



Acquisition, Technology and Logistics

Integrating Sustainability into DoD Acquisition Programs



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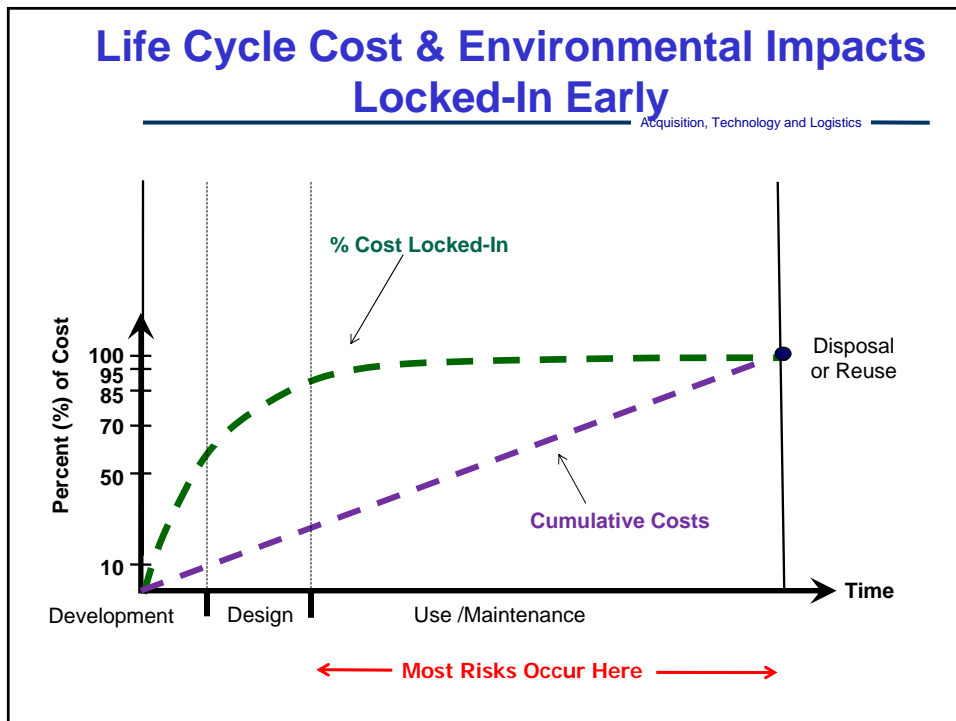
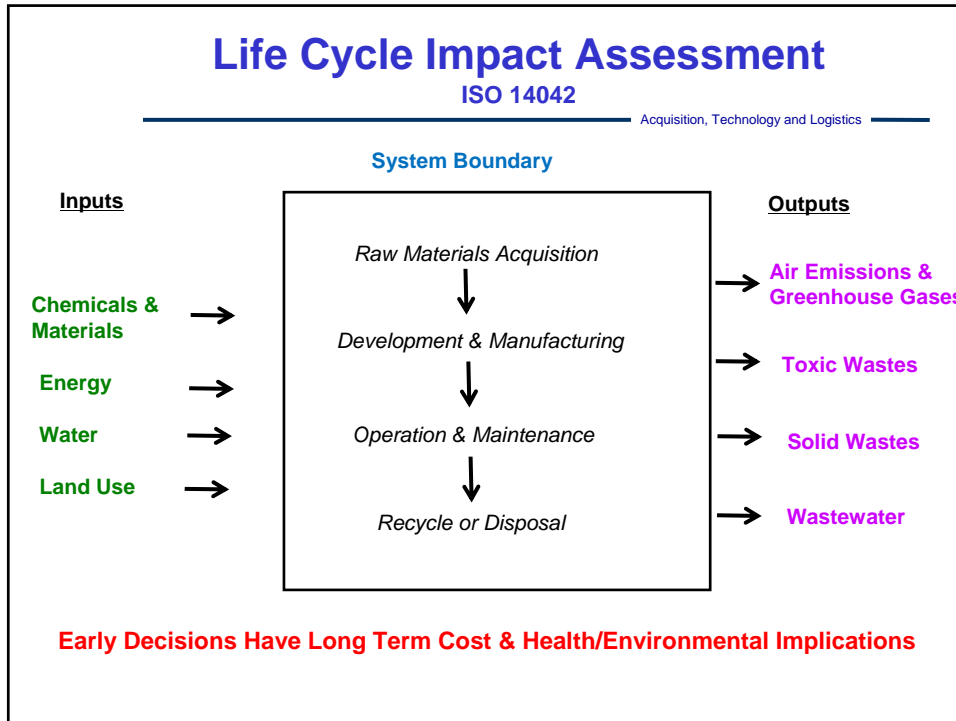
The Vision

