Agenda

• Introductions
• High level Sector Overview
• Geographic Subsector Focus
• Subsector Overview, Trends and Opportunities
  • Aerospace Design
  • Materials Handling
  • Environmental Engineering
  • Agri-tech Engineering
  • Power Generation
• Industry Events
• Summary
• Q&A
Manufacturers account for 12% of the US GDP, employing 8.7% of the workforce. Total output from manufacturing was $2,090.7 billion in 2014. In addition, there were 12,338,000 manufacturing employees in the US in 2015, with an average annual compensation of $79,553 in 2014. (Source: The National Association of Manufacturer, Feb. 2016)


<table>
<thead>
<tr>
<th>Sector</th>
<th>2013 Value (US$ M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastics and rubber products</td>
<td>73.4</td>
</tr>
<tr>
<td>Miscellaneous manufacturing</td>
<td>82.5</td>
</tr>
<tr>
<td>Aerospace and other Transportation</td>
<td>123.2</td>
</tr>
<tr>
<td>Motor vehicles and parts</td>
<td>138</td>
</tr>
<tr>
<td>Fabricated metal production</td>
<td>139.9</td>
</tr>
<tr>
<td>Machinery</td>
<td>144.6</td>
</tr>
<tr>
<td>Petroleum and Coal Products</td>
<td>169.7</td>
</tr>
<tr>
<td>Food, Beverage and Tobacco products</td>
<td>235.1</td>
</tr>
<tr>
<td>Computer and Electronic Products</td>
<td>255.1</td>
</tr>
<tr>
<td>Chemical Products</td>
<td>345.7</td>
</tr>
</tbody>
</table>

### Top 5 States with Highest Manufacturing Share of State GDP, 2013

<table>
<thead>
<tr>
<th>State</th>
<th>Manufacturing share of total employment</th>
<th>Manufacturing GDP ($ billions)</th>
<th>Manufacturing share of state GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>The US</td>
<td>8.8%</td>
<td>2,079.5</td>
<td>12.5%</td>
</tr>
<tr>
<td>Indiana</td>
<td>16.8%</td>
<td>95.3</td>
<td>30.1%</td>
</tr>
<tr>
<td>Oregon</td>
<td>10.4%</td>
<td>65.4</td>
<td>29.8%</td>
</tr>
<tr>
<td>Louisiana</td>
<td>7.4%</td>
<td>59.3</td>
<td>23.4%</td>
</tr>
<tr>
<td>North Carolina</td>
<td>10.9%</td>
<td>98.3</td>
<td>20.9%</td>
</tr>
<tr>
<td>Michigan</td>
<td>13.5%</td>
<td>82.3</td>
<td>19.0%</td>
</tr>
</tbody>
</table>

Sources: Economic Policy Institution
Sub-sector Cluster Focus (Eastern US)

Power Generation
- Offshore Wind (New Jersey, Rhode Island)
- Liquid Natural Gas: Louisiana, Maryland

Agri-Tech Engineering
- Monsanto (Missouri)
- Danforth Plant Science Center (Missouri)
- Nebraska

Materials Handling
- JCB (Georgia)
- Caterpillar (Illinois)
- Terex (Connecticut)
- Sandvik (New Jersey)

Environmental Engineering
- Water Crisis (Michigan, Florida)
- Flood defenses (Eastern Seaboard, Southern States)

Aerospace and Aerospace Design
- Boeing (South Carolina)
- Airbus (Alabama)
- Lockheed Martin (Maryland)
- Rolls Royce (Indiana)
- GKN (North Carolina)
- Gulfstream (South Carolina)
- MBDA Systems (Virginia)
- Honeywell (New Jersey)
- United Technologies Corporation (Connecticut)
Aerospace Design

Aerospace opportunities estimated to be worth $4.5 trillion by 2032 as US upgrades world’s oldest fleets and its manufacturers export to emerging markets

**Commercial:** Booming market
- Lower operating costs, industry expanding as global economies rebound
- Rapid change in supply chain due to increased production rates: parts shortages, defects

**Defense:** Large market (US market 10x UK) but uncertain outlook
- Constrained military budgets
- Joint Strike Fighter program: Lockheed Martin

**Opportunities and other considerations**
- Unmanned Aerial Vehicles (UAV’s) market estimated to be worth $10billion by 2020
- World Development Agencies (World Bank, UN): need helicopters, UAV’s
- Tough to break into Supply Chains, significant government intervention can be required
- “Buy America” Legislation – in mass transit related procurement, preference to domestically produced materials on procurement part financed by federal funds
- International Traffic in Arms Regulations are significant barriers unless working via US company
Environmental Engineering

