

**6.01.27 - APPENDIX: SUPPLEMENTAL MATERIAL FOR SECTION 4.02 - LCC Sample F  
DESIGN AND CONSTRUCTION STANDARD**

**Project Level Entries**

<b>General Information</b>	
<b>Project Name:</b>	UT Austin Energy Recovery Study - 8760 (Year Round)
<b>Location:</b>	Austin, Tx
<b>Analyst Name:</b>	Travis Alexander
<b>Discounting Convention:</b>	End-of-Year
<b>Discount Rate:</b>	6%

<b>Key Dates</b>	
<b>Base Date:</b>	1-Jan-08
<b>Length of Study Period:</b>	25 Years

**Life-Cycle Analysis Description:**  
This LCC was performed to determine at what amount of outside air justifies the increase of price for outside air units with energy recovery compared to ones without energy recovery. The input values for the LCC were determined by taking the difference in costs between the two types of units. A positive LCC total means the energy recovery unit is justified. It was assumed that these units ran 8760 hours a year. The analysis looked at outside air units ranging from 1000 CFM to 50,000 CFM.

**Summary of Results:**  
ASHRAE 90.1 establishes minimum requirements; however, based on this analysis. For the range of CFM reviewed, outside air units over 8,000 CFM should be evaluated for the use of exhaust energy recovery.

**(Add as many alternates as are needed)**

<b>Alternate Name:</b>	1,000 CFM
<b>Alternate Description:</b>	The alternate was used to determine if the increase of price for 1,000 CFM outside air units with energy recovery compared to ones without energy recovery are justified.

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<b>Alternative Level Entries</b>	
<b>Alternate Name:</b>	1,000 CFM
<b>OM&amp;R Replacement Cost</b>	
<b>Cost Name:</b>	Capital Cost
<b>Calculated Annual Simple:</b>	-\$2,229
<b>Cost Name:</b>	Maintenance
<b>Calculated Annual Simple:</b>	-\$2,000
<b>Electricity Costs</b>	
<b>Annual Consumption:</b>	-1,702
<b>Units:</b>	Watts-Hours
<b>Price/Unit:</b>	\$0.077
<b>Chilled Water Costs</b>	
<b>Annual Consumption:</b>	1,423
<b>Units:</b>	Therm
<b>Price/Unit:</b>	\$0.8875
<b>Steam Costs</b>	
<b>Annual Consumption:</b>	98
<b>Units:</b>	Therm
<b>Price/Unit:</b>	\$0.914
<b>Water Costs</b>	
<b>Annual Water Usage:</b>	N/A
<b>Units:</b>	N/A
<b>Price/Unit:</b>	N/A
<b>Price Escalation Rates:</b>	N/A
<b>Non-Annually Recurring O&amp;M and Repair Cost</b>	
<b>Years/Months:</b>	N/A
<b>Amount:</b>	N/A
<b>Annual Rate of Increase:</b>	N/A

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<b>Alternative Level Entries</b>	
<b>Alternate Name:</b>	2,000 CFM

<b>OM&amp;R Replacement Cost</b>	
<b>Cost Name:</b>	Capital Cost
<b>Calculated Annual Simple:</b>	-\$2,112
<b>Cost Name:</b>	Maintenance
<b>Calculated Annual Simple:</b>	-\$2,000

<b>Electricity Costs</b>	
<b>Annual Consumption:</b>	-3,909
<b>Units:</b>	Watts-Hours
<b>Price/Unit:</b>	\$0.077

<b>Chilled Water Costs</b>	
<b>Annual Consumption:</b>	2,482
<b>Units:</b>	Therm
<b>Price/Unit:</b>	\$0.8875

<b>Steam Costs</b>	
<b>Annual Consumption:</b>	177
<b>Units:</b>	Therm
<b>Price/Unit:</b>	\$0.914

<b>Water Costs</b>	
<b>Annual Water Usage:</b>	N/A
<b>Units:</b>	N/A
<b>Price/Unit:</b>	N/A
<b>Price Escalation Rates:</b>	N/A

