4.0 Program Administration

The final section of this document contains information on how the FCVT Program is administered in an efficient manner. This includes a description of the structure of the organization, program implementation, cost management and monitoring, environmental safety and health, and communications and outreach efforts. This section deals primarily with administrative matters that are not essential to the strategic or decision-making processes, but rather support the organization itself (such as cost management) and are therefore necessary to the success of the Program and its multi-year planning.

4.1 Organizational Structure

The organizational structure of the FCVT Program is shown in Figure 4.1. There are four technology area teams that encompass all research projects coordinated by the Program: Vehicle Technologies, Advanced Materials Technologies, Fuels Technologies and Engine and Emissions Control Technologies. In addition, FCVT works with two industry partnerships, the FreedomCAR and Fuel Partnership and the 21st Century Truck Partnership. Research performed in support of each of the partnerships is managed by a Partnership Director reporting to the Program Manager. The Program also has a Chief Scientist reporting to the Program Manager.

The FCVT Program participates in several interoffice working groups known as crosscutting groups. These include vehicle systems integration, power electronics, combustion research, fuels technologies, and materials.

FCVT shares the responsibility of vehicle systems integration with the HFCIT Program. The HFCIT Program is responsible for the research and development activities pertaining to automotive fuel cells and hydrogen storage tanks. The FCVT Program is responsible for vehicle modeling and simulation, advanced power electronics, electric machines, energy storage and lightweight materials. These technologies from both programs will be required in the fuel cell vehicles of the future. To assure that the technologies being developed will be compatibly integrated in future vehicles, a systems integration working group, comprised of members from both programs has been formed.

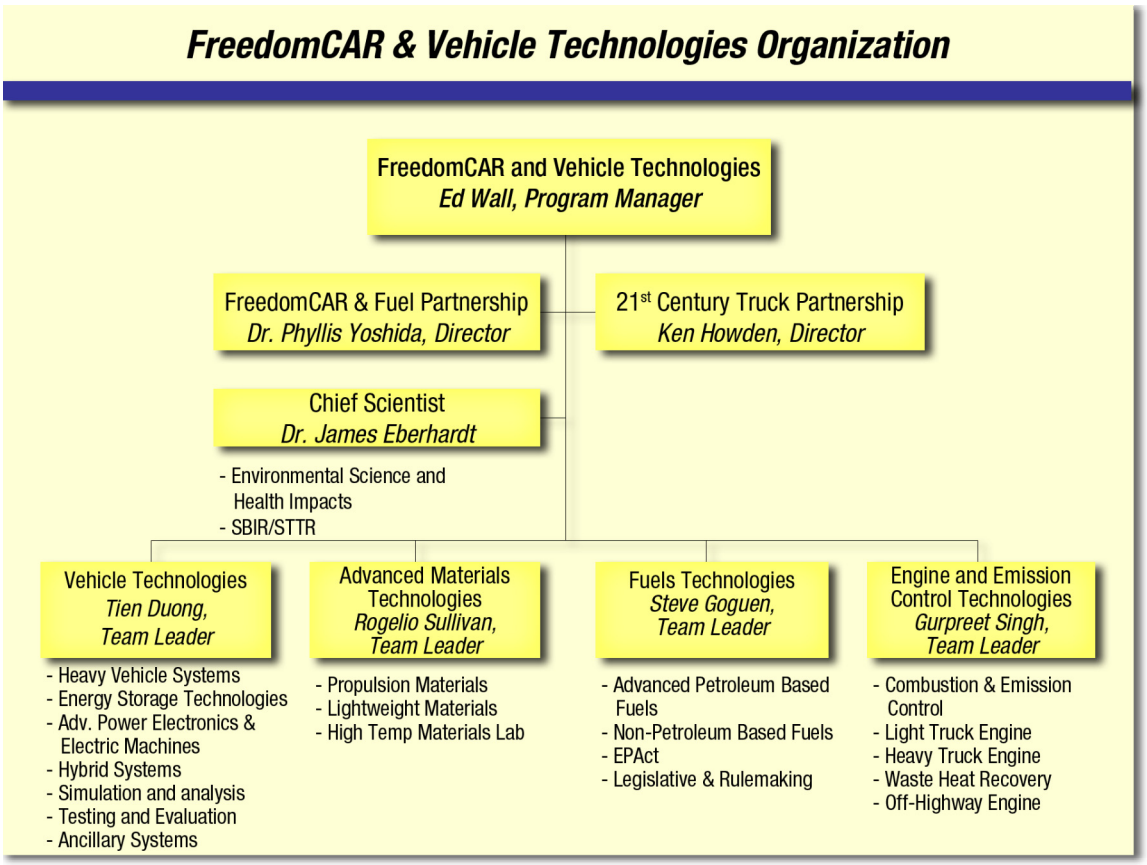


Figure 4-1. The FCVT Program has four technology area teams supporting two partnerships with industry

