

Overview of Research and Development Los Alamos and Sandia National Laboratories

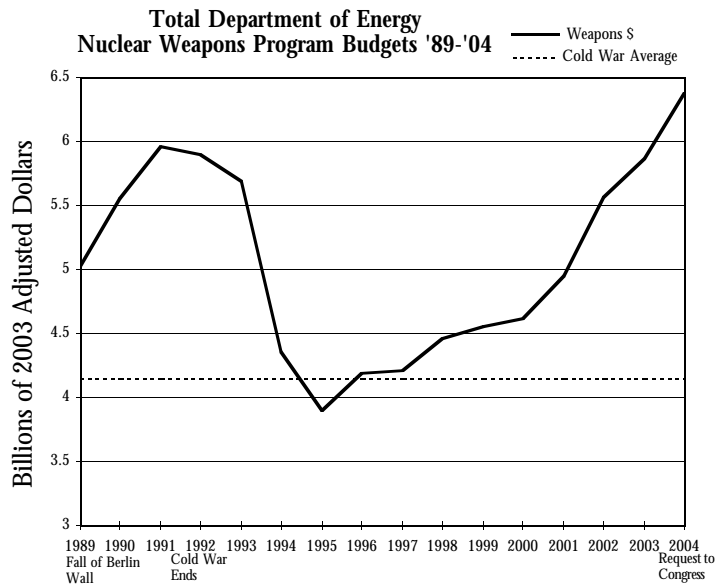
Introduction:

The Cold War ended over a decade ago, yet one would hardly guess it from a glance at recent U.S. nuclear weapons budgets. Even though the Soviet threat dissolved into bankruptcy, the U.S. continues to sink vast sums of money into research, development, design, re-design, and maintenance of its nuclear weapons stockpile. The close of the Cold War saw a phase in U.S. nuclear weapons policy that could have dramatically shifted the national laboratories away from the nuclear weapons program to programs that were of more direct societal impact. That new policy had its roots in the self-imposed nuclear weapons testing moratorium under the Bush Sr. Administration.

Unfortunately, a great opportunity was lost. The national laboratories and the Department of Energy were too heavily entrenched and financially committed to the nuclear weapons program. While facing massive budget cuts and restructuring to result from the then pending ratification of the Comprehensive Test Ban Treaty and expected ratification of the Strategic Arms Reduction Treaty, the national labs successfully persuaded Congress that a new research program was needed to ensure the reliability of the U.S. nuclear weapons arsenal. The treaties never made it past Congress, and it is doubtful they ever will. A moment to dramatically refocus the Nation's priorities was lost, and a new nuclear weapons program was born whose primary goal is to ensure that nuclear weapons are here to stay.

That new program is called Stockpile Stewardship and Management (SS&M). The thrust of this program is two-fold. First, it is tasked with maintaining a reliable and robust nuclear weapons stockpile and second, to create a complex super-computing system to be used to simulate nuclear weapons tests.¹ Funding for nuclear weapons dropped or stabilized, for the individual national laboratories, in the mid 1990s. It has since taken off towards the stratosphere. As a result, the national laboratories have maintained their historic and primary mission of nuclear weapons R&D, thereby denying other vital programs the attention that they deserve.

Much has been written on the economic repercussions of the Cold War for the U.S. and the Soviet Union. Many authors have commented on how both nations neglected important social programs and infrastructure during the Cold War. However, very little attention is being paid to the Department of Energy's (DOE) current spending spree, endorsed by Congress, on nuclear weapons programs. Nuclear weapons are now costing more than the yearly average of the entire U.S. Cold War nuclear weapons program. Though this fact



sheet is not the place to discuss the over-arching issues of the U.S. nuclear weapons program versus the important social needs this Nation currently faces, it will underscore the overwhelming emphasis nuclear weapons programs receive at the two national laboratories in New Mexico. This will be contrasted to programs such as alternative energy R&D that only receive lip service by leaders at the national labs. Furthermore, by using Congressional budget authorization numbers and DOE funding requests, this fact sheet will demonstrate that the nuclear weapons business is far from over, despite the fact that there is no tangible threat to U.S. superiority to either its nuclear or conventional forces.

