

Executive Summary

The Department of Energy (DOE) laboratories are national assets that have contributed profoundly to the Nation's security, scientific leadership, and economic competitiveness. In recognition of the continuing and evolving threats to our security and the dramatic increase in global economic and scientific competition, the laboratories are and will continue to be vitally important.

Yet, the contributions of the National Laboratories are not inevitable, nor have they realized their full potential. This final report of the Commission to Review the Effectiveness of the National Energy Laboratories recommends ways the laboratories could overcome challenges to more efficiently and effectively accomplish the work for which they are uniquely suited. The Commission's unanimous findings and recommendations are grouped around six themes:

- Recognizing value
- Rebuilding trust
- Maintaining alignment and quality
- Maximizing impact
- Managing effectiveness and efficiency
- Ensuring lasting change

Recognizing Value

The National Laboratories provide critical capabilities and facilities in service of DOE's mission, the needs of the broader national science and technology (S&T) community, and the Nation as a whole. They, for example, offer a unique venue for the conduct of major, long-term, high-payoff/high-risk research. The funding for the laboratories has remained flat in constant dollars over the past decade. In addition, the amount of Federal research and development (R&D) support to DOE as a whole has stayed relatively level for the past 40 years, a period during which many other nations have increased their research investments. The Nation should recognize the value of these laboratories and the Administration and Congress should provide the necessary resources to maintain their critical capabilities and facilities.

Rebuilding Trust

The intended relationship between DOE and the National Energy Laboratories is as trusted partners, working together to carry out critical missions for the Nation. The Federal Government develops important R&D programs and turns to the National Laboratories to provide the expert people, facilities, and management systems to carry them out. Sixteen of the 17 laboratories are run as federally funded research and development centers (FFRDCs), managed through a management and operating (M&O) contract. Under the FFRDC/M&O model, the government is responsible for setting the “*what*” of strategic and program direction to meet the Nation’s needs, while the contracted partners, along with the laboratories they manage and operate, are responsible for determining precisely “*how*” to meet the technical and scientific challenges and to carry out programs. Over the years, the relationship between DOE and many of the laboratories has eroded. This has resulted in a less-than-optimal working relationship and reduced efficiency.

DOE and the National Laboratories, with the support of Congress and others, must work together as partners to restore the FFRDC relationship with a culture of trust and accountability. As a foundation for this, the partners should jointly establish annual operating plans that delegate clearly defined authority to the laboratories in exchange for transparency and successful mission performance. Laboratories that earn DOE’s trust should enjoy greater freedom to operate, while others will continue to experience heightened DOE oversight and control. DOE should strengthen leadership and management development for its Federal workforce—including multi-directional rotational assignments with the laboratories, field elements, and headquarters—to improve its ability to manage in this mode. DOE should abandon *incentive* award fees in their M&O contracts with the National Laboratories in favor of a fixed fee set at competitive rates. These rates should take into account contractor investments of talent and funds, as well as financial and reputational risk. DOE should also adopt a broader and richer set of incentives and consequences to motivate sound laboratory management and enforce accountability.

Enabling the laboratories to take more responsibility for managing their activities involves rebalancing contract requirements, local oversight, assessments and data calls, and budgeting. For example, for non-nuclear, non-high-hazard, unclassified activities, DOE should allow laboratories to use Federal, State, and industry standards in place of DOE requirements. DOE should also utilize a risk-based model with meaningful stakeholder engagement when developing new requirements and conducting assessments.

While DOE has attempted to shift from transactional compliance to a performance-based oversight model by implementing a contractor assurance system (CAS) at each of the laboratories, systematic improvements to the implementation and utilization of the CAS must be made at many laboratories. All stakeholders responsible for assessments should reduce duplicative assessments and burden on the laboratories by making maximum use of these local assessments, and DOE should establish a single point of control over data

requests to the laboratories. Also the roles and responsibilities of site offices and support centers must be clarified; support centers should not have approval authority.

DOE should give laboratories more flexibility to manage funds with full accountability within legal bounds. This translates to larger funding increments, fewer budgetary buckets, longer timelines with fewer milestones, and in many cases, notification rather than approval for fund transfers.

Maintaining Alignment and Quality

Despite the lack of a Department-wide, comprehensive, in-depth, long-term, strategic planning process, the National Laboratories' research programs and capabilities are generally well-aligned with DOE's missions and strategic priorities. There are robust processes in some program offices (particularly the Office of Science [SC]) that provide strategic oversight, evaluation, and direction to the laboratories. To improve the consistency of those processes across the Department, all DOE offices should adapt the processes of SC for laboratory planning, alignment, and quality to their particular contexts.

