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and Water Development, Committee on
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February 2011

DEPARTMENT OF ENERGY

Advanced Technology Vehicle Loan Program Implementation Is Under Way, but Enhanced Technical Oversight and Performance Measures Are Needed



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Highlights of [GAO-11-145](#), a report to the Subcommittee on Energy and Water Development, Committee on Appropriations, U.S. Senate

Why GAO Did This Study

In the Energy Independence and Security Act of 2007, Congress mandated higher vehicle fuel economy by model year 2020 and established the Advanced Technology Vehicles Manufacturing (ATVM) loan program in the Department of Energy (DOE). ATVM is to provide up to \$25 billion in loans for more fuel-efficient vehicles and components. Congress also provided \$7.5 billion to pay the required credit subsidy costs—the government’s estimated net long-term cost, in present value terms, of the loans. GAO was asked to review the ATVM program and agreed to (1) identify the steps DOE has taken to implement the program, (2) examine the program’s progress in awarding loans, (3) assess how the program is overseeing the loans, and (4) evaluate the extent to which DOE can assess progress toward meeting its goals. GAO analyzed loan documents and relevant laws and regulations and interviewed DOE and ATVM officials.

What GAO Recommends

To help ensure the effectiveness and accountability of the ATVM program, GAO recommends that DOE accelerate its efforts to engage the engineering expertise needed for effective technical oversight and develop sufficient, quantifiable performance measures for its program goals. DOE disagreed with GAO’s recommendations. GAO continues to believe DOE should engage expertise and reaffirms its recommendation that DOE develop sufficient performance measures.

View [GAO-11-145](#) or key components. For more information, contact Frank Rusco at (202) 512-3841 or ruscof@gao.gov.

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What GAO Found

DOE has taken several steps to implement the ATVM program. First, it set three goals: increase the fuel economy of U.S. passenger vehicles as a whole, advance U.S. automotive technology, and protect taxpayers’ financial interests. DOE also set technical, financial, and environmental eligibility requirements. In addition, DOE established criteria for judging the technical and financial merits of applicants and projects deemed eligible, and policy factors to consider, such as a project’s potential for supporting jobs. DOE established procedures for ATVM staff, aided by experts from within and outside DOE, to score applicants and projects. Finally, the Credit Review Board, composed of senior DOE officials, uses the scores and other information to recommend loan decisions to the Secretary of Energy.

The ATVM program has made \$8.4 billion in loans that DOE expects to yield fuel economy improvements in the near term along with greater advances, through newer technologies, in years to come. Although the loans represent about a third of the \$25 billion authorized by law, the program has used 44 percent of the \$7.5 billion allocated to pay credit subsidy costs, which is more than was initially anticipated. These higher credit subsidy costs were, in part, a reflection of the risky financial situation of the automotive industry at the time the loans were made. As a result of the higher credit subsidy costs, the program may be unable to loan the full \$25 billion allowed by statute.

Although the ATVM program has set procedures for overseeing the financial and technical performance of borrowers and has begun oversight, it has not yet engaged engineering expertise needed for technical oversight. To oversee financial performance, staff review data submitted by borrowers on their financial health to identify challenges to repaying the loans. Staff also rely on outside auditors to confirm whether funds have been used for allowable expenses. To oversee technical performance, ATVM staff analyze information borrowers report on their technical progress and are to use outside engineering expertise to supplement their analysis. According to our review, projects needing additional technical oversight are under way and the ATVM staff lack the engineering expertise called for by the program’s procedures for adequately overseeing technical aspects of the projects. However, the program has not yet engaged such expertise. As a result, DOE cannot be adequately assured that the projects will be delivered as agreed.

DOE has not developed sufficient performance measures that would enable it to fully assess the extent to which it has achieved its three program goals. For example, while DOE has a measure for assessing specifically the fuel economy gains for the vehicles produced under the program, the measure falls short of enabling assessment of progress in achieving DOE’s broad goal of improving the fuel economy of U.S. passenger vehicles as a whole because it does not account for, among other things, the fuel economy improvements manufacturers would have made, in the absence of the loans, to remain in compliance with increasingly strict federal fuel economy requirements. Principles of good governance call for performance measures tied to goals as a means of assessing the extent to which goals have been achieved.

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Abbreviations

ATVM	Advanced Technology Vehicles Manufacturing
CAFE	corporate average fuel economy
CBO	Congressional Budget Office
DOE	Department of Energy
EERE	Office of Energy Efficiency and Renewable Energy
EISA	Energy Independence and Security Act
EPA	Environmental Protection Agency
GPRA	Government Performance and Results Act
mpg	miles per gallon
mpgge	miles per gallon of gasoline equivalent
NEPA	National Environmental Policy Act
NHTSA	National Highway Traffic Safety Administration
OMB	Office of Management and Budget
PSAT	Powertrain System Analysis Toolkit

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Accountability * Integrity * Reliability

United States Government Accountability Office
Washington, DC 20548

February 28, 2011

The Honorable Dianne Feinstein
Chairman
The Honorable Lamar Alexander
Ranking Member
Subcommittee on Energy and Water Development
Committee on Appropriations
United States Senate

In recent years, concern about fluctuations in gasoline prices, along with worries about the environmental impact of petroleum use, such as increasing greenhouse gases, has prompted Congress to take steps aimed at making passenger vehicles in use in the United States more fuel-efficient. In December 2007, Congress enacted the Energy Independence and Security Act (EISA), which made the nation's corporate average fuel economy (CAFE) standards for newly manufactured passenger vehicles more stringent by requiring significant increases in the fuel economy of the vehicles being sold in the United States by 2020. In addition, EISA authorized, but did not provide funding for, the Advanced Technology Vehicles Manufacturing (ATVM) loan program, to provide loans for projects to produce more fuel-efficient passenger vehicles and their components.¹ The fiscal year 2009 continuing resolution appropriated \$7.5 billion from which the Department of Energy (DOE) is to pay the program's credit subsidy costs to support up to \$25 billion in direct loans to manufacturers of passenger vehicles and their components. Credit subsidy costs are the estimated net long-term costs to the government, in present value terms, of loans over the entire period the loans are outstanding.² In November 2008, DOE received and began to review the program's first loan applications. In December 2008, under the Troubled Asset Relief Program, the United States entered into loan agreements with two of the major U.S. automakers—Chrysler Group, LLC and General Motors Corporation—to provide \$62 billion in restructuring loans. In

¹In Section 136 of EISA, Congress also authorized the ATVM program to make grants, but to date, this has not been funded.

²Credit subsidy costs exclude administrative costs and any incidental effects on governmental receipts or outlays. Present value is the worth of the future stream of returns or costs in terms of money paid immediately. In calculating present value, prevailing interest rates provide the basis for converting future amounts into their "money now" equivalents.

addition, in May 2009 the Administration announced its National Fuel Efficiency Policy, which, to implement the increase in fuel economy required by EISA, called for higher CAFE standards for model years 2012 through 2016 for passenger cars and light-duty trucks—surpassing those EISA required by 2020. On April 1, 2010, the National Highway Traffic Safety Administration (NHTSA) and the Environmental Protection Agency (EPA) made final the rule putting the more stringent CAFE standards in place.³

In this context, you asked us to review the ATVM loan program. Specifically, our objectives were to (1) identify the steps DOE has taken to implement the ATVM loan program, (2) examine the ATVM program's progress in awarding loans, (3) assess how the program is overseeing the loans, and (4) evaluate the extent to which DOE can assess its progress toward meeting program goals. To address these objectives, we analyzed relevant legislation and regulations, Office of Management and Budget (OMB) guidance on federal loan programs, our prior work on implementing the Government Performance and Results Act (GPRA),⁴ federal standards for internal control,⁵ and DOE's program guidance. In addition, we analyzed information on applicants and documents DOE decision makers used to select borrowers. We also reviewed the loan agreements DOE had executed as of February 24, 2011. We analyzed DOE data on the expected fuel economy of vehicles to be produced by projects funded by ATVM loans and compared them with data on future regulatory requirements; we examined documentation on DOE's model and its process for generating these data—we believe the data to be sufficiently reliable for our purposes. In addition, we interviewed relevant DOE officials. We did not evaluate the technical or financial soundness of the projects that DOE considered for loans. We conducted this performance audit from September 2009 through February 2011 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions

³EPA is responsible for developing and executing CAFE testing and calculation procedures. NHTSA uses EPA data to determine if a manufacturer's fleet is in compliance for a given model year. The final rule was published in the *Federal Register* on May 7, 2010.

⁴GAO, *Effectively Implementing the Government Performance and Results Act*, [GAO/GGD-96-118](#) (Washington, D.C.: June 1996).

⁵GAO, *Standards for Internal Control in the Federal Government*, [GAO/AIMD-00-21.3.1](#) (Washington, D.C.: November 1999).

based on our audit objectives. We believe that the evidence obtained does so. A further discussion of the scope of our review and the methods we used is presented in appendix I.

