BIG STONE II
POWER PLANT

Applicants' Witness
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Summary
Applicants' Exhibits 23 and 51

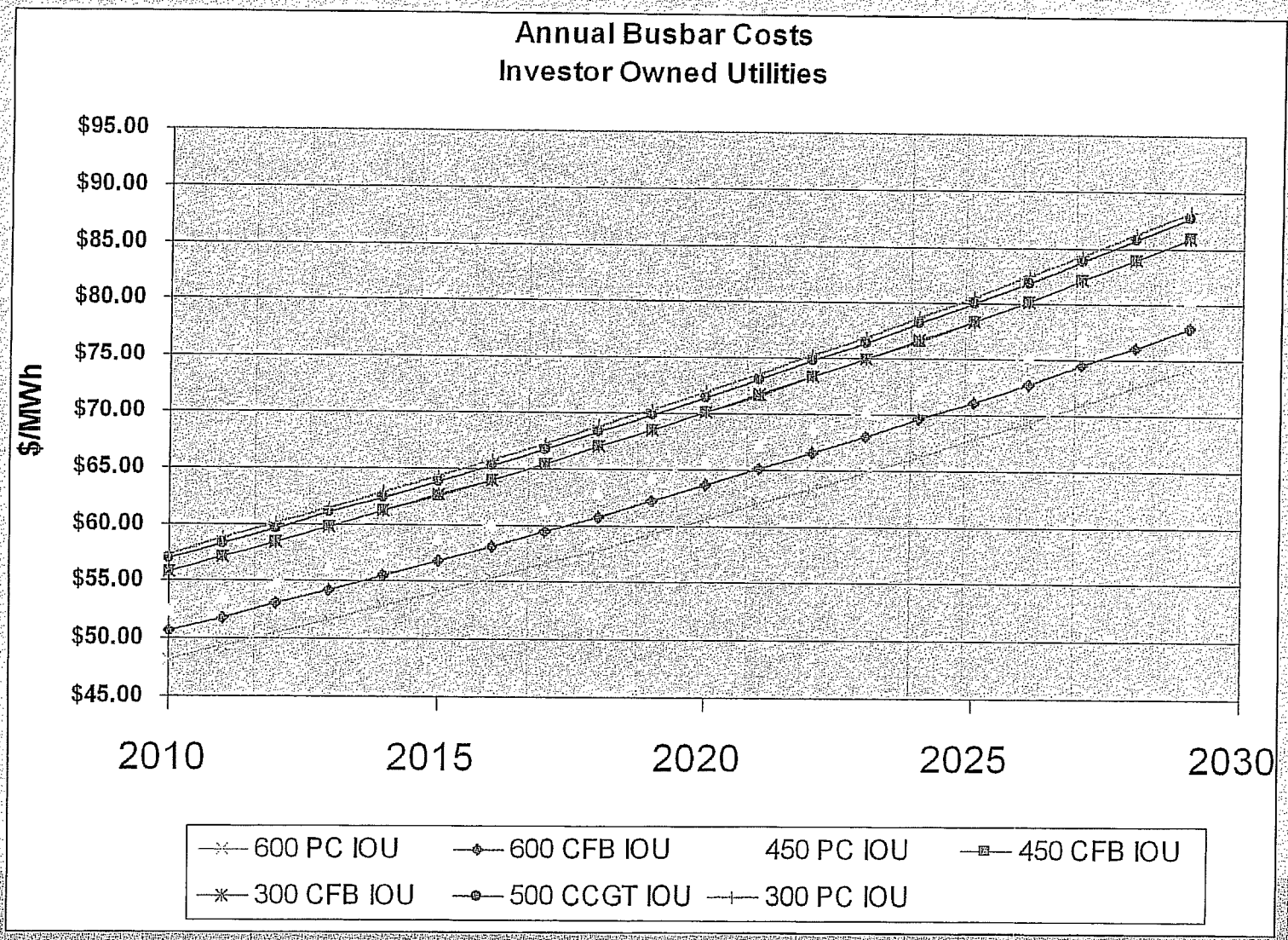
Purpose

- Based on initial planning efforts, Otter Tail and other utilities identified a potential need for additional baseload resources
- Burns & McDonnell (B&McD) was retained to evaluate baseload generation alternatives:
  - *Phase I Report Big Stone Unit II, July 2005* (Applicants' Exhibit 24-A)
  - *Analysis of Baseload Generation Alternatives, September 2005* (Applicants' Exhibit 23-A)

