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U. S. Department of Energy Credit Programs: A Primer

In 2004 and 2005, Congress authorized the United States Department of Energy (DOE) to begin offering substantial loan guarantees and other credit assistance in support of its missions. In 2004, for example, a loan guarantee was authorized for a proposed gas pipeline from Alaska to the lower 48 states – potentially, the largest construction project in U.S. history. The Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007 added further loan guarantee programs for a variety of energy initiatives. In the past, the DOE had several loan guarantee programs which were undertaken in the 1970s and 80s to promote coal gasification and the use of ethanol fuel, but these prior programs were plagued by defaults and are no longer in effect.

The DOE's new credit programs are intended to encourage innovative energy projects, help the U.S. develop alternative energy sources and diversify the sources of reliable energy. The cost and effectiveness of these new credit programs will greatly depend on how specific programs are structured by the DOE, the types of projects which are approved and the extent to which Congress appropriates funds sufficient to cover the net subsidy cost of these programs. This primer focuses only on the recent credit programs of the DOE and is intended to provide a neutral explanation of those programs. COFFI does not normally take policy positions.

Basics:

- What is the DOE?
- What are the DOE's credit functions?

- Who typically receives loans or financial assistance?
- How does the DOE provide credit?

DOE Credit Programs

- What special purpose credit programs are offered?

Current Issues

- What steps do the Congress and the DOE need to take in implementing the new credit programs?
- How will the DOE decide to support a particular project?

Conclusion

- What is the future of the DOE credit programs likely to be?

Basics

What is the DOE?

The DOE was officially formed in 1977, assuming the responsibilities of the Federal Energy Administration, the Energy Research and Development Administration, the Federal Power Commission and parts of several other agencies. The DOE is a cabinet department, directed by the Secretary of Energy (the Secretary), and overseen in Congress by the House Committee on Energy and Commerce and the Senate Committee on Energy and Natural Resources.

Its missions are to:

- Advance the national, economic and energy security of the United States;
- Promote scientific and technological innovation in support of that mission;
- Ensure the environmental cleanup of the national nuclear weapons complex.

The largest component of the DOE budget (\$9.4 billion estimated out of \$24.26 billion proposed for fiscal year 2008) is devoted to the National Nuclear Security Administration. The next largest component of the DOE budget, \$6.6 billion, is generally devoted to environmental management, which includes the cleanup of hazardous waste and radioactive contamination at numerous sites involved with nuclear research and weapons production.

Since 2004, the DOE has been authorized to provide loan guarantees and other credit assistance in support of its missions. The net costs of these programs are

supported by annual Congressional appropriations, but only small appropriations have been made to date. With the increased emphasis on developing energy security, the DOE's credit programs may become a more important component of its budget in the years ahead. However, there may be budget constraints on the size and number of these programs since Congress will have to appropriate funds to cover the net subsidy cost of these programs. Currently, the DOE's principal credit programs are established by Congress pursuant to the Alaska Natural Gas Pipeline Act, 15 U.S.C. §720n, enacted in 2004, the Energy Policy Act of 2005, 42 U.S.C. §15801 et seq., and the Energy Independence and Security Act of 2007 (Public Law 110-140).

What are the DOE's Credit Functions?

The DOE or its predecessor agencies have operated federal loan guarantee or other credit programs for energy projects since the 1970's in such areas as coal gasification, ethanol fuel and geothermal energy, but with poor results. The DOE currently uses cooperative agreements where the DOE provides financial assistance to a project on a cost-sharing basis without taking an equity interest or security interest in the project. By contrast, the Alaska Natural Gas Pipeline Act and the Energy Policy Act of 2005 established major new loan guarantee programs and, although no loan guarantees have yet been issued under these programs, new controls and guidelines are hoped to produce more economic outcomes.