Background

In recent years, concerns have arisen about fluctuations in gasoline prices and the environmental impact of petroleum use. For example, the price of gasoline increased significantly from 2002 to 2008, negatively affecting consumers, domestic automakers, and the U.S. economy in general. In addition, gasoline-fueled passenger vehicles are a major source of greenhouse gas emissions, and public concern has grown about the relationship between their greenhouse gas emissions and global climate change. According to our analysis of EPA data, passenger cars and light-duty trucks are responsible for a significant share of greenhouse gas emissions in the United States—in 2007, their use accounted for 18 percent of total greenhouse gas emissions. In light of these concerns, in 2007, Congress enacted EISA, which, among other things, increased CAFE standards, requiring that the nation's automobile manufacturers' new vehicle fleets attain at least an average of 35 miles per gallon by 2020.

In addition to increasing CAFE standards, EISA also authorized, but did not provide funding for, the ATVM loan program to provide up to \$25 billion in loans to support projects to produce more fuel-efficient passenger vehicles and components. Loans made under the program are to be disbursed by the Federal Financing Bank,⁶ have an interest rate equal to the government's cost of funds,⁷ and be in force for a period of 25 years or the projected life of the eligible project, whichever is less. Congress also required that DOE, when making loans to manufacturers with existing facilities, among other things, give priority to those facilities that are the oldest or are at least 20 years old.

In addition to the negative effect that rising fuel prices had on domestic automobile sales, the economic recession that began in late 2007 particularly affected the three major domestic automakers—Chrysler Group, LLC; Ford Motor Company; and General Motors Corporation—

⁶The Federal Financing Bank is a government corporation, created by Congress, under the supervision of the Department of the Treasury.

⁷The government's cost of funds is the interest cost that the federal government must pay for the use of the money it lends to ATVM borrowers—that is, the interest rate on Treasury notes at the time the funds are disbursed.

known as the Detroit 3. Rising fuel prices had negatively affected the sales of domestic automakers as consumers shifted to smaller, more fuel-efficient vehicles and away from less fuel-efficient light trucks and sport utility vehicles. At the end of 2008, several economic indicators, including economic growth and the unemployment rate, worsened while credit markets tightened and dampened consumers' demands for new passenger vehicles. Sales of new vehicles had been trending downward since 2006, but the decrease was markedly sharper in 2008 and 2009. For example, U.S. sales for the Detroit 3 dropped by 49 percent from February 2008 through February 2009, whereas U.S. sales for American Honda Motor Co., Inc.; Nissan North America, Inc.; and Toyota Motor North America, Inc., dropped 39 percent during this period. Additionally, the Detroit 3 had been losing U.S. market share to foreign automakers for several years. For instance, General Motors' U.S. market share for total light vehicle retail sales—including passenger cars and light-duty trucks—fell from 27.2 percent in 2004 to 22.1 percent in 2008, while the market share of Japanese auto manufacturers grew from 29.8 percent to 38.9 percent during the same period. Furthermore, since the 1980s, the Detroit 3 have relied heavily on sales of light-duty trucks and sport utility vehicles, which were more profitable than passenger cars but had relatively low fuel economy ratings. As a result of this reliance, the Detroit 3 faced more difficulty in achieving substantial improvements in fuel economy than most foreign-based manufacturers, which historically had produced and sold more fuel-efficient vehicles. When proposing the new, more stringent CAFE standards, NHTSA estimated that the Detroit 3 would face significantly higher costs to meet revised standards than the major Japanese automakers.

In September 2008, the Consolidated Security, Disaster Assistance, and Continuing Appropriations Act provided \$7.5 billion to DOE to pay the credit subsidy costs of up to \$25 billion in ATVM loans.⁸ Congress also provided \$10 million to DOE to administer the ATVM loan program and required that DOE issue an interim final rule to establish regulations necessary to implement the program. DOE issued an interim final rule for implementing the program in November 2008.

⁸The Federal Credit Reform Act of 1990 requires that the credit subsidy costs of federal loan programs be paid; for the ATVM program, they are paid by congressional appropriations.

DOE Established Program Goals and Set Criteria for Applicant and Project Eligibility and Merit

To implement the ATVM program, DOE established three goals and set, in its interim final rule, certain technical and financial criteria and environmental requirements that vehicle and component manufacturers must meet to qualify to receive a loan under the program. DOE also established criteria for determining the technical and financial merits of projects once they have been deemed eligible.

DOE Established Three Goals for the ATVM Program

Although DOE documents do not specifically identify the goals of the ATVM loan program, DOE officials told us that they established three broad goals for the program:

- increase the fuel economy of U.S. passenger vehicles as a whole,
- advance automotive technology in the United States, and
- protect taxpayers' financial interests.

According to DOE officials, the program's first goal is to increase the fuel economy of U.S. passenger vehicles as a whole. Specifically, EISA calls for the program to make loans to provide funding to automobile manufacturers and component suppliers for projects that re-equip, expand, or establish manufacturing facilities in the United States for the purpose of building more fuel-efficient passenger cars and light-duty trucks. According to DOE's 2011 budget submission, the first and second goals support the agency-level goal to build a competitive, low-carbon economy by, among other things, funding vehicles that reduce the use of petroleum-derived fuels and accelerating growth in advanced automotive technology manufacturing. According to DOE officials, the program's third goal is to protect taxpayers' financial interests. This goal reflects EISA's requirement that loans are to be made to financially viable borrowers. Specifically, ATVM's interim final rule states that the program should make loans only to borrowers who have a reasonable prospect of repaying the loan. According to the Executive Director for DOE's Loan Programs Office, whom we interviewed about ATVM as well as the office's loan guarantee programs, identifying applicants with projects for innovative technologies and strong prospects of repaying a loan is particularly difficult because innovative technologies are typically more risky than established technologies.

DOE Set Criteria to Determine Eligibility for Loans

DOE set technical and financial criteria and environmental requirements in its interim final rule that applicants and their projects must meet to be eligible for an ATVM loan.⁹

Technical Eligibility Criteria for Applicants and Their Projects

To ensure that applicants meet the minimum fuel economy improvement thresholds specified by EISA, DOE established a technical eligibility criterion for vehicle manufacturers. An established vehicle manufacturer—that is, a manufacturer that produced passenger vehicles in model year 2005—must demonstrate that the adjusted average fuel economy of the fleet of vehicles it produced for the most recent model year is at least equal to the adjusted average fuel economy of the fleet it produced in model year 2005.¹⁰ An applicant that is not an established manufacturer—that is, one that did not produce vehicles in 2005—must demonstrate that the fuel economy of its proposed vehicles will at least equal the adjusted average fuel economy of established manufacturers’ model year 2005 vehicles in the same vehicle class.

For applicants deemed eligible, DOE also used statutory-based technical criteria that a project must meet to be eligible for a loan under the program:

- a proposed passenger vehicle must meet the fuel economy and emissions requirements set forth in the definition of an advanced technology vehicle, and a proposed component must be designed for a specific advanced technology vehicle;
- a proposed passenger vehicle or component must be designed or manufactured in the United States; and
- applicants’ proposed projects must meet federal prevailing wage requirements for facility construction, alteration, and repair.¹¹

⁹DOE evaluates proposed projects individually. Applicants may submit loan requests for multiple projects in a single application, but each proposed project must include all necessary information specific to that project.

¹⁰The interim final rule defines the “most recent” year as the year for which the most recent CAFE compliance data are available. DOE defines “adjusted average fuel economy” as the average of the combined CAFE fuel economy ratings—adjusted by production volume—of all the relevant vehicles in a manufacturer’s vehicle fleet.

¹¹The federal prevailing wage requirements, commonly known as Davis-Bacon requirements, are codified at 40 U.S.C. §§ 3141-3148 and apply to borrowers, contractors and subcontractors.

For a project to meet the first criterion, a proposed vehicle, or a vehicle in which a proposed component will be used, must meet the fuel economy and emissions requirements for an advanced technology vehicle as defined in EISA. EISA specifies that the vehicle, when produced, must achieve at least 125 percent of the average fuel economy for all manufacturers' vehicles with substantially similar attributes in a base year. The vehicle must also meet EPA emissions standards in effect at the time the vehicle is manufactured.¹² Conventional vehicles—that is, vehicles powered primarily by gasoline-fueled internal combustion engines like those in wide use in the United States today—can be considered advanced technology vehicles under the law if they meet the fuel economy and emissions requirements. In addition, vehicles with newer technologies—including conventional hybrid vehicles, such as those that are powered by both gasoline and a battery that is charged during driving; plug-in hybrid vehicles, such as those that are powered by both gasoline and a battery that is charged using an electrical outlet; and all-electric vehicles, such as those powered by plug-in batteries alone—can be considered advanced technology vehicles under the law. The interim final rule calls for component projects to identify the specific advanced technology vehicles in which the proposed components will be installed. According to its interim final rule, DOE chose 2005 as the base year because, among other reasons, model year 2005 CAFE compliance fuel economy data for all manufacturers' vehicles were fully available when the interim final rule was published, and using model year 2005 as the base year “would promote efficient and effective administration” of the program and would be consistent with the technical eligibility criterion for vehicle manufacturers set forth in EISA. To help the program determine whether vehicles share “substantially similar attributes,” the interim final rule set out vehicle classes based on vehicle size and horsepower. DOE based these classes largely on EPA's vehicle classes for 2005, which are size-based.