<b>Non-Annually Recurring O&amp;M and Repair Cost</b>	
<b>Years/Months:</b>	N/A
<b>Amount:</b>	N/A
<b>Annual Rate of Increase:</b>	N/A

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<b>Alternative Level Entries</b>	
<b>Alternate Name:</b>	4,000 CFM

<b>OM&amp;R Replacement Cost</b>	
<b>Cost Name:</b>	Capital Cost
<b>Calculated Annual Simple:</b>	-\$1,877
<b>Cost Name:</b>	Maintenance
<b>Calculated Annual Simple:</b>	-\$2,000

<b>Electricity Costs</b>	
<b>Annual Consumption:</b>	-9,184
<b>Units:</b>	Watts-Hours
<b>Price/Unit:</b>	\$0.077

<b>Chilled Water Costs</b>	
<b>Annual Consumption:</b>	4,995
<b>Units:</b>	Therm
<b>Price/Unit:</b>	\$0.8875

<b>Steam Costs</b>	
<b>Annual Consumption:</b>	351
<b>Units:</b>	Therm
<b>Price/Unit:</b>	\$0.914

<b>Water Costs</b>	
<b>Annual Water Usage:</b>	N/A
<b>Units:</b>	N/A
<b>Price/Unit:</b>	N/A
<b>Price Escalation Rates:</b>	N/A

<b>Non-Annually Recurring O&amp;M and Repair Cost</b>	
<b>Years/Months:</b>	N/A
<b>Amount:</b>	N/A
<b>Annual Rate of Increase:</b>	N/A

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<b>Alternative Level Entries</b>	
<b>Alternate Name:</b>	8,000 CFM

<b>OM&amp;R Replacement Cost</b>	
<b>Cost Name:</b>	Capital Cost
<b>Calculated Annual Simple:</b>	-\$5,222
<b>Cost Name:</b>	Maintenance
<b>Calculated Annual Simple:</b>	-\$2,000

<b>Electricity Costs</b>	
<b>Annual Consumption:</b>	-14,790
<b>Units:</b>	Watts-Hours
<b>Price/Unit:</b>	\$0.077

<b>Chilled Water Costs</b>	
<b>Annual Consumption:</b>	10,293
<b>Units:</b>	Therm
<b>Price/Unit:</b>	\$0.8875

<b>Steam Costs</b>	
<b>Annual Consumption:</b>	726
<b>Units:</b>	Therm
<b>Price/Unit:</b>	\$0.914

<b>Water Costs</b>	
<b>Annual Water Usage:</b>	N/A
<b>Units:</b>	N/A
<b>Price/Unit:</b>	N/A
<b>Price Escalation Rates:</b>	N/A

<b>Non-Annually Recurring O&amp;M and Repair Cost</b>	
<b>Years/Months:</b>	N/A
<b>Amount:</b>	N/A
<b>Annual Rate of Increase:</b>	N/A

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<b>Alternative Level Entries</b>	
<b>Alternate Name:</b>	15,000 CFM

<b>OM&amp;R Replacement Cost</b>	
<b>Cost Name:</b>	Capital Cost
<b>Calculated Annual Simple:</b>	-\$6,923
<b>Cost Name:</b>	Maintenance
<b>Calculated Annual Simple:</b>	-\$2,000

<b>Electricity Costs</b>	
<b>Annual Consumption:</b>	-25,079
<b>Units:</b>	Watts-Hours
<b>Price/Unit:</b>	\$0.077

<b>Chilled Water Costs</b>	
<b>Annual Consumption:</b>	19,253
<b>Units:</b>	Therm
<b>Price/Unit:</b>	\$0.8875

<b>Steam Costs</b>	
<b>Annual Consumption:</b>	1,355
<b>Units:</b>	Therm
<b>Price/Unit:</b>	\$0.914

<b>Water Costs</b>	
<b>Annual Water Usage:</b>	N/A
<b>Units:</b>	N/A
<b>Price/Unit:</b>	N/A
<b>Price Escalation Rates:</b>	N/A