David K. Garman, Undersecretary of Energy, in testimony before the U.S. Senate Committee on Energy and Natural Resources on May 1, 2006, commented on the new loan guarantee authority in the Energy Policy Act of 2005: "We are mindful that the Department does not have an enviable record of accomplishment with loan guarantees issued in the past, but we will follow the Federal Credit Reform Act of 1990 (FCRA) and Office of Management and Budget (OMB) guidelines issued since our last experience with loan guarantees, and we will emulate the best practices of other federal agencies." In discussing the DOE's record of past loan guarantee programs, Undersecretary Garman was referring to a \$1.5 billion DOE coal gasification guaranteed loan which defaulted in 1985 and several ethanol fuel guaranteed loans which defaulted in 1986 and 1987.

Because many of the new DOE programs will provide loan guarantees for the financing of projects using new technologies or technologies where the commercial viability is uncertain, these projects will often carry significant technological risks, risk of cost-overruns, completion risk and/or project viability risk. The effect of the DOE role is thus, to reduce risk to lenders and encourage investment in energy technologies beyond what would occur otherwise.

Who typically receives loan guarantees or assistance?

Most of the loan guarantee programs are for businesses that qualify based on specific criteria established in the Alaska Natural Gas Pipeline Act, the Energy Policy Act of 2005, or the Energy Independence and Security Act of 2007, as

explained below. The renewable fuels loan guarantee programs for cellulosic biomass projects and the Clean Renewable Energy Bonds program will be available for governmental bodies and mutual or cooperative electric companies.

How does the DOE provide credit?

The DOE primarily offers loan guarantees, although there is one direct loan program to place in service a designated clean coal technology plant located near Healy, Alaska. The Clean Renewable Energy Bonds Program takes a different path, essentially providing a tax subsidy in lieu of interest on the bonds, and is administered by the Internal Revenue Service (IRS). In a number of cases the DOE has the ability to combine a loan guarantee program with production incentives, grants or cooperative agreements in which the DOE shares in the cost of projects. The DOE also provides insurance to sponsors of advanced nuclear projects against delays outside of the control of the sponsors.

DOE Credit Programs

What Special Purpose Loan Programs are Offered?

Alaska Natural Gas Pipeline Loan Guarantee Program

The Alaska Natural Gas Pipeline Act was enacted in 2004 as part of the Military Construction Appropriations and Emergency Hurricane Supplemental Appropriations Act. The Act is intended to expedite regulatory consideration, approval and construction of a project to transport liquefied natural gas from South-Central Alaska to the lower 48 states and to provide financial incentives in the form of federal loan guarantees for construction of such a project. See 15 U.S.C. §720n.

The pipeline is a 3,500 mile project that would run from the North Slope of Alaska, following the existing oil Trans-Alaska Pipeline System, then following the Alaska Highway to the Alaska-Yukon border and continuing through Canada (Alberta) to connect to a new or expanded existing pipeline which would carry the gas to the lower 48 states.

The Alaska Natural Gas Pipeline loan guarantee:

- is restricted to a single “qualified infrastructure project;”
- may not exceed \$18 billion (indexed for inflation from date of enactment);
- may be no more than 80% of the capital costs of the project;
- is further limited to a subsidy cost of the guarantee, as determined by the OMB, that does not exceed \$2 billion; and

- may not have a loan term extending beyond 30 years.

The DOE may not require any credit support for the guarantee except equity contribution commitments and a completion guarantee.

In May, 2005, the DOE issued a notice of inquiry requesting comments concerning proposed rulemaking relating to its Alaska Natural Gas Loan Guarantee Program. No specific rules have been proposed or adopted. When a commercial project emerges which is approved by the State of Alaska, the DOE will proceed with structuring the loan guarantee process. If the project is undertaken, it is expected to be the largest construction project in U.S. history and, if funded, would be the largest single-project federal loan guarantee in history.

Innovative Technology Loan Guarantee Program

The Energy Policy Act of 2005 authorizes the Secretary to make loan guarantees for projects which:

- Avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases and
- Employ new or significantly improved technologies as compared to commercial technologies in service in the U.S. at the time of the guarantee.