For a project to meet the second technical eligibility criterion, the interim final rule calls for proposed vehicles or components to be either designed or manufactured in the United States. Furthermore, DOE set limits on the types of design activities—that is, engineering integration—that may be paid for using ATVM loan funds. In general, engineering integration involves the design and layout of production processes necessary to implement and build a new vehicle or component, according to the ATVM

¹²Pub. L. No 110-140, § 136(a), 121 Stat. 1492, 1514 (2007), *codified at* 42 U.S.C. § 17013.

Director. The interim final rule allows two engineering integration activities: incorporating qualifying components into the design of an advanced technology vehicle and designing and developing production facilities for producing qualifying components or vehicles.

Because of their technical expertise, staff in DOE's Office of Energy Efficiency and Renewable Energy (EERE) are responsible for determining whether applicants and proposed projects have met the program's technical eligibility criteria. EERE staff perform most of the technical eligibility analysis; for example, EERE staff determine whether the adjusted average fuel economy of an applicant's current production fleet is at least equal to the adjusted average fuel economy of the applicant's comparable fleet in model year 2005. In addition, EERE staff rely on the Argonne National Laboratory to analyze applicant-provided data using a computer model developed by the laboratory. The model estimates the miles per gallon (mpg) that a proposed vehicle is likely to achieve.¹³ EERE uses the results to determine whether the vehicle meets the program's fuel economy eligibility criterion. According to EERE staff, laboratory staff test one vehicle per project. In the case of a single-vehicle project, laboratory staff analyze data provided for that vehicle alone. For projects for which the borrower plans to produce multiple variations of a vehicle, the applicant provides data on a vehicle it has deemed to be "representative" of those it plans to produce under the project.¹⁴ Our review of DOE's test results and approved loan documents indicated that, in the event that the project is approved for a loan, the vehicles produced may or may not have the same specifications as the representative vehicle. According to EERE staff, to judge whether the variations of the vehicle that were not modeled are likely to meet the program's fuel economy eligibility criterion, the staff compare applicant-submitted data on the expected mpgs of those variations with that eligibility criterion.

Financial Eligibility Criteria for Applicants

Applicants must also demonstrate financial viability to be selected for an ATVM loan. According to DOE's interim final rule, an applicant is financially viable if it has (1) a reasonable prospect of repaying principal

¹³To determine the expected fuel economy of proposed vehicles, DOE laboratory staff analyze applicant-provided data on the specifications of a proposed vehicle using the Powertrain System Analysis Toolkit, which DOE uses as its primary fuel-efficiency simulation tool for a number of vehicle-related projects.

¹⁴Manufacturers may produce multiple versions of a model within a project that have varying technical specifications—that is, for a sedan model, manufacturers might plan to produce versions with automatic and manual transmissions that vary in their fuel economy.

and interest in accordance with the proposed loan terms and (2) a positive net present value—that is, estimated flow of future income exceeds estimated flow of future costs when discounted and expressed in today’s dollars. Furthermore, by law, for the purpose of determining its financial viability, a selected applicant must not receive any additional federal funding associated with the proposed project.

To determine whether an applicant has a reasonable prospect of repayment, ATVM staff are to analyze an applicant’s current financial condition and develop a projection of its ability to repay the loan over time. Specifically, ATVM staff are to analyze an applicant’s liquidity and debt-to-equity ratio at the time of the application, as well as the applicant’s balance sheet and income statements. ATVM staff then build on this financial analysis to examine an applicant’s prospect of repayment by determining an applicant’s net present value. ATVM staff use an applicant’s projected cash flows and underlying assumptions, as well as the state of the automotive industry, to make a net present value determination. The ATVM program uses accounting and market analysis firms to help with its financial analysis, according to ATVM officials. For example, the market analysts assess whether an applicant’s likely production volume and sales projections are realistic given overall market conditions. ATVM officials also told us the firms perform cost analyses to help verify the costs of proposed projects.

Environmental Eligibility Requirements for Projects

To comply with the National Environmental Policy Act (NEPA),¹⁵ DOE requires that ATVM applicants submit three environmental impact reports for each project they propose. Specifically, applicants are to submit reports on the following:

- the likely *environmental impacts* of the project, including the construction and operation of the facilities to be associated with it;
- the likely *socioeconomic impacts* of constructing and operating the proposed project, including the likely effects on nearby towns and counties; and

¹⁵Under NEPA, federal agencies evaluate the likely environmental effects of projects that are proposed using an environmental assessment or, if projects are likely to significantly affect the environment, a more detailed environmental impact statement. See 42 U.S.C. §§ 4332(2)(C), (E).

-
- a comparison of the environmental impacts proposed in the first report with *alternatives to the project*, including a comparison of the environmental benefits and costs with the economic benefits and costs.

Depending on the proposed activities, applicants may have to take additional steps to mitigate the potential environmental impacts of their projects. If, however, applicants demonstrate minimal impacts, these reports may satisfy the NEPA requirements. For example, a project may be “categorically excluded” from a more detailed environmental analysis if it falls within a category of activities that a federal agency has previously determined has no significant environmental impact. To determine whether applicants meet the NEPA requirements for a categorical exclusion or whether additional analysis and, perhaps, mitigation are needed, specialists in DOE’s NEPA office review ATVM applicants’ environmental impact reports. They then share the results of their review with the ATVM Director and staff.

DOE Also Set Criteria for Determining Eligible Projects’ Technical and Financial Merits

To help choose among applicants and projects deemed eligible, DOE also considers their technical and financial merits. According to DOE officials, to determine technical merit, at least three experts from EERE or the DOE national laboratories individually review each project according to four criteria and provide written documentation of the strengths and weaknesses in each area. The technical merit criteria, as specified in the program’s procedures, are (1) improved vehicle fuel economy; (2) contribution to improved fuel economy of passenger vehicles in use in the United States; (3) promotion of the use of advanced fuels (e.g., electricity and ultra-low sulfur diesel); and (4) reductions in petroleum use by the passenger vehicles in use in the United States. After the individual reviews, the experts must agree on a single final merit score. To the extent that a project exceeds the fuel economy eligibility threshold for its vehicle class, the project receives a correspondingly higher technical merit score.

According to program procedures for determining financial merit, the ATVM program staff score an applicant on the basis of its likely ability to repay a loan. As part of this effort, the Credit Division—a separate group within DOE’s Loan Programs Office—reviews the financial soundness of applicants and their projects, producing both a credit rating for applicants and an estimate of the applicants’ credit subsidy cost.¹⁶ ATVM staff rank an

¹⁶The ATVM program’s credit rating for applicants is based, in part, on any publicly available credit ratings.

applicant's financial merit by considering (1) the credit rating generated by the Credit Division, (2) the Credit Division's estimated credit subsidy cost and the proportion that cost represents of the funds available to the program for paying credit subsidy costs, and (3) the loan's credit subsidy rate, which is the ratio of the loan's credit subsidy cost to the total amount of the loan. A loan with a relatively low credit subsidy rate is considered the most desirable. The Credit Division briefs OMB on its analysis and its credit subsidy cost estimate for each applicant. OMB then reviews this analysis and produces the final credit subsidy cost for the ATVM applicant.

In addition, the ATVM staff told us they gather information on how applicants and their projects address six additional "policy factors":

- a project's potential impact on the local economy, such as job creation or job preservation;
- whether a project is likely to advance automotive technology;
- an applicant's significance to the overall well-being of the automotive industry;
- the risk that an applicant may not be able to complete a proposed project, including difficulty in translating plans for innovative technology into manufactured vehicles and components;
- the geographic location that will be affected by a proposed project; and
- the age of any facilities that would be improved with the loan proceeds.

The ATVM staff provide the information to the Credit Review Board, a group composed of senior DOE officials charged with overseeing the ATVM program and making recommendations to the Secretary of Energy on whether to award ATVM loans.¹⁷ Finally, the program's procedures call for the Credit Review Board to weigh an applicant's technical and financial merit scores, the credit subsidy cost approved by OMB, the six policy factors, and other information, such as a summary of the financial

¹⁷Prior to the review by the Credit Review Board, the Credit Committee—a group composed of the Director of the Loan Guarantee Program and senior staff of the Chief Financial Officer's Office—reviews the financial analysis and makes recommendations to the Director of the ATVM program and the Credit Review Board on whether to award loans.

analysis, to decide whether to recommend that the Secretary of Energy award a loan.