Any sector that generates, transports or uses electrons as an energy carrier, has a need for power electronics. This includes nine of the eleven EERE programs, and the Office of Electricity Delivery and Energy Reliability. In addition, the Office of Science, Basic Energy Sciences has seen the need for R&D in this area. Recognizing the leveraging and synergistic opportunities in FY 2004, FCVT initiated a power electronics crosscut activity, involving all interested DOE programs. In FY 2005, the crosscut activity is being expanded outside of DOE to include such organizations as DARPA, NASA and NSF.

Combustion research is funded by the Office of Fossil Energy, Office of Science, and FCVT. These organizations have formed a crosscut committee to foster communications and assure there is no duplication of effort.

Three organizations with very distinct roles in fuels research are the Office of Fossil Energy, Biomass Program and FCVT. Fossil Energy is pursuing the development of clean fuels from fossil sources, while the Biomass Program is developing fuels from renewable sources. The role of FCVT is to determine the fuel characteristics required for high efficiency, low emission engines, regardless of the origination of the products from which the fuel was made. A fuels crosscut group assures timely communications and exchange of information among these groups.

Materials research is performed throughout Federal government and as such requires a broad range of interactions to enhance communications. Within DOE, Materials Technologies interacts with the Industrial Technologies Program on Industries of the Future and Office of Science for fundamental materials research. External to DOE, Materials Technologies coordinates materials and material processing research with the Department of Commerce, Department of Transportation, Department of Defense, National Aeronautics and Space Administration and the International Energy Agency.

The FCVT Program has contracted the services of the National Academy of Sciences (NAS) to perform a biennial peer review of the research performed in support of the FreedomCAR and Fuel Partnership. This biennial peer review is a continuing activity that began in 1994 under the Partnership for a New Generation of Vehicles. Beginning in FY 2005, the peer review process is being applied to the 21st Century Truck Partnership as well, and both Partnerships are being reviewed in FY 2006. The EERE has promulgated guidance for the reviews which has been used but tailored to the technology area and unique situations in the past. In 2007, FCVT will move to a consolidated review and the guidance will be adhered to fully. Each of the peer reviews results in a well documented publication of findings and recommendations and the "Review of the Research Program of the FreedomCAR and Fuel Partnership: First Report (2005)" is available on the Internet at the following URL:

http://www.nap.edu/books/0309097304/html/.

4.2 Program Funding Mechanisms

The FCVT Program uses the best funding mechanism available for the research to be performed. Figure 4.2 illustrates the Program implementation process, including the funding mechanisms.

Funding is transferred to the national laboratories through the internal DOE process of guidance letters and work authorizations. Most work performed by the laboratories is in-house and cost-share is minimal; although, not non-existent. Often, material and equipment required for research is provided at either reduced or no cost to the government by industry or a state/local government agency. The laboratories also enter into Cooperative Research and Development Agreements with industry. Typically, under a CRADA, industry will provide matching cost share; although, the maturity of the technology may warrant more or less cost share. For example, an 80/20 (government/industry) cost share may be justified on a project in the exploratory research phase, while a 20/80 cost share could be justified on a project in the technology validation phase. The laboratories also subcontract some of the research effort to supplement the expertise available in-house. When the private sector subcontractor is likely to gain intellectual property, some cost share is justified with the amount of the cost share being inversely proportional to the risk.

Research to be performed by industry, academia, and other agencies is processed through a procurement request. Industry projects may take the form of a contract or a cooperative agreement with cost share determined by project risk and technology maturity. Work performed by other agencies is handled through an Interagency Agreement (IA). The IA is most often used when another agency is conducting research in an FCVT area of interest. FCVT is then able to leverage funds with those of the other agency to gain full benefit of the research at a fraction of the cost. Academic research takes on the form of a grant or a subcontract. Cost sharing is not common for research performed by academia; however, an exception to this is the student competitions. Universities participating in the student competitions receive a small grant from FCVT and a vehicle from the sponsoring manufacturer and then seek sponsorship funds and hardware from many organizations. The contributions from organizations outside of FCVT and the sponsoring manufacturer are often several multiples greater than the original grant.

