committees of the sixty-sixth legislative assembly regarding the status of the project."

Renumber accordingly

2017 TESTIMONY

SB 2196

1.25.2017

SB2196
1-25-17 #1
P1

TO: North Dakota Senate Appropriations Committee
Senator Ray Holmberg, Chairman

RE: SB2196

FROM: Senator Lonnie J. Laffen, District 43

Mr. Chairman & members of the Senate Appropriations Committee:

I am here to introduce a very exciting idea. Approximately 6 years ago, UND, through privately funded research, explored various methods to utilize lignite coal more effectively. The project reduced the lignite into a char which could be used as a substitute for coke in the production of iron - similar to activated carbon. We refer to this as metallurgical carbon. The original privately funded research went a different direction, but it spurred the idea for doing more with this lignite char - treat it with steam to create activated carbon and use it as fuel for our steam plants. Is there a new way to get more out of our lignite coal?

This bill proposes to build an Activated Carbon plant at VCSU for the purpose of providing steam for their heating system. I'm not going to try to be the technology expert - others here are, but am going to give you a 30 second synopsis.

The Activated Carbon plant does not burn the lignite, but instead distills it down into the rich constituents of: 1) carbon char and 2) a volatile hydrogen rich gas. The hydrogen rich gas is delivered to VCSU's current steam plant, where it is burned in the boilers to create steam. A fraction of the steam is returned to the plant to "activate" the carbon char and produce activated carbon. The remaining steam is distributed throughout the campus for heating needs. If heating demands are low on the campus, we can redirect the steam to a turbine which can produce electricity and continue to consume the hydrogen gas to keep the process moving.

Mr. Chairman - VCSU is currently building a new coal fired steam plant on their campus - approved by this legislative body in 2015. This bill would essentially add a bolt-on addition to their current project to allow this new technology to be utilized for heating the campus.

P1

Why VCSU? VCSU's new steam plant is equipped with the required state-of-the-art emission and combustion controls. It's close to our source of dry-fined lignite at Spiritwood, and is right-sized for the initial proof of concept project.

#1
p2

What the plant will do is deliver a hydrogen rich gas, so that the campus can generate steam for heat as it currently does but also steam for electric generation, which would be a new side benefit. As a by-product the process produces activated carbon which can be sold on the open market. It's the sale of this residual activated carbon that makes this work economically.

Let's look the economics:

VCSU currently spends \$600,000 for coal and natural gas annually for producing steam. The carbon plant will provide a hydrogen rich gas that will offset the current use of coal and natural gas, while producing 6,000 tons of activated carbon annually. Based on a very attractive wholesale cost of \$1400 per ton (retail is \$2400), VCSU will generate \$8,400,000 annual revenue. Total annual operating costs, including bond debt service, is \$5,900,000 based on a 10-year debt repayment schedule. So net income after expenses is \$2,500,000 cash.

To recap:

1. The campus currently spends \$600K to provide steam.
2. After this project the campus would make steam, electricity, pay off the debt service, pay their operating costs and earn \$2.5M per year.
3. That income jumps to \$4.3M in the tenth year.

The plant will also lower our emissions. We greatly reduce the carbon (CO₂) emissions associated with coal combustion by using instead the hydrogen rich portion of lignite. Our carbon profile would be much closer to that of natural gas (or ½ that of a straight lignite burn). More importantly, activated carbon has the ability to remove CO₂ from any combustion source, and this new plant will be part of the research bench needed to perfect that process.

The technology is scalable to fit all of our district heating systems: NDSU, UND, Mayville State, NDSCS, Minot State, and our smaller Dakota College at Bottineau. It is not scalable to fit a large, electrical generation facility as the thermodynamics of heat transfer from the hydrogen rich gas won't work on an ultra-high pressure system. Of major benefit to our lignite industry is the market for dry-fined lignite, and the

p2

development of practical carbon capture technology using the activated carbon. It also has the potential to become the premier research and education platform for lignite energy technology in the U.S. Think Center of Excellence for Lignite Technology

#1
p3

Mr. Chairman: This bill is asking for authority to sell \$22.5M in revenue bonds as per Century Code requirements for the SBHE to do so.

One last overview before you here from the experts:

1. Instead of paying \$600K per year for its heat - VCSU would now get paid \$2.5M. In year ten they would gain \$4.3M per year.
2. It will prove out the potential for even larger savings at our other state institutions.
3. It will reduce the carbon emissions at VCSU's coal plant to the equivalent of natural gas.
4. It will employ 20 people, the FTE's of which are included in the net gain....and
5. It will showcase this technology across our nation, increasing the value of our state's vast lignite reserves.

Mr. Chairman: In private business we would call this idea a "no-brainer", but two questions need to be answered first:

1. Will the technology work?
2. Can we find a long term buyer for the activated carbon to essential eliminate the risk?

Mr. Chairman, the answer to these two questions will not be determined by this committee, nor by the legislature. The answer to these questions will be determined by the bonding company. This idea, and the technology behind it, will need to be fully proven and vetted. This is a revenue bond and the bonding companies will not sell bonds unless they are confident that the financials are going to work. And I'm certain they will require a long term contract from someone willing to buy the activated carbon at a price that will make it possible for VCSU to pay off their bonds.

We do, however, need your approval to start that process and ask for your approval on SB 2196. And with that I have a host of experts who will sound a lot smarter than I.

Thank you.