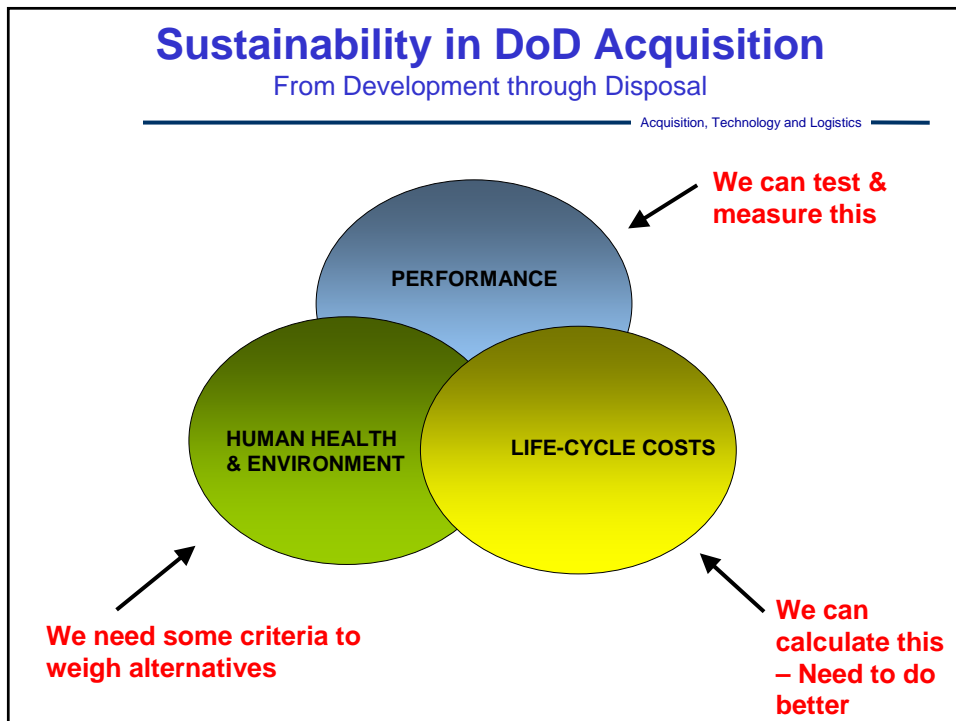
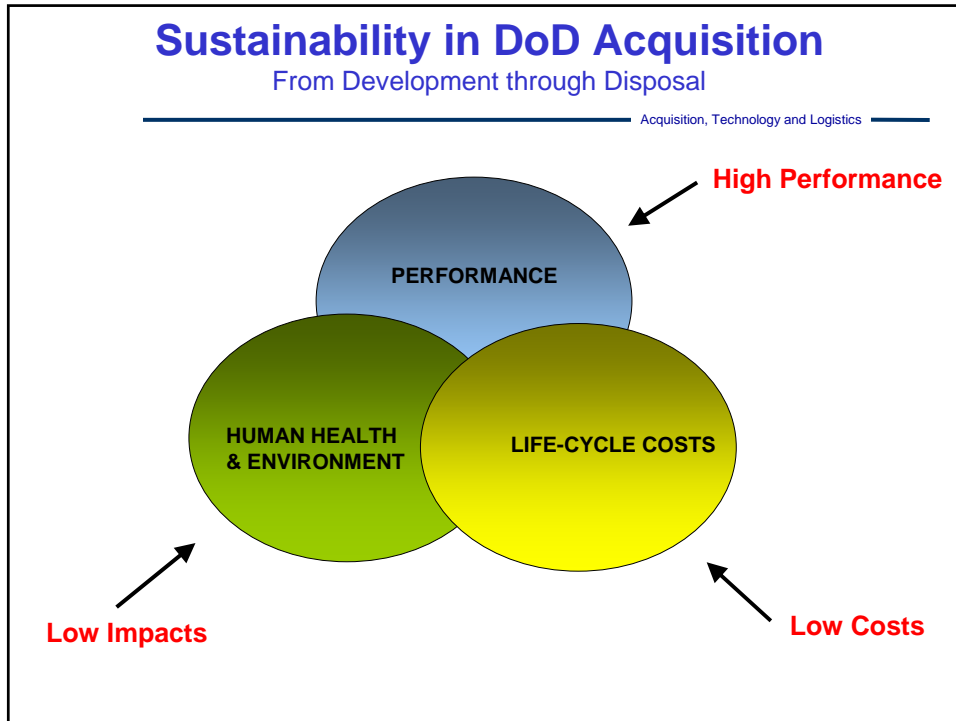
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DoD developers, program managers, and prime contractors analyze alternatives for meeting mission requirements and make informed decisions that result in:

- **Sustainable Systems regarding energy, water, chemicals/materials, & land use**
- **Lower Total Ownership Cost**

How? Use Life Cycle Impact Assessment





What We've Learned About LCA in DoD

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- Pockets of good practice & results exist
- Some practices stymied
- Sustainability insufficiently considered
 - Examples: water use, noise, toxic chemical use
- Need better Total Ownership Cost estimates
 - Not all life cycle costs (LCCs) estimated and analyzed
 - Poor transparency for LCC
 - Large O&M costs often passed to operators
- Consistent DoD methodology for analyzing sustainability & related costs does not exist

Challenges

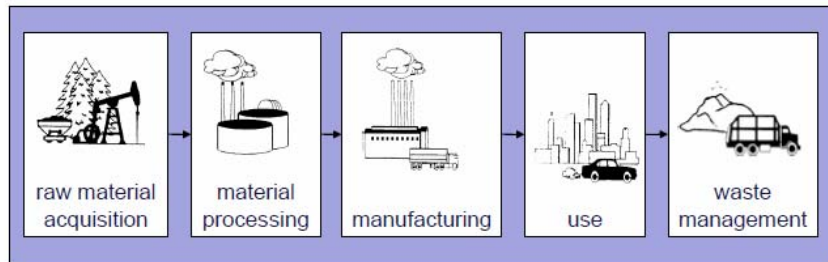
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- **Where do we get the data to estimate outputs, impacts & life cycle costs?**
- What phases in the acquisition process can we reasonably assess sustainability?
- What are the life cycle assessment boundaries?
- Do we assess for whole systems, sub-systems, components?
- There are many players & the acquisition system is complex & changing
- ESOH issues are not high priority
 - Priorities are *cost, performance, schedule*

What are the Boundaries?

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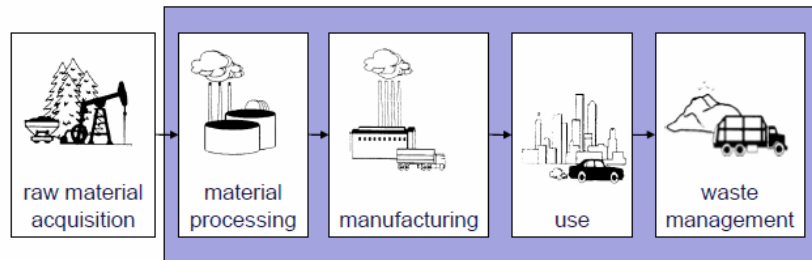
Cradle-to-Grave



What are the Boundaries?

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Gate-to-Grave



What Level to Assess?

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



Current Thinking – Part 1

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- Focus on 3 key acquisition stages:
 - Analysis of Alternatives (AoA)...use an “LCA light” method
 - Development...a bit more detailed
 - Design...as detailed as data availability will allow

Current Thinking – Part 2

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- **Focus on 4 key life cycle stages stages:**
 - **Materials extraction & transportation...maybe**
 - **Development & manufacturing**
 - **Use & sustainment (e.g., operation & maintenance)**
 - **Recycling/demilitarization/disposal**

Current Thinking – Part 3

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- **Focus on a few key “inputs” and “impacts”**

