

Office of Science

Analysis of Alternative

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Requirement

Prior to CD-1 Approval, responsible program office is required to

Conduct an Analysis of Alternatives (AoA), that is independent of the contractor organization responsible for managing the construction or constructing the proposed capital asset project, for projects with an estimated TPC top-end range of \$10M or greater. For projects with an estimated TPC top-end range less than \$50M, the independent AoA shall be commensurate with the project cost and complexity.

Challenges for SC

Ideally—

Alternative analysis should be performed independent of the contractor managing the work since the contractor will likely choose an alternative that they think will benefit them the most. This could selecting an alternative that HQ may “buy into” or selecting an option that may precludes other sites, etc.

Reality—

- HQ does not have the data or the resources to perform AoA
- For some types of projects such as office or laboratory buildings, an independent contractor may be hired, but for more complex projects (fusion or accelerators) such firms do not exist.
- Also, it is common in SC that projects partner with many organizations. Within SC, there will be a difficulty in organizing a team of appropriate expertise to evaluate the alternatives that is independent of the contractor.

Challenges for SC (con't)

Ideally—

- All viable alternative should be analyzed for life cycle cost and **benefit**.
- Which option to select should be made on best cost/benefit option.
- A project may cost more, but benefits may also outweigh the costs.
- Alternative analysis also includes location analysis.

Reality—

- Within SC there is limited funding available that needs to be spread across other projects or laboratories. As a result, most alternatives SC selects are funding constrained.
- Available infrastructure and areas of expertise may be site specific

Alternative Evaluation Criteria

When performing alternative analysis, evaluation criteria, as well as the weight or importance of the criteria needs to be clearly defined. Examples of criteria used for evaluating alternatives include

10. Mission or strategic needs
9. Funding and/or cost constraints
7. Geographic or location requirements
7. Need date or time the capability is needed
6. Technology availability
5. Operational limitations
4. Security or accessibility
2. Aesthetics
8. Increase number of users
1. Ease of use

	<i>Mission or strategic needs</i>	<i>Funding and/or cost constraints</i>	<i>Geographic or location requirements</i>	<i>Need date or time the capability is needed</i>	<i>Technology availability</i>	<i>Operational limitations</i>	<i>Security or accessibility</i>	<i>Aesthetics</i>	<i>Increase number of users</i>	<i>Ease of use</i>
Weight	10	9	7	7	6	5	4	2	8	1
Alternative 1	7	4	9	6	6	2	2	4	5	2
Alternative 2	5	4	5	5	4	3	8	6	2	5
Alternative 3	7	6	5	1	6	5	2	2	2	1
Alternative 4	8	3	6	8	5	7	3	6	9	8
Alternative 5	6	5	4	6	5	3	2	2	3	1

Analysis of Alternative (AOA) Guide

- PMOA is in the process of developing the AOA Guide
- The Guide is based on the GAO-16-22 AoA best practices criteria
- GAO has identified four characteristics that help identify high-quality, reliable AoA.
 1. **Well-documented**—The process is thoroughly described in a central document including all source data, clearly detailed methodologies, calculations and results, as well as explanations for selection criteria.
 2. **Comprehensive**—Allows for a robust set of alternatives, that no alternatives are omitted and that each alternative is examined thoroughly for the project’s entire expected life-cycle.
 3. **Unbiased**—Ensure that the process does not have a predisposition towards one alternative over another; it is based on traceable and verified information.
 4. **Credibility**—Discuss the limitations of the analysis resulting from the uncertainty that surrounds both the data and the assumptions for each alternative.

Options

Have the AoA performed by contractor personnel independent of the project?

Current SC Position

SC has limited options except to continue what we've been doing. The basis for SC position is

- The advisory committees play a significant role in providing guidance and direction on facility options and needs
- SME for SC facilities are limited and not readily available
- SC peer reviews will review the alternatives analysis
- SC is exempt from requirements of DOE Order 413.3B

Conclusion

Regardless of what the Programs decide to choose, the alternative analysis must be

- ✓ Well documented
- ✓ Comprehensive
- ✓ Unbiased, and
- ✓ Credible