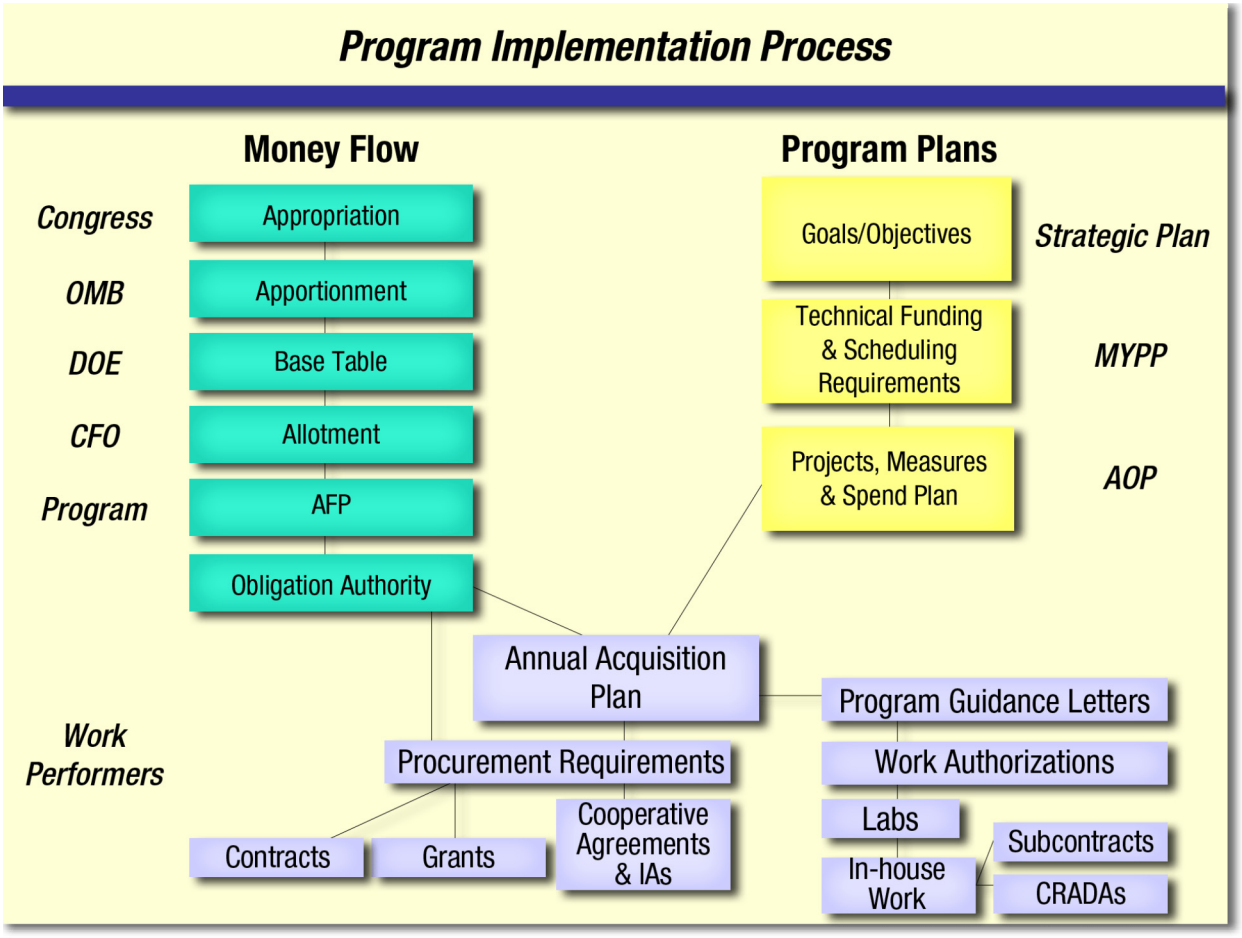


Figure 4-2. FCVT Implementation Process and Funding Mechanisms

Project Selection Process

Many factors enter into the decision of which projects to initiate and which organization should perform the projects. These factors include risk/benefit analysis, technology barrier being addressed, and appropriateness of FCVT funding.

Many projects funded by FCVT fall in the category of high risk, high benefit; however, the Program maintains a balanced portfolio and funds a full spectrum of projects. Projects that are low risk and high benefit are most frequently carried out by industry and require no Federal support. But there are situations when Federal funding may be required. For example, the high benefit may be societal rather than economic. Similarly, low risk, low benefit projects may justify FCVT funding when technologies are required to meet Program objectives and the research would not be performed without Federal support. At the other end of the spectrum are projects rated as having high risk and low benefit. Very few projects are funded in this area; however, in a situation where a technology solution is required, FCVT funding may be the best option. When a technology area is rated as high risk, high benefit, the Program may choose parallel research paths to mitigate the risk and improve the probability of success.