SB2196

Senate Appropriations Committee

January 25, 2017

Tisa Mason, Valley City State University President

701.845.7102 | tisa.mason@vcsu.edu

Chairman Holmberg and members of the committee: For the record, I am Tisa Mason, President of Valley City State University. I am here to speak in favor of senate bill 2196 and to thank Senators Laffen, Cook, Lee, Robinson and Representatives Sanford and Delmore for sponsoring this bill.

I have distributed a handout to provide further background on the project. In a moment you will hear from several colleagues who have made this project possible. I have provided a list of speakers to the chair.

Valley City State University is excited about this project for the following reasons:

- Our culture of distinction, innovation, and collaboration – paired with the perfect timing of building a heat plant able to integrate with this new science – makes us an ideal beta site.
- This entrepreneurial project will allow us to develop an independent source of revenue with scalable impact across the system.
- The new science of this project opens opportunities to expand research opportunities for our faculty and students.
- It is an excellent opportunity to promote North Dakota lignite.
- It is great for the environment: activated carbon is used to clean water – from your glass to a lake.

Thank you for the opportunity to speak with you today. I will now turn the podium over to our experts.

1-25-17 SB 2196

#3

p1

[EXCERPT FROM]

**ACTIVATED CARBON PLANT / HEAT PLANT INTEGRATION: VCSU & UND
Pro Forma**

Prepared by:

University of North Dakota
Institute for Energy Studies
Energy & Environmental Research Center

Valley City State University

January 3, 2017

#3
p2

**ACTIVATED CARBON PLANT / HEAT PLANT INTEGRATION: VCSU & UND
PRO FORMA SUMMARY**

Introduction

Valley City State University and the University of North Dakota (VCSU/UND) intend to partner with a private sector business to produce and sell Activated Carbon (AC). VCSU will manufacture AC at lower costs than traditional methods by leveraging their approved new steam heating system to offset necessary capex required for manufacturing AC. Distribution and sales will be conducted by the private sector partner. The efficiencies provide a significant source of revenue (*annual cash flow of \$2.5 million in years 1 – 10, \$4.3 million after initial debt retired*) which can fully liquidate the capital procurement debt within a few years, after which revenues will build reserves for other needs. The model can be replicated at other NDUS campuses.

AC Market Values

- Current market value of \$2400 per ton to end user with future projections of \$4000/ton.
- VCSU plans to sell at \$1400 per ton F.O.B under contract to private sector distribution.
- \$1000 per ton mark-up covers transportation and marketing costs for re-seller. VCSU profit of \$325/ton.

AC Market Demand

- VCSU production planned at 6,000 tons per year. We are exploring partnerships with Midwest Energy Emissions Corporation (ME2C) and Calgon Corporation.
- ND market alone exceeds 100,000 tons per year, with a global market projected to grow to more than 2 million tons by 2022.
- VCSU production 0.25% of current demand - will have no identifiable impact on market demand.

Self-liquidating Capital Construction Debt

- Total capital investment of \$22.5M including working capital during construction.
- Gross revenue from annual production of 6,000 tons @ \$1400 per ton = \$9.4M.
- Annual cash flow of \$2.5 million in years 1 – 10, \$4.3 million after initial debt retired.
- Debt liquidation in 3.5 years.
- Model remains viable at \$1000 per ton, with debt liquidation in 10 years or less.

Market Risks

- China may flood market with AC
 - Unlikely, but North Dakota – Regional market will have some insulation based on local demand and shipping costs to this area.
- Technology will displace AC usage
 - Currently not on the horizon, with debt liquidation occurring well before any anticipated reduction in demand.
- Other Market Variables
 - Increase in transportation costs would have minimal impact.
 - Feed stock (lignite) costs increases would have a minimal impact.
 - EPA regulations promulgated in next ten years may reduce overall functional life of plant, but impact on debt liquidation unlikely.

Primary benefit: New sources of revenue promote self-sufficiency in higher education.

3
Pg. 3

ACTIVATED CARBON PLANT / HEAT PLANT INTEGRATION: VCSU & UND PRIMER

Key Point – What is activated carbon?

- Activated carbon is produced from carbon-containing natural resources such as biomass and coal using well developed technology.
- Activated carbon is valuable as it absorbs contaminants from air, water, and other media.
- Activated carbon is mainly used for gas cleanup in coal fired power plants and water purification in municipal water treatment plants. It has many other uses as well.

Key Point – Activated carbon markets:

- Activated carbon sale is a growth market. Marketing surveys from eight different sources estimate a CAGR ranging from 11 to 13%.
- Activated carbon sale is a stable market, with no practical substitute on the horizon.
- Activated carbon is valuable, and typically sells from \$1500 to \$3,000 per ton.
- High purity specialty carbons (a potential future market) can sell for \$15,000 per ton.

Key Point – Activated carbon manufacturing:

- Activated carbon is a straight-forward manufacturing process using proven methods.
- Current US production levels are approximately 435 tons annually from seven major producers.
- Activated carbon manufacturing requires steam to “activate” the carbon.
- Standard activated carbon manufacturing wastes significant amounts of volatile gasses which are released from coal feed stocks.

Key Point – Why lignite coal?

- Lignite is mined locally, and produces the best activated carbon as it is already a porous feed stock.
- Costs for shipping lignite for local production of activated carbon is low.
- Costs for shipping lignite-sourced activated carbon to regional users is low.

Key Point – Why combine steam plants with activated carbon plants?

- Activated carbon plants release fuel during production and require steam for activation.
- Steam plants produce steam and can use the fuel.
- Together, the two plants become much more efficient than if standing alone.

Key Point – How do the financials play out?