Projects which are eligible for the guarantee are:

- Renewable energy systems;
- Advanced fossil energy technology (including coal gasification);
- Hydrogen fuel cell technology;
- Advanced nuclear energy facilities;
- Carbon capture and sequestration practices and technologies;
- Efficient electrical generation, transmission and distribution technologies;
- Efficient end-use energy technologies;
- Production facilities for fuel efficient vehicles, including hybrid and advanced diesel vehicles;
- Pollution control equipment
- Oil refineries.

The Energy Independence and Security Act of 2007 amended the Energy Policy Act to also authorize loan guarantees for production facilities for the manufacture

of fuel efficient vehicles or their components, including electric drive vehicles and advanced diesel vehicles.

No guarantee may exceed 80% of the estimated cost of a project. No guarantee may be made unless an appropriation for the cost of the guarantee has been made or the Secretary “has received from the borrower a payment in full for the cost of the obligation and deposited the payment into the Treasury.” The “cost of the obligation” is considered to be the estimated subsidy cost of the loan guarantee. The guaranteed obligation must be repaid in a period not to exceed the lesser of 30 years or 90% of the useful life of the project. The Secretary is authorized to collect a fee sufficient to recover administrative expenses. See 15 U.S.C. §16511 *et seq.*

The loan guarantee program is still in its early stages of operation. In 2006, the DOE established a loan guarantee office under the DOE’s Chief Financial Officer, but had no authorization for loan or guarantee volume. In August 2006, the DOE published policy guidelines to use in soliciting proposals for loan guarantees for project that employ innovative technologies and invited pre-applications for the first round of loan guarantees under the program. In February 2007, the Office received a small appropriation for administrative expenses and authority to issue guarantees on up to \$4 billion in loans. In March, 2007, the DOE announced that it had received 143 pre-applications for guarantees by the December 31, 2006 deadline. In May 2007, the DOE published its formal proposed rule for the guarantee program and requested comments.

In October, 2007, the DOE published final rules for projects employing new clean energy technologies. The DOE regulations provide that if the DOE guarantees 100% of the loan, the loan must be funded by the Federal Financing Bank and the DOE will have a first priority lien on project assets pledged as collateral and all other debt is subordinate. Where DOE guarantees 90% or less of the obligation, the guaranteed portion may be stripped from the non-guaranteed portion if the loan is participated, syndicated or otherwise resold in the secondary debt market. The DOE’s regulations require that, as a condition to issuing the guarantee, the DOE is required to receive either a Congressional appropriation of the funds to cover the “credit subsidy cost” of the loan guarantee or a payment from the borrower in the amount of the credit subsidy cost. The DOE announced that its intent is only to issue loan guarantees where borrowers and project sponsors pay the credit subsidy cost. The credit subsidy cost is defined as the net present value of the estimated payments by the government to cover defaults and delinquencies and other payments less payments to the government, including recoveries.

The DOE also invited 16 (of the original 143) project sponsors to submit applications for full loan guarantees for projects including advanced technologies using biomass, fossil energy, solar, industrial energy efficiency, electricity delivery and energy reliability, hydrogen and alternative fuel vehicles.

The Energy Policy Act also authorizes the Secretary to enter into standby support provisions to insure project sponsors of advanced nuclear projects against delays outside the control of the sponsors (42 U.S.C. §16014). That Act also provides production tax credits for qualified advanced nuclear power facilities (Section 45J). Tax credits may also be available with respect to other innovative technology projects, such as for qualifying advanced coal projects (Section 48A) or qualifying gasification projects (Section 48B).

Coal Loan and Loan Guarantee Programs

The Energy Policy Act of 2005 authorizes a number of new DOE credit programs. These include:

- Loan guarantees for a project located in the Upper Great Plains to produce energy from coal of less than 7,000 Btu/lb using advanced integrated gasification combined cycle technology. The project is also eligible for investment tax credits under new Section 47A of the Internal Revenue Code which provides a tax credit for qualifying advanced coal projects. No dollar amount is specified for the loan guarantee. See 42 U.S.C. §15971.
- A direct loan of up to \$80 million to place in service a designated clean coal technology plant located near Healy, Alaska. See 42 U.S.C. §15972.
- Loan guarantees for a project to produce energy for a plant using integrated gasification combined cycle technology of at least 400 megawatts in capacity. No dollar limit is specified. See 42 U.S.C. §15974.
- Loan guarantees for at least five petroleum coke gasification projects. No dollar limit is specified. See 42 U.S.C. §15975.