Energy

Chemicals & Materials

Water Use

Land Use



Human Health Impact

Toxicity, carcinogenicity, noise

Environmental Impact

Waste, greenhouse gases, habitat and resource depletion

Mission Impacts

Material, energy, water availability
Basing potential

The Way Ahead

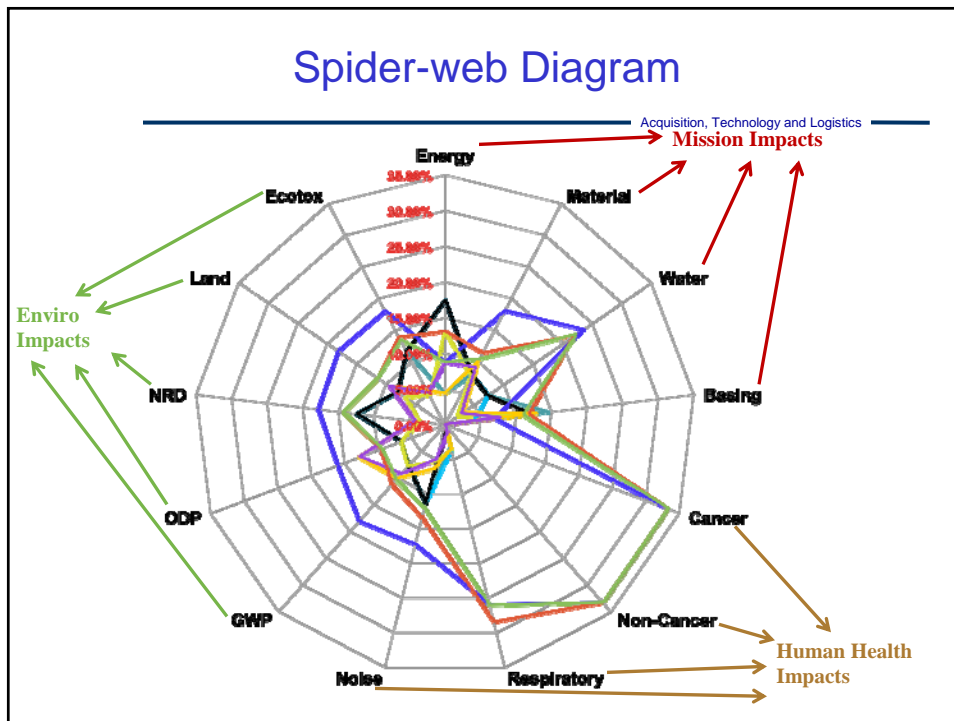
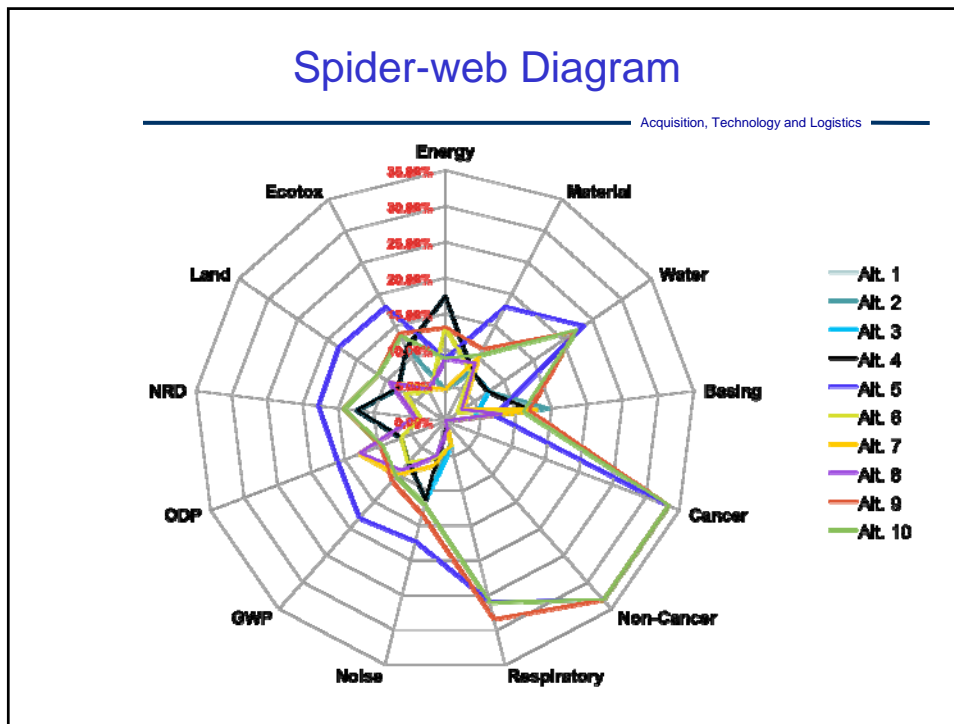
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- **Convene a DoD steering group...done**
- **Benchmarking study on methods for analyzing sustainability...done**
- **Collect quantitative case studies...underway**
- **Adopt method(s) to DoD acquisition process...underway**
 - What factors should be considered in the acquisition process?
 - What life cycle costs need to be considered?
- **Pilot/test the process...learn...refine**
- **Develop a Military Standard -- "Life Cycle Assessment for Sustainability in Acquisition" ...outline done**

Possible Methods to Weigh/Score Outputs

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- **Stakeholder weighting**
 - Example: Is energy or waters use more important (sensitive) for a specific system
- **Use of spider-web diagrams**



Possible Methods to Weigh/Score Outputs

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- **Stakeholder weighting**
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- **Use of Data Envelope Analysis (DEA)**
 - Also called frontier analysis
 - Used in operations research & investing (portfolio theory)
 - Runs a series of optimization calculations...finds most efficient alternatives as compared to all others

2-Dimensional DEA Frontier

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