- Manufacturing efficiencies by combining the plant result in increased profits.
- Profits are sufficient to repay the capital investment in the carbon plant within 5 years.
- New boilers and/or steam plants can be installed and payed for in an additional 5 years.

Key Point – Win-Win

- Activated carbon is a stable market with sales generating revenue to meet the deferred maintenance needs.
- This is a model for campus self-sufficiency that reduces the need for appropriations.
- Institutions can use this model for research and education to strengthen their mission.
- This model can be replicated at other sites across North Dakota.

#3
p.4

Activated Carbon Project Advisory Team

- Steve Benson, Associate VP for Research, Energy and Environmental Research Center, UND
- Nick Hacker, State Board of Higher Education
- Lonnie Laffen, CEO, JLG Architects
- Michael Mann, Executive Director, Institute for Energy Studies, UND
- Tisa Mason, President, VCSU
- Larry Robinson, Executive Director, VCSU Foundation
- Ed Schafer, 30th Governor of North Dakota
- Mike Seifert, CEO, Aurora Borealis Dakota
- Delton Steele, Regional President, U.S. Bank
- Greg Stemen, State Board of Higher Education
- Rick Tonder, Facility Planning Director, NDUS
- Wesley Wintch, VP for Business Affairs, VCSU

SB 2196

Senate Appropriations Committee
January 25, 2017
Rick Tonder, Director of Facility Planning
701.777.4270 | rick.tonder@ndus.edu

Chair and Committee Members: My name is Rick Tonder, Director of Facility Planning for the NDUS, and I'm here today in support of and to provide information on SB 2196. The bill provides authorization for the sale of revenue bonds by the State Board of Higher Education which would enable construction of an integrated Activated Carbon Plant / Steam Heating Plant at Valley City State University.

Senator Laffen has provided a very complete overview of the planned project, and I would only add a few brief points to his testimony:

1. VCSU and UND are working together to make this plant a successful reality.
2. Activated carbon production is a proven technology that will be enhanced by our project.
3. This endeavor will be the foundation for new research, education, and economic development opportunities that will have long term lasting benefits for North Dakota.

Our request to authorize the sale of revenue bonds in the amount of \$22,500,000 is a tall order in the current economic times. I would not be here today if I did not believe this project will reach its potential and be able to service the substantial debt, but also provide a source of significant revenue for the future. Revenue that will be spent wisely on campus needs and introduce a refreshing new entrepreneurial spirit to university operations. But I realize that my conviction alone is inadequate to earn your support and trust.

Instead, I would point to the self-limiting nature of revenue bond sales, and our standing authority from the SBHE which prevents this project from moving forward until all aspects of our business plan have been met, specifically a contractual relationship with a vendor who will market and distribute our activated carbon product.

The process of issuing revenue bonds requires a bond credit rating by established rating agencies such as Moody's Investors Services or Standard & Poor's that will provide strong sales and the lowest interest rates. The rating agency will be unable to provide the needed rating unless all of our business plan goals have been met, including the retention of the vendor who must also have a strong financial foundation.

Your authorization is critical to the project, but by no means received as approval to proceed: we have a long way to travel before we have reached that point. Your authorization is needed to retain the needed distribution service with assurances to applicants we can move forward if our business plan goals have been met.

I ask for a do pass on SB 2196 and am available to answer your questions. Thank you.

1-25-17

SB 2196

#5

P1

SB2196

Senate Appropriations Committee

January 25, 2017

Steve Benson, Associate Vice President for Research, Energy & Environmental Research Center

701.777.5177 sbenson@undeerc.org

Michael Mann, Executive Director, Institute for Energy Studies, UND

701.777.3852 michael.mann@enr.und.edu

Technical Overview of the Activated Carbon Steam Plant Process (Dr. Benson)

Chairman Holmberg and members of the committee: For the record, I am Dr. Steve Benson, Associate Vice President for Research, Energy & Environmental Research Center at UND. I am here to speak in favor of Senate Bill 2196.

Lignite is heated under conditions that produces a gas (hydrogen-rich) and a solid char. The lignite is not burned, it is only heated. The hydrogen-rich gas produced is piped to the steam plant boiler and burned to produce steam and hot flue gas.

The steam is used to heat the campus through the existing district heating system. The hot char is reacted with steam to produce activated carbon and more hydrogen-rich gas that can be piped to the steam plant boiler to produce more steam. The hot flue gas is used to generate electricity through a process that can take waste heat (not used to generate steam) and turn it into electricity (organic Rankin cycle or supercritical CO₂ cycle).

The integration of an activated carbon production with steam generation allows for reduction in the cost of producing activated carbon. Integration of the activated carbon/steam generation with the ability to produce electricity from waste heat allows for operation of the system year round.

In addition, the CO₂ footprint is reduced through the integration of the activated carbon/steam plant as compared to stand alone systems and the system can incorporate biomass to decrease the CO₂ footprint further.

Financial Feasibility of the Activated Carbon Steam Plant Process (Dr. Mann)

Chairman Holmberg and members of the committee: For the record, I am Dr. Michael Mann, Executive Director of the Institute for Energy Studies at UND. I am here to speak in favor of senate bill 2196.

As indicated on the pro forma summary, the cost to construct the facility, including the costs for any additional land purchases and capital during construction is **\$22.5 million**. The anticipated revenues from this investment is **\$2.5 million per year** during the first ten years while the initial debt is repaid, and **\$4.3 million every year thereafter**. I would like to review the procedures and key assumptions used to develop these numbers, along with an assessment of the investment risk.