In addition, the Energy Policy Act authorizes the Secretary to provide various forms of financial assistance including cost sharing, grants, cooperative agreements or loans to “facilitate the production and generation of coal-based power through the deployment of clean coal electric generating equipment” and “processes that improve energy efficiency or environmental performance and facilitate the utilization of existing coal-based electricity generating plants through projects that...deploy advanced air pollution control equipment and are designed to enhance environmental performance”. Such projects may include advanced combustion equipment and processes and hybrid gasification/combustion systems. The Act authorizes appropriations of \$250 million starting in fiscal year 2007 and increasing in the fiscal years thereafter. See 42 U.S.C. 13572 *et seq.*

Indian Energy Loan Guarantee Program

The Secretary is authorized by the Energy Policy Act of 2005 to provide loan guarantees for an amount equal to not more than 90% of the unpaid principal and interest on any loan made to an Indian tribe for energy development. The purpose of the loan is to provide or expand capacity for or access to electricity on Indian land. The Secretary is required to encourage cooperative arrangements

between Indian tribes and utilities. The aggregate outstanding amount guaranteed under this program may not exceed \$2 billion. The Secretary is also authorized to provide grants and low-interest loans to Indian tribes for similar purposes, but no dollar amount is specified. See 25 U.S.C. §3502(c).

Clean Renewable Energy Bonds

The Energy Policy Act of 2005 provides a tax credit for the interest cost of “Clean Renewable Energy Bonds” (“CREBs”). (Tax credit programs are actually administered by the IRS, but are included here because of their relationship to the DOE programs.) With a CREB, the issuer does not make interest payments on the bonds but the federal government provides a tax credit to the bondholder in lieu of interest. While private lenders do provide the principal amount of the loans for this program, the use of the tax credits as a subsidy effectively eliminates the nonpayment of interest as a credit risk of the loans. See 26 U.S.C. §54.

The requirements for CREBs are as follows:

- The qualified borrower must be a mutual or cooperative electric company or a governmental body.
- A qualified project is a wind facility, closed-loop biomass facility, open-loop biomass facility, geothermal or solar energy facility, a small irrigation power facility, a travel combination facility, a refined coal production facility or a qualified hydropower facility.
- The maximum bond limitation is \$800 million of which no more than \$500 million may be allocated to governmental bodies.

Essentially, the CREB offers cooperatives and public power systems zero-interest loans for financing qualified energy projects. Thus, cooperatives and governmental power systems are provided an incentive comparable to production tax credits available to private developers and investor-owned utilities for similar projects. In 2006, the Internal Revenue Service solicited applications for allocation of clean energy renewable energy bond limitation under Section 54(f) of the Internal Revenue Code. On November 29, 2006, the IRS announced it had allocated \$800 million in tax credits under the program, covering 610 renewable energy projects.

Commercial Byproducts from Municipal Solid Waste and Cellulosic Biomass Loan Guarantee Program

The Energy Policy Act of 2005 establishes a program to provide guarantees of loans made by private institutions for the construction of facilities for processing and conversion of municipal solid waste and cellulosic biomass into fuel ethanol and other commercial byproducts.

Cellulose is the main component of plant cell walls and is the most common organic compound on earth. It is more difficult to break down cellulose to convert it into usable sugars for ethanol production than is true when ethanol is produced from corn or sugar. Because cellulose can be found in many materials now regarded as waste, as well as corn stalks, rice straw, wood chips or fast-growing trees and grasses; it would greatly expand the types and amount of material available for ethanol production.