To maintain the quality of the technical staff, DOE should proactively encourage laboratory researchers to attend and participate in conferences—both national and international—so they may keep abreast of the latest developments in S&T. The Commission is encouraged by DOE's recently revised guidance on conference-related activities and spending, noting that the laboratories have been given more autonomy on this issue, while at the same time being held accountable for the appropriate use of taxpayer funds.

The ability to adapt, retool, invest in staff and capabilities, and enter new research areas is crucial to laboratory performance and maintenance of high-quality staff and research. Laboratories rely in large part on laboratory directed research and development (LDRD) programs to achieve these goals. Congress should support LDRD by restoring the LDRD cap to an unburdened 6 percent, or its equivalent, of laboratory budget.

To maximize the laboratories combined efforts, DOE should manage them as a system having an overarching strategic plan that gives the laboratories the flexibility to pursue new lines of inquiry so long as the research aligns with mission priorities. Similar and competitive laboratory programs add value in the early, discovery phases of a new research initiative, but, once the research has matured to the point that a preferred or most promising approach can be identified, the Department should assert its strategic oversight and guidance to coordinate and potentially consolidate programs to achieve the most effective and efficient use of resources.

Maximizing Impact

A great deal of money and talent has been invested to create scientific and technical capabilities that are crucially important for the Nation's security and economic

competitiveness. Realizing the full potential of the laboratories requires a much greater effort to tap their capabilities, especially in support of regional and national economic competitiveness. DOE and the laboratories must work to break down barriers to external collaboration with small and large businesses, academia, and other Federal agencies. Innovative technology transfer and commercialization mechanisms should continue to be pursued, and best practices in other sectors, including academia, should be examined. Congress and DOE should continue to support leading edge S&T user facilities, making sure to continue using scientific community input and peer review processes to determine future priorities for new and upgraded facilities.

Managing Effectiveness and Efficiency

The M&O contractors, in conjunction with DOE, must improve several areas of laboratory management: overhead costs, facilities and infrastructure, and project and program management. The Commission found laboratory overhead rates to be comparable to university-negotiated rates at the science and applied laboratories. The overhead rates at the National Nuclear Security Administration laboratories are understandably higher, due to the unique costs of their national security and nuclear weapons-focused mission. DOE should provide greater transparency into laboratory indirect costs and should publish an annual report of overhead rates for each laboratory.

DOE and the laboratories should continue efforts to improve laboratory facilities and infrastructure by halting the growth in deferred maintenance and speeding up the deactivation and decommissioning of excess facilities. Given the limited budget, DOE, the laboratories, Congress, and the Office of Management and Budget (OMB) should actively work together to agree upon the size and nature of the resources shortfall for facilities and infrastructure, and to develop a long-term plan to resolve it through a combination of increased funding, policy changes, and innovative financing approaches. Such approaches might include third-party financing, enhanced use leases, State funding, gifts, and leveraging partnerships with other Federal agencies.

To better its project management record, DOE and the laboratories should maintain focus on strengthening institutional capability and imposing greater discipline in implementing DOE project management guidance. The Commission also supports the recent Secretary of Energy Advisory Board Task Force recommendation to put more resources into S&T development for the Environmental Management program given the technical complexity of its projects that seriously challenge project performance.

Ensuring Lasting Change

A review of over 50 past reports shows a strikingly consistent pattern of criticism with a repeating set of recommendations for improvement. Despite the extensive examination of the issues, none of these reports has led to the comprehensive change necessary to address the well-documented, persistent challenges confronting the Department and its

laboratories. While the current Secretary of Energy has taken a number of steps to improve the relationship between DOE and its laboratories, and thereby the efficiency and effectiveness of the laboratories, these efforts must be institutionalized. A standing review body should be established to track implementation of the recommendations and actions in this report. This body should report regularly to DOE, the laboratories, the Administration, and Congress. Congress should also develop a more orderly and consistent process of reviewing the National Laboratories, in lieu of the past unrelenting pace of studies.

The Commission wishes to acknowledge that the current Secretary of Energy and the current laboratory directors, and the management teams of both, have made much progress in improving the relationship between DOE and the laboratories. Rebuilding trust is a slow process that requires a sustained culture change that is underway. The Commission encourages future Secretaries and laboratory directors to continue these efforts and Congress and others to continue supporting them.