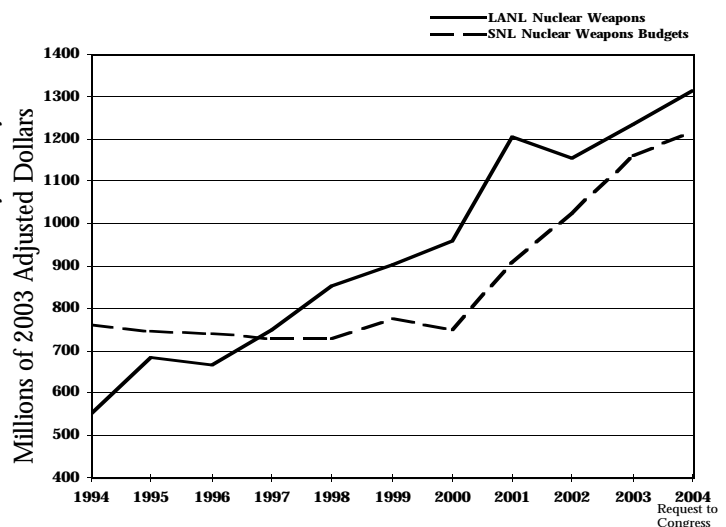
Nuclear Weapons:

In its most recent budget request for Fiscal Year (FY) '04 (A Federal FY begins October 1 and ends September 30, of the following calendar year), the DOE requested \$6.38 billion for its nuclear weapons programs.ⁱⁱ This is 54% over the yearly average spent by the DOE and its predecessors from FY '48 to FY '92 as demonstrated in the graph on the previous page.ⁱⁱⁱ Budgets had dramatically shrunk directly after the Cold War. By FY '95 funding for the entire nuclear weapons program was down to its post-Cold War low, a mere \$3.89 billion. It is worth noting that the FY '95 budget was the lowest funding level since FY '80. They were to begin rising again in FY '96. The FY '04 request is 64% higher than the funding received in FY '95. Out of the requested \$6.38 billion total for nuclear weapons programs for FY '04, Los Alamos National Laboratory (LANL) and Sandia National Laboratories (SNL) will receive \$2.53 billion combined, 40% of the total nuclear weapons budget for DOE.

LANL: Out of the \$2.53 billion to be divided between the two New Mexican national laboratories, LANL will receive the largest share. The DOE has requested that LANL's nuclear weapons programs be funded at \$1.31 billion. This accounts for 76% of the entire \$1.72 billion of DOE's funding for the lab for FY '04. This leaves 24% for other programs, including the cleanup of 60 years of environmental contamination left behind by the nuclear weapons program.

SNL: Sandia will receive \$1.23 billion for its nuclear weapons programs in FY '04. DOE has requested that the entire lab be funded at \$1.51 billion, meaning that nuclear weapons R&D consumes 81% of DOE's funding for the lab, leaving a mere 19% for other R&D programs, including SNL's often touted renewable energy projects.

LANL and SNL Nuclear Weapons Programs '89 - '04



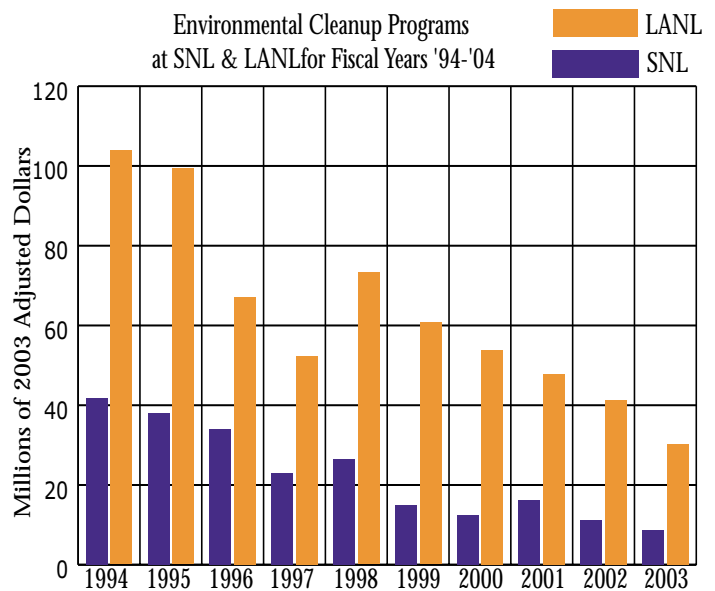
Both LANL and SNL receive funding under a category called "Work for Others." Work for others would include agencies such as the Department of the Army, Health and Human Services, National Aeronautics and Space Administration as well as others. These agencies provide separate funding for research projects that they have commissioned the labs to work on. During the 1990s, Work for Others funding at SNL was between \$200-\$400 million annually in addition to the funding already received from DOE. At LANL, the

funding was between \$100-\$200 million annually. At the time of this writing, funding under the Work for Others category in FY '03 and FY '04 was not known.