A loan guaranteed under this program may have a maturity of not more than 20 years. In selecting applicants, the Secretary is required to consider proposals that:

- Meet all applicable Federal and State permitting requirements;
- Are most likely to be successful; and
- Are located in local markets where there is a limited availability of land for waste disposal, sufficient quantities of cellulosic biomass are available or there is a high level of demand for fuel ethanol or other commercial byproducts of the facility.

The applicant is required to provide an assurance of repayment in the form of a performance bond, insurance, collateral or other means acceptable to the Secretary for at least 20% of the amount of the loan. No dollar amount is specified in this program. See 42 U.S.C. §16501.

Cellulosic Biomass Ethanol and Municipal Solid Waste Loan Guarantee Program

Under a very similar program, the Energy Policy Act of 2005 authorized the DOE to issue loan guarantees to carry out not more than four projects to demonstrate the commercial feasibility of producing cellulosic biomass ethanol or sucrose-derived ethanol. Each project must have a design capacity to produce at least 30,000,000 gallons of cellulosic biomass ethanol annually. One of the four projects must use cereal straw as a feedstock and one must use municipal solid waste as a feedstock.

Each of the four loan guarantees may be issued for up to 80% of the estimated cost of the project but may not exceed \$250 million for a single project. Applicants must provide an equity commitment of 20% of total project cost. The DOE may issue additional loan guarantees for a project to cover up to 80% of the excess of actual project cost over estimated cost but not to exceed 15% of the amount of the original guarantee. If there are insufficient funds for four projects, the loan guarantees are allocated in the order that the applications are received. See 42 U.S.C. §7546. Production incentives may also be available under another provision of the Energy Policy Act for cellulosic biofuels projects (See 42 U.S.C. §16251) and under another provision of the Energy Policy Act (12 U.S.C. §16251).

Sugar Ethanol Loan Guarantee Program

The Energy Policy Act of 2005 authorizes loan guarantees to carry out commercial demonstration projects for ethanol derived from sugarcane, bagasse and other sugarcane products. The guarantee for 100% of the principal and interest on the loan may be issued for up to 80% of the estimated cost of the project and may not exceed \$50 million for any one project. The Secretary may issue additional loan guarantees for up to 80% of the excess of the actual project costs over the estimated project costs not to exceed 15% of the amount of the original loan guarantee. For example, if a project had previously received a maximum loan guarantee of \$50 million and had cost-overruns, the Secretary could provide an additional loan guarantee up to 80% of the additional cost but no more than \$7,500,000 (15% of the original loan guarantee amount). See 42 U.S.C. §16503.

An applicant is required to demonstrate, to the satisfaction of the Secretary, that:

- the project design has been validated through the operation of a continuous process facility;
- the project has been subject to a full technical review;
- the project with the loan guarantee is economically viable; and
- there is a reasonable assurance of repayment of the guaranteed loan.

There is no aggregate limit on the number of projects which may receive guaranteed loans.

Advanced Battery Loan Guarantee Program

The Energy Independence and Security Act of 2007 established a program to provide a guarantee of loans for the construction of facilities for the manufacture of advanced vehicle batteries and battery systems, including advanced lithium ion batteries and hybrid electrical systems and component manufacturers and software designers. Loan maturity may not exceed 20 years. No dollar amount is specified in the legislation.

Advanced Technology Vehicles Direct Loan Program

The Energy Independence and Security Act of 2007 established a program of direct loans from the DOE in an amount not exceeding \$25 billion for the cost of reequipping, expanding, or establishing a manufacturing facility in the U.S. to produce qualified advanced technology vehicles or qualifying components and engineering integration performed in the U.S. of qualifying vehicles and qualifying components. A qualifying vehicle must meet certain emission and fuel economy standards. The loans are limited to a maturity of the lesser of the projected life of the project or 25 years and must be made by the Federal Financing Bank.

Current Issues

What steps do the Congress and the DOE need to take in implementing the new credit programs?

All of the credit programs described in this paper are new programs. In October, 2007, the DOE issued final regulations for the innovative technologies program enacted as part of the Energy Policy Act of 2005.