Today, DOE laboratories face a more complex set of challenges and have a more diverse array of missions than existed when the first National Laboratories were created more than a half-century ago. The recommendations in this report are intended to ensure that the laboratories are able to operate as efficiently and effectively as possible so that the Nation realizes the maximum benefit from this national asset in the years ahead.

Table 4. Responsible Actors for Each Recommendation and Cross-References to Volume 2

Volume 1 Chapter & Section Reference	Rec. No.	Recommended Action	Responsible Actor(s)	Volume 2 Chapter & Section Reference
2.C	1	The Administration and Congress should recognize the value of the National Laboratories and provide the necessary resources to maintain their capabilities and facilities. Congress should also develop a more orderly process of reviewing the laboratories.	Administration and Congress	1.E
3.A.1	2	Department of Energy (DOE) and the laboratories must work together to restore the ideal Federally Funded Research and Development Center (FFRDC) relationship as one of trust and accountability. DOE should delegate more authority and flexibility to the laboratories and hold them accountable. The laboratories must be more transparent with DOE about their activities.	DOE and Laboratories	2.C
3.A.1	3	DOE and each laboratory should jointly develop an annual operating plan, with agreements on the nature and scope of the laboratory's activities, including goals and milestones. DOE should then provide increased flexibility and authority to the laboratory to implement that plan.	DOE and Laboratories	2.C
3.A.1	4	To improve DOE's ability to manage the laboratories, DOE should implement greater leadership and management development for its Federal workforce, including multi-directional rotational assignments.	DOE	2.C
3.A.1	5	DOE should separate the National Energy Technology Laboratory's (NETL) research and development (R&D) function from its program responsibilities. Consideration should be given to converting the new research NETL into an FFRDC. NETL should increase its interactions with universities.	DOE and Congress	2.C
3.A.2	6	DOE should abandon <i>incentive</i> award fees in favor of a fixed fee set at competitive rates with risk and necessary investment in mind. DOE should also adopt richer set of incentives to motivate sound management.	DOE	2.C
3.B.1	7	DOE should give the laboratories the authority to operate with more discretion whenever possible. For non-nuclear, non-high hazard, unclassified activities, DOE should allow laboratories to use Federal, State, and national standards in place of DOE requirements. DOE should review and minimize approval processes.	DOE	3.G
3.B.1	8	DOE should modify its processes for developing directives, orders and other requirements to get more input on the benefits and impacts of the proposed requirements. When developing new requirements, DOE should use a risk-based model, ensuring the level of control over an activity is commensurate with the potential risk.	DOE	3.G
3.B.2	9	DOE should focus on making the use of Contractor Assurance System (CAS) more uniform across the laboratories. DOE local overseers should rely on information from the CAS systems, with appropriate validation, as much as possible for their local oversight. The quality of CAS can be increased through peer reviews for implementation and effectiveness.	DOE	4.D
3.B.2	10	The role of the site office should be emphasized as one of "mission support." The site office manager should be responsible for the performance of the site office; all staff, including the Contracting Officers, should report to the site office manager. DOE should devote more effort to professional development of field staff.	DOE	4.D
3.B.2	11	DOE should clarify the role and authority of the support centers. Wherever approval authority resides with a support center, DOE should remove it and reinstate it at the site office or DOE headquarters.	DOE	4.D