The DOE, and more particularly the directors of LANL and SNL, want us to believe that they are on the cutting edge of research programs on topics ranging from environmental restoration, cleaner energy generation and energy efficiency, and renewable energy sources. Hand-in-hand with this argument is a not so tacit claim that nuclear weapons programs are no longer the heartbeat of the two labs. In late September 2002, John Browne, then Director of LANL, was quoted by local media as stating that “[LANL’s] role in the next 10 to 20 years [will be] one that will focus more on reducing the threat of biological weapons and finding ways to reduce pollution in the atmosphere.”^{iv} This is an interesting projection, and one that NWNM would welcome, but it is a projection that is at odds with historical budgetary trends. Those trends have demonstrated that nuclear weapons programs take priority above all else, and it is highly dubious that the trend will change in the coming decade. For Browne’s claims to be fulfilled, the DOE and the national laboratories would have to undergo massive restructuring and refocusing of their current mission of nuclear weapons R&D. Such a refocusing would require a drastic policy change originating from the highest levels of the Federal government, specifically the Executive Branch. Even if there were some degree of policy change, it is highly unlikely that funding for the programs that Browne mentions will even come close to the funding levels currently enjoyed by the nuclear weapons R&D mission. History itself can be very telling about the overwhelming emphasis the DOE and national labs have and will continue to place upon nuclear weapons R&D programs above all else.

Urgent Needs, Shrinking Budgets:

Environmental Cleanup: DOE categorizes cleanup into two classes. The first is environmental restoration (ER) and the second is waste management (WM). ER programs at both New Mexico laboratories are responsible for cleaning up of the hazardous, mixed, and radioactive wastes generated during the Cold War era^v. During the Cold War, there were poor or even no environmental standards that regulated releases of contaminants. As an example, for years LANL dumped contaminated waste water directly into the canyon systems found throughout laboratory property. Solid wastes were dumped into unlined pits and trenches, which are now beginning to leak into the surrounding environs. The ER program attempts to address these issues, albeit not as quickly and effectively as NWNM and State regulators would like to see.



WM is generally considered to be the management, packaging, and disposal of wastes generated from the ongoing, post-Cold War, nuclear weapons missions. WM cannot be accurately called cleanup, as it does nothing to remove existing contaminants from the soil and water at the national labs. In essence, WM is the continuation of business as usual. The New Mexico Environment Department (NMED), armed with

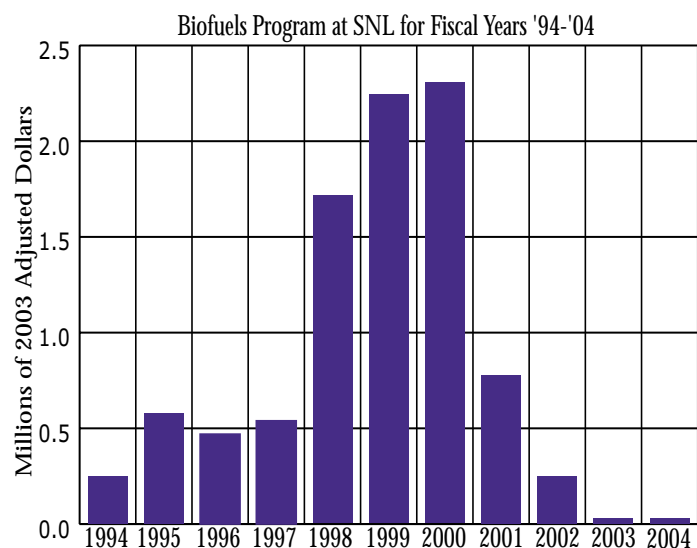
stronger environmental laws such as the Resource Conservation and Recovery Act (RCRA), is now in the process of attempting to compel both LANL and SNL to meet their ER obligations for some 50 years of negligent dumping of wastes. In its most laudable effort to date, NMED issued a Corrective Action Order to LANL and its landlord, the University of California (UC). LANL and UC are vigorously challenging this Order in court. If they are successful, such a precedent would greatly weaken the ability of all 50 States to effectively regulate environmental compliance by Federal facilities within their state lines. A similar order to SNL has also been released and is being challenged in court by DOE.

