HARDEN FURNITURE
Sustainable Furniture Council – 2012 Membership Application

Carbon Footprint Calculation (CY2012)

- **Electrical**
  - Consumption: Annual kWh = 5,923,176
  - Factors: Line Loss = 7% [a]

    NYS Average CO_2 Emission Factor = 0.86 lbs/kWh [b]
  - Calculation: Annual lbs CO_2

    = (Annual Consumption kWh + Line Loss) * NYS Average CO_2 Emission Factor lbs/kWh

    = (5,923,176 * 1.07) * 0.86 lbs/kWh

    = 5.45×10^6 lbs
- **Thermal – Wood Fuel**
  - Consumption: Annual Tons = 12,677
  - Factors: Higher Heating Value (HHV) of Wood Fuel = 5.2×10^{-3} MMBtu/lb [c]

    Wood Fuel (wet wood/bark) CO_2 Emission Factor = 1.95×10^2 lb/MMBtu [d]

    1.95×10^2 lb/MMBtu * (5.2×10^{-3} MMBtu/lb * 2000 lbs/ton)

    = 2.03×10^3 lbs/ton
  - Calculation: Annual lbs CO_2

    = Wood Fuel CO_2 Emission Factor (lbs/ton) * Annual Consumption (tons)

    = 2.03×10^3 lbs/ton * 12,677 tons

    = 2.57×10^7 lbs
- **Thermal – Natural Gas**
  - Consumption: Annual therms = 12,137
  - Factors: 1 therm = 100,000 Btu

    Average Gross Heating Value = 1,020 Btu/cf [e]

    1 therm = 100,000 Btu / 1,020 Btu/cf = 98 cf

    Natural Gas CO_2 Emission Factor = 120,000 lbs/10^6 cf [f]

    120,000 lbs/10^6 cf * 98 cf/therm / 10^6

    = 11.8 lbs/therm
  - Calculation: Annual lbs CO_2

    = Natural Gas CO_2 Emission Factor (lbs/therm) * Annual Consumption (therms)

    = 11.8 lbs/therm * 12,137 therms

    = 1.43×10^5 lbs

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

  Total Annual lbs. CO_2

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

  = 5.45×10^6 lbs + 2.57×10^7 lbs + 1.43×10^5 lbs

  = 3.13×10^7 lbs or **15,650 tons**

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[a] Conservative estimate for line loss when electricity is transmitted through the system.
[b] 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.
[c] Estimate of the average Higher Heating Value (HHV) of all wood fuel combusted.
[d] 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.
[e] 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.
[f] 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.