<b>Non-Annually Recurring O&amp;M and Repair Cost</b>	
<b>Years/Months:</b>	N/A
<b>Amount:</b>	N/A
<b>Annual Rate of Increase:</b>	N/A

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<b>Alternative Level Entries</b>	
<b>Alternate Name:</b>	30,000 CFM

<b>OM&amp;R Replacement Cost</b>	
<b>Cost Name:</b>	Capital Cost
<b>Calculated Annual Simple:</b>	-\$11,499
<b>Cost Name:</b>	Maintenance
<b>Calculated Annual Simple:</b>	-\$2,000

<b>Electricity Costs</b>	
<b>Annual Consumption:</b>	-38,121
<b>Units:</b>	Watts-Hours
<b>Price/Unit:</b>	\$0.077

<b>Chilled Water Costs</b>	
<b>Annual Consumption:</b>	37,598
<b>Units:</b>	Therm
<b>Price/Unit:</b>	\$0.8875

<b>Steam Costs</b>	
<b>Annual Consumption:</b>	2,668
<b>Units:</b>	Therm
<b>Price/Unit:</b>	\$0.914

<b>Water Costs</b>	
<b>Annual Water Usage:</b>	N/A
<b>Units:</b>	N/A
<b>Price/Unit:</b>	N/A
<b>Price Escalation Rates:</b>	N/A

<b>Non-Annually Recurring O&amp;M and Repair Cost</b>	
<b>Years/Months:</b>	N/A
<b>Amount:</b>	N/A
<b>Annual Rate of Increase:</b>	N/A

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<b>Alternative Level Entries</b>	
<b>Alternate Name:</b>	50,000 CFM

<b>OM&amp;R Replacement Cost</b>	
<b>Cost Name:</b>	Capital Cost
<b>Calculated Annual Simple:</b>	-\$21,239
<b>Cost Name:</b>	Maintenance
<b>Calculated Annual Simple:</b>	-\$2,000

<b>Electricity Costs</b>	
<b>Annual Consumption:</b>	-83,374
<b>Units:</b>	Watts-Hours
<b>Price/Unit:</b>	\$0.077

<b>Chilled Water Costs</b>	
<b>Annual Consumption:</b>	62,966
<b>Units:</b>	Therm
<b>Price/Unit:</b>	\$0.8875

<b>Steam Costs</b>	
<b>Annual Consumption:</b>	6,079
<b>Units:</b>	Therm
<b>Price/Unit:</b>	\$0.914

<b>Water Costs</b>	
<b>Annual Water Usage:</b>	N/A
<b>Units:</b>	N/A
<b>Price/Unit:</b>	N/A
<b>Price Escalation Rates:</b>	N/A

<b>Non-Annually Recurring O&amp;M and Repair Cost</b>	
<b>Years/Months:</b>	N/A
<b>Amount:</b>	N/A
<b>Annual Rate of Increase:</b>	N/A

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**Alternate Name:** 2,000 CFM

**Alternate Description:**

The alternate was used to determine if the increase of price for 2,000 CFM outside air units with energy recovery compared to ones without energy recovery are justified.

**Alternate Name:** 4,000 CFM

**Alternate Description:**

The alternate was used to determine if the increase of price for 4,000 CFM outside air units with energy recovery compared to ones without energy recovery are justified.

**Alternate Name:** 8,000 CFM

**Alternate Description:**

The alternate was used to determine if the increase of price for 8,000 CFM outside air units with energy recovery compared to ones without energy recovery are justified.

**Alternate Name:** 15,000 CFM

**Alternate Description:**

The alternate was used to determine if the increase of price for 15,000 CFM outside air units with energy recovery compared to ones without energy recovery are justified.

**Alternate Name:** 30,000 CFM

**Alternate Description:**

The alternate was used to determine if the increase of price for 30,000 CFM outside air units with energy recovery compared to ones without energy recovery are justified.

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**Alternate Name:** 50,000 CFM  
**Alternate Description:**  
The alternate was used to determine if the increase of price for 50,000 CFM outside air units with energy recovery compared to ones without energy recovery are justified.

**Alternate Name:**  
**Alternate Description:**

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