The DOE has neglected environmental restoration at all of its facilities within the nuclear weapons complex. Under the early Clinton Administration, ER programs were heavily funded, but with the Republican takeover of Congress and the appointment of more conservative DOE officials, funding for ER programs have dropped dramatically. Furthermore, DOE has begun combining funding for ER with the funding for WM, which is a blatant obfuscation of the facts. Combining these two budget categories makes the DOE look good on paper and enables it to make the claim to Congress and the public that it is pursuing a rigorous cleanup schedule, a claim that reality on the ground proves false. This is particularly noticeable at SNL and LANL. By breaking down the combined WM/ER budget category, ER receives about a half of the program funding at each lab. This sounds good in theory, but the funding levels are ultimately very poor, despite the environmental catastrophe caused by 5 decades of contamination. In fact, the contamination is so bad that in the NMED's Corrective Action Orders for both labs, NMED declared that there is an "imminent and substantial endangerment to health or the environment."^{vi} The sorry tale of DOE's lack of commitment to cleanup can be seen in the graph on the previous page.

In FY '94, funding for ER was at its highest levels since the ER program's inception. LANL's ER program saw funding levels of \$104.2 million and SNL's program was funded at \$41.9 million. In FY '03, that funding is down to \$30.3 million for LANL and \$8.6 million for SNL. That is a decrease of 71% and 79% respectively since FY '94. Funding for ER programs at LANL make up 2% of the lab's total DOE funding. For SNL, ER funding consumes about 1/2 of 1 percent of SNL's DOE funded budget. Complete budget data is not yet available for FY '04 on ER programs pending decisions by DOE.

Biofuels: Fuels based upon biomass appear to be a very promising source of energy, allowing farmers, small towns, and large cities to capture gases such as methane from decomposing solid wastes and generate electricity by burning that methane. Furthermore, biomass fuels such as wood, corn, etc., may be used to extend the life of the massive and costly coal fired electricity generating plants by replacing coal with biofuels. Such a substitution, in addition to being a renewable cycle, could greatly reduce the amount of heavy metals, like lead, that are produced by firing plants with coal.

The only national laboratory that receives discrete funding for biofuels and biomass R&D is SNL. In FY '00 DOE dedicated \$2.31 million

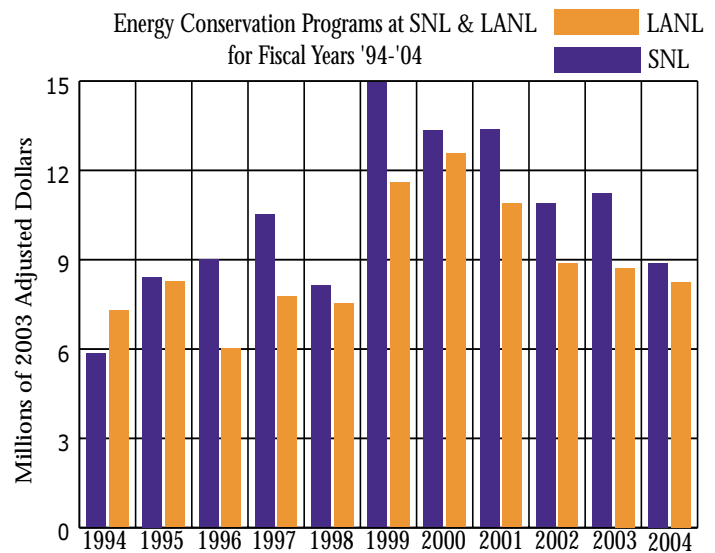
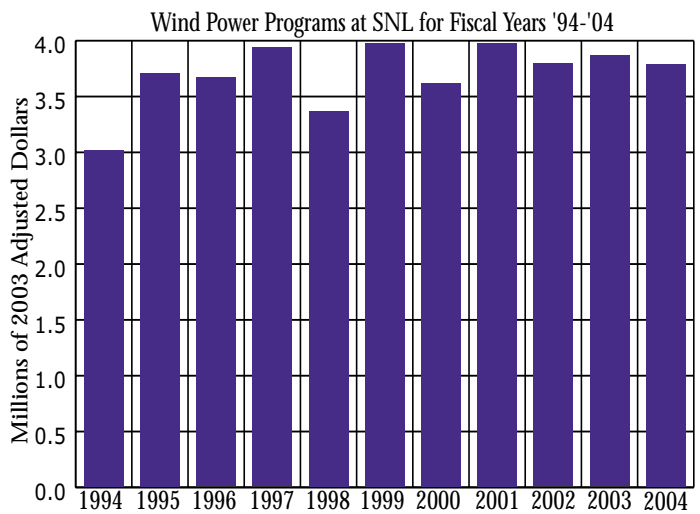
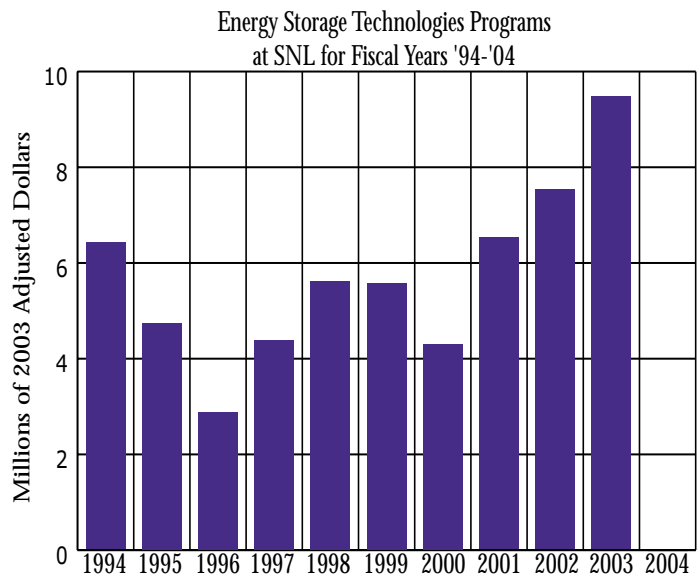