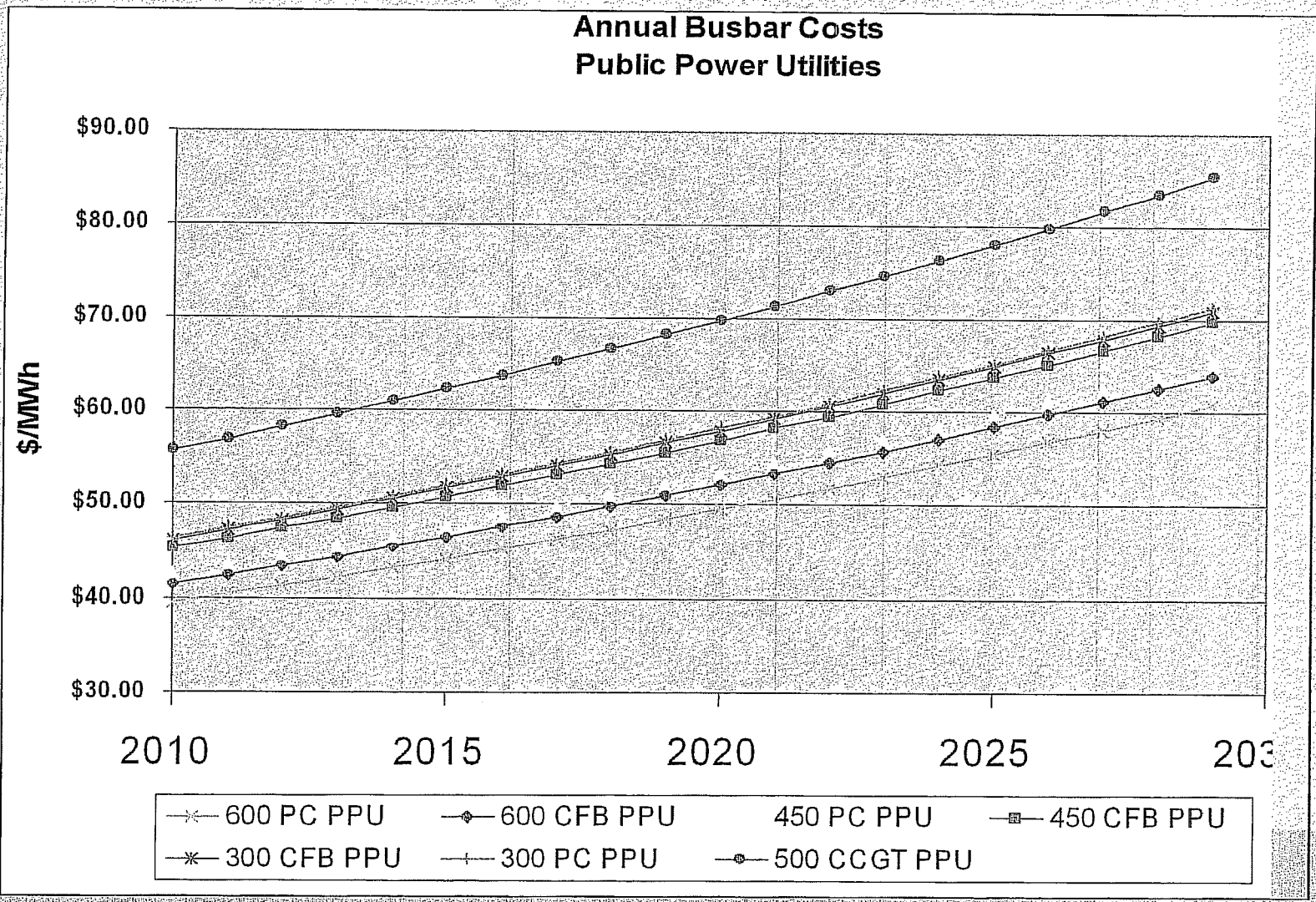
Phase I Report

- Included an economic evaluation of seven baseload generation alternatives:
  - Supercritical Pulverized Coal (PC) Unit
    - 450 MW / 600 MW
  - Subcritical PC Unit
    - 300 MW
  - Circulating Fluidized Bed (CFB) Coal Unit
    - 300 MW / 450 MW / 600 MW
  - Combined Cycle Gas Turbine (CCGT) Unit
    - 500 MW
- Included projected capital and operating costs, performance and emissions estimates, and financing structures and costs

