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ENERGY RESEARCH

Recovery of Federal  
Investment in Technology  
Development Projects

Statement of Allen Li, Associate Director  
Energy, Resources, and Science Issues,  
Resources, Community, and Economic  
Development Division



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Mr. Chairman and Members of the Subcommittee:

We are pleased to be here today to summarize the results of our recently issued report on recovering the federal investment in technology development projects.<sup>1</sup> At the Subcommittee's request, we (1) determined the extent to which the Department of Energy (DOE) requires repayment of its investment in cost-shared technology development, including the similarities and differences in the mechanisms used, and (2) identified advantages and disadvantages of repayment. We focused our work on four DOE offices—Fossil Energy, Energy Efficiency and Renewable Energy, Environmental Management, and Nuclear Energy—because they fund most of the Department's cost-shared technology development programs and projects involving contracts and cooperative agreements.

In summary, we found that:

- DOE generally does not require repayment of its investment in cost-shared technology development projects. We identified only four programs in DOE that require repayment of the federal investment if the technologies are commercialized. The offices on which we focused our review plan to devote about \$8 billion in federal funds to cost-shared projects, of which about \$2.5 billion is subject to repayment. The mechanisms used for repayment are similar in that they generally require a portion of royalties and fees from licensing technologies and revenues from commercial sales. One program allows for recovery of 150 percent of the federal investment, while the other three are limited to 100 percent.
- The major advantage of having a repayment policy is that the federal government could recover some of its investment in successfully commercialized technologies. However, according to DOE officials, repayment could also discourage some in industry from commercializing technologies or participating in projects, create an administrative burden on both DOE and industry, and cause technologies to become less competitive. We believe that many of the disadvantages can be mitigated by structuring a flexible repayment requirement with the disadvantages in mind. A flexible repayment requirement would allow the government to share in the benefits of successfully commercialized technologies that could amount to hundreds of millions of dollars.

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<sup>1</sup>Energy Research: Opportunities Exist to Recover Federal Investment in Technology Development Projects (GAO/RCED-96-141, June 26, 1996).

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## Background

DOE and the private sector are involved in hundreds of cost-shared projects aimed at developing a broad spectrum of cost-effective, energy-efficiency technologies that protect the environment; support the nation's economic competitiveness; and promote the increased use of oil, gas, coal, nuclear, and renewable energy resources. The offices in our review are funding more than 500 projects under contracts and cooperative agreements with industry that are expected to cost more than \$15 billion by the time they are completed. As we mentioned, DOE plans to fund about \$8 billion and industry the balance.

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## Four Programs Require Repayment

The four programs that require repayment are the (1) Clean Coal Technology Program, which accounts for about 90 percent of all current and planned funds subject to repayment; (2) Metals Initiative Program; (3) Electric Vehicles Advanced Battery Program; and (4) Advanced Light Water Reactor Program, which requires repayment for some projects in the program. The time periods for repayment to DOE generally range up to 20 years after the projects end. The Clean Coal Technology and Electric Vehicles Advanced Battery Programs allow grace periods before repayment begins if starting repayments earlier would adversely affect the competitiveness of the technologies in the marketplace.

DOE is investing more than \$2.2 billion in the Clean Coal Technology Program through the year 2003. The funds have been committed to more than 40 demonstration projects that were selected in five separate rounds of nationwide competitions conducted from 1986 to 1993. These cost-shared projects demonstrate innovative technologies for using coal in a more environmentally sound, efficient, and economical manner. When the program began, DOE made a programmatic decision, in consultation with industry and the Congress, to require repayment of the federal investment if the technology is successfully commercialized. As the program matured, DOE revised the repayment provisions to respond to industry's concerns and lessen the likelihood that repayment could hamper the competitiveness of the project participants. Among other things, DOE reduced the percentage of revenues from technology sales that are subject to repayment, excluded foreign sales from repayment, and allowed a grace period before repayment begins to ease the technology's initial market penetration. As of June 30, 1996, DOE had received payments totaling about \$379,000 from participants of four completed projects.

The Metals Initiative Program is the only program that allows repayment that exceeds DOE's investment. This program shares in the cost of research

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and development projects intended to increase energy efficiency and enhance the competitiveness of domestic steel, aluminum, and copper industries. Legislation requires repayment of up to 150 percent of the total federal investment from the proceeds of the commercial sale, lease, manufacture, or use of the technologies developed under the program. Repayment applies to both domestic and foreign sales. DOE has spent about \$60.9 million for completed or terminated projects and plans to spend about \$41.9 million for active projects. According to DOE officials, none of the projects have begun repayment yet, but repayment for one is expected to start later this year.

Under the Electric Vehicles Advanced Battery Program, DOE and a consortium of automobile companies, together with participating electric utilities and battery developers, are cost-sharing \$206 million in development costs for advanced batteries to be used in electric vehicles. DOE is contributing about \$103 million through 1996, and the other project participants are providing the balance. DOE expects to approve additional funding to continue this research after the participants submit their funding needs. As recommended in a Senate appropriations report, DOE requires repayment of its investment if the advanced batteries are commercialized. Repayment, which has not yet begun, applies to both domestic and foreign licensing revenues.