to such programs, but that has now been decreased to \$30,000 in FY '04, representing less than 1/10 of one percent of SNL's total DOE funding. In comparison to the highest point of funding in FY '00, funding for biofuels programs have decreased by 99%.

Energy Storage Systems: This SNL program, which includes research on advanced battery technologies, has actually seen a rise in funding over the past decade. The DOE has requested that the program be funded at a level of \$9.5 million for FY '04 but was zeroed in FY '04. The FY '04 funding was a three-fold increase in funding compared to its low-point in FY '96. It is unfortunate that funding has been eliminated for energy storage technologies. Research in this field will become increasingly important, particularly as more hybrid (gas/electric) and electric cars make a bid to enter the U.S. market.

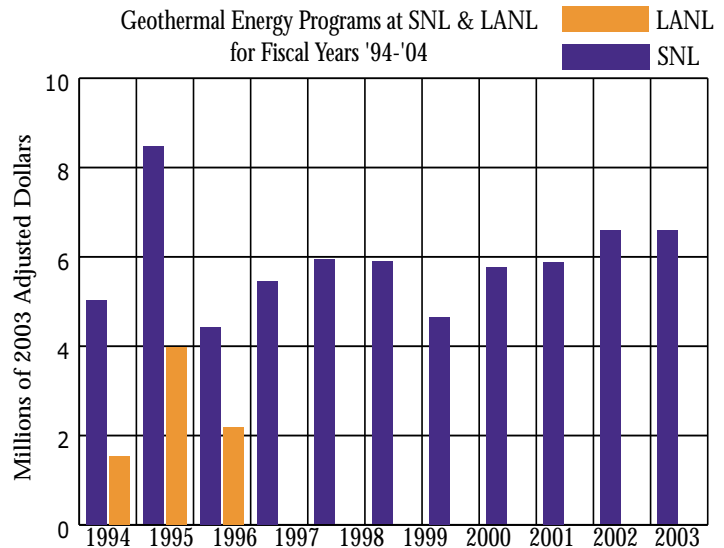
Wind Power: The DOE has requested that SNL's wind power research program be funded at a level of \$3.8 million in FY '04. Funding for this program consumes less than 1/4 of one percent of SNL's total funding from DOE in FY '04. This is probably the most shockingly underfunded program. Wind energy production is one of the fastest growing sources of electricity in the U.S., and New Mexico is commonly thought to be one of the best states to locate wind farms. Technologies developed by SNL could greatly benefit the State economy by creating high-tech spin-off opportunities. Furthermore, wind energy technologies, and the development of wind farms could greatly improve smog problems now seen in the Middle Rio Grande Valley that are due in part to the coal fired power plants in the Four Corners region of the State. The use of wind power would also greatly reduce water consumption were it to be used as an alternative to the State's coal fired plants.