Phase I Results – Investor Owned



Phase I Results – Public Power



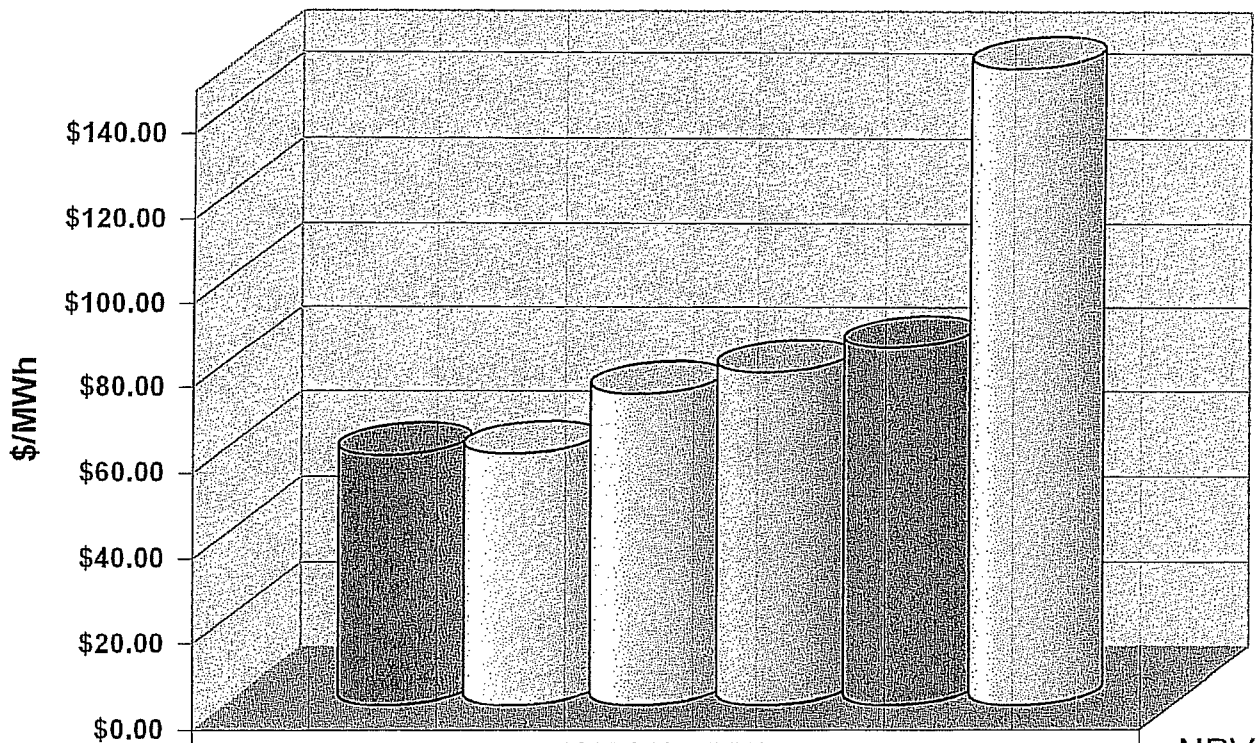
Phase I Conclusions

- Pulverized coal (PC) units had economic advantage over CFB units
- 600 MW Unit had economic advantage over smaller unit sizes, due to economies of scale
- 600 MW PC Unit had a significant economic advantage over 500 MW gas-fired CCGT for baseload generation