Some projects under the Advanced Light Water Reactor Program provide for repayment of all or part of the federal investment. This program's primary focus is to make standardized advanced nuclear reactors available in time to help meet the projected needs for future power generation. As recommended in an appropriations report, DOE is requiring the repayment of \$14 million in additional funding provided for a project under the design certification component of the program. DOE also may require the repayment of any additional future funding for this project and another design certification project. DOE's original contractual commitment to these two projects is not subject to repayment. DOE also requires that its investment in two first-of-a-kind engineering projects aimed at producing more detailed designs and reliable construction schedules and cost estimates, which is expected to total \$100 million, be repaid from royalties from the sale or use of the plant designs or technologies. Repayment, which has not yet begun, covers both domestic and foreign sales.

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## Advantages and Disadvantages of a Repayment Policy

As we mentioned, the primary advantage of a repayment policy is that the government could recover some of its investment in the development of technologies. A repayment policy could also provide more assurance that industry cost-shared project proposals are sound and economically viable by discouraging proposals that are too marginal financially for their sponsors to commit to repayment.

In 1991, DOE considered having a Department-wide policy to recover its investment in technology development projects and developed a draft order with criteria and guidelines for determining when repayment is appropriate. But due to substantial opposition within the Department and the departure of the Deputy Secretary who was the primary supporter of this concept, the order was never implemented.

In discussing technology development programs and projects with DOE Deputy Assistant Secretaries and other DOE officials, many of them said that certain types of projects might be appropriate candidates for repayment of the federal investment if new projects are undertaken.<sup>2</sup> The officials generally indicated that repayment should be more applicable to projects with a large federal investment that is easily identified, projects involving technologies that are close to commercialization, projects in which the federal investment serves to reduce the costs and risks of providing the technology to potential users, and projects that have large, well-financed industry teams. They also said that technologies that have a large potential market and technologies that are likely to be commercialized in foreign countries are good candidates for repayment.

DOE officials indicated, for example, that the Reservoir Class Field Demonstration Program might be appropriate for repayment if future projects are undertaken. This program shares costs for demonstrations of existing and new technologies for increasing production from oil fields that might otherwise be prematurely abandoned. They also indicated that the Advanced Turbine Systems Program might be appropriate if new projects are begun. This program is intended to develop more efficient, advanced turbine systems for both utility and industrial electric power generation.

Many of the DOE officials generally indicated a willingness to consider repayment for new projects, but they said that flexibility should exist allowing them to structure repayment to meet program needs or waive

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<sup>2</sup>DOE officials said that, except for the projects under programs that already require repayment, only new or follow-on projects should be considered for repayment because of the difficulty in renegotiating applicable cooperative agreements or contracts.

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repayment when not appropriate. For example, some officials believe that repayment may not be suitable for grants, universities, and small businesses or for projects that are directed at basic research. Others indicated that repayment should be waived if the federal investment is considered disproportionately small in comparison with the potential costs of administering the repayment process.

DOE officials also pointed out several disadvantages to the government or industry participants that would need to be addressed if repayment is required. Some DOE officials believe that repayment could discourage industry from participating in cost-shared projects or commercializing the technologies. We recognize that a repayment requirement might have some influence on participation in technology development projects or the timing of commercialization, but industry participants would not have to repay the federal investment unless the technology is commercialized. Therefore, repayment should be more favorable than a bank loan, which would have to be repaid with interest regardless of whether the technology is commercialized.

DOE officials generally believe that repayment would create an administrative burden in negotiating, administering, auditing, and enforcing repayment agreements. In our opinion, one way of making the administrative burden less onerous might be to require sample audits of industry participants' records. Another approach might be to require repayment only in those instances where the amount of potential return justifies the cost of necessary audits and other internal control measures.

Many DOE officials believe that obtaining increased industry cost-sharing is preferable to requiring repayment of the federal investment. Some officials argue that it may be better to obtain an increased cost-share from all participants than to obtain repayment only from those successfully commercializing their technologies. However, in our opinion, an argument can still be made that taxpayers have an interest in the repayment of taxpayers' dollars when technologies developed with federal funds are commercialized.

According to DOE, repayment might adversely affect the ability of the entity carrying out the project to compete in the marketplace (that is, to proceed with commercialization of the technology and achieve a rate of return commensurate with the industry and the risk). We believe one way of mitigating this concern could be to allow a grace period after a project

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ends before requiring repayment to begin (as was done in two of the programs that require repayment).

We recognize that some types of projects may not lend themselves to repayment for various reasons and that repayment has disadvantages. However, we believe it may be possible to mitigate the disadvantages in many cases by structuring a flexible repayment policy.

We recommended in our report that the Secretary of Energy develop and implement a Department-wide policy for requiring repayment of the federal investment in successfully commercialized cost-shared technologies. The policy should provide criteria and flexibility for determining which programs and projects are appropriate for repayment.

In commenting on a draft of our report, DOE did not explicitly state whether it would develop and implement a repayment policy. However, DOE agreed that any repayment policy should provide the flexibility for determining which programs and projects are appropriate for repayment. DOE believes that a policy should also have flexibility in determining the repayment terms, and when and how they should be applied so as not to adversely affect the development or introduction of technologies into the marketplace.

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Mr. Chairman, this concludes our prepared statement, which has highlighted some of the information contained in our report. We will be pleased to answer any questions that you or Members of the Subcommittee may have.



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