The project team identified each piece of equipment in the plant bigger than a pump. Bids were solicited for the larger more expensive pieces of equipment. Industry relevant factors (multipliers)

were used to account for items not specifically identified, such as the cost of piping and electrical work. A potential layout of the plant was proposed to allow factors such as building and land development to be considered. Construction labor costs were based upon values used for constructing similar plants. All these inputs were combined and a contingency added to estimate the total capital cost for the plant. This type of analysis produces a range of expected capital cost. The amount requested in this bonding bill represents the high end of the range and is used to ensure there will be adequate funding to cover the cost of the project. Formal bids will be requested and the project team will work with the selected contractor to develop the final cost and implementation plan.

The plant is expected to produce about 6000 tons of activated carbon per year. This represents about 0.25% of the current demand so will not impact the market dynamics. The North Dakota market alone exceeds 100,000 tons per year. The price of activated carbon has been and is expected to continue to increase, with a current value of approximately \$2400 per ton. We propose to team with a private partner who will market and distribute the product. Based upon preliminary discussions with our preferred partner, a wholesale price of \$1400 per ton is used for our analysis. Using these assumptions, the potential revenue to Valley City State University from activate carbon is \$8.4 million per year with additional revenues from the sale of electricity and steam.

The primary costs associated with the operations of the plant are debt repayment, labor, general operation and maintenance, coal, and other consumables, in that order. For this analysis, it was assumed debt would be repaid during the first ten years of the project, with a projected annual cost of \$2.7 million. The plant will employ 20 permanent employees at an annual cost of \$1.6 million including benefits. We included a salary premium in order to attract high quality workers to Valley City. These employees will be paid with revenue from the project and do not represent an additional burden to VCSU or the NDUS. A high estimate of approximately \$900 thousand was used for operations and maintenance to ensure continual upgrades are made to the plant and to avoid accruing deferred maintenance costs. The plant will utilize over \$700 thousand per year of North Dakota lignite.

The risk of this investment was analyzed by varying all of the revenue and cost inputs by 40% and examining their impact on the discounted cash flow rate of return and the payback time. The base rate of return is 17.7% with a simple payback time of 3.7 years. The lowest rate of return realized was 12% with an associated payback time of 6 years when the cost parameters were varied, showing that the project has relatively low risk based upon the cost inputs. An analysis of revenues indicated a break-even point of a selling price of \$860 per ton for activated carbon. This offers a considerable margin of safety for the investment.

Here is a copy of the feasibility study performed. The results of this analysis have been vetted by the UND engineering team, the NDUS Facility Planner, and the project's external advisory board. These projections are also valid for other campuses in the university system.

In summary, based upon the pro forma, this project represents a low risk, high return project to the Valley City campus. The project will **turn a \$600 thousand annual cost to heat the campus into a \$2.5 million revenue stream**, even during the repayment of debt, providing much needed resources to the campus during this time of tight budgets.

ND Senate Appropriations Committee
Hearing SB 2196

SB 2196

1-25-17

#6

P1

Testimony from ND Board of Higher Education Member, Nick Hacker

Good afternoon Mr. Chairman and members of the committee. Academics including VCSU, UND and the EERC, along with private sector experts, collaborated for nearly two years to research and develop a model heating plant at VCSU. The goal was to produce the necessary energy to heat and support the institution but just as importantly process and capture activated carbon. In its simplistic form activated carbon is a manufactured resource used in commercial applications such as water filtration.

The result was great success proving that the institution could not only provide sustainable energy from ND lignite coal for the institution at a very low cost but commercial grade and marketable activated carbon. The level of carbon that will be marketable is sufficient to pay for the debt service of the bonds and in fact deliver a new income stream to the institution beyond expenses and debt service.

For the past 6 months, along fellow Board member Greg Stemen and many other stakeholders, we review the project and provided input. From my role, the involvement included, understanding the process from a high level and testing the financial assumptions. The other more appropriate experts will better explain the process and technology.

From a governance role the institution is taking a very conservative approach in its assumptions for the marketability and value of the activated carbon and hence potential income stream. They also completed sufficient due diligence to identifying the pros and cons of potentially privatizing the project.

The story and process technology created in this effort is truly a first class example of how we are redeveloping higher education for the future and this specific project is likely to become a model for other institutions as energy infrastructure needs arise.

On December 14, 2016 the Board was presented with complete information on the project and authorized VCSU to request funding from the North Dakota Legislature through revenue bonds or other sources.

We ask for your support, approval and encouragement to proceed with what should be acknowledged as a game changer investment for institutional facility needs.

Thank you,

Nick Hacker

Nicholas.hacker@ndus.edu

(701) 751-4988

Att. 1 3.14.17
SB 2196

3.14.17

TO: North Dakota House Appropriations Committee
Representative Jeff Delzer, Chairman

RE: SB 2196

FROM: Senator Lonnie J. Laffen, District 43

Mr. Chairman & members of the House Appropriations Committee:

I am here to introduce a very exciting idea. Approximately 6 years ago, UND, through privately funded research, explored various methods to utilize lignite coal more effectively. The project reduced the lignite into a char which could be used as a substitute for coke in the production of iron - like activated carbon. We refer to this as metallurgical carbon. The original privately funded research went a different direction, but it spurred the idea for doing more with this lignite char: i.e. - treat it with steam to create activated carbon and use it as fuel for our steam plants. Is there a new way to get more out of our lignite coal?