The ATVM Program Has Awarded \$8.4 Billion in Loans That Largely Enhance Conventional Vehicle Technology, but the Program May Be Unable to Lend the Full Authorized Amount

The loan funds the ATVM program has awarded largely enhance conventional vehicle technology and, according to DOE, are expected to result in improved fuel economy. The remainder of the funds support vehicles with newer technologies—specifically, conventional hybrid vehicles, plug-in hybrid vehicles, and all-electric vehicles—that are also expected to result in improved fuel economy. In addition, DOE officials cited other benefits that could result from the projects. The loans the ATVM program has made to date have used almost half of the \$7.5 billion available to pay credit subsidy costs. At this rate, the program may not be able to provide the full \$25 billion in loans allowed by statute.

The Loan Funds Largely Support Projects for Enhancing Conventional Vehicle Technology, with the Remainder Supporting Newer Technologies

Of the about \$8.4 billion in loans the ATVM program has awarded to date, \$5.9 billion went to the Ford Motor Company; \$1.4 billion to Nissan North America; \$529 million to Fisker Automotive, Inc.; and \$465 million to Tesla Motors, Inc.¹⁸ About \$5.2 billion—62 percent of the loan funds awarded so far—is for projects that largely enhance the technologies of conventional vehicles powered by gasoline-fueled internal combustion engines. These projects include such fuel-saving improvements as adding assisted direct start technology to conventional vehicles, which reduces fuel consumption by shutting off the engine when the vehicle is idling (e.g., while at traffic lights) and automatically restarting it with direct fuel injection when the driver releases the brake. According to DOE's analysis, the projects will result in vehicles with improved fuel economy that will contribute in the near term to improving the fuel economy of the passenger vehicles in use in the United States as a whole because the conventional vehicles are to be produced on a large scale relatively quickly and offered at a price that is competitive with other vehicles being offered for sale. We are not reporting details on DOE's expectations for production of the enhanced

¹⁸Loan amounts awarded to each company do not add up to the total loan amount the ATVM program awarded to date because of rounding.

conventional vehicles or those vehicles' expected prices because of concerns raised by Ford about the proprietary nature of this information.

DOE used data from the borrowers in its modeling software—the Powertrain System Analysis Toolkit (PSAT)—to estimate the fuel economy of the vehicles being considered for ATVM loans. For conventional vehicles and conventional hybrid vehicles, fuel economy was estimated in terms of mpg. For all-electric and plug-in hybrid vehicles, fuel economy was estimated in terms of the number of miles the vehicles can drive with the energy equivalent of one gallon of gasoline. The PSAT model, in an effort to be consistent with CAFE mpg ratings (which are calculated after vehicles have been produced), estimates a vehicle's fuel economy using two drive-cycle tests—commonly referred to as the Highway and City tests. EPA's CAFE mpg ratings are typically higher than its ratings that appear on new car window stickers, in part because, since 2008, the window sticker ratings have been calculated using three additional drive-cycle tests—commonly referred to as the High Speed, Air Conditioning, and Cold Temperature tests. Furthermore, EPA has not yet made final a standard calculation for reporting the fuel economy of plug-in hybrids and all-electric vehicles. EPA expects to issue a regulation standardizing fuel economy calculations for plug-in hybrid and all-electric vehicles that it will use when reporting the estimated fuel economy of new vehicles to the public, such as on a new car's window sticker.

According to our calculations using DOE's modeled estimates of fuel economy, the projects for enhanced conventional vehicles are expected to result in vehicles with improved fuel economy that exceed both the program's eligibility requirements and the CAFE targets that will be in place at the time the vehicles are produced.¹⁹ We calculated the extent to which the vehicles are expected to exceed the program's fuel economy eligibility requirements by comparing DOE's estimated fuel economy for the vehicles it used to establish the projects' eligibility for the program to the fuel economy of the comparable vehicle class for model year 2005. Taken together, the average expected fuel economy of the enhanced conventional vehicle projects is 33.5 mpg. This is about 42 percent better

¹⁹The CAFE standards for 2012 to 2016 will subject passenger cars and light trucks to target levels of fuel efficiency based on the vehicles' "footprints." A vehicle's footprint is a measure of its size calculated by multiplying its wheelbase (the distance from the center of the front wheels to the center of the rear wheels) by its average track width (the average of the width between the two front wheels and the width between the two rear wheels). The vehicle-level mpg targets generally become more stringent with each new model year.

than the average 2005 baseline of 23.6 mpg for the respective vehicle classes and exceeds the 25 percent improvement over the 2005 baseline required to be eligible for the program.²⁰ We also used DOE's fuel economy estimates to calculate the extent to which the funded vehicles are expected to exceed the CAFE targets that will be in place at the time the vehicles are produced. According to our calculations, the projects for enhanced conventional vehicles as a whole are expected to achieve fuel economy that exceeds the CAFE targets by, on average, 21 percent.

The remaining funds—\$3.1 billion, or about 38 percent of the \$8.4 billion—support projects for vehicles and components with newer technologies. Fisker has received a loan for two plug-in hybrid projects: the Karma, a sedan classified by DOE as a subcompact-performance sedan at the time its eligibility was established; and the Nina, classified by DOE as a subcompact sedan.²¹ Tesla received a loan to manufacture an all-electric midsize sedan, the Model S, and Nissan received a loan to manufacture an all-electric vehicle, the LEAF, classified by DOE as a small wagon at the time its eligibility was established.²² Finally, a portion of the loan to Ford supports projects for manufacturing conventional hybrid and all-electric vehicles. In addition, there are two advanced technology components projects: Nissan has a project to build a manufacturing facility to produce batteries for the LEAF and potentially other vehicles, and Tesla has a project to build a manufacturing facility to produce electric battery packs, electric motors, and electric components for the Tesla Roadster and vehicles from other manufacturers. In contrast to the projects supporting enhancements to conventional vehicles, DOE's and the borrowers' analyses indicate that the projects with newer technologies will result in vehicles with far greater fuel economy gains per vehicle but that these

²⁰We calculated harmonic averages, which are often used for determining the average of a set of rates, such as, in this case, mpgs. DOE used harmonic averages to calculate the combined average fuel economy for its vehicle classes under the ATVM interim final rule.

²¹For the purpose of establishing eligibility, DOE used the classifications in the interim final rule. According to Fisker officials, while these classifications accurately reflect the vehicles' footprints and are appropriate for judging the fuel economy of the vehicles, the classifications do not accurately reflect the type of vehicles to be produced by Fisker under the program. More specifically, the officials characterized the Karma as a "premium-luxury sedan" and the Nina as a "near-luxury performance sedan," noting that vehicles that are known in the industry as "subcompacts" generally are not luxury vehicles.

²²Nissan officials told us that the LEAF that will be produced will be a midsize sedan, differing slightly from the design classified by DOE as a small wagon that was used to establish eligibility. DOE's projected fuel economy for the LEAF also exceeds the eligibility requirements for the midsize sedan classification.

vehicles will be sold in smaller volumes, thereby having a less immediate impact on the fuel economy of total U.S. passenger vehicles. For example, DOE's analysis estimates that the Fisker Nina subcompact sedan will achieve the equivalent of about 111 mpg. Fisker has stated production of the Nina will begin in late 2012, with expected production capacity of 70,000 to 100,000 vehicles per year. The Fisker Karma is estimated by DOE to achieve fuel economy that is the equivalent of 86 mpg. Fisker has stated that production of the Karma will begin in 2011 and that the company will have a production capacity of 15,000 vehicles per year. The Karma has a base price of \$95,900, prior to any federal tax credit. Similarly, DOE's analysis estimates that the Tesla Model S will achieve the equivalent of about 111 mpg, with production planned to begin in 2012. According to Tesla officials, the company plans to produce as many as 7,000 vehicles in 2012 and up to 20,000 vehicles per year thereafter. In addition, DOE's analysis indicates that the Nissan LEAF is estimated to achieve the equivalent of about 165 mpg.²³ The LEAF is currently listed to sell for about \$33,000 each, and Nissan has accepted 20,000 reservations for the vehicle in the United States.²⁴ The company expects to have a production capacity in the United States of 150,000 vehicles per year once the ATVM-funded manufacturing facility, scheduled to open in 2012, reaches full capacity in 2015. Finally, for Ford, we are not reporting information on expected production levels or prices for conventional hybrids or all-electric vehicles to be produced with ATVM loan funds because the company is concerned about the proprietary nature of this information.