Analysis of Baseload Generation Alternatives

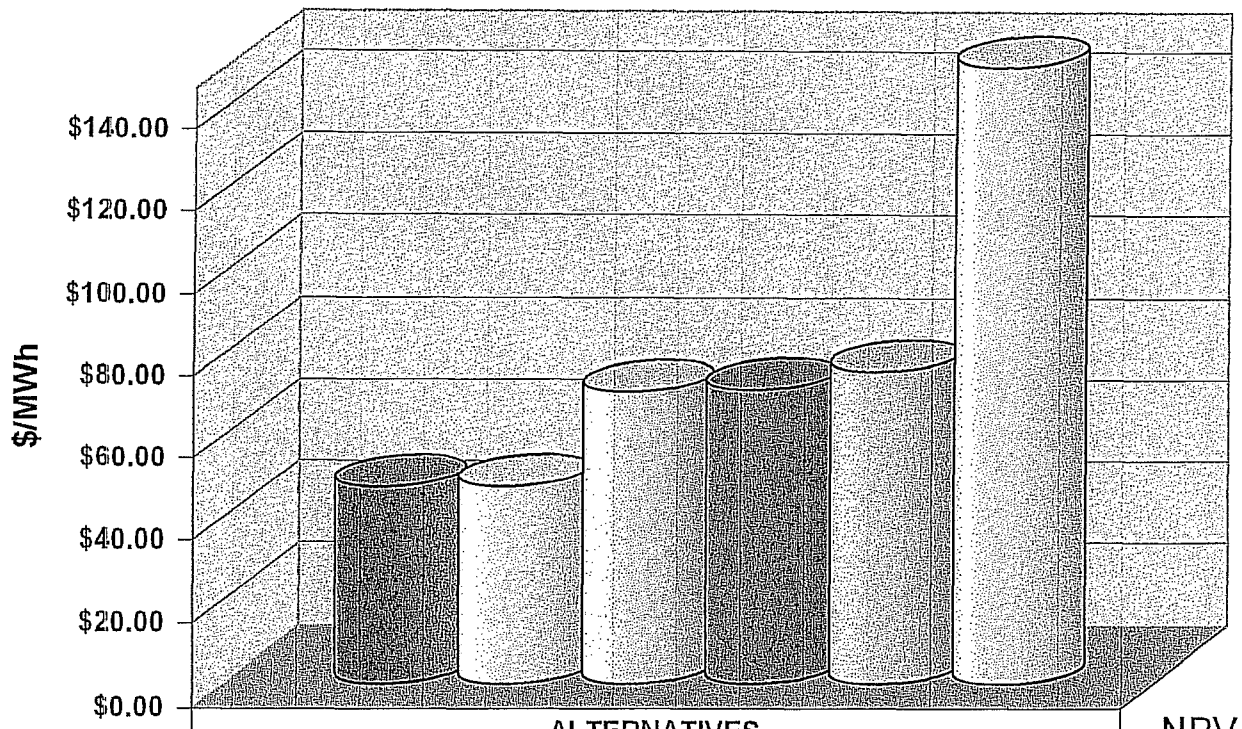
- Further Economic Evaluation of Six Baseload Generation Alternatives:
  - 600 MW Supercritical Pulverized Coal (PC) Unit
  - 600 MW Subcritical PC Unit
  - 600 MW Combined Cycle Gas Turbine (CCGT) Unit
  - 600 MW CCGT + 600 MW Wind Case
  - 535 MW Integrated Gasification Combined Cycle (IGCC) Unit
  - 50 MW Biomass Facility
- Included Projected Capital and Operating Costs, Performance and Emissions Estimates, and Financing Structures and Costs
- Included Carbon Sensitivity