Energy Conservation: Research under this category is conducted at both LANL and SNL. Work in this field supports Federal agency initia-

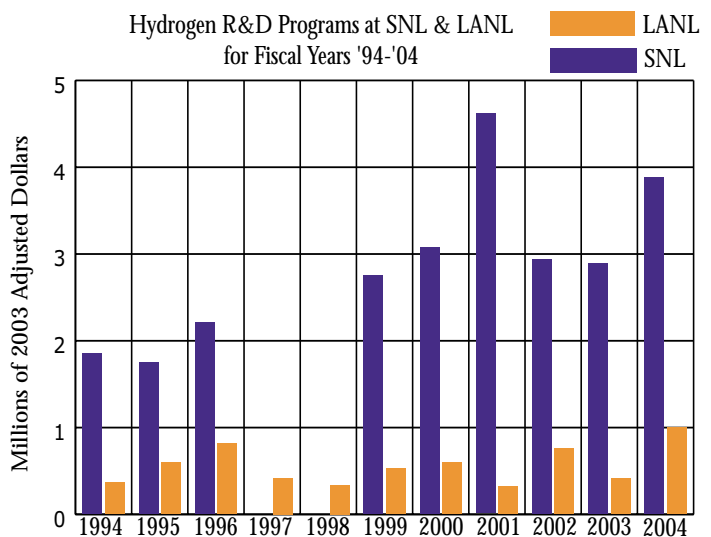


tives to improve the use of electricity and heating and air conditioning systems in office buildings, among other things. This program also provides the public sector with new technologies, materials, equipment, and appliances that reduce the nation's consumption and waste of energy. The DOE requested funding for this program at LANL and SNL for FY '04, is \$8.27 million and \$8.91 million respectively. FY '99 saw the peak funding rate at \$11.63 million and \$14.99 million respectively. In comparison to overall DOE funding for LANL and SNL, energy conservation receives less than 1/2 of one percent at LANL and just over 1/2 of one percent at SNL.

Geothermal Energy: LANL has not received a discrete budget item for geothermal energy capture research since FY '96, despite the fact that the Jemez Mountain range, in which LANL is situated, is a hot bed of geothermal activity. For FY '04, DOE requested that SNL's geothermal energy program be funded at a level of \$6.6 million, or just under 1/2 of one percent of SNL's total DOE funding. This is surprising given that New Mexico has strong potential for geothermal energy capture considering the amount of near-surface volcanic venting activity within the State. Application of this technology could also provide the State with economic benefits, including jobs generated from the development of hot water vents.



Hydrogen Energy Sources: This category, which includes research in hydrogen fuel cell technology for applications such as automobiles, etc., will receive funding at the level of \$1.0 million and \$3.9 million at LANL and SNL respectively for FY '04. This translates into a budget commitment of 1/4 of one percent at LANL and 1/2 of one percent at SNL. The lack of funding for this program boggles the mind, given that hydrogen fuel technology promises to be one of the more important energy frontiers in the coming decade, and that President George W. Bush stated in his State of the Union address that substantial resources would be devoted to hydrogen research this year (FY '04).

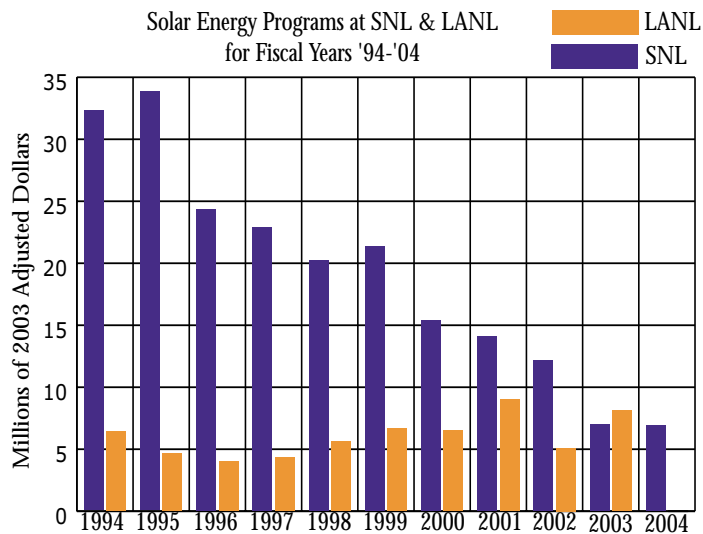


Solar Energy: During the mid-90s, SNL invested a sizeable amount of money into solar energy technology development. In FY '95, solar energy R&D received a budget commitment of \$33.94 million. That funding, however, has dropped down to a paltry \$6.92 million requested for FY '04. At LANL funding is equally dismal, at a mere \$8.18 million last year which has been zeroed in FY '04. In comparison to the DOE's total funding of the two labs in its FY '03 request, solar energy R&D will receive 1/2 of one percent at SNL

and zero at LANL. Solar energy capture, on a commercial scale is much more land-use intensive than that of wind energy, however, given the climate of the Southwest it is shocking that so little effort by the two national labs is going into technologies that could be used to make solar energy capture more practical.