According to our calculations, the projects for vehicles with newer technologies, like the projects for enhanced conventional vehicles, are expected to result in improved fuel economy that exceeds the program's eligibility requirements, as well as CAFE targets. The average expected fuel economy of the vehicles with newer technologies is 78.1 mpg. This is about 181 percent better than the average 2005 baseline of 27.8 mpg for the respective vehicle classes and exceeds the 25 percent improvement over

²³Nissan has announced that EPA has approved a fuel economy window sticker for the LEAF for model year 2011 with a rating of the equivalent of 99 miles per gallon of gasoline equivalent (mpgge), resulting from the five-cycle testing regimen EPA is using until it makes final its regulation.

²⁴For sales occurring after December 31, 2009, the cost to consumers of plug-in hybrid vehicles and all-electric vehicles is reduced by a federal tax credit ranging from \$2,500 to \$7,500, depending on the battery capacity of the vehicle. The credit begins to phase out for a manufacturer after it has sold at least 200,000 qualifying vehicles for use in the United States.

the baseline required to be eligible for the program. Using DOE's fuel economy estimates to calculate the extent to which the funded vehicles are expected to exceed the CAFE targets that will be in place at the time the vehicles are produced, we calculated that the vehicles' fuel economy is expected to be about 161 percent better than the 29.9 mpg CAFE target average for the respective vehicles.

The extent to which DOE's and borrowers' projections of gains in fuel economy and reductions in petroleum use will prove accurate depends on a number of factors. These include the borrowers' ability to overcome technical challenges they may face in producing vehicles that achieve the intended fuel economy gains and the extent to which the vehicles are sold in numbers that meet the initial projections, which itself depends largely on whether consumers consider the vehicles to be competitive in price and costs to operate when compared with vehicles offered by competitors, including conventional vehicles and those with newer technologies. Moreover, the extent to which the vehicles that are sold actually replace older vehicles currently on the road will affect the accuracy of the projected gains in fuel economy and reductions in petroleum use; similarly, how much consumers use the new vehicles compared to their use of the replaced vehicles will affect the accuracy of the estimates.

DOE Officials Also Cited Benefits Other than Improved Fuel Economy That Projects Could Provide

In addition to improved fuel economy, ATVM program staff identified other potential benefits projects could provide. Benefits cited by the program staff include the geographic location of proposed projects—that is, whether a project would benefit an area that had not otherwise received funding under the program—and the potential impact of the projects in creating or sustaining economic development—in particular, creating or sustaining jobs (see table 1). In the case of Fisker, the program staff also identified the extent to which the company's projects would support U.S. parts suppliers, noting that over 65 percent of the parts for Fisker's Karma are expected to come from U.S. parts suppliers.

Table 1: ATVM Loan Program Expectations of Jobs to Be Created or Preserved and Their Locations

Borrower	Locations of facilities funded by ATVM loans	Borrowers' estimates of jobs created or preserved
Ford	13 factories in Illinois, Kentucky, Michigan, Missouri, and Ohio	33,000
Nissan	2 factories in Tennessee	1,300
Fisker	1 factory in Delaware	2,000
Tesla	2 factories in California	1,500
Total		37,800

Source: ATVM analysis of borrower data.

ATVM program officials also noted other benefits the projects could provide after the loans had been awarded. For example, the ATVM Director stated that awarding loans to all-electric vehicle manufacturers has influenced major automakers to enter the advanced automobile technology market in order to remain competitive. Specifically, he noted that the recently announced partnership between Tesla and Toyota to build components for all-electric vehicles may have been encouraged by the ATVM loan to Nissan supporting the all-electric LEAF. Additionally, DOE has announced that Nissan is forming partnerships with states, counties, cities, and electric utilities to install charging stations needed to introduce and sustain all-electric vehicles.

Moreover, ATVM officials noted that all of the funded projects could result in environmental benefits—for example, by reducing petroleum consumption, they could reduce emissions of greenhouse gases and air pollutants. However, the extent of the environmental benefits will depend a number of factors, including the number and type of ATVM-funded vehicles consumers buy, the number and type of vehicles currently on the road that consumers replace with the ATVM-funded vehicles produced, and the extent to which consumers use the new vehicles compared with the vehicles they replaced. These benefits will also depend on the vehicles that the borrowers actually deliver to the market. DOE's estimates of fuel-economy gains were calculated using the information the borrowers provided on the vehicles they plan to produce; however, the loan agreements allow the borrowers to alter their production plans for individual vehicles as long as the projects as a whole comply with the program's eligibility requirements.

Furthermore, consumers may be deterred from buying ATVM-funded vehicles if they are not competitive in terms of their purchase prices and

their costs to operate when compared with vehicles available from competitors, including conventional vehicles and those with newer technologies (such as all-electric vehicles) that were not funded by the ATVM program. The competitiveness of the three types of vehicles with newer technologies, in particular, will be determined largely by the cost of batteries and, for plug-in hybrid and all-electric vehicles, by trends in the price of gasoline relative to the price of electricity and the available infrastructure for charging batteries. Moreover, because the plug-in hybrid and all-electric vehicles rely on electricity, the extent to which they will reduce greenhouse gases and air pollution depends on, among other things, whether producing the electricity they use leads to fewer emissions of greenhouse gases and pollutants than the gasoline the electricity replaces. For example, hydroelectric plants produce significantly fewer greenhouse gases and pollutants than coal-burning plants. In June 2009, we reported on these and other issues related to consumer adoption and the environmental effects of advanced technology vehicles.²⁵

The ATVM Program Has Used about Half of the Funds Available to Pay Credit Subsidy Costs, Which May Limit the Program's Ability to Loan the Entire \$25 Billion Allowed by Statute

In order to make loans, federal agencies are required by the Federal Credit Reform Act of 1990 to set aside the estimated net long-term costs of the loans to the government over the life of the loans in present value terms—that is, the loans' credit subsidy costs. In September 2008, the Congressional Budget Office (CBO) was tasked with determining the amount of funds needed by the ATVM program in order to pay the credit subsidy costs that would enable the program to award \$25 billion in loans—the full amount of the program's loan authority. CBO estimated that a total of \$7.5 billion would be needed to pay credit subsidy costs. This would amount to an average credit subsidy rate of 30 percent per loan (\$7.5 billion divided by \$25 billion equals 30 percent). In line with CBO's estimate, Congress appropriated \$7.5 billion to be used to pay credit subsidy costs for the ATVM program. However, the average credit subsidy rate for the \$8.4 billion in loans awarded as of February 24, 2011, was 39 percent—a total of roughly \$3.3 billion in credit subsidy costs. At this rate, the \$4.2 billion remaining to be used to pay credit subsidy costs will not be sufficient to enable DOE to loan the full \$25 billion in loan authority. For DOE to make loans that use all of the remaining \$16.6 billion in loan

²⁵See GAO, *Federal Energy and Fleet Management: Plug-in Vehicles Offer Potential Benefits, but High Costs and Limited Information Could Hinder Integration into the Federal Fleet*, [GAO-09-493](#) (Washington, D.C.: June 9, 2009).

authority, the credit subsidy rate for the loans would have to average no more than 25 percent (\$4.2 billion divided by \$16.6 billion).

A primary reason for the high credit subsidy rate for the loans made thus far is that they were made at a time of particularly difficult economic conditions for the automotive industry. For example, in September 2008, by the time CBO made its credit subsidy cost estimate, Ford's credit rating was B-, indicating the company was more vulnerable to adverse business, financial, and economic conditions than higher-rated companies but had the capacity to meet its financial commitments.²⁶ However, when the ATVM program considered Ford's application in June 2009, Ford's credit rating had dropped to CCC+ as a result, in part, of the severe economic downturn. Since the ATVM loan recipients first applied to the program, the economic standing of the U.S. automotive industry has improved. For example, Ford's credit rating had risen to B+ in August 2010. The improved economic conditions within the industry suggest that the loans awarded to date might not have reached an average credit subsidy rate of 39 percent had their credit subsidy costs been determined at a more economically favorable time. The Federal Credit Reform Act of 1990 and OMB guidance call for initial credit subsidy rates to be updated or "reestimated" annually to reflect any changes in assumptions related to future loan performance, such as the recent changes in the economic conditions of the U.S. automotive industry. However, reestimates that result in lower credit subsidy costs do not return funds to the program—once funds for credit subsidy costs have been apportioned for a loan, they are no longer available to support other loans. Therefore, it remains unclear whether the ATVM program will have sufficient funds remaining to loan the full amount allowed by statute.

²⁶The credit rating was determined by Standard and Poor's.

The ATVM Program Has Begun Overseeing Loans to Ensure Borrowers Comply with Financial and Technical Requirements but Has Not Engaged Engineering Expertise That Would Help Ensure That Projects Are Delivered as Agreed

ATVM program staff have set procedures and have begun using those procedures to oversee borrowers' compliance with the financial and technical requirements of the loans. ATVM staff share responsibility for financial oversight of the loans with external auditors engaged for that purpose. Although ATVM program procedures call for sufficient expertise to help oversee borrowers' compliance with the loans' technical requirements, the ATVM program has not yet engaged such engineering expertise and without it, cannot be sure that the projects are being delivered as agreed.