The Federal Credit Reform Act of 1990, 2 U.S.C. §661c (Credit Reform Act), provides that new loan guarantee commitments may be made only to the extent that new budget authority to cover their costs is provided in advance in an appropriations Act enacted by Congress, a limitation on the use of funds otherwise available for the loan guarantee program has been provided in advance in an appropriation Act or authority is otherwise provided in appropriation Acts. Congress has so far appropriated only a small amount of money for the DOE's new credit programs.

There are generally two steps to the process. Congress needs to "authorize" the loan or guarantee program, which it has done in the Energy Policy Act of 2005 or other legislation, and then follow up with an actual appropriation of funds. In the President's proposed budget for fiscal year 2008, \$8,390,000 is proposed to be appropriated for fiscal year 2008 for the administrative expenses of the DOE's Office of Loan Guarantees. In addition, the 2008 budget proposes a loan volume guarantee limitation of \$9 billion of which \$4 billion is for nuclear facilities, carbon sequestration optimized coal power plants or other central power generation facilities, \$4 billion is for loan guarantees for projects that promote biofuels and clean transportation fuels and \$1 billion is for loan guarantees for projects using new technologies for electric transmission facilities or renewable power generation systems. However, precisely how any authorized loan guarantee authority would be allocated would depend on the merits and benefits of particular projects and their compliance with legal requirements.

Under the Energy Policy Act of 2005, an appropriation for the cost of the guarantee may not be necessary if the guarantee is considered "self-pay." In a "self-pay" situation, a project sponsor that has a loan authorized to be guaranteed would pay for the cost of the guarantee by depositing funds with the U.S. Treasury equal to the estimated subsidy cost of the guarantee. The Innovative Technology Loan Guarantee Program authorized by the Energy Policy Act of 2005 permits such a deposit, although such deposit does not eliminate taxpayer exposure to the possible default of the entire loan amount.

How this self-pay arrangement would actually work would depend on an agreement negotiated between the Secretary and the project sponsor. In the President's budget proposal for fiscal year 2008, the DOE has estimated that \$1.9 billion will be provided by borrowers to pay the loan guarantee subsidy costs. The DOE states that those estimates are "placeholder estimates" which are "based on an illustrative portfolio" and "not related to any specific project

proposals”. The 2008 omnibus appropriation legislation contains specific language appropriating such self-pay amounts under the Innovative Technology Loan Guarantee Program for the cost of the guaranteed loans.

The Federal Credit Reform Act, 2 U.S.C. §661a(c), provides that “the cost of a loan guarantee shall be the net present value at the time when the guaranteed loan is disbursed of the following estimated cash flows: (i) payments by the government to cover defaults and delinquencies, interest subsidies or other payments; and (ii) payments to the Government including origination and other fees, penalties and recoveries...”. See “Budgeting for Federal Credit Programs: A Primer,” available at www.coffi.org, for further explanation of the subsidy process.

Thus, the Federal Credit Reform Act requires that the cost of an estimated default on a project be included as part of the cost of the loan guarantee. Such a calculation will not only be difficult to do in the case of large innovative energy projects involving new technology, completion risk and project viability risk, but also may be a very large amount. Under 2 U.S.C. §661b, the Director of the Office of Management and Budget, in consultation with the DOE and the Congressional Budget Office, is responsible for the coordination of the cost estimates required by the law.

The difficulty in determining the true subsidy costs for the DOE programs can be contrasted with other existing federal loan and guarantee programs. Most other existing programs provide credit to a large number of borrowers in smaller amounts, such as is the case with student loans, housing loans or small business loans. The “law of large numbers” as well as past historical default rates allow an agency to use statistical analysis to provide a reasonable degree of accuracy in the projections in most cases.

