

NIST BLCC 5.3-07: Detailed LCC Analysis

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

General Information

File Name: C:\Program Files\BLCC5\projects\UT Austin Energy Recovery Study - 8760.xml
 Date of Study: Wed Jan 23 09:26:41 CST 2008
 Analysis Type: FEMP Analysis, Energy Project
 Project Name: UT Austin Energy Recovery Study - 8760
 Project Location: Texas
 Analyst: Travis Alexander
 Base Date: January 1, 2008
 Service Date: January 1, 2008
 Study Period: 25 years 0 months (January 1, 2008 through December 31, 2032)
 Discount Rate: 6%
 Discounting Convention: End-of-Year

Discount and Escalation Rates are NOMINAL (inclusive of general inflation)

Alternative: 1,000 CFM

Initial Cost Data (not Discounted)

Initial Capital Costs

(adjusted for price escalation)

Initial Capital Costs for All Components: \$0

Component:

Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2008	100%	\$0

Total (for Component)		\$0

Energy Costs: Electricity Savings

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
-1,702.0 kWh	\$0.07700	-\$131	\$0
			Annual Rebate
			\$0

Energy Costs: Chilled Water Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
1,422.8 Therm	\$0.88750	\$1,263	\$0
			Annual Rebate
			\$0

Energy Costs: Steam Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
98.0 Therm	\$0.91400	\$90	\$0
			Annual Rebate
			\$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	\$0	\$0
Energy Costs		
Energy Consumption Costs	\$15,611	\$1,221
Energy Demand Charges	\$0	\$0
Energy Utility Rebates	\$0	\$0
	-----	-----
Subtotal (for Energy):	\$15,611	\$1,221
Water Usage Costs	\$0	\$0
Water Disposal Costs	\$0	\$0
Operating, Maintenance & Repair Costs		
Component:		
Annually Recurring Costs	-\$63,672	-\$4,981
Non-Annually Recurring Costs	\$0	\$0
	-----	-----
Subtotal (for OM&R):	-\$63,672	-\$4,981
Replacements to Capital Components		
Component:	\$0	\$0
	-----	-----
Subtotal (for Replacements):	\$0	\$0
Residual Value of Original Capital Components		
Component:	\$0	\$0
	-----	-----
Subtotal (for Residual Value):	\$0	\$0
Residual Value of Capital Replacements		
Component:	\$0	\$0
	-----	-----
Subtotal (for Residual Value):	\$0	\$0
Total Life-Cycle Cost	-\$48,061	-\$3,760

Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity Savings:		
CO2	-306.74 kg	-7,668.19 kg
SO2	-2.48 kg	-61.88 kg
NOx	-0.36 kg	-9.04 kg
Chilled Water Saved:		
CO2	7,514.80 kg	187,864.96 kg
SO2	60.65 kg	1,516.13 kg
NOx	8.86 kg	221.41 kg
Steam Saved:		
CO2	517.56 kg	12,938.67 kg
SO2	4.18 kg	104.42 kg
NOx	0.61 kg	15.25 kg
Total:		
CO2	7,725.63 kg	193,135.45 kg
SO2	62.35 kg	1,558.66 kg
NOx	9.11 kg	227.63 kg

Alternative: 2,000 CFM

Initial Cost Data (not Discounted)

Initial Capital Costs

(adjusted for price escalation)

Initial Capital Costs for All Components: \$0

Component:

Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2008	100%	\$0

Total (for Component)		\$0

Energy Costs: Electricity Savings

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
-3,909.0 kWh	\$0.07700	-\$301	\$0
			Annual Rebate
			\$0

Energy Costs: Chilled Water Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
			Annual Rebate

2,482.3 Therm \$0.88750 \$2,203 \$0 \$0

Energy Costs: Steam Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
176.9 Therm	\$0.91400	\$162	\$0
			Annual Rebate
			\$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	\$0	\$0
Energy Costs		
Energy Consumption Costs	\$26,382	\$2,064
Energy Demand Charges	\$0	\$0
Energy Utility Rebates	\$0	\$0

Subtotal (for Energy):	\$26,382	\$2,064
Water Usage Costs	\$0	\$0
Water Disposal Costs	\$0	\$0
Operating, Maintenance & Repair Costs		
Component:		
Annually Recurring Costs	-\$62,172	-\$4,864
Non-Annually Recurring Costs	\$0	\$0

Subtotal (for OM&R):	-\$62,172	-\$4,864
Replacements to Capital Components		
Component:	\$0	\$0

Subtotal (for Replacements):	\$0	\$0
Residual Value of Original Capital Components		
Component:	\$0	\$0

