



# HARDEN FURNITURE

## Sustainable Furniture Council – 2010 Membership Application

### Carbon Footprint Calculation (CY2009)

#### • Electrical

- Consumption: Annual kWh = 5,920,843
- Factors: Line Loss = 7% <sup>a</sup>  
NYS Average CO<sub>2</sub> Emission Factor = 0.86 lbs/kWh <sup>b</sup>
- Calculation: Annual lbs CO<sub>2</sub>  
= (Annual Consumption kWh + Line Loss) \* NYS Average CO<sub>2</sub> Emission Factor lbs/kWh  
= (5,920,843 \* 1.07) \* 0.86 lbs/kWh  
= 5.45x10<sup>6</sup> lbs

#### • Thermal – Wood Fuel

- Consumption: Annual Tons = 12,380
- Factors: Higher Heating Value (HHV) of Wood Fuel = 5.2x10<sup>-3</sup> MMBtu/lb <sup>c</sup>  
Wood Fuel (wet wood/bark) CO<sub>2</sub> Emission Factor = 1.95x10<sup>2</sup> lb/MMBtu <sup>d</sup>  
1.95x10<sup>2</sup> lb/MMBtu \* (5.2x10<sup>-3</sup> MMBtu/lb \* 2000 lbs/ton)  
= 2.03x10<sup>3</sup> lbs/ton
- Calculation: Annual lbs CO<sub>2</sub>  
= Wood Fuel CO<sub>2</sub> Emission Factor (lbs/ton) \* Annual Consumption (tons)  
= 2.03x10<sup>3</sup> lbs/ton \* 12,380 tons  
= 2.51x10<sup>7</sup> lbs

#### • Thermal – Natural Gas

- Consumption: Annual therms = 13,496
- Factors: 1 therm = 100,000 Btu  
Average Gross Heating Value = 1,020 Btu/cf <sup>e</sup>  
1 therm = 100,000 Btu / 1,020 Btu/cf = 98 cf  
Natural Gas CO<sub>2</sub> Emission Factor = 120,000 lbs/10<sup>6</sup> cf <sup>f</sup>  
120,000 lbs/10<sup>6</sup> cf \* 98 cf/therm / 10<sup>6</sup>  
= 11.8 lbs/therm
- Calculation: Annual lbs CO<sub>2</sub>  
= Natural Gas CO<sub>2</sub> Emission Factor (lbs/therm) \* Annual Consumption (therms)  
= 11.8 lbs/therm \* 13,496 therms  
= 1.59 x10<sup>5</sup> lbs



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- **Carbon Footprint (Total Electrical and Thermal)**

**Total Annual lbs. CO<sub>2</sub>**

= Electrical lbs + Thermal Wood Fuel lbs + Thermal Natural Gas lbs

=  $5.45 \times 10^6$  lbs +  $2.51 \times 10^7$  lbs +  $1.59 \times 10^5$  lbs

=  **$3.07 \times 10^7$  lbs or 15,354.5 tons**

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<sup>a</sup> Conservative estimate for line loss when electricity is transmitted through the system.

<sup>b</sup> From the U.S. Department of Energy and U.S. Energy Information Administration Form EIA-1605 (March 2006, data through 2005), Voluntary Reporting of Greenhouse Gases, Appendix C: Adjusted Electricity Emission Factors by State.

<sup>c</sup> Estimate of the average Higher Heating Value (HHV) of all wood fuel combusted.

<sup>d</sup> From AP-42, Fifth Edition Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Chapter 1: External Combustion Sources, Section 1.6: Wood Residue Combustion in Boilers, Table 1.6-3.

<sup>e</sup> From AP-42, Fifth Edition Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Chapter 1: External Combustion Sources, Section 1.4.1: Natural Gas Combustion, General.

<sup>f</sup> From AP-42, Fifth Edition Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Chapter 1: External Combustion Sources, Section 1.4: Natural Gas Combustion, Table 1.4-2.