Results – Investor Owned



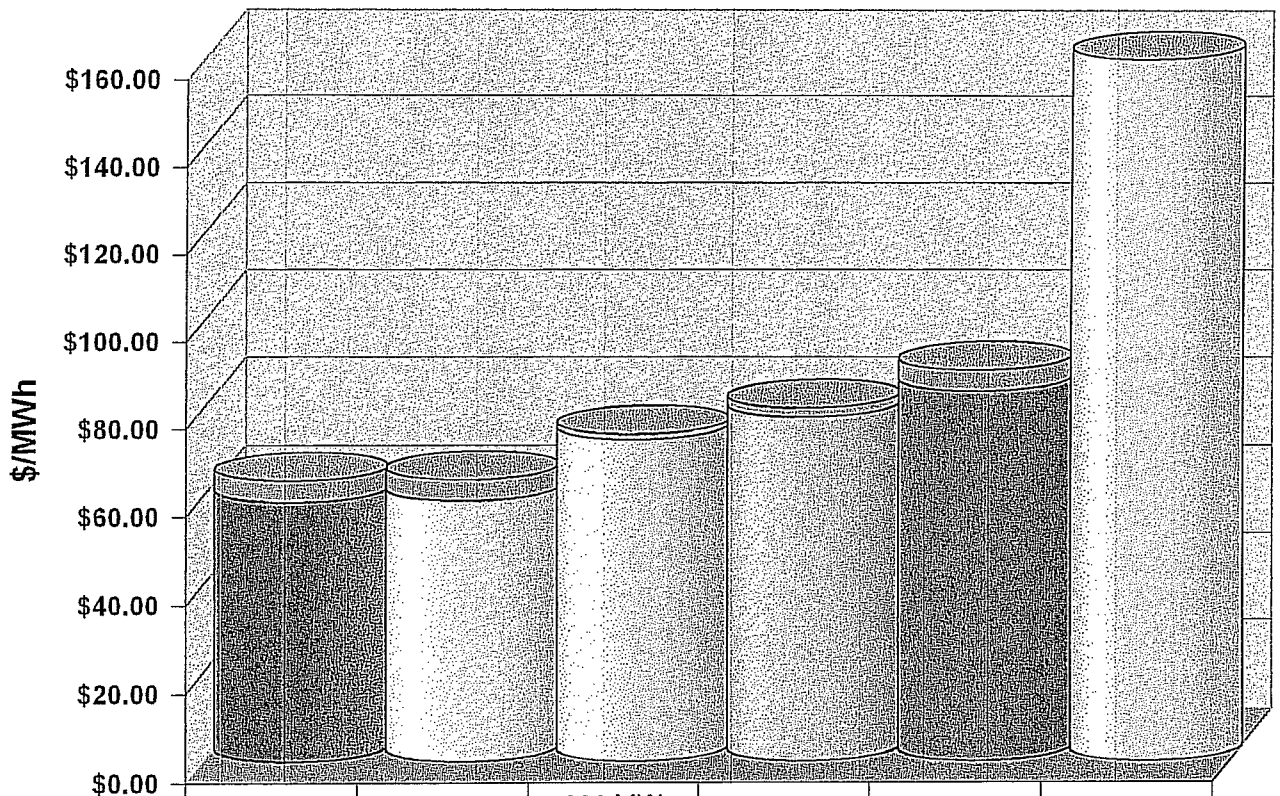
ALTERNATIVES		NPV (millions)
☒ 600 Sub PC IOU	$58.41	
☐ 600 Super PC IOU	$58.81	$2,356
☐ 600 Wind + CCGT IOU	$72.89	$2,920
☐ 600 CCGT IOU	$77.94	
☒ 535 IGCC IOU	$83.84	
☐ 50 Biomass IOU	$170.52	

Results – Public Power



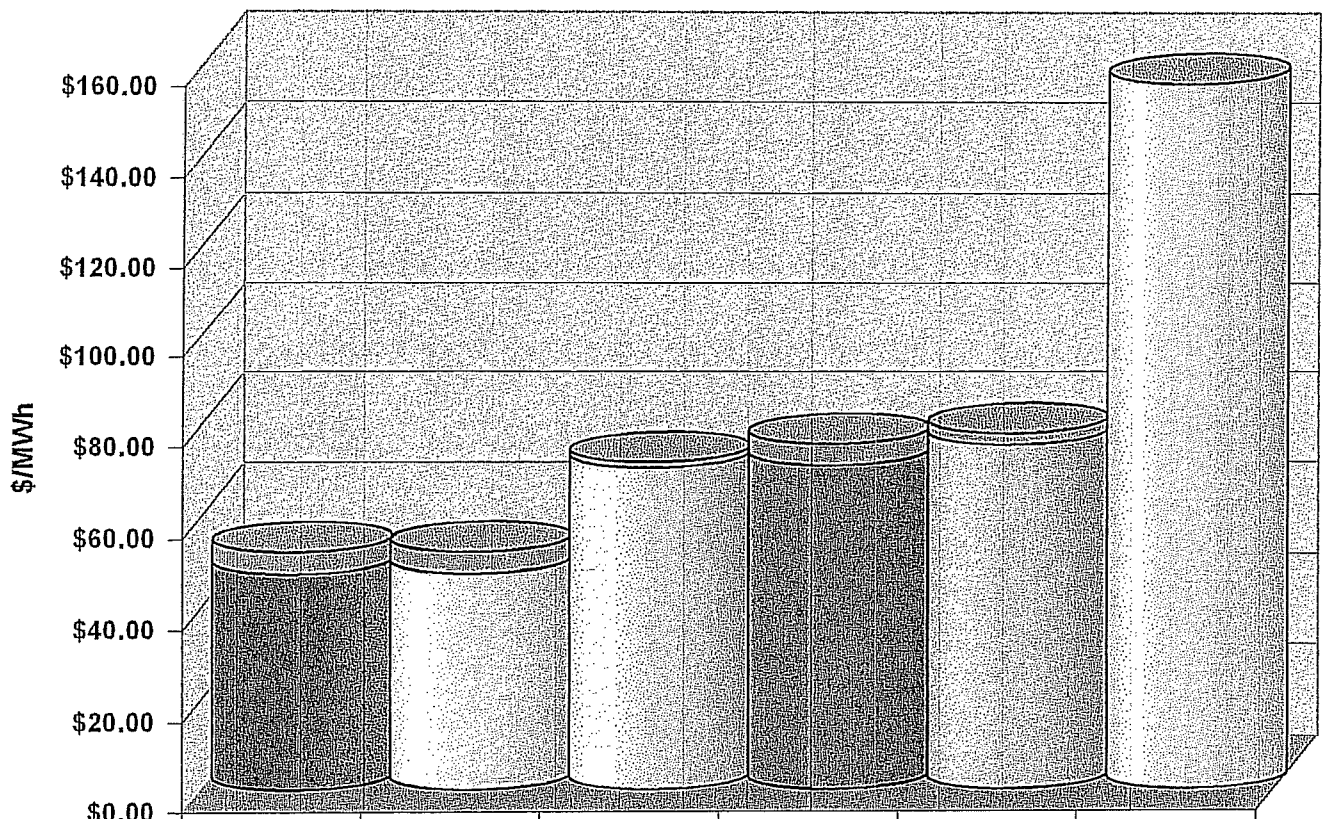
ALTERNATIVES	NPV (millions)
600 Sub PC PPU	$47.21	$2,513
600 Super PC PPU	$47.37	$3,744
600 Wind + CCGT PPU	$70.57	
535 IGCC PPU	$71.05	
600 CCGT PPU	$75.61	
50 Biomass PPU	$156.02	