Volume 1 Chapter & Section Reference	Rec. No.	Recommended Action	Responsible Actor(s)	Volume 2 Chapter & Section Reference
3.B.3	12	All stakeholders should make maximum use of local assessments (performed by site offices and laboratories), with appropriate verification, to reduce duplicative assessments and burden on the laboratories.	DOE and External Auditors	5.C
3.B.3	13	DOE should establish a single point of control within the Department for all laboratory-directed data requests.	DOE	5.C
3.B.4	14	DOE should increase the size of funding increments by consolidating budget and reporting (B&R) codes, extending timelines and minimizing milestones for each funding increment and institutionalizing mechanisms to move money between B&R codes for related research areas.	DOE	6.D
3.B.4	15	Congress should repeal Section 307(d) of the FY 2014 Consolidated Appropriations Act as soon as feasible to remedy the transitional burden it creates for the Office of Management and Budget (OMB), DOE Headquarters, and the laboratories.	Congress	6.D
4.A	16	Other DOE program offices should adapt the processes that DOE's Office of Science has in place for guiding and assessing the alignment of the laboratories under its stewardship with DOE's missions and priorities.	DOE	7.E
4.B	17	The processes that Office of Science has in place for assessing the quality of the research being done by its laboratories and for assessing the quality of its research portfolio should be adapted by the other program offices.	DOE	7.E
4.B	18	There must be reconsideration of the travel restrictions to enable conference participation at levels appropriate to the professional needs of the existing scientific staff and to attract the highest quality staff in the future. The Commission is encouraged by DOE's recently revised guidance on conference-related activities and spending.	DOE and OMB	7.E
4.C	19	The Commission strongly endorses Laboratory Directed Research and Development (LDRD) programs, both now and into the future, and supports restoring the cap on LDRD to 6 percent unburdened, or its equivalent. The Commission recognizes that, in practice, restoring the higher cap will have the largest impact on the LDRD programs of the National Nuclear Security Administration laboratories.	Congress	8.D
4.D	20	DOE should manage its laboratories as a system having an overarching strategic plan that gives the laboratories the flexibility to pursue new lines of inquiry. Once the research has sufficiently mature, DOE should provide strategic oversight and guidance to coordinate and potentially consolidate their programs.	DOE	7.E
4.D	21	Congress should recognize that the capabilities currently housed within the NNSA laboratories are essential to the Nation. Maintaining these capabilities in separate and independent facilities should continue.	Congress	7.E
5.A	22	DOE should establish techniques to make the Strategic Partnership Projects process more efficient.	DOE	9.E
5.A	23	DOE should support efforts to strengthen the Mission Executive Council.	DOE	9.E
5.B	24	DOE and its laboratories should continue to facilitate and encourage engagement with universities through collaborative research and vehicles such as joint faculty appointments and peer review.	DOE and Laboratories	10.C
5.C	25	DOE and the laboratories should fully embrace the technology transition mission and continue improving the speed and effectiveness of collaborations with the private sector. Innovative transfer and commercialization mechanisms should be pursued and best practices in other sectors should be examined.	DOE and Laboratories	11.E

Volume 1 Chapter & Section Reference	Rec. No.	Recommended Action	Responsible Actor(s)	Volume 2 Chapter & Section Reference
5.C	26	DOE should determine whether the annual operating plans proposed by the Commission could qualify as the "agency-approved strategic plan" under the Stevenson-Wylder Technology Innovation Act of 1980, and the Fast-Track Cooperative Research and Development Agreement Program. If not, Congress should amend the law accordingly.	DOE and Congress	11.E
5.C	27	Laboratories should pursue innovation-based economic development by partnering with regional universities.	Laboratories	11.E
5.D	28	DOE and Congress should continue to support user facilities at the DOE laboratories. External advisory groups should continue to be used to decide which facilities to build and how to upgrade existing facilities.	DOE, Administration, and Congress	12.C
6.A	29	DOE should continue implementing the Institutional Cost Report (ICR) as a method for tracking indirect costs across the laboratories, and encourage peer reviews to help mature the ICR as a tool for DOE, the laboratories, and other stakeholders.	DOE	13.E
6.A	30	DOE should provide greater transparency into laboratory indirect costs and publish an annual report of the overhead rates at each individual National Laboratory.	DOE	13.E
6.B	31	DOE should consider whether a capital budget will better serve its internal facilities and infrastructure budgeting and management needs.	DOE	14.D
6.B	32	DOE and the laboratories should continue efforts to improve facilities and infrastructure by halting the growth in deferred maintenance and speeding up the deactivation and decommissioning of excess facilities. DOE should work with Congress and OMB to agree upon the size and nature of the resources shortfall for facilities and infrastructure, and to develop a long-term plan to resolve it through a combination of increased funding, policy changes, and innovative financing.	DOE, Laboratories, Congress, and OMB	14.D
6.B	33	DOE, the laboratories, Congress, and OMB should actively work together to identify appropriate situations and methods for utilizing innovative financing approaches, such as third-party financing, enhanced use leases, and other methods, including State funding, gifts, and leveraging partnerships with other Federal agencies.	DOE, Laboratories, Congress, and OMB	14.D
6.C	34	DOE should maintain focus on increasing institutional capability and imposing greater discipline in implementing DOE project guidance, which is currently being incorporated into its DOE directive 413.3 B. There should be more peer reviews and "red teams" within DOE.	DOE	15.G
6.C	35	The Commission supports the recent Secretary of Energy Advisory Board task Force recommendation to put more resources into science and technology development for the EM program given the technical complexity of its projects.	DOE, Administration, and Congress	15.G
7.C	36	A standing body should be established to track implementation of the recommendations and actions in this report, and to report regularly to DOE, the laboratories, the Administration, and the Congress. This body could assist Congress in developing a rational plan for future evaluations of the DOE laboratories.	DOE, Administration, and Congress	16.D