Subtotal (for Residual Value):	\$0	\$0
Residual Value of Capital Replacements		
Component:	\$0	\$0

Subtotal (for Residual Value):	\$0	\$0

Total Life-Cycle Cost	-\$35,791	-\$2,800
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Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity Savings:		
CO2	-704.48 kg	-17,611.61 kg
SO2	-5.69 kg	-142.13 kg
NOx	-0.83 kg	-20.76 kg
Chilled Water Saved:		
CO2	13,110.95 kg	327,764.80 kg
SO2	105.81 kg	2,645.17 kg
NOx	15.45 kg	386.30 kg
Steam Saved:		
CO2	934.56 kg	23,363.29 kg
SO2	7.54 kg	188.55 kg
NOx	1.10 kg	27.54 kg
Total:		
CO2	13,341.02 kg	333,516.48 kg
SO2	107.67 kg	2,691.58 kg
NOx	15.72 kg	393.08 kg

Alternative: 4,000 CFM

Initial Cost Data (not Discounted)

Initial Capital Costs

(adjusted for price escalation)

Initial Capital Costs for All Components: \$0

Component:

Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2008	100%	\$0

Total (for Component)		\$0

Energy Costs: Electricity Savings

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Rebate
-9,184.0 kWh	\$0.07700	-\$707	\$0

Energy Costs: Chilled Water Saved
(base-year dollars)

Average		Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand	Annual Rebate
4,994.9 Therm	\$0.88750	\$4,433		\$0

Energy Costs: Steam Saved
(base-year dollars)

Average		Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand	Annual Rebate
351.1 Therm	\$0.91400	\$321		\$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	\$0	\$0
Energy Costs		
Energy Consumption Costs	\$51,730	\$4,047
Energy Demand Charges	\$0	\$0
Energy Utility Rebates	\$0	\$0
Subtotal (for Energy):	\$51,730	\$4,047
Water Usage Costs	\$0	\$0
Water Disposal Costs	\$0	\$0
Operating, Maintenance & Repair Costs		
Component:		
Annually Recurring Costs	-\$59,172	-\$4,629
Non-Annually Recurring Costs	\$0	\$0
Subtotal (for OM&R):	-\$59,172	-\$4,629
Replacements to Capital Components		
Component:	\$0	\$0
Subtotal (for Replacements):	\$0	\$0
Residual Value of Original Capital Components		
Component:	\$0	\$0
Subtotal (for Residual Value):	\$0	\$0

Residual Value of Capital Replacements

Component:	\$0	\$0

Subtotal (for Residual Value):	\$0	\$0
Total Life-Cycle Cost	-\$7,442	-\$582

Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity Savings:		
CO2	-1,655.15 kg	-41,377.59 kg
SO2	-13.36 kg	-333.93 kg
NOx	-1.95 kg	-48.77 kg
Chilled Water Saved:		
CO2	26,381.83 kg	659,527.79 kg
SO2	212.91 kg	5,322.60 kg
NOx	31.09 kg	777.31 kg
Steam Saved:		
CO2	1,854.38 kg	46,358.19 kg
SO2	14.97 kg	374.13 kg
NOx	2.19 kg	54.64 kg
Total:		
CO2	26,581.06 kg	664,508.39 kg
SO2	214.52 kg	5,362.79 kg
NOx	31.33 kg	783.18 kg

Alternative: 8,000 CFM

Initial Cost Data (not Discounted)

Initial Capital Costs

(adjusted for price escalation)

Initial Capital Costs for All Components: \$0

Component:

Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2008	100%	\$0

Total (for Component)		\$0

Energy Costs: Electricity Savings

(base-year dollars)

Average		Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand	Annual Rebate
-14,790.0 kWh	\$0.07700	-\$1,139		\$0

Energy Costs: Chilled Water Saved
(base-year dollars)

Average		Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand	Annual Rebate
10,293.0 Therm	\$0.88750	\$9,135		\$0

Energy Costs: Steam Saved
(base-year dollars)

Average		Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand	Annual Rebate
726.3 Therm	\$0.91400	\$664		\$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	\$0	\$0
Energy Costs		
Energy Consumption Costs	\$110,703	\$8,660
Energy Demand Charges	\$0	\$0
Energy Utility Rebates	\$0	\$0
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Subtotal (for Energy):	\$110,703	\$8,660
Water Usage Costs	\$0	\$0
Water Disposal Costs	\$0	\$0
Operating, Maintenance & Repair Costs		
Component:		
Annually Recurring Costs	-\$101,926	-\$7,973
Non-Annually Recurring Costs	\$0	\$0
	-----	-----
Subtotal (for OM&R):	-\$101,926	-\$7,973
Replacements to Capital Components		
Component:	\$0	\$0
	-----	-----
Subtotal (for Replacements):	\$0	\$0