This bill proposes to build an Activated Carbon plant at VCSU for providing steam for their heating system. I'm not going to try to be the technology expert - others here are, but am going to give you a 30 second synopsis.

The Activated Carbon plant does not burn the lignite, but instead distills it down into the rich constituents of: 1) carbon char and 2) a volatile hydrogen rich gas. The hydrogen rich gas is delivered to VCSU's current steam plant, where it is burned in the boilers to create steam. A fraction of the steam is returned to the plant to "activate" the carbon char and produce activated carbon. The remaining steam is distributed throughout the campus for heating needs. If heating demands are low on the campus, we can redirect the steam to a turbine which can produce electricity and continue to consume the hydrogen gas to keep the process moving.

Mr. Chairman - VCSU is currently building a new coal fired steam plant on their campus - approved by this legislative body in 2015. This bill would essentially add a bolt-on addition to their current project to allow this new technology to be utilized for heating the campus.

Why VCSU? VCSU's new steam plant is equipped with the required state-of-the-art emission and combustion controls. It's close to our source of dry-fined lignite at Spiritwood, and is right-sized for the initial proof of concept project.

What the plant will do is deliver a hydrogen rich gas, so that the campus can generate steam for heat as it currently does but also steam for electric generation, which would be a new side benefit. As a by-product, the process produces activated carbon which can be sold on the open market. It's the sale of this residual activated carbon that makes this work economically.

Let's look the economics:

VCSU currently spends \$600,000 for coal and natural gas annually for producing steam. The carbon plant will provide a hydrogen rich gas that will offset the current use of coal and natural gas, while producing 6,000 tons of activated carbon annually. Based on a very attractive wholesale cost of \$1400 per ton (retail is \$2400), VCSU will generate \$8,400,000 annual revenue. Total annual operating costs, including bond debt service, is \$5,900,000 based on a 10-year debt repayment schedule. So, net income after expenses is \$2,500,000 cash.

To recap:

1. The campus currently spends \$600K to provide steam.
2. After this project the campus would make steam, electricity, pay off the debt service, pay their operating costs and earn \$2.5M per year.
3. And that income jumps to \$4.3M in the tenth year.

The plant will also lower our emissions. We greatly reduce the carbon (CO₂) emissions associated with coal combustion by using instead the hydrogen rich portion of lignite. Our carbon profile would be much closer to that of natural gas (or ½ that of a straight lignite burn). More importantly, activated carbon can remove CO₂ from any combustion source, and this new plant will be part of the research bench needed to perfect that process.

The technology is scalable to fit all our district heating systems: NDSU, UND, Mayville State, NDSCS, Minot State, and our smaller Dakota College at Bottineau. It is not scalable to fit a large, electrical generation facility as the thermodynamics of heat transfer from the hydrogen rich gas won't work on an ultra-high pressure system. Of major benefit to our lignite industry is the market for dry-fined lignite and the

development of practical carbon capture technology using the activated carbon. It also has the potential to become the premier research and education platform for lignite energy technology in the U.S. Think Center of Excellence for Lignite Technology

Mr. Chairman: This bill is asking for authority to sell \$22.5M in revenue bonds as per Century Code requirements for the SBHE to do so.

One last overview before you here from the experts:

1. Instead of paying \$600K per year for its heat - VCSU would now get paid \$2.5M. In year ten they would gain \$4.3M per year.
2. It will test out the potential for even larger savings at our other state institutions.
3. It will reduce the carbon emissions at VCSU's coal plant to the equivalent of natural gas.
4. It will employ 20 people, the FTE's of which are included in the net gain....and
5. It will showcase this technology across our nation, increasing the value of our state's vast lignite reserves.

Mr. Chairman: In private business, we would call this idea a "no-brainer", but two questions need to be answered first:

1. Will the technology work?
2. Can we find a long-term buyer for the activated carbon to essentially eliminate the risk?

Mr. Chairman, the answer to these two questions will not be determined by this committee, nor by the legislature. The answer to these questions will be determined by the financier. This idea, and the technology behind it, will need to be fully proven and vetted. No one will finance this until they are confident that the financials are going to work. And I'm certain they will require a long-term contract from someone willing to buy the activated carbon at a price that will make it possible for VCSU to pay off their bonds.

We do, however, need your approval to start that process and ask for your approval on SB 2196. And with that I have a host of experts who will sound a lot smarter than I.

Thank you.



VALLEY CITY
STATE UNIVERSITY

SB2196

House Appropriations Committee

March 14, 2017

Wesley Wintch, Valley City State University Vice President for Business Affairs
701.845.7234 | wesley.wintch@vcsu.edu

Chairman Delzer and members of the committee: For the record, I am Wesley Wintch, Vice President for Business Affairs at Valley City State University. I am here to speak in favor of senate bill 2196 and to thank Representatives Sanford and Delmore as well as Senators Laffen, Cook, Lee, and Robinson for sponsoring this bill.

I have distributed a handout to provide further background on the project. In a moment you will hear from several colleagues who have made this project possible. I have provided a list of speakers to the chair.

Valley City State University is excited about this project for the following reasons:

- Our culture of distinction, innovation, and collaboration – paired with the perfect timing of building a heat plant able to integrate with this new science – makes us an ideal beta site.
- This entrepreneurial project will allow us to develop an independent source of revenue with scalable impact across the system.
- The new science of this project opens opportunities to expand research opportunities for our faculty and students.
- It is an excellent opportunity to promote North Dakota lignite.
- It is great for the environment: activated carbon is used to clean water – from your glass to a lake.

Thank you for the opportunity to speak with you today. I will now turn the podium over to our experts.