$3.64/ton CO_2 Sensitivity – Investor Owned



	600 MW Sub PC	600 MW Super PC	600 MW CCGT + Wind	600 MW CCGT	535 MW IGCC	50 MW Biomass
Total Busbar Cost	$63.39	$63.69	$74.08	$79.98	$88.67	$170.52
Carbon Tax	$4.98	$4.88	$1.19	$2.04	$4.83	$0.00
Busbar Cost w/o Carbon Tax	$58.41	$58.81	$72.89	$77.94	$83.84	$170.52

$3.64/ton CO_2 Sensitivity – Public Power



	600 MW Sub PC	600 MW Super PC	600 MW CCGT + Wind	535 MW IGCC	600 MW CCGT	50 MW Biomass
Total Busbar Cost	$52.16	$52.22	$71.77	$75.81	$78.10	$156.02
Carbon Tax	$4.94	$4.84	$1.20	$4.76	$2.49	$0.00
Busbar Cost w/o Carbon Tax	$47.21	$47.37	$70.57	$71.05	$75.61	$156.02

Baseload Generation Conclusions

- Confirmed that 600 MW PC Unit represents low-cost baseload generation alternative
  - Conclusion did not change with inclusion of high-end Minnesota PUC carbon value
  - Conclusion did not change with or without extension of the Production Tax Credit for wind
- Supercritical and subcritical units had similar economics
  - Applicants selected supercritical to minimize emissions

Baseload Generation Study Criticism

- Intervenors say 600 MW CCGT Plus Wind Case should have been given capacity credit for wind
  - 600 MW CCGT & 600 MW PC are baseload resources
  - Wind is not a baseload resource
  - Wind was added to CCGT analysis to enhance CCGT economics
- Purpose of B&McD Studies was to evaluate baseload alternatives
  - Applicants performed system-level studies for their Integrated Resource Plans

Intervenors Criticism (continued)

Table 1
Net Present Value Busbar Cost (millions)

Resource Alternative	Combined [2] B&McD Cases No CO_2	Combined [2] B&McD Cases PUC High CO_2 [1]
Coal 600 MW	**$2,452**	**$2,686**
600 MW Wind + 600 MW CCGT - NO PTC	**$3,425**	**$3,483**
600 MW Wind + 510 MW CCGT - NO PTC	**$3,357**	**$3,414**
600 MW Wind + 600 MW CCGT - WITH PTC	**$3,163**	**$3,221**
600 MW Wind + 510 MW CCGT - WITH PTC	**$3,095**	**$3,153**

Notes:

[1] PUC High CO_2 Case is based on a $3.64/ton carbon tax in 2005 and escalated at 2.5%. Results in a 2005 levelized cost of $4.50/ton in 2005$.

[2] Investor owned and public power NPV results combined 38.67%/61.33% based on respective ownership shares.