The new DOE programs present several difficulties for the projection process. These are:

- The new programs are harder to estimate than are established programs, especially if private sector experience is limited or non-existent.
- The DOE programs tend to provide credit for a small number of large projects, rendering statistics on average historical loss experience much less useful.
- The Alaska pipeline project contemplates an \$18 billion loan guarantee. There is only one large project so there is no prospect of averaging out losses from that project with gains from other similar projects.
- On the positive side, the budget subsidy cost could turn out to be zero if there is no loss on a large project. The economic cost, by contrast, could still be positive because it depends on the nature of opportunities lost because of the diversion of funds from other uses.

The Congressional Budget Office stated in its cost estimate dated June 9, 2005 concerning the proposed Energy Policy Act (p. 6): “The costs of such subsidies [for loan guarantees] could vary widely depending on the terms of the contracts and the financial and technical risk associated with different types of projects. According to Standard & Poor’s, the cumulative default risk for projects rated as speculative investments can range from about 20% to almost 60%, depending on a project’s cash flows and contractual terms. Subsidy costs also are affected by amounts that can be recovered by the government in the event of default, which in turn depends on the value of the security backing the guarantee as well as contractual protections.” The CBO assumed that the DOE would not provide guarantees for innovative technology projects with a net subsidy cost greater than 20%. To illustrate, if a project is estimated to have a default risk of 30% but it is estimated that half of that amount (15%) would be recovered by the government in the event of a default, the net subsidy cost would be 15%.

With respect to specific loan guarantee programs, the CBO cost estimate assumed subsidy rates of 20% for the coal gasification and renewable energy loan guarantee programs. The CBO’s estimate of the subsidy cost for the nuclear energy loan guarantee program (part of the innovative technologies loan program) was 30%. CBO estimated that the subsidy costs for the Indian Loan Guarantee Program could range from 2 or 3% for routine conventional projects to 50% or more for unproven technologies. For the cellulosic biomass and cane sugar loan guarantee programs, the CBO estimated a subsidy rate of 15-20%.

The Congressional Budget Office provided a cost estimate dated May 7, 2003 for the Alaska Natural Gas Pipeline loan guarantees. Even taking into account that the major owners of the North Slope natural gas have very strong credit ratings and the known and estimated gas reserves could fill the pipeline to capacity for decades, the CBO estimated that the project would have a 20-25% risk of default over its lifetime. The CBO also estimated that, in the event of a default, there is a high likelihood that the creditors could expect to recover substantial amounts of their investments through credit restructuring over a longer term. Taking all of this into account, the CBO estimated that the proposed federal loan guarantee would have a 10% subsidy and thus could cost \$2 billion (for a \$20 billion guarantee), subject to appropriation of the necessary sums. The Alaska Natural Gas Pipeline Act, 15 U.S.C. §720n(c)(2), imposes a limit of \$2 billion for the cost of the loan guarantees.

The amount of the subsidy costs will be difficult to determine on a case-by-case basis because of the risks in these projects and the fact that the financing of many of these programs would not be viable without the loan guarantees. Moreover, in some cases, the statute authorizing the project may be silent on the taking of collateral or limit the collateral or other protection that the DOE can obtain in the event of a default on the loan guarantee, thus probably increasing the subsidy cost of the loan guarantee.

How will the DOE decide to support a particular project?

In deciding how to implement the various loan guarantee programs, the DOE will need to determine the extent to which it is willing to provide loan guarantees for innovative projects which have not been previously determined to be workable on a commercial basis and/or which have significant technological risk. Many of the projects may have substantial completion risks (including the potential for cost-overruns) and risks concerning their long-term viability from a financial or commercial perspective. It will be necessary for the DOE to determine, consistent with the statutory requirements of each loan program, the extent to which it can be and should be protected against completion risk by requiring completion guarantees, security interests, equity commitments or other arrangements. As noted earlier, in some cases, the statute may limit the ability to obtain collateral or other credit protection or is silent on the subject. The DOE will also have a difficult and complex job of evaluating the statutory and technical criteria for eligibility for the various loan guarantees. If the DOE does not obtain adequate protection against default, the subsidy cost of a loan guarantee logically should be much higher.

