Total Energy

### Manufacturing Energy and Carbon Footprint

**Sector:** Chemicals (NAICS 325)

**Total Primary Energy Use:** 4,513 TBtu

**Total Combustion Emissions:** 275 MMT CO$_2$e

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#### Energy Use (TBtu = Trillion British Thermal Units)

- **Fuel**
- **Electricity**
- **Steam**
- **Losses**

#### Combustion Emissions (MMT CO$_2$e = Million Metric Tons Carbon Dioxide Equivalent)

- **Offsite**
- **Onsite**

- **Total Emissions** = Offsite Emissions + Onsite Emissions

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**Notes:**
- Feedstock energy not included
- Energy values <0.5 TBtu shown as 0
- Values represent aggregate data
- Offsite generation shown on net basis

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**Prepared for the Advanced Manufacturing Office (AMO) by Energetics Incorporated**
Manufacturing Energy and Carbon Footprint
Sector: Chemicals (NAICS 325)

Onsite Energy Use:
- 3,195 TBtu
- Onsite Combustion Emissions: 129 MMT CO₂e

Onsite Energy

- Onsite Generation
  - Conventional Boilers: 541 TWh, 30% of Total
  - CHP/Cogeneration: 457 TWh, 18% of Total
    - 60.5% Natural Gas
    - 21% Waste Gas (byproduct fuel)
    - 8% Coal
    - 1% Distillate and Residual Fuel Oils
    - < 0.5% LPG and NGL
    - 4% Other Fuels
  - Other Electricity Generation*: 188 TWh, 8% of Total

- Process Energy
  - Process Heating: 63.0 TWh, 60.5% of Total
  - Process Cooling and Refrigeration: 10.7 TWh, 10.7% of Total
  - Other Process Uses: 7.1 TWh, 7.1% of Total
  - Electro-Chemical: 9.4 TWh, 9.4% of Total
  - Machine Drive: 69.3 TWh, 69.3% of Total
    - 117 TWh, 117 TWh

- Steam Generation Losses: 457 TWh, 30% of Total
- Electricity Generation Losses: 351 TWh, 351 TWh
- Steam Distribution Losses: 457 TWh, 457 TWh

- Facility HVAC: 11.8 TWh, 11.8 TWh
- Facility Lighting: 3.8 TWh, 3.8 TWh
- Other Facility Support: 1.6 TWh, 1.6 TWh
- Onsite Transportation: 0.2 TWh, 0.2 TWh
- Other Nonprocess: 2.3 TWh, 2.3 TWh

Energy Use data source: 2006 MECS (with adjustments)
Last Revised: October 2012

Notes:
- Feedstock energy not included
- Energy values <0.5 TBtu shown as 0
- Values represent aggregate data
- Offsite generation shown on net basis
- * Onsite, renewable, non-combustion generation contributes 0 TBtu

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