Residual Value of Original Capital Components

Component:	\$0	\$0

Subtotal (for Residual Value):	\$0	\$0

Residual Value of Capital Replacements

Component:	\$0	\$0

Subtotal (for Residual Value):	\$0	\$0

Total Life-Cycle Cost \$8,777 \$687

Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity Savings:		
CO2	-2,665.47 kg	-66,634.87 kg
SO2	-21.51 kg	-537.76 kg
NOx	-3.14 kg	-78.53 kg
Chilled Water Saved:		
CO2	54,365.26 kg	1,359,094.30 kg
SO2	438.74 kg	10,968.32 kg
NOx	64.07 kg	1,601.81 kg
Steam Saved:		
CO2	3,836.26 kg	95,903.85 kg
SO2	30.96 kg	773.97 kg
NOx	4.52 kg	113.03 kg
Total:		
CO2	55,536.05 kg	1,388,363.28 kg
SO2	448.19 kg	11,204.53 kg
NOx	65.45 kg	1,636.31 kg

Alternative: 15,000 CFM

Initial Cost Data (not Discounted)

Initial Capital Costs

(adjusted for price escalation)

Initial Capital Costs for All Components: \$0

Component:

Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2008	100%	\$0

Total (for Component) \$0

Energy Costs: Electricity Savings

(base-year dollars)

Average		Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand	Annual Rebate
-25,079.0 kWh	\$0.07700	-\$1,931	\$0	\$0

Energy Costs: Chilled Water Saved

(base-year dollars)

Average		Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand	Annual Rebate
19,253.0 Therm	\$0.88750	\$17,087	\$0	\$0

Energy Costs: Steam Saved

(base-year dollars)

Average		Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand	Annual Rebate
1,354.9 Therm	\$0.91400	\$1,238	\$0	\$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	\$0	\$0
Energy Costs		
Energy Consumption Costs	\$209,572	\$16,394
Energy Demand Charges	\$0	\$0
Energy Utility Rebates	\$0	\$0

Subtotal (for Energy):	\$209,572	\$16,394
Water Usage Costs	\$0	\$0
Water Disposal Costs	\$0	\$0
Operating, Maintenance & Repair Costs		
Component:		
Annually Recurring Costs	-\$123,678	-\$9,675
Non-Annually Recurring Costs	\$0	\$0

Subtotal (for OM&R):	-\$123,678	-\$9,675

Replacements to Capital Components

Component:	\$0	\$0
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Subtotal (for Replacements):	\$0	\$0
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Residual Value of Original Capital Components

Component:	\$0	\$0
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Subtotal (for Residual Value):	\$0	\$0
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Residual Value of Capital Replacements

Component:	\$0	\$0
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Subtotal (for Residual Value):	\$0	\$0
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Total Life-Cycle Cost	\$85,894	\$6,719
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Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity Savings:		
CO2	-4,519.76 kg	-112,990.93 kg
SO2	-36.48 kg	-911.87 kg
NOx	-5.33 kg	-133.17 kg
Chilled Water Saved:		
CO2	101,689.97 kg	2,542,179.58 kg
SO2	820.67 kg	20,516.19 kg
NOx	119.85 kg	2,996.18 kg
Steam Saved:		
CO2	7,156.22 kg	178,900.72 kg
SO2	57.75 kg	1,443.79 kg
NOx	8.43 kg	210.85 kg
Total:		
CO2	104,326.43 kg	2,608,089.37 kg
SO2	841.95 kg	21,048.10 kg
NOx	122.96 kg	3,073.86 kg

Alternative: 30,000 CFM

Initial Cost Data (not Discounted)

Initial Capital Costs

(adjusted for price escalation)

Initial Capital Costs for All Components: \$0

Component:

Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2008	100%	\$0

Total (for Component)		\$0

Energy Costs: Electricity Savings**(base-year dollars)**

Average		Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand	Annual Rebate
-38,121.0 kWh	\$0.07700	-\$2,935	\$0	\$0

Energy Costs: Chilled Water Saved**(base-year dollars)**

Average		Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand	Annual Rebate
37,597.8 Therm	\$0.88750	\$33,368	\$0	\$0

Energy Costs: Steam Saved**(base-year dollars)**

Average		Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand	Annual Rebate
2,668.0 Therm	\$0.91400	\$2,439	\$0	\$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	\$0	\$0
Energy Costs		
Energy Consumption Costs	\$420,201	\$32,871
Energy Demand Charges	\$0	\$0
Energy Utility Rebates	\$0	\$0