To help ensure that borrowers are complying with the financial requirements of the loans, the ATVM program calls for staff and external auditors to share oversight duties. ATVM officials developed monitoring procedures and a plan for each borrower that specifies the financial information to be collected and analyzed by ATVM staff. The ATVM program staff, as called for in the procedures and plans, oversee the loans' financial requirements by monitoring the financial health of borrowers to help identify potential challenges they might face in repaying the loans. To do this, ATVM staff analyze market trends and conditions that could affect the borrowers and information on the financial standing of the companies. For example, according to the procedures, ATVM staff collect and analyze information on market trends in the automobile industry that may affect the borrowers' liquidity, as well as analyze a variety of information provided by borrowers, such as their income statements, debt levels, changes to credit ratings, and the value of pledged collateral. If ATVM staff determine that a borrower is facing financial challenges but remains financially viable, they are to develop a plan for restructuring the loan, among other steps, to protect the investment. In the event that the steps fail and the borrower is deemed to be no longer financially viable, the ATVM program may foreclose on a loan if it concludes that doing so would offer the best protection of the taxpayers' financial interests.

The ATVM program is also using external auditors to oversee borrowers' financial performance by verifying that loan funds are being spent as intended, as called for by the program's procedures. To date, the auditors have reported instances in which three of the four borrowers did not spend funds as required, with, for example, two borrowers spending some loan funds outside the United States and the third spending some loan funds on ineligible payroll expenses. ATVM officials told us these instances were minor because the amounts were small relative to the total value of the loans and that the inappropriate use of funds has been corrected in these cases. Moreover, the officials stated that the borrowers have made corrections to their practices in light of these findings. We did

not evaluate the extent to which borrowers have complied with requirements for use of ATVM funds or the sufficiency of the borrowers' corrections of the instances noted by the auditors.

The ATVM program's procedures also specify technical oversight duties, a primary purpose of which is to confirm that borrowers have made sufficient technical progress before the program disburses additional funds. ATVM staff are to periodically review information borrowers submit on projects' progress to determine whether they are adhering to the technical requirements of the loan agreements. The procedures also call for "heightened [technical] monitoring" when borrowers are (1) constructing or retrofitting manufacturing facilities or (2) performing engineering integration—that is, designing and building vehicle and component production lines. Further, the procedures call for engaging independent engineering expertise to provide independent validation of project progress when ATVM staff determine it is needed. ATVM officials have indicated independent engineering expertise is an important aspect of heightened technical monitoring.

To date, according to ATVM officials, the program's technical oversight for all the funded projects has largely consisted of ATVM staff reviewing borrower-submitted information on the projects' technical progress. Although the expertise of program staff is largely financial, rather than technical, ATVM officials told us that their technical reviews have been sufficient so far, including those reviews for the one borrower officials identified as having projects at a stage requiring heightened technical monitoring. In that regard, the program staff responsible for overseeing the ATVM loan to Ford has been reviewing Ford's quarterly reports on the progress of production and engineering integration activities, visiting facilities, and meeting regularly with company officials to discuss the projects' progress. According to the ATVM Director and staff, established manufacturers such as Ford will require little additional independent engineering expertise to supplement the oversight performed by ATVM staff because those manufacturers have experience with successfully bringing vehicles from concept to production. In contrast, the Director and staff explained that the start-up manufacturers are less experienced with the complexities of setting up new production processes and, therefore, their projects may be riskier. For this reason, ATVM officials told us, they plan to engage independent engineering expertise in the months ahead to monitor the activities of the start-up companies and Nissan once they reach a phase requiring heightened technical monitoring. According to ATVM staff, as of September 2010, they were in the process of evaluating one consultant's proposal to provide engineering expertise and were

working with DOE's Loan Guarantee Programs to make those programs' manufacturing consultants available to assist the ATVM program.

According to documents we reviewed, however, all four borrowers—rather than the single borrower that the ATVM program staff asserts—have one or more projects that, according to the program's procedures, have already reached the stage requiring heightened technical monitoring. Specifically, Nissan has begun constructing its new battery manufacturing facility, and Fisker, Ford, and Tesla are performing engineering integration. Because ATVM staff, whose expertise is largely financial rather than technical, are so far providing technical oversight for the loans without the assistance of independent engineering expertise, the program may be at risk of not identifying critical deficiencies.

DOE Lacks Performance Measures That Would Enable It to Fully Assess the Extent to Which the ATVM Program Has Achieved Its Goals

DOE lacks sufficient performance measures that would enable it to fully assess whether the ATVM program has achieved its three goals. Principles of good governance indicate that agencies should establish quantifiable performance measures to demonstrate how they intend to achieve their program goals and measure the extent to which they have done so.²⁷ These performance measures should allow agencies to compare their programs' actual results with desired results and should be linked to program goals.

For the program goal of increasing the fuel economy of total passenger vehicles in use in the United States, the ATVM program has established two performance measures that assess the performance of ATVM-funded vehicles relative to the performance of similar vehicles in model year 2005, the base year. However, the measures do not enable DOE to assess the program's success in increasing the total fuel economy of U.S. passenger vehicles. The current ATVM program performance measures assess (1) the extent to which the average fuel economy of vehicles manufactured through projects funded by the ATVM program has increased over the average fuel economy of similar vehicles in model year 2005, expressed in percentage terms, and (2) the extent to which the petroleum used by vehicles manufactured through projects funded by the ATVM program has decreased from the amount used by similar vehicles in model year 2005, expressed in millions of gallons of fuel per year.

²⁷GAO, *Agencies' Annual Performance Plans under the Results Act: An Assessment Guide to Facilitate Congressional Decisionmaking*, GAO/GGD/AIMD-10.1.18 (Washington, D.C.: February 1998) and GAO, *The Results Act: An Evaluator's Guide to Assessing Agency Annual Performance Plans*, GAO/GGD-10.1.20 (Washington, D.C.: April 1998).

While these two performance measures will enable DOE to assess the fuel economy improvements of ATVM-funded vehicles specifically, the measures stop short of enabling DOE to fully determine the extent to which it has accomplished its overall goal of improving the fuel economy of all passenger vehicles in use in the United States. The measures stop short, in part, because neither isolates the improvements resulting from the program from those due to other factors. For example, the final rule effective July 6, 2010, implementing new CAFE standards requires that automakers selling vehicles in the United States produce more fuel-efficient passenger cars and light-duty trucks starting in model year 2012. In light of these new standards, in the future, ATVM borrowers might have acted to increase fuel economy and reduce the petroleum use of their vehicles in order to meet the more stringent CAFE standards—even without the ATVM funds. Without knowing the actions these companies might have taken in the absence of ATVM funding, the program will not be able to measure the extent to which the improvements in fuel economy and reductions in petroleum used by ATVM-funded vehicles resulted directly from the program. In prior work, we noted that it can be difficult to isolate the improvements resulting from a federal program when external factors also play a role, and this can hinder agency efforts to identify meaningful performance measures. In situations where a federal program is one factor among many contributing to an intended result of a program, measuring the effect of the other factors may help the agency measure the effect of the program. CAFE standards are one external factor affecting automakers' decisions about improving the fuel economy of their vehicles. Facing new CAFE standards beginning in model year 2012, automakers will need to improve the fuel economy of their vehicles to bring them in line with the new standards, and U.S. automakers in most cases have historically complied with increases in CAFE standards. For those ATVM-funded vehicles that will have achieved fuel economy that exceeds the CAFE targets in place at the time they are delivered, the extent to which their fuel economy exceeds the CAFE targets could indicate the maximum amount of improvement in fuel economy that could be attributed to the program.

Furthermore, the two performance measures stop short of enabling DOE to account for the effect of the ATVM program on the fuel economy of the passenger vehicles in use in the United States as a whole because they do not put the fuel economy improvements of vehicles funded by the program into the broader context of total U.S. passenger vehicle fuel economy. The two measures will enable DOE to take critical steps toward assessing its achievement of the overall goal by accounting for the fuel economy improvements and petroleum use reductions specific to ATVM-funded

vehicles. However, assessing achievement of the overall goal would require DOE to put those specific achievements into the context of the fuel economy of all passenger vehicles in the United States and would require accounting for several factors, including the number and type of ATVM-funded vehicles consumers buy, the number and type of vehicles currently on the road that consumers replace with ATVM-funded vehicles, and the extent to which consumers use the ATVM-funded vehicles as compared with the vehicles they replaced. Our prior work has highlighted the importance of developing performance measures that provide a basis for comparing actual results with goals. Although problems with isolating program contributions make it difficult to develop performance measures that account for program effects with precision, a link between goals and measures is needed to provide important information for decision makers on the effectiveness of a program. In the case of the ATVM program, this would mean not only isolating the contribution of the program when it accounts for the fuel economy improvements and reductions in petroleum used for ATVM-funded vehicles, but also taking into account the numbers and types of ATVM vehicles that consumers have bought, the numbers and types of vehicles consumers have replaced, and the extent to which the new vehicles have been used by consumers relative to the old vehicles.