Downbeat:

The above-discussed programs are the only renewable energy R&D programs, along with site-specific environmental cleanup (ER) that receive line-item budget descriptions in the DOE's funding requests submitted to Congress over the past decade. The two national labs may indeed conduct research on renewable energy within other budget categories (i.e., at the sub-program level), however the funding for such research can be guaranteed to be very minute. As a result, funding at the sub-program level would not make a calculable difference in the figures presented above. Therefore, the program descriptions represent an accurate and complete picture of LANL and SNL's commitment to renewable energy R&D over the past decade.



The DOE's SNL funding request during FY '04 for renewable energy programs R&D totals \$30.16 million. The funding for renewables accounts for 2.0% of SNL's total budget. Renewable energy R&D will receive 10.3% of the FY '04 funding that is not solely dedicated to nuclear weapons R&D and production.

At LANL, renewables have a total requested funding level of \$9.27 million for FY '04. That amounts to just over 1/2 of one percent of LANL's total DOE operating budget. Of the funding not specifically dedicated to nuclear weapons programs, renewables will receive 2.2% of LANL's financial commitment to non-nuclear weapons budget items.

A Nuclear Weapons Tax?:

Both national labs have a program called Laboratory Directed Research and Development (LDRD). LDRD is a tax of up to 6% on all DOE funding that the lab can apply to other programs at its discretion. The LDRD funding is intended to "maintain the scientific and technical vitality of the laboratories; enhance the laboratories' ability to address future DOE missions; foster creativity and stimulate exploration of forefront science and technology..."^{vii} Because of the great emphasis placed upon nuclear weapons by the DOE and its national laboratories, LDRD primarily supports advanced nuclear weapons R&D. SNL taxed its budget to the tune of 5.5% in FY '02, thereby re-directing \$78 million from other programs such as renewable energy R&D to support its primary mission of nuclear weapons work. If SNL "taxes" its budget at the same 5.5% level in FY '04, funding for renewable energy R&D will be decreased by \$1.66 million. If LANL were to do the same, funding for renewables would be decreased by \$510,000, the majority of it to benefit nuclear weapons work at the labs.

Conclusion:

The public relations machines at the labs may be in high gear in an attempt to remake the labs' historic image as designers, developers, and producers of nuclear weapons. Lurking in the background, however, is the truth that they remain the weaponeers of the decades old stereotype. And in program oriented documents, neither LANL nor SNL attempt to paint a picture that is otherwise. In its Institutional Plan, LANL states that "LANL's core mission is nuclear stockpile stewardship..." LANL relegates research programs such as renewable energy to the category of "Ancillary."^{viii} Such statements meet in a head on collision course with the claims of former lab Director Browne when he asserts that research programs such as the environment will come to the forefront of the lab's strategic mission. In its 5-year plan, SNL opens the section titled "Strategic Objectives and Intermediate Goals" with "Nuclear Weapons: Our Primary Mission."^{ix} The nuclear weapons industry in New Mexico is far from over; indeed, it is growing by leaps and bounds. All this is at the cost of important R&D programs, and the long-needed environmental cleanup, that could have a positive impact to our State's environment as well as economy.

In a recent analysis of the impacts of renewable energy infrastructure development, such as the construction of wind farms, geothermal plants, and solar energy sources, the New Mexico Public Interest Research Group (NMPIRG) came up with some interesting data. Using conservative models and data developed by the DOE's National Renewable Energy Laboratory (RNEL), NMPIRG asserts "New Mexico could generate over 116,000 GWh/y [gigawatt hours per year] of electricity" from wind, "over three times the amount the state generated in 1999."^x NMPIRG states that total wind generating capacity grew in the Nation by 60% during 2001. Taking that model and existing knowledge of prime locations in New Mexico for wind generation, they claim that by 2010 New Mexico could be "generating more than 3,500 GWh/y of electricity emission free."^{xi} Calling for an aggressive but reasonable approach to renewable energy development, NMPIRG claims that by 2010 New Mexico could be generating a majority of its energy from renewable sources, which, when combined with energy efficiency and conservation programs, would allow the state to replace many of its conventional energy generators, such as coal, and still remain a large exporter of electricity to other states. Such a transition, NMPIRG asserts, would not hit the consumers' pocket book, as the cost of renewable energy production is easily on par with conventional power per kW/h with recent advances in technology. Furthermore, they claim that such initiatives would have a net gain of "4,200 additional jobs by 2010."^{xii} These jobs would come in the form of technically skilled maintenance crews, as well possible small companies dedicated to supplying or manufacturing parts for the energy systems. Should the national labs refocus their attention away from nuclear weapons towards renewables and environmental technologies, the potential for spin-off would be immense. Additionally there would be a direct conduit between the R&D community and direct field application. This in turn could further advance the degree of efficiency as well as increase job potential. NMPIRG's projection of a net gain of 4,200 new jobs by 2010 is more than half the number of jobs that were held at SNL during 2003. Therefore, without even considering the secondary and tertiary job impacts, and a possible "high-tech" boom that would likely result in a reasonable but aggressive renewable energy program, it is clear that the direct impact on the State's economy would be vast.

