Can Sustainability be Factored into DoD Acquisition Programs?

Paul Yaroschak
Deputy Director, Chemical & Material Risk Management
Office of the Secretary of Defense
The Vision

DoD developers, program managers, and prime contractors analyze alternatives for meeting mission requirements and make informed decisions that result in:

• Lower Total Ownership Cost
• Sustainable Systems

How? Use Life Cycle Impact Assessment
Sustainability is seen as a durable and self-sufficient balance between social, economical and environmental factors.
“The Department’s vision of sustainability is to maintain the ability to operate into the future without decline – either in the mission or in the natural and manufactured systems that support it. DoD embraces sustainability as a means of improving mission accomplishment. Sustainability is not an individual Departmental program; rather, it is an organizing paradigm that applies to all DoD mission and program areas. DoD personnel are learning to apply this mindset to their practices to improve mission performance and reduce lifecycle costs.”
DoD Sustainability Sectors

Installations Management

Military Operations & Training

Acquisition
Sustainability in DoD Acquisition
From Development through Disposal

High Performance

Low Impacts

Low Costs
Sustainability in DoD Acquisition
From Development through Disposal

We need a consistent method to analyze alternatives.

We can test & measure this.

We can calculate this – Need to do better.
95% of Life Cycle Cost Locked-In Early

Most Risks After System Delivery

Lifecycle Cost
- Operations and Support
- System Acquisition
- Production
- System R&D

Lifecycle cost locked in

Disposal

Ltetime cost expended

Percent (%)
- 100
- 95
- 90
- 85
- 80
- 75
- 70
- 65
- 60
- 55
- 50
- 45
- 40
- 35
- 30
- 25
- 20
- 15
- 10
- 5
- 0

Time
What We’ve Learned

• Pockets of good practice & results exist
• Some practices stymied
• Sustainability insufficiently considered
  – Water use, energy, noise, toxic chemical use
• Need better Total Ownership Cost estimates
  – Not all life cycle costs (LCC) estimated and analyzed
  – Poor transparency for LCC
  – LCCs often passed to operators due to procurement costs
• We need a consistent DoD methodology for analyzing sustainability & related life cycle costs
Life Cycle Impact Assessment
ISO 14040 Series

Inputs
- Raw Materials
- Energy
- Water

Raw Materials Acquisition
- Manufacturing
- Operation & Maintenance
- Recycle & Waste Management

Outputs
- Air Emissions & Greenhouse Gases
- Toxic Wastes
- Solid Wastes
- Wastewater

System Boundary
DoD Systems Sustainability
Cross-Cutting Risk & Cost Factor

Acquisition, Technology and Logistics
Making Wise Chemical/Material Decisions

Life Cycle Framework for End Product/System
How will product/system be used, maintained, and disposed of?

Analysis of Chemical/Material Alternatives
What chemicals/materials can potentially meet performance requirements?

Exposure Scenarios
Where are the possible points of human exposure and release to the environment?

Health and Environmental Risk Analysis
Use physical, chemical and toxicity criteria and exposure scenarios

Chemical/Material Choice
Select chemical/material with least risk and LCC that meets performance requirements

Possible Performance Testing

Need Data
Physical, Chemical, & Toxicity Data Needs

- Five types of data displayed in standard Tables
- Data needs vary based on uses and predicted exposures
- Data can be used to better identify, assess, & mitigate risks

<table>
<thead>
<tr>
<th>General Chemical, Production, and Use Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Item #</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>1.01</td>
</tr>
<tr>
<td>1.02</td>
</tr>
</tbody>
</table>
Challenges

• What phases in the acquisition process can we reasonably assess sustainability?
• Materiel Development Decision precedes entry into any phase of the acquisition process
• PDR = Preliminary Design Review  CDR = Critical Design Review
• FRP = Full Rate Production
Challenges

• What are the life cycle assessment boundaries?
What are the Boundaries?

Cradle-to-Grave

1. raw material acquisition
2. material processing
3. manufacturing
4. use
5. waste management
What are the Boundaries?

Gate-to-Grave

- raw material acquisition
- material processing
- manufacturing
- use
- waste management
Challenges

- Do we assess for whole systems, components, sub-components?
Challenges

• What phases in the acquisition process can we reasonably assess sustainability?

• What are the life cycle assessment boundaries?

• Do we assess for whole systems, components, sub-components?

• Where do we get the data to estimate life cycle costs?

• There are many players in the acquisition process

• The acquisition system is complex & changing

• Priorities are acquisition cost, performance, schedule
Next Steps

- Convene a DoD steering group…done
- Benchmarking study on methods for analyzing sustainability…done
- Collect quantitative case studies
- Adopt method(s) to DoD acquisition process
  - What factors should be considered in the acquisition process?
  - What life cycle costs need to be considered?
- Pilot/test the process…learn…refine
- Develop a Military Standard for “Sustainability in Acquisition”
- Develop training module - Defense Acquisition University
The Horse to Ride

ISO Standard 14040 Series + E.O. 13514 = Military Standard for LCA
(General framework) (Driver) (Uniform DoD methodology)
DEPARTMENT OF DEFENSE

LIFE CYCLE ASSESSMENT PROCESS FOR SUSTAINABILITY IN DOD ACQUISITIONS

Not for distribution outside the DoD Sustainability in Acquisition Working Group.
Questions & Discussion

Paul Yaroschak, P.E.
Deputy Director for Chemical & Material Risk Management
Office of the Deputy Under Secretary of Defense
(Installations & Environment)
1225 S. Clark St., Suite 1500
Arlington, VA  22202
703-604-0641
paul.yaroschak@osd.mil
Extra Slides
Comparing Alternatives
DoD Acquisition Policies

- **DoDD 5000.1 – The Defense Acquisition System (2007)**
  - “Safety shall be addressed throughout the acquisition process. Safety considerations include human (includes human/system interfaces), toxic/hazardous materials and substances, …”

- **DoDI 5000.2 – Operation of the Defense Acquisition System (2008)**
  - Programmatic Environmental and Occupational Health Evaluation (PESHE) is required…. (at various milestones).
  - As part of risk management, the PM shall eliminate ESOH hazards where possible, and manage ESOH risks where hazards cannot be eliminated. … During system design, the PM shall document hazardous materials contained in the system and shall estimate and plan for the system’s demilitarization and safe disposal.

- **MIL-STD-882D, Ch 1 (draft)**
  - Eliminate or reduce risk through alternate designs and materials
  - Manage life cycle risk
Example Sustainability Factors
(Impact Categories in Life Cycle Assessment)

- Toxic Chemicals & Materials Use
- Energy Use
- Greenhouse Gas Emissions
- Ozone Depletion
- Waste Production
- Water Use
- Land Use
- Noise
What LCA Can Do

- Develop systematic evaluation of environmental consequences associated with a given product
- Compare impacts between two or more products/systems
- Quantify environmental releases to air/water/land in relation to each life cycle stage
- Identify impacts of a specific process
- Inform design
- Quantify uncertainty in product/system choice