In addition, the ATVM program lacks performance measures that will allow DOE to assess the extent to which it has achieved the other two goals of the program—advancing automotive technology and protecting taxpayers’ financial interests. ATVM program managers told us they believe that supporting the first generation of all-electric vehicles will further the program’s second goal of advancing automotive technology by providing a springboard for industry to expand production of that technology in future years. However, the ATVM program does not have measures that will enable DOE to assess the extent to which the technologies it has supported have been adopted in the marketplace. Similarly, officials have said that to achieve the program’s third goal of protecting taxpayers’ financial interests, the program must award loans only to borrowers who are financially viable—that is, have reasonable prospects of repayment. However, the ATVM program has not identified related performance measures. When overseeing the loans, ATVM program procedures call for program staff to periodically review the borrowers’ financial condition, examining such factors as borrowers’ liquidity and debt service coverage ratios—used when the program established the borrowers’ eligibility—as well as other indicators of borrowers’ performance, such as timeliness of payments. However, the program has not set targeted levels of performance for all of these factors to be used to

judge the financial condition of the borrowers and the extent to which taxpayers' financial interests have been protected.

Conclusions

DOE established the ATVM program so that it would, according to program estimates, result in fuel economy gains for the nation's vehicle fleet, advance the availability of innovative automotive technology to consumers, and protect the taxpayers' financial interests. In making its first loans, the ATVM program has injected significant funds into the U.S. automotive industry for promoting improved fuel efficiency of conventional vehicles and encouraging the development of vehicles with newer technologies that rely less, or not at all, on petroleum.

Technical oversight of the program is important to ensure that it delivers on its promises of advanced vehicles and components, thereby providing U.S. taxpayers what they paid for through the loans. However, the program's current approach of using ATVM staff to monitor the technical progress of the projects may not be sufficient to ensure that the vehicles are delivered as agreed because their expertise is largely financial and not technical—that is, ATVM staff lack the engineering expertise called for in the program's procedures, which cite the need for independent engineering expertise to validate project progress. Without qualified oversight to analyze the information submitted by the borrowers and to provide technical monitoring, the ATVM program cannot be adequately assured that the borrowers are delivering the vehicle and component projects as required by the loan agreements.

Further, assessing the extent to which the ATVM program has delivered on its promises requires the discipline of using quantifiable performance measures tied to program goals as a means of charting the program's direction and assessing its achievement. Although the ATVM program has performance measures tied to DOE's first goal of increasing the fuel economy of passenger vehicles in use in the United States, because these measures do not isolate the net effect of the program—that is, the improvements in fuel economy achieved by ATVM-funded vehicles that are the direct result of the program and that would not have occurred for other reasons, such as complying with new CAFE standards—gains in fuel economy and reductions in petroleum use that the program reports could be inaccurate. The extent to which the ATVM-funded vehicles achieve fuel economy that exceeds the CAFE targets in place at the time the vehicles are delivered, and associated reductions in petroleum use, may indicate the maximum amount of improvement in fuel economy that could be attributed to the ATVM program and could provide a useful metric for

assessing program performance. Further, because the performance measures for the fuel economy goal stop short of quantifying the impact of the program on total U.S. passenger vehicles—by not taking into account the number and type of ATVM-funded vehicles consumers may purchase, the number and type of vehicles that may be replaced, and the relative usage of the new vehicles compared with that of the old ones—DOE will be unable to assess the extent to which the program has achieved this goal. Moreover, because DOE does not have quantifiable measures for assessing the extent to which the advanced technologies supported by the program have been adopted in the marketplace, DOE will not be able to assess its achievement of this second goal. Similarly, DOE’s ability to assess its achievement of its third goal—protecting taxpayers’ financial interests—is limited because DOE has not identified measures for quantifying indicators of borrowers’ financial condition or other indicators of borrower performance.

Recommendations for Executive Action

To help ensure the effectiveness and accountability of the ATVM program, we recommend that the Secretary of Energy direct the ATVM Program Office to take the following two actions: (1) accelerate efforts to engage sufficient engineering expertise to verify that borrowers are delivering projects as agreed and (2) develop sufficient and quantifiable performance measures for its three goals.

Agency Comments and Our Evaluation

We provided a draft of this report to the Secretary of Energy or his designee for review and comment. In his comments, the Executive Director of DOE’s Loan Programs Office responded that he was pleased that we reported on the progress DOE has made in awarding loans that promise to deliver gains in fuel economy, but that DOE did not agree with either of our two recommendations.

DOE disagreed with our recommendation that the agency accelerate its efforts to engage sufficient engineering expertise to verify that borrowers are delivering projects as agreed. According to the Executive Director, the program will use engineering expertise to help monitor projects under certain circumstances, such as during the construction of manufacturing facilities. However, he explained in his comments that the projects for the four loans DOE has made to date are in the very early stages of engineering integration—at drafting tables and on computers—and therefore such expertise has not yet been required to monitor them. We disagree. That the work may be in its early stages does not diminish the need for independent engineering expertise. In fact, the ATVM program’s

procedures state that engineering integration and construction activities require heightened technical monitoring, and, as DOE officials have previously told us, independent engineering expertise is an important aspect of such monitoring—particularly since ATVM staff expertise is largely financial, rather than technical. Moreover, three of the four loans have one or more projects that have been in the engineering integration phase for at least 10 months, and the other loan has at least one project that has begun construction—suggesting that DOE’s assessment of the projects’ status may not be up to date. By not engaging engineering expertise to aid ATVM staff in monitoring the projects, DOE has not taken appropriate steps to become adequately informed about the technical progress of the projects. Thus, DOE cannot be assured that the projects are on track to deliver the vehicles as agreed nor be in a position to require the borrowers to make any corrections in a timely and efficient manner. We maintain that DOE should accelerate its efforts to engage sufficient engineering expertise for monitoring technical aspects of the projects as soon as possible.

DOE also disagreed with our recommendation to develop sufficient and quantifiable performance measures for its three ATVM program goals. In his comments, the Executive Director stated that the performance measures suggested by GAO would greatly expand the scope of the ATVM program and do not appear to be consistent with the intent of Congress in authorizing the program. However, he did not explain how measuring the performance of the program would expand its scope or be inconsistent with Congress’ intent beyond pointing out that measuring performance as we recommended would require research efforts by program staff and that Congress did not specify the performance measures. Principles of good government, as specified in the Government Performance and Results Act, require agencies to establish goals for their programs and performance measures that provide a basis for comparing program goals with the results. DOE rightly established performance goals for the program, which are to (1) increase the fuel economy of U.S. passenger vehicles as a whole, (2) advance automotive technology in the United States, and (3) protect taxpayers’ financial interests. Furthermore, as we reported, DOE established two performance measures for its first goal—the extent to which the average fuel economy of ATVM-funded vehicles has increased over that of similar vehicles from model year 2005 and the extent to which the vehicles have consumed petroleum in comparison to similar vehicles from model year 2005. These performance measures fall short, in part, because they address only improvements at the program level and do not put those improvements into the broader context of total U.S. passenger vehicle fuel economy, which is necessary for assessing progress toward

the national-level goal. For example, DOE's measure for assessing the petroleum saved by vehicles in the program provides a first step in determining whether the program is making progress toward its national-level goal of increasing fuel economy of U.S. passenger vehicles as a whole. However, to put DOE's estimates of petroleum to be saved by program vehicles into the context of U.S. vehicles as a whole, DOE would need to determine such additional factors as (1) the extent to which program vehicles become part of the U.S. fleet as a whole, (2) the number of vehicles that the program vehicles replace, and (3) the number of miles the new vehicles are driven as compared with the miles driven by the vehicles they replace. Furthermore, DOE's two performance measures do not isolate the effects of the program from other factors. Although this can be difficult to do with precision, accounting for the effects of other factors could help the agency more accurately determine the effects of the program. We note in our report that, because automakers selling cars in the United States have to meet increasingly stringent CAFE targets, DOE could approximate the effects of the program by measuring the extent to which the ATVM-funded vehicles achieve fuel economy that surpasses those CAFE targets. However, in his comments, the Executive Director stated that DOE will not create new performance measures for any of its three program goals. By not setting sufficient performance measures for its three program goals, DOE is unable to assess its progress in accomplishing them. Assessing the extent to which the ATVM program is accomplishing its goals is particularly important given the current economic climate and constrained federal budget. DOE's failure to develop and use appropriate performance measures means that Congress lacks important information on whether the funds spent so far are furthering the program's goals and, consequently, whether the program warrants continued support. It also means that U.S. taxpayers do not know whether they are getting what they paid for through the loans.