[EXCERPT FROM]

**ACTIVATED CARBON PLANT / HEAT PLANT INTEGRATION: VCSU & UND
Pro Forma**

Prepared by:

University of North Dakota
Institute for Energy Studies
Energy & Environmental Research Center

Valley City State University

January 3, 2017

ACTIVATED CARBON PLANT / HEAT PLANT INTEGRATION: VCSU & UND PRO FORMA SUMMARY

Introduction

Valley City State University and the University of North Dakota (VCSU/UND) intend to partner with a private sector business to produce and sell Activated Carbon (AC). VCSU will manufacture AC at lower costs than traditional methods by leveraging their approved new steam heating system to offset necessary capex required for manufacturing AC. Distribution and sales will be conducted by the private sector partner. The efficiencies provide a significant source of revenue (*annual cash flow of \$2.5 million in years 1 – 10, \$4.3 million after initial debt retired*) which can fully liquidate the capital procurement debt within a few years, after which revenues will build reserves for other needs. The model can be replicated at other NDUS campuses.

AC Market Values

- Current market value of \$2400 per ton to end user with future projections of \$4000/ton.
- VCSU plans to sell at \$1400 per ton F.O.B under contract to private sector distribution.
- \$1000 per ton mark-up covers transportation and marketing costs for re-seller. VCSU profit of \$325/ton.

AC Market Demand

- VCSU production planned at 6,000 tons per year. We are exploring partnerships with Midwest Energy Emissions Corporation (ME2C) and Calgon Corporation.
- ND market alone exceeds 100,000 tons per year, with a global market projected to grow to more than 2 million tons by 2022.
- VCSU production 0.25% of current demand - will have no identifiable impact on market demand.

Self-liquidating Capital Construction Debt

- Total capital investment of \$22.5M including working capital during construction.
- Gross revenue from annual production of 6,000 tons @ \$1400 per ton = \$9.4M.
- Annual cash flow of \$2.5 million in years 1 – 10, \$4.3 million after initial debt retired.
- Debt liquidation in 3.5 years.
- Model remains viable at \$1000 per ton, with debt liquidation in 10 years or less.

Market Risks

- China may flood market with AC
 - Unlikely, but North Dakota – Regional market will have some insulation based on local demand and shipping costs to this area.
- Technology will displace AC usage
 - Currently not on the horizon, with debt liquidation occurring well before any anticipated reduction in demand.
- Other Market Variables
 - Increase in transportation costs would have minimal impact.
 - Feed stock (lignite) costs increases would have a minimal impact.
 - EPA regulations promulgated in next ten years may reduce overall functional life of plant, but impact on debt liquidation unlikely.

Primary benefit: New sources of revenue promote self-sufficiency in higher education.

ACTIVATED CARBON PLANT / HEAT PLANT INTEGRATION: VCSU & UND PRIMER

Key Point – What is activated carbon?

- Activated carbon is produced from carbon-containing natural resources such as biomass and coal using well developed technology.
- Activated carbon is valuable as it absorbs contaminants from air, water, and other media.
- Activated carbon is mainly used for gas cleanup in coal fired power plants and water purification in municipal water treatment plants. It has many other uses as well.

Key Point – Activated carbon markets:

- Activated carbon sale is a growth market. Marketing surveys from eight different sources estimate a CAGR ranging from 11 to 13%.
- Activated carbon sale is a stable market, with no practical substitute on the horizon.
- Activated carbon is valuable, and typically sells from \$1500 to \$3,000 per ton.
- High purity specialty carbons (a potential future market) can sell for \$15,000 per ton.

Key Point – Activated carbon manufacturing:

- Activated carbon is a straight-forward manufacturing process using proven methods.
- Current US production levels are approximately 435 tons annually from seven major producers.
- Activated carbon manufacturing requires steam to “activate” the carbon.
- Standard activated carbon manufacturing wastes significant amounts of volatile gasses which are released from coal feed stocks.

Key Point – Why lignite coal?

- Lignite is mined locally, and produces the best activated carbon as it is already a porous feed stock.
- Costs for shipping lignite for local production of activated carbon is low.
- Costs for shipping lignite-sourced activated carbon to regional users is low.

Key Point – Why combine steam plants with activated carbon plants?

- Activated carbon plants release fuel during production and require steam for activation.
- Steam plants produce steam and can use the fuel.
- Together, the two plants become much more efficient than if standing alone.

Key Point – How do the financials play out?

- Manufacturing efficiencies by combining the plant result in increased profits.
- Profits are sufficient to repay the capital investment in the carbon plant within 5 years.
- New boilers and/or steam plants can be installed and paid for in an additional 5 years.

Key Point – Win-Win

- Activated carbon is a stable market with sales generating revenue to meet the deferred maintenance needs.
- This is a model for campus self-sufficiency that reduces the need for appropriations.
- Institutions can use this model for research and education to strengthen their mission.
- This model can be replicated at other sites across North Dakota.