Market Overview

- U.S. environmental industry worth over $300 billion
- Approximately 30,000 private sector companies and more than 80,000 public sector entities, employing 2 million Americans

Key Trends

- Chronic problem with drinking water infrastructure reaching end of useful life: replacement cost over next decade could exceed $1tn: e.g. Flint Water Crisis
- Water shortages (CA, FL)
- Urgent need to rehabilitate levee system, $100bn cost

Opportunities and other considerations

- Desalination, wastewater and water recycling technologies
- Flood defenses on Eastern Seaboard
- Federal Emergency Management Agency (FEMA) – coordinator of disaster response
  - Need to register (in advance) in System for Award Management (SAM)
  - Submit a FEMA profile.
Materials Handling

Market Overview

- North American market for automated material handling worth $4.8bn (2014), forecast compound annual growth of 8% to 2019 to $7.1bn market
- Key demand driver: ageing infrastructure of roads, bridges, railroads, airports
- 42% of urban highways congested: $170bn capital investment needed to improve
- Backlog of maintenance: estimated $3.6 trillion investment needed by 2020

Key Trends

- Continued trend toward diverting waste from landfill boosting demand for recycling machinery e.g. sorting and washing

Opportunities and other considerations

- Appetite for fuel efficiency e.g. JCB’s progress in fuel efficiency generating good US market share
- Product certification / safety testing - UL
Agri-Tech Engineering

Market Overview

- Significant growth sector: attracted $2.36bn investment in 2014
- Drivers: declining crop yields, food demand, extreme weather, more informed consumers, environmental impact of agriculture (emissions)

Key Trends

- Remote sensing and monitoring
- Drones
- Agriculture management software
- Plant growing laboratories (algae farms)

Opportunities and other considerations

- Innovation centers in Missouri
- Fertile first market opportunities for many technologies yet to make impact in consumer space
Power Generation

Market Overview

- US high reliance on fossil fuels
- Renewables contribute 13% > goal to reach 20% by 2030
  - Hydroelectric largest renewable source (6.5% of US electricity production)
  - Wind (4%)

Key Trends

- Offshore unpredictable and politically charged, but several projects in pipeline
- Cheap oil reducing market demand for green solutions
- Liquid Natural Gas: US has a supply to last 100 years at current consumption levels
- Biofuels

Opportunities and other considerations

- Monitoring, fault detection hardware and software
- Plans to increase affordability of solar PV systems
- Business energy efficiency software e.g. Mark Group Philadelphia
<table>
<thead>
<tr>
<th>Event</th>
<th>Dates / Location</th>
<th>Description</th>
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<tbody>
<tr>
<td>International Manufacturing</td>
<td>September 2016</td>
<td>Biannual show featuring leading manufacturers in metal cutting, tooling and</td>
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<tr>
<td>Technology Show</td>
<td>Chicago, IL</td>
<td>work holding systems, fabricating, controls, machining components.</td>
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<tr>
<td>Aerospace Defense and Suppliers</td>
<td>April 2016</td>
<td>An event for commercial aerospace manufacturing and defense aerospace</td>
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<tr>
<td>Summit</td>
<td>Seattle, WA</td>
<td>manufacturing</td>
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<tr>
<td>MRO Americas</td>
<td>April 2016,</td>
<td>Flagship event of Aviation Week Network's MRO event series</td>
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<td></td>
<td>Dallas, TX</td>
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<tr>
<td>WasteExpo</td>
<td>June 2016 Las Vegas,</td>
<td>North America's largest waste and recycling trade show</td>
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<tr>
<td></td>
<td>NV</td>
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<tr>
<td>AeroDef Manufacturing</td>
<td>February 2016</td>
<td>Leading exposition and technical conference for the aerospace and defense</td>
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<td></td>
<td>Long Beach, CA</td>
<td>manufacturing industry</td>
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<tr>
<td>North American International</td>
<td>January 2017</td>
<td>Traditional platform for many of the United States’ auto makers to show off</td>
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<tr>
<td>Auto Show</td>
<td>Detroit, MI</td>
<td></td>
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<tr>
<td>FabTech</td>
<td>November 2016</td>
<td>North America's Largest Metal Forming, Fabricating, Welding and Finishing</td>
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<tr>
<td></td>
<td>Las Vegas, NV</td>
<td>Event</td>
</tr>
</tbody>
</table>
1. Huge opportunities for companies with solid USP and financials
2. Highly competitive but many UK companies have succeeded
3. Sub-regional partnership and procurement opportunities
4. Shop window to the world, entry point to global supply chain
5. It takes time, may involve investment