## Calculating the Energy, Cost & Climate Impact of an Open Sash

A lot of energy is used cooling and heating the air drawn out by a fume hood with an open sash.

Here are the numbers used to calculate the impacts for a fume hood left open year-round in New Orleans.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>750 cubic ft/min</td>
<td>Air flow to provide 100 ft/min face velocity through a 5' wide fume hood with sash open 1.5 feet</td>
<td></td>
</tr>
<tr>
<td>36,260 Btu/cfm</td>
<td>Annual energy used to heat each cubic foot/minute to room temperature</td>
<td></td>
</tr>
<tr>
<td>27,195 kBtu</td>
<td>Annual energy use to heat air drawn out with sash open 1.5 ft</td>
<td></td>
</tr>
<tr>
<td>70 kBtus</td>
<td>kBtus heat generated by 1 CCF natural gas (w/ efficiency of heating system factored in)</td>
<td></td>
</tr>
<tr>
<td>388 CCF</td>
<td>Annual CCFs natural gas consumed to heat air for one hood</td>
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<tr>
<td>$388</td>
<td>Annual cost for this natural gas at a price of $1/CCF</td>
<td></td>
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<tr>
<td>12 lbs</td>
<td>Lbs CO2 emitted per CCF natural gas</td>
<td></td>
</tr>
<tr>
<td>2.3 tons</td>
<td>Tons CO2 emitted by burning gas to heat air for one hood</td>
<td></td>
</tr>
<tr>
<td>169,200 Btu/cfm</td>
<td>Annual energy use needed to cool each cfm to room temperature</td>
<td></td>
</tr>
<tr>
<td>126,900 kBtu</td>
<td>Annual energy use to cool air drawn out with sash left open 1.5 ft year round</td>
<td></td>
</tr>
<tr>
<td>10 kBtu</td>
<td>kBtus cooling created by each kilowatt hour electricity used at Tulane's central chiller plant</td>
<td></td>
</tr>
<tr>
<td>12,690 kWh</td>
<td>Kilowatt hours electricity consumed to cool air for one fume hood left open 1.5' year round</td>
<td></td>
</tr>
<tr>
<td>$1,269</td>
<td>Annual cost for this electricity at a price of $0.10/kWh</td>
<td></td>
</tr>
<tr>
<td>1.3 lbs</td>
<td>lbs CO2 emitted by utility per kWh delivered, regional average</td>
<td></td>
</tr>
<tr>
<td>8.2 tons</td>
<td>Tons CO2 emitted to cool air for one 5' wide fume hood left open 1.5' year round</td>
<td></td>
</tr>
<tr>
<td>$1,657</td>
<td>Annual cost to provide the heated /cooled air exhausted by a 5' wide fume hood left open 1.5'</td>
<td></td>
</tr>
<tr>
<td>10.6 tons</td>
<td>Annual CO2 emissions associated with providing this heated / cooled air</td>
<td></td>
</tr>
</tbody>
</table>

### Totals for heating+cooling

- **Annual CO2 emissions for energy use per single-family home**: 11.6 metric tons CO2
- **Annual greenhouse gas emissions per passenger vehicle per Year**: 5.1 metric tons CO2E

### Comparisons

- **Comparison to Single-family home emissions**: Calculated by EPA by adding up national average energy use per single family home for electricity, natural gas, liquid petroleum gas, fuel oil and kerosene. Vehicle emissions calculated for 2007 by the EPA using weighted average combined fuel economy of cars and light trucks of 20.4 miles per gallon and an average vehicle miles traveled of 11,720 miles per year.

For EPA estimates, visit [http://www.epa.gov/cleanenergy/energy-resources/refs.html](http://www.epa.gov/cleanenergy/energy-resources/refs.html)