Activated Carbon Project Advisory Team

- Steve Benson, Associate VP for Research, Energy and Environmental Research Center, UND
- Nick Hacker, State Board of Higher Education
- Lonnie Laffen, CEO, JLG Architects
- Michael Mann, Executive Director, Institute for Energy Studies, UND
- Tisa Mason, President, VCSU
- Larry Robinson, Executive Director, VCSU Foundation
- Ed Schafer, 30th Governor of North Dakota
- Mike Seifert, CEO, Aurora Borealis Dakota
- Delton Steele, Regional President, U.S. Bank
- Greg Stemen, State Board of Higher Education
- Rick Tonder, Facility Planning Director, NDUS
- Wesley Wintch, VP for Business Affairs, VCSU



THE NDUS *EDGE*

SB 2196

House Appropriations Committee

March 14, 2017

Rick Tonder, Director of Facility Planning

701.777.4270 | rick.tonder@ndus.edu

Chair and Committee Members: My name is Rick Tonder, Director of Facility Planning for the NDUS, and I'm here today in support of and to provide information on SB 2196. The bill provides authorization for the sale of revenue bonds by the State Board of Higher Education, which would enable construction of an integrated Activated Carbon Plant / Steam Heating Plant at Valley City State University. In addition, an amendment introduced by Senator Laffen would allow for private, Bank of North Dakota, and Taxable Revenue Bond financing as well.

Senator Laffen has provided a very complete overview of the planned project, and I would only add a few brief points to his testimony:

1. VCSU and UND are working together to make this plant a successful reality.
2. Activated carbon production is a proven technology that will be enhanced by our project.
3. This endeavor will be the foundation for new research, education, and economic development opportunities that will have long-term lasting benefits for North Dakota.

Our request to finance \$22,500,000 is a tall order in the current economic times. It is important to note that none of the proposed financing methods would allow the debt to become a direct obligation of the State of North Dakota

Our goals and concerns parallel those of lawmakers, and our fiduciary responsibilities are clear:

- This debt must be the responsibility of the project, and it must demonstrate an ability to perform and successfully service the debt.
- The evidences of debt (bonds, bank financing, or other) must clearly establish that the responsibility for repayment is that of the project, and that the assets so constructed by the project with its assurance of revenue is the security for the debt.
- That the financial risk for this venture is kept as low as possible, and that this basic premise is the basis for undertaking the project.

The process of issuing revenue bonds, acquiring BND financing, or private financing require a credit rating by established credit rating agencies such as Moody's Investors Services or Standard & Poor's that will provide the lowest interest rates. The credit rating agency will be unable to provide the needed rating unless all of our business plan goals have been met, including the retention of the vendor who must also have a strong financial foundation.

Your authorization is critical to the project, but by no means received as approval to proceed: we have a long way to travel before we have reached that point. Your authorization is needed to retain the needed distribution service with assurances to applicants we can move forward if our business plan goals have been met.

I ask for a **Do Pass on SB 2196** and am available to answer your questions. Thank you.

INSTITUTE FOR ENERGY STUDIES
COLLEGE OF ENGINEERING AND MINES
UPSON II ROOM 366
243 CENTENNIAL DRIVE – STOP 8153
GRAND FORKS, NORTH DAKOTA 58202-8153
PHONE (701) 777-3852 FAX (701) 777-4838

SB2196

House Appropriations Committee

Dan Laudal, Manager: Major Projects, Institute for Energy Studies, UND

701.777.3456 | daniel.laudal@engr.und.edu

Chair and Committee Members: For the record, my name is Dan Laudal, Manager: Major Projects at the University of North Dakota Institute for Energy Studies. I am here to speak in favor of senate bill 2196.

Technical Overview of the Activated Carbon Steam Plant Process

Lignite is heated under conditions that produces a gas (hydrogen-rich) and a solid char. The lignite is not burned, it is only heated.

The hydrogen-rich gas produced is piped to the steam plant boiler and burned to produce steam and hot flue gas.

The steam is used to heat the campus through the existing district heating system. The hot char is reacted with steam (small quantity compared to campus heating steam) to produce activated carbon and more hydrogen-rich gas that can be piped to the steam plant boiler to produce more steam.

The hot flue gas is used to generate electricity through a process that can take waste heat (not used to generate steam) and turn it into electricity (organic Rankine cycle or supercritical CO₂ cycle).

The integration of activated carbon production with steam generation allows for reduction in the cost of producing activated carbon. Integration of the activated carbon/steam generation with the ability to produce electricity from waste heat allows for operation of the system year round (no campus steam demand in summer).

In addition, the CO₂ footprint is reduced through the integration of the activated carbon/steam plant as compared to stand alone systems and the system can incorporate biomass to decrease the CO₂ footprint further. The majority of carbon is not burned, but stored permanently as solid activated carbon.

Financial Feasibility of the Activated Carbon Steam Plant Process

As indicated on the pro forma summary, the cost to construct the facility, including the costs for any additional land purchases and capital during construction is **\$22.5 million**. The anticipated revenues from this investment is **\$2.5 million per year** during the first ten years while the initial debt is repaid, and **\$4.3 million every year thereafter**. I would like to review the procedures and key assumptions used to develop these numbers, along with an assessment of the investment risk.

The project team worked together with a senior design team to identify and size each piece of equipment in the plant. Every item bigger than a pump was included. Bids were solicited for the larger more expensive pieces of equipment. Industry relevant factors (multipliers) were used to account for items not specifically identified, such as the cost of piping and electrical work. A potential layout of the plant was proposed to allow factors such as building and land development to be considered. Construction labor costs were based upon values used for constructing similar plants. All these inputs were combined and a contingency added to estimate the total capital cost for the plant. This type of analysis produces a range of expected capital cost. The amount requested in this bonding bill represents the high end of the range and is used to ensure there will be adequate funding to cover the cost of the project. Formal bids will be requested and the project team will work with the selected contractor to develop the final cost and implementation plan.

