

# **UNIVERSITY OF TENNESSEE BIO-FUELS INITIATIVE**

Legislative History and State Funding

November 4, 2009

Fiscal Review Committee Staff

# Legislative History

SB 6 filed on January 9, 2007 by Sen. Kurita

- Authorized the University of Tennessee “to construct a Biomass Conversion Complex for the development and testing of agricultural biomass and bast fiber crop production techniques and cellulose conversion technology.”
- Encouraged the University “to establish a research program focusing on the development of Switchgrass as a bio-fuel feedstock in the state.”

# **FISCAL NOTE SB 6**

# Key Assumption

- Based on information provided by the University, the fiscal note assumed construction of a facility that would produce 1 million gallons of ethanol in the first year and 5 million gallons per year each succeeding year.

# Capital Outlay

- Bond issue to finance capital outlay for construction of facility in the amount of \$40.7 million, with annual debt service of \$4.5 million.

# **Fiscal Note on SB 6**

## **Additional Annual Expenditures**

(millions of dollars)

	<b>YEAR 1</b>	<b>YEARS 2-5</b>
<b>FEEDSTOCK</b>	<b>\$1.67</b>	<b>\$1.67</b>
<b>INCENTIVE PAYMENT</b>	<b>1.75</b>	<b>1.75</b>
<b>OPERATING COST</b>	<b>1.55</b>	<b>3.64</b>
<b>R &amp; D</b>	<b>5.25</b>	<b>6.50</b>
<b>TOTAL</b>	<b>\$10.22</b>	<b>\$13.56</b>

# **Total Annual Expenditures SB 6**

(Operating Costs plus Debt Service)

Year 1

\$14,697,000

Years 2-5

\$18,037,000

# Revenue Generated

- University stated sufficient revenue would be generated from the sale of ethanol to make the facility self-sufficient beginning in year 6. Fiscal Note Support Form, 1/8/07.)
- University assumed revenue of:
  - \$1,650,000 in year 1 (1 million gallons sold at \$1.65 per gallon)
  - \$8,250,000 in years 2-5 (5 million gallons sold at \$1.65 per gallon)

# Budget Proposal

- Separately, the Governor proposed a similar program for the University in the state budget for FY07-08.
- The Governor's budget proposal, released on February 20, 2007, stated:
  - The facility will be “capable of producing five million gallons of biomass-based ethanol per year.”

# Budget Proposal

(continued)

- “This facility will be part of an initiative that will help establish a new industry sector across the state that creates jobs, generates increased state and local tax revenues, and provides farmers with a new production crop.”
- “The facility will be self-supporting from production revenues after five years of operation.”

# Budget Proposal

## Capital Cost

- The Governor's proposal contained capital funding in the same amount as SB 6 (\$40,700,000).
  - Construction of demonstration bio-refinery
  - Operated by corporate partner

# Budget Proposal

## Additional Annual Expenditures

- The additional annual expenditures of the Budget Proposal were very similar to the cost estimated by the University for SB 6, net of revenue generated from production, not including debt service:
  - Year 1: \$8.25 million
  - Years 2-5: \$5.30 million each year

# Subsequent Legislative History

## SB 6

- SB 6 was not funded in the Governor's Budget.
- It passed the Senate on June 12, 2007, but no funding amendment was included in the appropriations bill.
- The House companion, HB 347 (Rep. Tidwell), was approved by the House Agriculture Committee and was referred to the Budget Subcommittee, where no further action was taken.

# Subsequent Legislative History

## Budget Proposal

- Enacted as part of 2007-08 appropriations act (PC 603)
- \$40.7 million capital funding shifted from bonds to cash (eliminating \$4.5 million annual debt service cost)
- State has continued to provide \$5.3 million funding annually for operating costs, including payments to farmers to grow switchgrass.
- Two more years of operating cost payments are planned, a total of \$10.6 million that has not yet been appropriated.

# Projections Made in 2007

- Representatives of the University testified:
  - Switchgrass grown by Tennessee farmers on 6,000 acres would be used as feedstock to produce the ethanol.
  - The pilot bio-refinery plant would produce 5 million gallons of E-85 annually.
  - Approximately 6,000 acres of switchgrass is required to yield 5 million gallons (5 million gal./800 gal. per acre = 6,250 acres).