FCVT works with its industry partners to assure that the highest priority technology barriers are being addressed. Projects considered for funding must address one or more of these barriers. Within the funds available, FCVT attempts to address all barriers. But in the case of a funding shortfall, the Program may only be able to perform research on the highest priority barriers.

The congressional appropriations for FCVT are relatively specific on what can and can not be funded. Projects will not be initiated if there is not adequate funding appropriated or if the appropriation language does not include research on the technology proposed.

Partnership and Stakeholder Roles

FCVT works with many industry partners to help identify technology barriers and establish technical targets. This ensures an appropriate focus for research and development and also facilitates future commercialization. DOE's approach to working with the automotive and truck industries is *"collaboration, then competition,"* encouraging companies to work together on pre-competitive research, then letting the resulting new and more efficient technologies compete in the marketplace.

In January 2002, the Secretary of Energy and executives of the U.S. automobile industry announced a new cooperative automotive research partnership between the U.S. Department of Energy and the auto industry's U.S. Council for Automotive Research (USCAR). This government-industry partnership, designated "FreedomCAR" (in which CAR stands for "Cooperative Automotive Research") supersedes and builds upon the successes of the previous partnership (PNGV). In September 2003, the FreedomCAR Partnership was expanded to include five major energy companies to address issues related to the

FreedomCAR and Fuel Partnership goal: Enable the full spectrum of light-duty passenger vehicles to operate without using petroleum or producing harmful emissions while sustaining freedom of mobility and vehicle choice.

supporting fuel infrastructure. It was renamed the FreedomCAR and Fuel Partnership. This Partnership departs from the family sedan "vehicle" focus of PNGV, addressing the development of advanced technologies suitable for all light-duty passenger vehicles (e.g., cars, SUVs, pickups, minivans). Additionally, the government's role in the FreedomCAR and Fuel Partnership has shifted to more fundamental, longer-range, higher-risk technology research. The long-term goal of the FreedomCAR and Fuel Partnership is to enable the full spectrum of light-duty passenger vehicle classes to operate completely free of petroleum and harmful emissions while sustaining the driving public's freedom of mobility and vehicle choice. Secretary of Energy Spencer Abraham designated the FCVT to lead DOE's vehicle partnerships with the U.S. automotive industry. FCVT and HFCIT, in conjunction with USCAR and the five energy companies, lead the FreedomCAR and Fuel Partnership in developing the technologies that improve vehicle efficiency.