There are huge untapped potentials, yet those potentials are being neglected at both the DOE national laboratories and at the State level. New Mexico is gifted with a huge research and development community centered around the national laboratories, as well as an ideal climate and geology that make it a prime source for renewable power generation. Combined, these two factors could make New Mexico a model of renewable energy development for other states. Why is that not happening?

Recommendations for Citizens:

- Members of the New Mexico public should vigorously encourage State level decisionmakers to legislate an aggressive renewable energy development program
- Governor Bill Richardson should be specifically targeted and be pressured to make renewable energy development a priority of his Administration. This could be particularly useful, given his strong connections with the DOE because of his former position as DOE Secretary under the Clinton Administration.
- Lobby local city and county level government, as well as chambers of commerce, and educate them about the local job creation possibilities of renewable energy development.
- Call your New Mexico Congresspeople and ask them to request higher funding levels for renewable energy R&D programs at LANL and SNL. Additionally, ask them to mandate that LANL and SNL work cooperatively with the State, local communities, and utility companies by providing the research and development base behind which a strong renewable energy program could be developed.
- If an option, choose to specifically purchase “green” energy from your utility company.

ⁱ For more information on the Stockpile Stewardship and Management Program and the nuclear weapons work that fall under its rubric, please see the following documents: *Alterations, Modifications, Refurbishments, and Possible New Designs For the US Nuclear Weapons Stockpile* and *An Overview of Current and Planned U.S. Nuclear Weapons*. Both documents can be found electronically at www.nukewatch.org.

ⁱⁱ All FY '04 budget figures are for DOE's funding request to Congress. During the appropriations process, it is likely that Congress will make some adjustments.

ⁱⁱⁱ The Cold War average was compiled from Atomic Audit, Stephen I. Schwartz, Editor, The Brookings Institution Press, 1998. All other budget figures have been compiled from DOE Congressional Budget Requests, LANL and SNL Institutional Plans, and LANL Comprehensive Site Plans. All budget figures have been adjusted to 2003 dollars using the Consumer Price Index, as calculated by the Federal Reserve Bank.

^{iv} *Albuquerque Journal, North Edition*, “Lab Not Pursuing Pits,” September 27, 2002.

^v Mixed wastes are a combination of hazardous and radioactive wastes generally regulated under the Resource Conservation and Recovery Act (RCRA), a Federal law which gives states the primary regulative authority.

^{vi} “Secretary’s Determination of an Imminent and Substantial Endangerment to Health and the Environment,” issued for SNL, NMED, September 3, 2002, http://www.nmenv.state.nm.us/HWB/SNL/order/SNL_ORDER_SNG.pdf. “Determination of an Imminent and Substantial Endangerment to Health and the Environment” issued for LANL, NMED, May 2, 2002, <http://www.nmenv.state.nm.us/HWB/lanl/ISE.pdf>.

^{vii} Institutional Plan, FY 2002-2007, Sandia National Laboratories, p. 6-41.

^{viii} Institutional Plan, FY 2002-2007, Los Alamos National Laboratory, p. 1.

^{ix} Institutional Plan, FY 2002-2007, Sandia National Laboratories, p. 3-3.

^x “Clean Energy Solutions, Energy Efficiency and Renewable Energy in New Mexico,” Marianne Zugal and Brad Heavner, NMPiRG Educational Fund, March 2002, p. 16, <http://www.nmpirg.org/reports/CleanEnergyReport.pdf>.

^{xi} *Ibid.*

^{xii} *Ibid.*, p. 39.

Comments, questions, and corrections are always welcomed. Please address them to Colin King, Research Director, Nuclear Watch of New Mexico, 551 West Cordova Rd., 808, Santa Fe, New Mexico, 87505, (505) 989.7342, or colinking@nukewatch.org.

Colin King, March, 2003