Finally, since there may be multiple applications for loan guarantees, the DOE will have important policy questions, such as determining which projects should be given priority and whether the lack of availability of appropriations and/or Congressional earmarking will limit DOE's policy choices and decisions. The loan guarantee programs will have limited utility if Congress fails to make appropriations to cover the subsidy costs and, for that reason, the DOE is unable to approve the projects.

Conclusion

One of the strategic goals of the Department of Energy is to protect the national and economic security of the United States "by promoting a diverse supply and delivery of reliable, affordable, and environmentally sound energy." These goals include increasing the supply of dependable energy and bringing cutting-edge science to bear on critical national energy priorities.

The DOE estimates that, by 2030, global energy consumption will grow by over 70%, with the strongest growth coming in developing countries in Asia such as China and India. Ninety percent of the world's untapped conventional oil reserves are controlled by governments or state-owned oil companies, many of which are in politically unstable regions of the world. In essence, because the country's heavy dependence on fossil fuels is believed to be unsustainable over the long-term, the DOE has embarked on a variety of programs to encourage innovative energy projects and diversify the sources of reliable energy.

DOE's Innovative Technology Loan Guarantee Program is intended to promote the use of improved technologies not only with renewable energy and coal

gasification but also advanced nuclear facilities and other projects with significant technological and other risks. Similarly, the cellulosic biomass loan guarantee programs may facilitate the ability to have commercially feasible projects of that type. Many of these projects may not be feasible without government assistance.

Energy-related projects, such as the Alaska pipeline, which is estimated to cost about \$24 billion, and advanced nuclear facilities, may not be financially feasible without federal loan guarantees. James Asseltoe, a Managing Director of Lehman Brothers, Inc., in testifying before the U.S. Senate Committee on Energy and Natural Resources on May 22, 2006 commented: "The availability of federal loan guarantees for up to 80 percent of a project's cost, in connection with the production tax credit, offers the greatest potential to reduce the cost of the initial nuclear plants to levels that are competitive with other baseload generating alternatives."

Advocates for loan guarantee programs contend that loan guarantees cost the government substantially less than grants, investment tax credits, and accelerated depreciation to achieve the same economic benefit for projects. Such contention is, of course, premised on the view that defaults on these loan guarantee programs will be kept at a low level, which did not happen with respect to the DOE's loan guarantee programs in the 1980's.

Critics of the loan guarantee programs, such as Public Citizen, a non-profit consumer-oriented organization headed by Joan Claybrook, criticized permitting loan guarantees for nuclear power plants, arguing that the nuclear projects could have a risk of a loan default well above 50% and that no solution has been found for the nuclear waste problem. With respect to all of the loan guarantee programs, Public Citizen further argues that "taxpayers hold all the risk while leaving companies [to] reap all the rewards." Public Citizen noted that the Energy Policy Act earmarks a number of programs to specific recipients and projects, arguing that such earmarks were caused by political considerations and constitute "energy industry giveaways."

In light of concerns over the country's growing dependence on foreign oil and the difficulty in financing large innovative energy projects, DOE's new loan guarantee programs are likely to continue at least for the next few years. New programs may be added in new legislation.

The effectiveness and efficiency of implementing the new lending and guarantee programs will be greatly dependent on how specific programs are structured by the DOE, the types of projects which are approved and, most importantly, the extent to which Congress appropriates adequate funds to cover the subsidy cost of these programs. Moreover, if specific projects are approved as a result primarily of political factors or Congressional earmarks rather than a practical and thorough analysis of the technological, economic and commercial feasibility of projects, there is a real risk of repeating the large net losses associated with DOE loan guarantee projects in the 1980's.

Sources

DOE: DOE budget, speeches, Congressional testimony and other information available via <http://www.energy.gov/news>.

U.S. Code: Full text of Alaska Natural Gas Pipeline Act, 15 U.S.C. §720n, and Energy Policy Act of 2005, 42 U.S.C. §15801 *et seq.*, the Energy Independence and Security Act of 2007 (Public Law 110-140) and other provisions of title 42 available via <http://uscode.house.gov>.

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