Subtotal (for Energy):	\$420,201	\$32,871
Water Usage Costs	\$0	\$0
Water Disposal Costs	\$0	\$0
Operating, Maintenance & Repair Costs		
Component:		
Annually Recurring Costs	-\$182,184	-\$14,252
Non-Annually Recurring Costs	\$0	\$0

Subtotal (for OM&R):	-\$182,184	-\$14,252
 Replacements to Capital Components		
Component:	\$0	\$0

Subtotal (for Replacements):	\$0	\$0
 Residual Value of Original Capital Components		
Component:	\$0	\$0

Subtotal (for Residual Value):	\$0	\$0
 Residual Value of Capital Replacements		
Component:	\$0	\$0

Subtotal (for Residual Value):	\$0	\$0
 Total Life-Cycle Cost	 \$238,017	 \$18,619

Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity Savings:		
CO2	-6,870.20 kg	-171,750.35 kg
SO2	-55.44 kg	-1,386.08 kg
NOx	-8.10 kg	-202.42 kg
Chilled Water Saved:		
CO2	198,583.24 kg	4,964,445.01 kg
SO2	1,602.63 kg	40,064.64 kg
NOx	234.05 kg	5,851.02 kg
Steam Saved:		
CO2	14,091.67 kg	352,282.13 kg
SO2	113.72 kg	2,843.03 kg
NOx	16.61 kg	415.19 kg
Total:		
CO2	205,804.71 kg	5,144,976.78 kg
SO2	1,660.91 kg	41,521.59 kg
NOx	242.56 kg	6,063.80 kg

Alternative: 50,000 CFM
Initial Cost Data (not Discounted)
Initial Capital Costs

(adjusted for price escalation)

Initial Capital Costs for All Components: \$0

Component:

Cost-Phasing

Date	Portion	Yearly Cost
January 1, 2008	100%	\$0

Total (for Component)		\$0

Energy Costs: Electricity Savings

(base-year dollars)

Average Annual Usage	Average Price/Unit	Average Annual Cost	Average Annual Demand	Average Annual Rebate
-83,374.0 kWh	\$0.07700	-\$6,420	\$0	\$0

Energy Costs: Chilled Water Saved

(base-year dollars)

Average Annual Usage	Average Price/Unit	Average Annual Cost	Average Annual Demand	Average Annual Rebate
62,965.8 Therm	\$0.88750	\$55,882	\$0	\$0

Energy Costs: Steam Saved

(base-year dollars)

Average Annual Usage	Average Price/Unit	Average Annual Cost	Average Annual Demand	Average Annual Rebate
6,079.0 Therm	\$0.91400	\$5,556	\$0	\$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	\$0	\$0
Energy Costs		
Energy Consumption Costs	\$703,313	\$55,019
Energy Demand Charges	\$0	\$0
Energy Utility Rebates	\$0	\$0

Subtotal (for Energy):	\$703,313	\$55,019
Water Usage Costs	\$0	\$0
Water Disposal Costs	\$0	\$0

Operating, Maintenance & Repair Costs

Component:		
Annually Recurring Costs	-\$306,696	-\$23,992
Non-Annually Recurring Costs	\$0	\$0
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Subtotal (for OM&R):	-\$306,696	-\$23,992

Replacements to Capital Components

Component:	\$0	\$0
	-----	-----
Subtotal (for Replacements):	\$0	\$0

Residual Value of Original Capital Components

Component:	\$0	\$0
	-----	-----
Subtotal (for Residual Value):	\$0	\$0

Residual Value of Capital Replacements

Component:	\$0	\$0
	-----	-----
Subtotal (for Residual Value):	\$0	\$0

Total Life-Cycle Cost	\$396,617	\$31,026
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Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity Savings:		
CO2	-15,025.74 kg	-375,633.22 kg
SO2	-121.26 kg	-3,031.48 kg
NOx	-17.71 kg	-442.72 kg
Chilled Water Saved:		
CO2	332,571.00 kg	8,314,047.28 kg
SO2	2,683.95 kg	67,096.99 kg
NOx	391.96 kg	9,798.82 kg
Steam Saved:		
CO2	32,107.91 kg	802,675.83 kg
SO2	259.12 kg	6,477.85 kg
NOx	37.84 kg	946.02 kg
Total:		
CO2	349,653.17 kg	8,741,089.88 kg
SO2	2,821.81 kg	70,543.35 kg
NOx	412.10 kg	10,302.12 kg