# Projections Made in 2007

(continued)

- The cost of producing E-85 from switchgrass, which was then estimated at \$2.20/gal., would drop to \$1.10/gal. in three to five years.
- A corporate partner would be brought in to help run the bio-refinery and to develop a business and research relationship leading to commercial-scale bio-refineries in the State. The corporate partner would invest approximately \$20 million to operate the demonstration plant.

# Projections Made in 2007

(continued)

- 8-10 100 million gal. commercial bio-refineries may be built across the State of Tennessee, mostly in rural areas.
- This scale of production would support 1.25 million acres of switchgrass production. (1 billion gal./800 gal. per acre = 1.25 million acres)
- The 5-million gal. production capacity of the demonstration plant would make Tennessee uniquely attractive in comparison to other states and universities researching switchgrass conversion.

# Status as of November 4, 2009

- Approximately 2,700 acres of switchgrass are under production.
  - The University is subsidizing this production with payments to farmers of \$450 per acre. In future years, the payment will be based more on production.
  - 2,700 acres of switchgrass would yield 2.16 million gallons of ethanol. The University is using this switchgrass for research purposes apart from ethanol production, including study of seeding, harvesting, storage and other bio-energy uses.
  - The total cost to the State of these payments over five years will be approximately \$12 million.

# Status as of November 4, 2009

(continued)

- The demonstration plant is under construction with a targeted December, 2009, substantial completion date.
- The plant has a total cost of approximately \$55 million.
  - \$ 36.7 million funded by State appropriation, all additional capital costs funded by Dupont Danisco Cellulosic Ethanol, LLC (DDCE) through prepaid lease payments.

# Status as of November 4, 2009

(continued)

- The plant will have a maximum production capacity of 250,000 gallons of ethanol per year, five percent of the capacity projected in 2007.
  - The cost of building a 5-million gallon plant would have been at least twice as great.
  - The University and DDCE determined that 250,000 gallons per year was sufficient for research purposes. 313 acres are required to yield 250,000 gallons of ethanol.

# Status as of November 4, 2009

(continued)

- Pilot Plant will begin with production of ethanol from corn cobs
  - DDCE has focused on this technology
  - Forecasted to begin using switchgrass for ethanol production in 2011, will use the switchgrass in PDU in 2010.
- DDCE has leased the plant for a period of 10 years, with three options to renew for a period of 5 years each, for a total of 25 years

# Status as of November 4, 2009

(continued)

- DDCE utilizes proprietary biotechnology and processes to convert corn cobs to ethanol, and has not shared that technology with the University.
- University plans construction of a separate pellet plant with scheduled completion date of Nov.-Dec. 2010. State funds will be used for this project. University states that other sources will provide additional funding.
  - Not affiliated with DDCE
  - Possible use of pellets for burning in coal-fired plants

# The Future

The University projects significant economic develop opportunities in rural areas including farm production, refining and spin-off technologies

- Remaining challenges:
  - Making technology viable outside the laboratory
  - Making production of switchgrass ethanol economically viable

# The Future – Potential State Costs

- The 250,000-gallon bio-refinery will not be self-sufficient. Its production capacity is not large enough to generate revenue to pay its operating costs.
  - A continuing state appropriation or funding from some other source will be required.
- Will demand for switchgrass be sufficient to support production of 6,000 acres at a market price that does not require subsidy?
  - If not, farmers will face the loss of revenue from the production payments and will not have a market for their crop

# The Future – Potential State Costs

(continued)

- Demonstration plant
  - The length of time that DDCE will use the plant is unknown. DDCE is not obligated to use it for production of ethanol from switchgrass, although it has publicly stated it plans to do so, and the state will only share in operating costs for switchgrass use.
  - Once DDCE no longer uses the plant, what use will be made of the facility?
    - Additional research by the university?
    - Lease to other industrial users?
    - Cost of conversion to other uses?

# Policy Considerations

- Level of risk in state-funded economic development projects
- Guidelines to ensure:
  - Expenditure of state funds for the purposes for which they were appropriated
  - Transparency
  - Accountability
- Appropriations bill versus general law







B3  
XV340042/ XV230000-  
XV221004 / XV340041  
XV221005/ XV221003

B5  
XV901005/ XV901007  
XV903006/ XV901006  
XV925803/ XV903004

B23  
T2200001  
T2410001  
P400011  
XV10000  
XV41001  
XV30001

B1  
XV90000/ XV90000  
XV41011/ XV90011  
XV90004/ XV40004







**CONCLUSION**