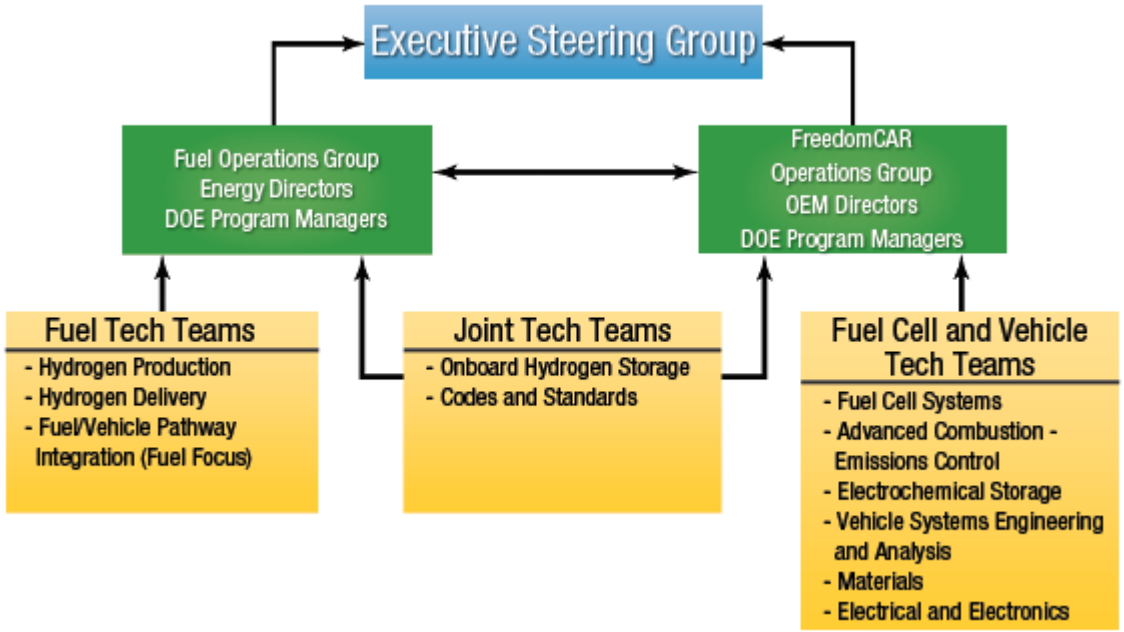


Figure 4-3. Executive Steering Group for the FreedomCAR and Fuel Partnership

21st Century Truck Partnership goal: Dramatically improve the energy efficiency and safety of trucks and buses while maintaining a dedicated concern for the environment.

The FCVT Program plays a prominent role in the FreedomCAR and Fuel Partnership by conducting R&D to achieve the near- to mid-term goals of the partnership. It does so through continued development of advanced technologies that will dramatically reduce the fuel consumption and emissions of all petroleum-fueled, light-duty personal vehicle classes. Achieving these near- to mid-term goals is of paramount importance. They provide four of the six core technologies for hybrid fuel cell electric vehicles. Figure 4.3 identifies the organizational structure for the FreedomCAR and Fuel Partnership.

The role of the FCVT Program in R&D for specific technologies ends once a technology has been validated and a viable technology development pathway has been identified to meet the needs of commercialization. Other parts of EERE and DOE and other Federal agencies may work with industry to foster the commercialization of the technologies; however, those efforts are not within the scope of this plan.

In November 2002, the Secretary of Energy announced the rejuvenation of the government–industry 21st Century Truck Partnership to address the R&D needs of commercial vehicles. The ultimate goal of this partnership is to dramatically improve the energy efficiency and safety of trucks and buses while maintaining a dedicated concern for the environment. The 21st CTP is a partnership between the government and the commercial vehicle industry. Commercial vehicles provide an important contribution to U.S. economic activity. Historically, the rise in gross domestic product, a measure of economic activity, has been directly linked to the increase in vehicle miles of commercial transport. There are large efficiency gains to be realized with commercial vehicles, especially heavy-duty transport vehicles, which are more dependent on high-energy-density, petroleum-based fuels. This is because of the long distances they travel, their heavier payloads, and their more demanding duty cycles. Therefore, in addition to working on technologies for light-duty passenger vehicles, the FCVT Program addresses R&D of technologies for commercial vehicles through the 21st CTP. The FCVT Program and this Multi-Year Plan are supportive of this important industry partnership. The FCVT Program is the only DOE program supporting 21st CTP, and it has the responsibility for managing the government's participation and for conducting and supporting the R&D necessary to meet the partnership's goals. Thus the Federal government, led by DOE, and the trucking industry are working together to develop these new technologies and develop prototype heavy-duty trucks and buses with improved fuel efficiency, reduced emissions, enhanced safety and performance, and lower operating costs. Major participants in the 21st CTP are identified in Figure 4.4.

Figure 4-4. Major Groups Participating in the 21st Century Truck Partnership

In 2003, Secretary Abraham announced the FreedomCAR and Fuel Partnership to develop technologies for (1) fuel-efficient motor vehicles and light trucks, (2) cleaner fuels, (3) improved energy efficiency, and (4) hydrogen production and the nationwide distribution infrastructure needed for vehicle and stationary power plants, to fuel both hydrogen ICEs and fuel cells.

Within EERE, the FCVT Program and the Hydrogen Fuel Cells and Infrastructure Technologies Program have been assigned the responsibility for implementing the FreedomCAR and Fuel Partnership and are working together closely to implement the initiative. The interdependency of the two programs is depicted in Figure 4.5.

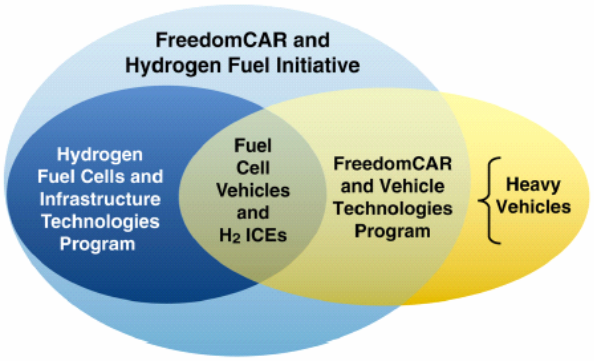


Figure 4-5. Interdependency of the HFCIT and FCVT

The expansion of the FreedomCAR and Fuel Partnership to include the energy sector further enhances the achievement of the goals. The HFCIT Program efforts in support of the initiative are provided under separate cover in the HFCIT *Multi-Year Research, Development, and Demonstration Plan* (http://www.eere.energy.gov/hydrogenandfuelcells/mypp/).