DOE's letter commenting on our report is presented in appendix II. DOE also provided more details and technical comments, which we incorporated as appropriate.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies to appropriate congressional committees, the Secretary of Energy, and other interested parties. In addition, the report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staffs have any questions about this report, please contact me at (202) 512-3841 or ruscof@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix III.

A handwritten signature in cursive script that reads "Frank Rusco". The signature is written in black ink and has a long, sweeping horizontal line extending to the right from the end of the name.

Frank Rusco
Director, Natural Resources and Environment

Appendix I: Objectives, Scope, and Methodology

To identify the steps the Department of Energy (DOE) has taken to implement the Advanced Technology Vehicles Manufacturing (ATVM) Loan Program, we analyzed relevant provisions of the Energy Independence and Security Act of 2007 (EISA) and the Consolidated Security, Disaster Assistance, and Continuing Appropriations Act, 2009; the ATVM program's 2008 interim final rule; the ATVM program's credit policies and procedures manual; and other documentation provided by DOE. We discussed the interim final rule and program implementation with officials from the ATVM program; the Office of Energy Efficiency and Renewable Energy; the Office of the Secretary of Energy; the Office of the Chief Financial Officer; and the Credit Review Board, which is charged with overseeing the ATVM program and making recommendations to the Secretary of Energy on whether or not to award loans. We also compared the interim final rule with applicable requirements contained in EISA and the Office of Management and Budget Circular A-129, Policies for Federal Credit Programs and Non-Tax Receivables.

To examine the ATVM program's progress in awarding loans, we analyzed documents DOE decision makers used to select borrowers; minutes of Credit Review Board meetings; the loan agreements made as of February 24, 2011, and other relevant documents. We also interviewed cognizant DOE and ATVM officials to gain further information on the loans. We did not evaluate the technical or financial soundness of the projects that DOE considered for loans.

In addition, we compared the program's fuel economy estimates for the funded vehicles with (1) the average fuel economy of the comparable vehicle class for model year 2005 and (2) data on future CAFE targets. For each vehicle project that has received funding from the ATVM program, we compared the miles per gallon (mpg) or miles per gallon of gasoline equivalent (mpgge) result from DOE's Powertrain System Analysis Toolkit (PSAT) model for the representative vehicle used to establish the project's eligibility to the average mpg for the comparable vehicle class for model year 2005 as defined under ATVM's interim final rule. We also compared the mpg or mpgge result from DOE's PSAT model, which is a single mpg rating for a particular model year, with the mpg target under corporate average fuel economy (CAFE) standards for a vehicle with the same footprint in the same model year. We did not compare the estimated mpg or mpgge to CAFE targets in years subsequent to the first year of expected production for that model. We determined that these data were sufficiently reliable for our purposes.

To assess how the ATVM program is overseeing the loans, we analyzed the ATVM program's credit policies and procedures manual, the program's credit monitoring plans for borrowers, borrowers' progress reports, and the external auditors' reports available for the three borrowers who have had external audit reports as of September 16, 2010. In addition, we discussed loan oversight and monitoring with officials from the ATVM program and the Office of Energy Efficiency and Renewable Energy. Finally, we consulted GAO's *Standards for Internal Control in the Federal Government*.

To evaluate the extent to which DOE can assess its progress toward meeting program goals, we analyzed relevant provisions of EISA, DOE's budget request documents, and other documentation provided by the ATVM program. We also analyzed relevant provisions of the Government Performance and Results Act (GPRA), as well as our prior work on GPRA and federal standards for internal control. Finally, we discussed strategic planning and program implementation and evaluation with relevant ATVM officials.

We conducted this performance audit from September 2009 through February 2011 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Comments from the Department of Energy



Department of Energy

Washington, DC 20585

NOV 2 2008

Mr. Frank Rusco
Director, Natural Resources and Environment
Government Accountability Office
Washington, DC 20548

Dear Mr. Rusco:

Thank you for the opportunity to comment on the Government Accountability Office's (GAO) draft report on the Department of Energy's (DOE or Department) Advanced Technology Vehicles Manufacturing Incentive Loan Program (ATVM), *Advanced Technology Vehicle Loan Program Implementation Is Underway but Enhanced Technical Oversight and Performance Measures Are Needed*.

The Department is pleased that the GAO recognizes the progress of the ATVM program in making \$8.4 billion in loans that will yield fuel economy improvements in the near and long-term while creating or saving an estimated 37,800 jobs. ATVM loans are fostering the development of a variety of advanced automotive projects including those that offer improved internal combustion technology as well as those utilizing electric and hybrid technologies.

DOE is very proud of the fact that the program was set up in record time. Authorized under Section 136 of the Energy Independence and Security Act of 2007 (P.L. 110-140) (EISA), the program was not funded until the Fiscal Year 2009 Continuing Resolution was approved by Congress in October 2008. On November 5, 2008, DOE issued the Interim Final Rule in approximately half of the 60-day expedited timeframe mandated by Congress. The ATVM program has been enthusiastically received by the automobile industry. Over 130 applications for nearly 290 projects have been submitted to the ATVM program. These applications have come from both automobile manufacturers and component makers. It is also important to note that the funding provided by ATVM came at a critical time in the development of plug-in hybrid and electric vehicles providing long-term capital for these efforts when private financing was not available.

As noted in your report, the Department has taken numerous steps to successfully implement the ATVM program. The Department set three goals: increase the fuel economy of U.S. passenger vehicles as a whole, advance U.S. automotive technology, and protect taxpayers' financial interests. DOE also set technical, financial, and environmental eligibility requirements. Additionally, DOE established criteria for judging the technical and financial merits of applicants.

A paramount concern is protecting the American taxpayer. To that end, the ATVM program undertakes a rigorous screening for technical merit, financial viability, including a thorough credit underwriting of the project, and then negotiates a commitment term sheet. The project then



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**Appendix II: Comments from the Department
of Energy**

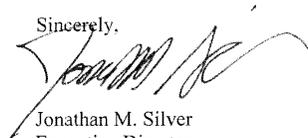
enters the approval process which, if successful, leads to negotiation of a loan agreement. After closing loans, the Department monitors the financial conditions of borrowers through comparisons of actual performance to the established financial covenants and other key terms and conditions associated with the loan to ensure taxpayers are protected.

GAO's report makes two recommendations. With respect to the first, DOE agrees that engineers should be engaged to monitor certain aspects of ATVM loans as part of a comprehensive monitoring program, and in fact, the Loan Programs Office has already engaged independent engineers to review certain aspects of ATVM applications. DOE takes exception with GAO's assertion that all four outstanding ATVM loans made to date should have had independent engineers reviewing initial stages of engineering integration work. This is done primarily at drafting tables or on computers and as such would be difficult to appraise. Engaging engineers at this stage would likely not yield the insights which would increase effectiveness of the ATVM program. DOE engineers will provide more extensive oversight of start-up companies including monthly on-site inspections. However, DOE believes that established original equipment manufacturers which have large staffs of highly experienced engineers and other experts require less frequent inspection unless there is a problem achieving performance specifications of new vehicles or in case there are manufacturing cost issues. DOE will utilize engineering expertise on a regular basis during the construction of all vehicle assembly and component manufacturing facilities supported by ATVM loans.

With respect to the second recommendation regarding performance measures, DOE believes that the ATVM program has faithfully adhered to the requirements of the EISA as more fully developed in its implementing regulations. Performance measures suggested by the GAO greatly expand the scope of the program and do not appear consistent with the intent of Congress in authorizing this program. We do not intend for the program to create new performance measures that Congress did not specify. Furthermore, isolating the contribution of the ATVM program by taking into account the numbers and types of ATVM vehicles that consumers might have bought, the numbers and types of vehicles consumers have replaced, and the extent to which the new vehicles have been used by consumers relative to the old vehicles as GAO suggests would require a significant research effort which would divert resources and produce no benefit.

Enclosed are the Department's detailed response to GAO's specific recommendations and separate technical and factual comments on specific language in the draft report. We look forward to working with your team on future engagements.

Sincerely,



Jonathan M. Silver
Executive Director
Loan Programs Office

Enclosures

Appendix III: GAO Contact and Staff Acknowledgments

GAO Contact

Frank Rusco, (202) 512-3841 or ruscof@gao.gov

Staff Acknowledgments

In addition to the individual named above, Karla Springer, Assistant Director; Marcia Carlsen; Elizabeth Curda; Nancy Crothers; Brandon Haller; Joah Iannotta; Terence Lam; Rebecca Makar; Reina Nunez; Madhav Panwar; Mick Ray; Ray Sendejas; Kiki Theodoropoulos; and Barbara Timmerman made key contributions to this report.

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