

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 - 8am to 5pm.xml
 Date of Study: Wed Jan 23 09:27:50 CST 2008
 Analysis Type: FEMP Analysis, Energy Project
 Project Name: UT Austin Energy Recovery Study - 8am to 5pm
 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
-454.0 kWh	\$0.07700	-\$35	\$0
			Annual Rebate
			\$0

Energy Costs: Chilled Water Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
434.3 Therm	\$0.88750	\$385	\$0
			Annual Rebate
			\$0

Energy Costs: Steam Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
17.3 Therm	\$0.91400	\$16	\$0
			Annual Rebate
			\$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	\$0	\$0
Energy Costs		
Energy Consumption Costs	\$4,682	\$366
Energy Demand Charges	\$0	\$0
Energy Utility Rebates	\$0	\$0
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Subtotal (for Energy):	\$4,682	\$366
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
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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	-\$58,990	-\$4,615

Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity Savings:		
CO2	-81.82 kg	-2,045.45 kg
SO2	-0.66 kg	-16.51 kg

SO2	-0.00 kg	-10.51 kg
NOx	-0.10 kg	-2.41 kg

Chilled Water Saved:

CO2	2,293.77 kg	57,342.66 kg
SO2	18.51 kg	462.77 kg
NOx	2.70 kg	67.58 kg

Steam Saved:

CO2	91.48 kg	2,286.95 kg
SO2	0.74 kg	18.46 kg
NOx	0.11 kg	2.70 kg

Total:

CO2	2,303.43 kg	57,584.16 kg
SO2	18.59 kg	464.72 kg
NOx	2.71 kg	67.87 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
-1,040.0 kWh	\$0.07700	-\$80	\$0
			Annual Rebate
			\$0

Energy Costs: Chilled Water Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
757.7 Therm	\$0.88750	\$672	\$0
			Annual Rebate
			\$0

Energy Costs: Steam Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
31.3 Therm	\$0.91400	\$29	\$0
			Annual Rebate
			\$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	\$0	\$0
Energy Costs		
Energy Consumption Costs	\$7,938	\$621
Energy Demand Charges	\$0	\$0
Energy Utility Rebates	\$0	\$0

Subtotal (for Energy):	\$7,938	\$621
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	-\$54,235	-\$4,243

Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity Savings:		
CO2	-187.43 kg	-4,685.62 kg
SO2	-1.51 kg	-37.81 kg
NOx	-0.22 kg	-5.52 kg

Chilled Water Saved:

CO2	4,001.90 kg	100,044.65 kg
SO2	32.30 kg	807.39 kg
NOx	4.72 kg	117.91 kg

Steam Saved:

CO2	165.16 kg	4,128.91 kg
SO2	1.33 kg	33.32 kg
NOx	0.19 kg	4.87 kg

Total:

CO2	3,979.63 kg	99,487.95 kg
SO2	32.12 kg	802.90 kg
NOx	4.69 kg	117.26 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 Demand
-2,446.0 kWh	\$0.07700	-\$188	\$0
			Annual Rebate
			\$0

Energy Costs: Chilled Water Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
1,524.6 Therm	\$0.88750	\$1,353	\$0
			Annual Rebate
			\$0

Energy Costs: Steam Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
62.0 Therm	\$0.91400	\$57	\$0
			Annual Rebate
			\$0

Life-Cycle Cost Analysis

Present Value Annual Value

Initial Capital Costs	\$0	\$0
Energy Costs		
Energy Consumption Costs	\$15,614	\$1,221
Energy Demand Charges	\$0	\$0
Energy Utility Rebates	\$0	\$0

Subtotal (for Energy):	\$15,614	\$1,221
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	-\$43,558	-\$3,407

Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity Savings:		
CO2	-440.82 kg	-11,020.21 kg
SO2	-3.56 kg	-88.94 kg
NOx	-0.52 kg	-12.99 kg
Chilled Water Saved:		

CO2	8,052.59 kg	201,309.35 kg
SO2	64.99 kg	1,624.63 kg
NOx	9.49 kg	237.26 kg

Steam Saved:

CO2	327.73 kg	8,193.13 kg
SO2	2.64 kg	66.12 kg
NOx	0.39 kg	9.66 kg

Total:

CO2	7,939.51 kg	198,482.28 kg
SO2	64.07 kg	1,601.81 kg
NOx	9.36 kg	233.93 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
-3,923.0 kWh	\$0.07700	-\$302	\$0
			Annual Rebate
			\$0

Energy Costs: Chilled Water Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
3,141.6 Therm	\$0.88750	\$2,788	\$0
			Annual Rebate
			\$0

Energy Costs: Steam Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
128.4 Therm	\$0.91400	\$117	\$0
			Annual Rebate
			\$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	\$0	\$0

Energy Costs

Energy Consumption Costs	\$33,280	\$2,603
Energy Demand Charges	\$0	\$0
Energy Utility Rebates	\$0	\$0

Subtotal (for Energy): \$33,280 \$2,603

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

Residual Value of Original Capital Components

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

Residual Value of Capital Replacements

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

Total Life-Cycle Cost -\$68,646 -\$5,370

Emissions Summary

Energy Name	Annual	Life-Cycle
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Electricity Savings:

CO2	-707.01 kg	-17,674.68 kg
SO2	-5.71 kg	-142.64 kg
NOx	-0.83 kg	-20.83 kg

Chilled Water Saved:

CO2	16,593.23 kg	414,819.28 kg
SO2	133.91 kg	3,347.72 kg

NOx	19.56 kg	488.90 kg
Steam Saved:		
CO2	678.02 kg	16,950.07 kg
SO2	5.47 kg	136.79 kg
NOx	0.80 kg	19.98 kg
Total:		
CO2	16,564.24 kg	414,094.66 kg
SO2	133.68 kg	3,341.87 kg
NOx	19.52 kg	488.05 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
-6,658.0 kWh	\$0.07700	-\$513	\$0
			Annual Rebate
			\$0

Energy Costs: Chilled Water Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
5,876.6 Therm	\$0.88750	\$5,216	\$0
			Annual Rebate
			\$0

Energy Costs: Steam Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
239.5 Therm	\$0.91400	\$219	\$0
			Annual Rebate
			\$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	\$0	\$0

Energy Costs

Energy Costs

Energy Consumption Costs	\$62,915	\$4,922
Energy Demand Charges	\$0	\$0
Energy Utility Rebates	\$0	\$0

Subtotal (for Energy): \$62,915 \$4,922

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

Residual Value of Original Capital Components

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

Residual Value of Capital Replacements

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

Total Life-Cycle Cost -\$60,763 -\$4,753

Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity Savings:		
CO2	-1,199.91 kg	-29,996.95 kg
SO2	-9.68 kg	-242.08 kg
NOx	-1.41 kg	-35.35 kg
Chilled Water Saved:		
CO2	31,039.09 kg	775,956.06 kg
SO2	250.50 kg	6,262.21 kg
NOx	36.58 kg	914.53 kg

Steam Saved:

CO2	1,264.83 kg	31,619.80 kg
SO2	10.21 kg	255.18 kg
NOx	1.49 kg	37.27 kg

Total:

CO2	31,104.01 kg	777,578.91 kg
SO2	251.02 kg	6,275.31 kg
NOx	36.66 kg	916.44 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: Copy of:

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
-10,079.0 kWh	\$0.07700	-\$776	\$0
			Annual Rebate
			\$0

Energy Costs: Chilled Water Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
11,476.1 Therm	\$0.88750	\$10,185	\$0
			Annual Rebate
			\$0

Energy Costs: Steam Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
471.6 Therm	\$0.91400	\$431	\$0
			Annual Rebate
			\$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	\$0	\$0
Energy Costs		
Energy Consumption Costs	\$125,786	\$9,840

Energy Demand Charges	\$0	\$0
Energy Utility Rebates	\$0	\$0

Subtotal (for Energy):	\$125,786	\$9,840
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Water Usage Costs	\$0	\$0
Water Disposal Costs	\$0	\$0

Operating, Maintenance & Repair Costs

Component: Copy of:

Annually Recurring Costs	-\$182,184	-\$14,252
Non-Annually Recurring Costs	\$0	\$0

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

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

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

Component: Copy of:	\$0	\$0
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Subtotal (for Residual Value):	\$0	\$0
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Total Life-Cycle Cost	-\$56,398	-\$4,412
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Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity Savings:		
CO2	-1,816.45 kg	-45,409.93 kg
SO2	-14.66 kg	-366.47 kg
NOx	-2.14 kg	-53.52 kg
Chilled Water Saved:		
CO2	60,614.08 kg	1,515,310.41 kg
SO2	489.17 kg	12,229.03 kg
NOx	71.44 kg	1,785.92 kg
Steam Saved:		
CO2	2,490.62 kg	62,263.82 kg

SO2	20.10 kg	502.49 kg
NOx	2.94 kg	73.38 kg

Total:

CO2	61,288.25 kg	1,532,164.31 kg
SO2	494.62 kg	12,365.05 kg
NOx	72.23 kg	1,805.79 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: Copy of: Copy of:

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
-22,169.0 kWh	\$0.07700	-\$1,707	\$0
			Annual Rebate
			\$0

Energy Costs: Chilled Water Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
19,219.2 Therm	\$0.88750	\$17,057	\$0
			Annual Rebate
			\$0

Energy Costs: Steam Saved

(base-year dollars)

Average	Average	Average	Average
Annual Usage	Price/Unit	Annual Cost	Annual Demand
783.9 Therm	\$0.91400	\$716	\$0
			Annual Rebate
			\$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	\$0	\$0
Energy Costs		
Energy Consumption Costs	\$205,381	\$16,066
Energy Demand Charges	\$0	\$0
	\$0	\$0

Energy Utility Rebates	\$0	\$0

Subtotal (for Energy):	\$205,381	\$16,066
Water Usage Costs	\$0	\$0
Water Disposal Costs	\$0	\$0
Operating, Maintenance & Repair Costs		
Component: Copy of: Copy of:		
Annually Recurring Costs	-\$306,696	-\$23,992
Non-Annually Recurring Costs	\$0	\$0

Subtotal (for OM&R):	-\$306,696	-\$23,992
Replacements to Capital Components		
Component: Copy of: Copy of:	\$0	\$0

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

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

Subtotal (for Residual Value):	\$0	\$0
Total Life-Cycle Cost	-\$101,315	-\$7,926

Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity Savings:		
CO2	-3,995.32 kg	-99,880.21 kg
SO2	-32.24 kg	-806.06 kg
NOx	-4.71 kg	-117.72 kg
Chilled Water Saved:		
CO2	101,511.50 kg	2,537,717.92 kg
SO2	819.23 kg	20,480.18 kg
NOx	119.64 kg	2,990.92 kg
Steam Saved:		
CO2	4,140.17 kg	103,501.48 kg
SO2	33.41 kg	835.29 kg

	NOx	4.88 kg	121.99 kg
Total:			
	CO2	101,656.35 kg	2,541,339.18 kg
	SO2	820.40 kg	20,509.41 kg
	NOx	119.81 kg	2,995.19 kg