The plant is expected to produce about 6000 tons of activated carbon per year. This represents about 0.25% of the current demand so will not impact the market dynamics. The North Dakota market alone exceeds 100,000 tons per year. The price of activated carbon has been and is expected to continue to increase, with a current value of approximately \$2400 per ton. We propose to team with a private partner who will market and distribute the product. Based upon preliminary discussions with our preferred partner, a wholesale price of \$1400 per ton is used for our analysis. Using these assumptions, the potential revenue to Valley City State University from activated carbon is \$8.4 million per year with additional revenues from the sale of electricity and steam.

The primary costs associated with the operations of the plant are debt repayment, labor, general operation and maintenance, coal, and other consumables, in that order. For this analysis, it was assumed debt would be repaid during the first ten years of the project, with a projected annual cost of \$2.7 million. The plant will employ 20 permanent employees at an annual cost of \$1.6 million including benefits. We included a salary premium in order to attract high quality workers to Valley City. These employees will be paid with revenue from the project and do not represent an additional burden to VCSU or the NDUS. A high estimate of approximately \$900 thousand was used for operations and maintenance to ensure continual upgrades are made to the plant and to avoid accruing deferred maintenance costs. The plant will utilize about \$700 thousand per year of North Dakota lignite.

The risk of this investment was analyzed by varying all of the revenue and cost inputs by 40% and examining their impact on the discounted cash flow rate of return and the payback time. The base rate of return is 17.7% with a simple payback time of 3.7 years. The lowest rate of return realized was 12%

with an associated payback time of 6 years when the cost parameters were varied, showing that the project has relatively low risk based upon the cost inputs. An analysis of revenues indicated a break-even point of a selling price of \$860 per ton for activated carbon. This offers a considerable margin of safety for the investment.

The results of this analysis have been vetted by the UND engineering team, the NDUS Facility Planner, and the project's external advisory board. These projections are also valid for other campuses in the university system.

In summary, based upon the pro forma, this project represents a low risk, high return project to the Valley City campus. The project will **turn a \$600 thousand annual cost to heat the campus into a \$2.5 million revenue stream**, even during the repayment of debt, providing much needed resources to the campus during this time of tight budgets.

Hearing SB 2196
Testimony from ND Board of Higher Education Member, Nick Hacker

Good afternoon Mr. Chairman and members of the committee. Academics including VCSU, UND and the EERC, along with private sector experts, collaborated for nearly two years to research and develop a model heating plant at VCSU. The goal was to produce the necessary energy to heat and support the institution but just as importantly process and capture activated carbon. In its simplistic form activated carbon is a manufactured resource used in commercial applications such as water filtration.

The result was great success proving that the institution could not only provide sustainable energy from ND lignite coal for the institution at a very low cost but commercial grade and marketable activated carbon. The level of carbon that will be marketable is sufficient to pay for the debt service of the bonds and in fact deliver a new income stream to the institution beyond expenses and debt service.

For the past 6 months, along fellow Board member Greg Stemen and an advisory team of other stakeholders, we reviewed the project and provided input. From my role, the involvement included, understanding the process from a high level and testing the financial assumptions. The other more appropriate experts will better explain the process and technology.

From a governance role the institution is taking a very conservative approach in its assumptions for the marketability and value of the activated carbon and hence potential income stream. They also completed sufficient due diligence to identifying the pros and cons of potentially privatizing the project.

The story and process technology created in this effort is truly a first class example of how we are redeveloping higher education for the future through collaboration and process innovation. This specific project is likely to become a model for other institutions as energy infrastructure needs arise.

On December 14, 2016 the Board was presented with complete information on the project and authorized VCSU to request funding from the North Dakota Legislature through revenue bonds or other sources.

We ask for your support, approval and encouragement to proceed with what should be acknowledged as a game changer investment for institutional facility needs.

Thank you,

Nick Hacker
Nicholas.hacker@ndus.edu
(701) 751-4988

HH. 6

3.14.17

SB 2196



Jason Bohrer, President & CEO
 Lignite Energy Council
 PO Box 2277
 Bismarck, ND 58502
 Telephone: (701) 258-7117
 Fax: (701) 258-2755

**Testimony in Support of SB 2196
 Submitted by the Lignite Energy Council
 House Appropriations Committee
 March 14, 2017**

Chairman Delzer, members of the committee, I would like to offer this testimony in support of Senate Bill 2196. This legislation would authorize Valley City State University to implement an activated carbon plant to take advantage of numerous economies of scale available at the university and create a new value-added use for our state's lignite coal reserves.

Activated carbon is one of the value added products from North Dakota lignite that can be both a regional fit and economically-viable. Activated carbon has a large number of commercial uses in industries such as food and agriculture, medical, and environmental. The environmental applications include gas and water purification, and demand for activated carbon is growing as utilities comply with mercury regulations.

The use of activated carbon for western coals is a successful solution for flue gas mercury control, in large part because of the extensive work performed under the Lignite Research Program in North Dakota to optimize the technology.

While demand for lignite-derived activated carbon is much smaller than for electrical generation, activated carbon can sell for over 100 times the value of the raw coal and would boost the regional economy through job creation. Combining activated carbon production with generation of heat and power from lignite would make all processes more efficient and cost effective. This is one example of the value added utilization of lignite that is envisioned in the lignite industry roadmap.

We believe that Valley City State University, in conjunction with North Dakota technology teams, have put together a well-researched and sound proposal that will serve the long-term interests of VCSU while developing a new product from North Dakota lignite.

Again, the LEC supports this legislation and we request the committee's favorable consideration. I would be happy to answer any questions, thank you.