In addition to these partnerships, achievement of the goals expressed in this *Multi-Year Program Plan* is furthered through the use of laws and regulations relating to intellectual property. Patent and copyright protection of intellectual property associated with the new technologies developed under this plan encourages exploitation of the new technologies by enhancing the competitive position of FCVT Program industrial partners. The degree of intellectual property ownership provided to the industrial partner for new technologies arising under this Plan is determined on a case-by-case basis and is commensurate with cost-sharing amounts.

The Partnerships ensure that the Federal program has the very best expertise and guidance to fully use resources and adjust to changing situations. Thus FCVT works to develop technologies that can improve our energy security, our environment, and our economy through its partnerships with industry. With the involvement of key industry participants, the commercialization opportunities for FCVT-supported technologies are greatly enhanced.

4.3 Cost Management and Monitoring

EERE tracks costs and uncosted balances using multiple systems at Headquarters and through the Project Management Center (PMC). At the PMC, the National Energy Technology Laboratory uses the Project Management Information System (ProMIS), and the Golden Field Office uses the Project Management Database. The PMC uses these systems to transmit data to EERE through the DOE Standard

Accounting and Reporting System (STARS). STARS data is accessed by EERE through the I-MANAGE Data Warehouse (IDW). Data from the IDW is pulled into a reporting and analysis application called COGNOS. Once in COGNOS, data on costs and uncosted balances are reviewed by EERE Technology Program staff.

The data on costs and uncosted balances are regularly monitored and evaluated against current performance and the Program's priorities. The evaluation uses data from the EERE Corporate Planning System on performance and Program priorities along with DOE financial data from the COGNOS reporting application. EERE staff consults with field project managers at the PMC and national laboratories to track costs and uncosteds against project milestones and Program goals.

Cost management begins in the planning phase and is carried through all phases of the program management process. The documents, tools and systems that are used include Annual Operating Plans, Corporate Planning System, Annual Acquisition/Procurement Plan, National Laboratory Annual Operating Plans, Project Cost Plans, and Monthly Project Cost Reports.

The Annual Operating Plan is an internal fiscal year plan approved by the Deputy Assistant Secretary for Technology Development (DAS-TD). It ties the budget formulation phase of program management to program implementation phase. It is written at the Program level and defines all projects to be carried out by the Program during the fiscal year. The AOP defines DOE and contractor resources (people and funding) for the execution of all projects. It also reestablishes the baseline for measuring progress within the projects. The AOPs are managed through the Corporate Planning System.

The fiscal operation of the Program is managed through CPS, a Web-enabled database program management system. Inputs to the CPS include project data and spend plan information. CPS is then used to write and track funding actions, generate reports and export to the Strategic Management System (SMS). As shown in Figure 4.6, CPS provides the linking and tracking of EERE and Program level milestones to the project level milestones. It also provides project tracking and reporting, including the reporting of costed dollars.

Each year FCVT submits a procurement requirements document, the Annual Acquisition Plan, to the Project Management Center (National Energy Technology Laboratory), describing the Program solicitations for the fiscal year. Project descriptions include project area, duration, cost share requirements, etc.

To assure understanding and agreement with the national laboratories, each laboratory submits a Laboratory Annual Operating Plan to each technology area for which they will be performing research. The Laboratory Annual Operating Plans include a description of the tasks to be performed, the budget for those tasks, milestones and deliverables.

