DOE Tools for Improving Energy Efficiency in Supply Chains

Paul Scheihing
U.S. Department of Energy
August 2016
Total GHG Emissions, 2013

Total U.S. GHG Emissions by Sector (MMT CO₂ equivalent) in 2013

- Industrial: 2,569 MMT CO₂e (39%)
- Transportation: 1,768 MMT CO₂e (27%)
- Residential: 1,129 MMT CO₂e (17%)
- Commercial: 1,086 MMT CO₂e (16%)
- Other: 1,512 MMT CO₂e
- CO₂ from Fossil Fuel Combustion: 5,126 MMT CO₂e

Federal Sector (scope 1 + 2, and T&D): 85 MMT CO₂e (1%)

Federal Sector GHG Emissions

- The U.S. Federal Government emits approximately 85 MMT CO₂e annually*, or 1% of total U.S. GHG emissions
- Energy use is responsible for 97% of the Federal Government’s scope 1 and 2 GHG emissions

* 2013 data. Includes scope 1 and 2 emissions and emissions attributable to T&D losses. All other scope 3 emissions are excluded from the Federal Sector estimate.
Out of the top 21 USG contractors, 11 are DOD manufacturers of which 8 published their GHG data. These 8 contractors collectively emitted almost 12 MMT CO$_2$e annually.*

*Note 1: Number is aggregated from publicly available data. All companies published scope 1 and 2 emissions, but not all published scope 3 emissions.

*Note 2: The 8 companies include GHG emissions from domestic and international operations.

<table>
<thead>
<tr>
<th>Company</th>
<th>GHG emissions MMT CO$_2$e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lockheed Martin</td>
<td>0.90</td>
</tr>
<tr>
<td>Boeing</td>
<td>1.09</td>
</tr>
<tr>
<td>General Dynamics</td>
<td>Not Available</td>
</tr>
<tr>
<td>Raytheon</td>
<td>0.45</td>
</tr>
<tr>
<td>Northrop Grumman</td>
<td>0.57</td>
</tr>
<tr>
<td>United Technologies Corporation</td>
<td>1.94</td>
</tr>
<tr>
<td>L-3 Communications</td>
<td>Not Available</td>
</tr>
<tr>
<td>BAE Systems</td>
<td>1.35</td>
</tr>
<tr>
<td>Huntington Ingalls Industries</td>
<td>Not Available</td>
</tr>
<tr>
<td>Hewlett-Packard</td>
<td>0.74</td>
</tr>
<tr>
<td>General Electric</td>
<td>4.53</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>11.57</strong></td>
</tr>
</tbody>
</table>
Energy efficiency is more cost-effective than other clean energy alternatives.

Energy efficiency is the least-cost resource option to reduce carbon emissions, compared to other clean energy alternatives.

Energy Efficiency is a Convening Force to Solve Business Challenges...

- Savings go straight to the bottom line
- Strong contributor to sustainability
- Reduces carbon footprint
- Hedge against energy price escalation
Existing focus on end uses:

- Building energy consumption
- Clean energy sources
- Water intensity
- Fleet efficiency

Where else can we find opportunities?
Significant EE Opportunities in the Supply Chain

Energy management along the entire supply chain impacts energy-related greenhouse gas emissions.

- **Energy consumption required for production** is an often overlooked contributor to the overall energy and carbon footprint. Includes raw materials extraction, Tier 1-3 suppliers, and OEM manufacturing.
- **Supply chains** represent critical opportunities for federal agencies to reduce carbon emissions, improve energy efficiency, and respond to national demands for greater sustainability.
Example: Production Accounts for Greater Share of GGE

Greenhouse Gas Emissions for the Apple iPhone 6s

80 kg CO₂e

Total greenhouse gas emissions

84% Production
10% Customer use
5% Transport
1% Recycling

Image and data from Apple:
How do you and your suppliers make the most of energy efficiency?

Greatest assets: Your people

- Consistent, structured approach that delivers continual improvement
- Integrate tested, proven best practices while leveraging existing ones
- Build knowledge and capabilities
- Tools
- Credible results, show your contribution to strategic business areas

Photo courtesy of Cummins
Engaging Suppliers on Energy Efficiency

Many companies are committed to sustainability and energy efficiency projects...

Source: Urjanet (2016). [Energy Executives Are Committed to Sustainability Projects, But Many Companies Are Lacking the Resources and Tools to Achieve Their Goals] [Infographic].
...But they lack resources and tools to achieve their goals and assess project outcomes

28 percent use software to calculate savings on energy projects
34 percent said an inability to validate ROI was inefficient
14 percent don’t bother even trying to calculate savings

Take a Structured Approach with Energy Management

An Energy Management System (EnMS):

- Elevates and integrates energy into normal business systems, as has happened for safety & quality
- Involves staff from the board room to the shop floor: Organizational change in culture
- Systematic energy management leads to continual improvements in energy and cost performance

Energy & cost savings over time
ISO 50001–Energy Management Systems (EnMS)

International standard that draws from best practices around the world. Manufacturers, corporations, utilities, energy service companies, and other organizations are using ISO 50001 to reduce costs and carbon emissions.

ISO 50001 specifies requirements for establishing, implementing, maintaining and improving an EnMS.

It does not prescribe specific energy performance improvement criteria.

Light blue text represents new data-driven sections in ISO 50001 that are not in ISO 9001 & ISO 14001.
DOE eGuide Tool

Get Started

Establish/enhance your energy management system

DOE eGuide: Your map and tools needed along the way

- Free step-by-step toolkit to guide energy management using ISO 50001 structure
- Includes sample plans, templates, communications

eGuide users:
- 3M
- Volvo Trucks
- Harbec

See www.energy.gov/eguide
Gather Data

Use the DOE Energy Footprint Tool

Easily track and analyze:

- **Energy consumption**
  Electricity, natural gas, etc.

- **Relevant variables**
  Production levels, degree days, operating hours, occupancy rates, etc.

- **Energy Uses**
  i.e., Application of energy

- **Calculates energy-related greenhouse gas emissions**

See [https://ecenter.ee.doe.gov/EM/tools/Pages/EnergyFootprint.aspx](https://ecenter.ee.doe.gov/EM/tools/Pages/EnergyFootprint.aspx)
Paul Scheihiing
Technology Manager, Technical Assistance
Advanced Manufacturing Office
US Department of Energy
paul.scheihiing@ee.doe.gov
1-202-586-7234

energy.gov/eere/amo
energy.gov/eere/amo/ta
energy.gov/eere/amo/software-tools