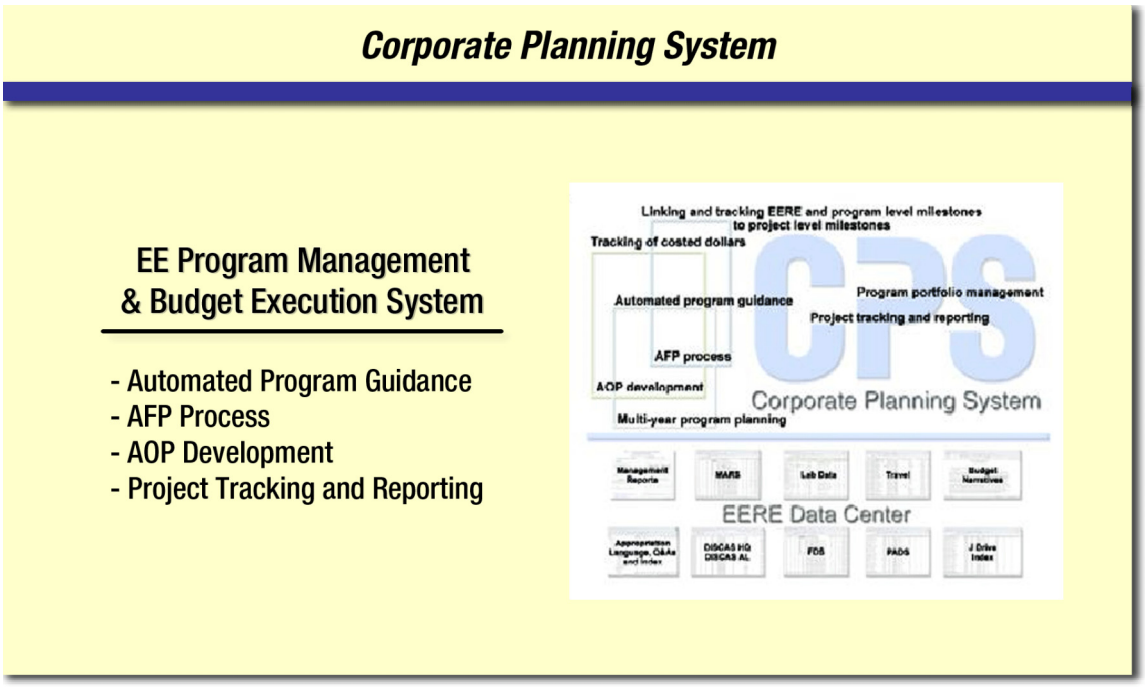
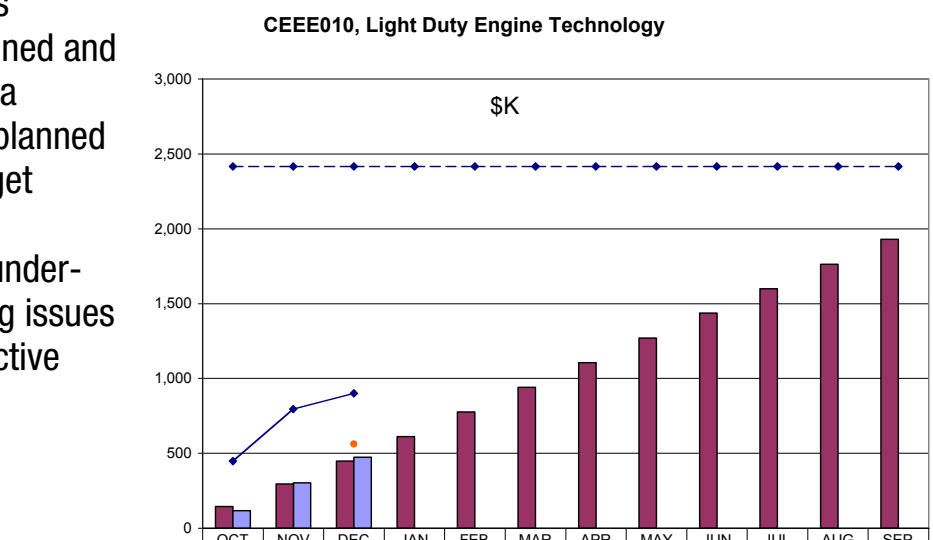


Figure 4-6. The Corporate Planning System is the Foundation for the EERE Program Management and Budget Execution System

An effective system requires Program and laboratory management attention to communicate targets and expectations early, clearly and often. The laboratory must perform cost planning at a level of detail that allows specific costing issues to be identified by their management. An example project cost plan is shown in Figure 4.7. In this example, Oak Ridge National Laboratory (ORNL) management conducts monthly reviews of actual cost versus cost plans jointly with the ORNL project managers. Once problem areas and costing issues are identified, ORNL and FCVT managers become actively involved by removing barriers and facilitating solutions. This system provides under- and over-costing issues in a timely manner and is reported to FCVT on a monthly basis at the nine-digit B&R level.

ORNL Cost Plan

- Cost plan shows cumulative planned and actual costs on a monthly basis, planned and actual budget
- Identifies both under- and over-costing issues for timely corrective action



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Cum. Planned Cost	146	295	448	612	776	942	1106	1270	1436	1600	1764	1930
Cum. Actual Cost	116	303	473									
Planned Total BA	2417	2417	2417	2417	2417	2417	2417	2417	2417	2417	2417	2417
Actual Total BA	448	796	901									
Commitment + Cost			563									

Figure 4-7. Example Project Cost Plans and Monthly Project Cost Reports as provided by the performing laboratory

4.4 Environmental Safety & Health

Environmental, safety and health issues are of considerable concern to the FCVT Program. Within the projects being performed, the national labs and the FCVT contractors have internal procedures, including National Environmental Protection Act (NEPA) documentation, to ensure that health, safety and the environment will not be compromised in the course of performing research.

Technologies developed by the Program require additional safeguards. In the case of the Advanced Combustion Engine R&D element, the Health Effects activity specifically addresses the environmental impacts and health implications of advanced engine emissions. In the recent past, congress has appropriated funds for the Environmental Impacts activity within the Fuels Technology element. The emphasis of this activity is to ensure that the requirements for fuels for advanced engines do not generate byproducts that will harm the environment or human health. These research activities are also coordinated with the Environmental Protection Agency.

The most significant safety aspect of technologies being developed by FCVT is the crashworthiness of vehicles using lightweight materials. To ensure that vehicles manufactured with new materials are as safe as the vehicles they replace, FCVT has an activity in the Materials Technologies element to determine material properties and behavior in a crash situation. This activity has established a unique research facility specifically for the characterization of energy absorbing materials. The crashworthiness activity also works very closely with the Department of Transportation.

4.5 Communication and Outreach

Information dissemination, communications, and outreach activities in EERE are carried out by the Office of Communication and Outreach (OCO). OCO communicates the EERE mission, program plans, accomplishments, and technology capabilities to a variety of stakeholder audiences including Congress, the public, educational institutions, industry, and other government and non-government organizations. In addition, OCO prepares speeches and presentations by the Assistant Secretary and others when requested; manages the EERE public website and EERE's centralized public information clearinghouse; manages official correspondence; and coordinates reviews of EERE-related statements by other DOE offices and Federal agencies.

OCO coordinates outreach and information activities across EERE integrating communications efforts from all programs to provide a unified approach to audiences. Thus, consumers will learn about all EERE technologies that may apply to them rather than simply receiving information on only one aspect of energy efficiency or renewable energy. Such coordinated efforts are designed to: target opportunities where rising prices or tight energy supplies may spur the acceptance for new technologies; remove barriers to technology acceptance and implementation; and provide accurate information regarding EERE technologies.

The FCVT Program annually evaluates and updates the communication and outreach plan to ensure the most efficient and consistent measures are being used to reach the identified target groups. The goal is to facilitate the adoption of advanced vehicle technologies, resulting from the Program's R&D work, that enable the reduction of petroleum use. The public's willingness to adopt these technologies will depend on their level of comfort and knowledge of the benefits as well as what is at stake if new technologies are not implemented. Outreach and communication is especially important to the FCVT due to the rising emphasis to decrease the nation's dependence on foreign oil. FCVT has identified 10 key audiences:

- EERE/Department Senior Management
- OMB
- Congressional Members & Staff
- Automotive Industry

- Energy Industry
- OEM Suppliers
- Educational Institutions
- Federal and State Agencies (including laboratories)
- Environmental Organizations
- General Public – consumers, investors, voters etc.

FCVT communicates with its stakeholders in a customized fashion depending on their specific needs and interests. The hope is to engage industry in developing advanced vehicle technologies, and stimulate manufacturer interest in applying these technologies. Educating the general public on the benefits of the advanced technologies will encourage consumers to buy advanced automotive technology vehicles as well as gain the support needed to keep developing more energy efficient and environmentally friendly technologies.

Several of FCVT's outreach activities include; Graduate Automotive Technology Education, Advanced Vehicle Competitions, Technical Conferences and the Technology Introduction portion of the Energy Policy Act of 1992 Replacement Fuels. The GATE and Advanced Vehicle Competition efforts aid in the development of interdisciplinary curricula to train the future workforce of automotive engineers. Many students who graduate from these vehicle competitions go on to take jobs in the auto industry, where they bring with them an unprecedented appreciation and understanding of advanced automotive technologies. FCVT also sponsors the Diesel Engine Emissions Reduction (DEER) Workshop. The DEER Workshop has been the DOE's primary mechanism for the public exchange of state-of-the-art clean diesel R&D and is now drawing international support.

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