INVESTMENT PLAN for the Alternative and Renewable Fuel and Vehicle Technology Program

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Introduction

Assembly Bill (AB) 118 (Núñez, Chapter 750, Statutes of 2007) created the Alternative and Renewable Fuel and Vehicle Technology Program (Program). This legislation authorizes the California Energy Commission (Energy Commission) to spend approximately $120 million per year for over seven years to develop, demonstrate, and deploy innovative technologies to transform California's fuel and vehicle types to help meet the state's alternative fuel use, and petroleum reduction goals in a manner consistent with the state's climate change and air quality objectives.

The legislation provides a broad array of activities and projects that are eligible to receive funding under the Program. The Energy Commission may select projects to:

- Develop and improve alternative and renewable low-carbon fuels;
- Optimize alternative and renewable fuels for existing and developing engine technologies;
- Produce alternative and renewable low-carbon fuels in California;
- Decrease the overall impact of an alternative and renewable fuel's life-cycle carbon footprint and increase sustainability;
- Install alternative and renewable fuel infrastructure, fueling stations, and equipment;
- Improve light-, medium-, and heavy-duty vehicle technologies to provide for better fuel efficiency and lower greenhouse gas (GHG) emissions, alternative fuel use and storage, or emission reductions;
- Accelerate the commercialization of vehicles and alternative and renewable fuels including buy-down programs through near market and market-path deployments, advanced technology warranty or replacement insurance, development of market niches, and supply-chain development;
- Retrofit medium-and heavy-duty on-road and non-road vehicle fleets with technologies that create higher fuel efficiencies, including alternative and renewable fuel vehicles and technologies, idle management technology, and aerodynamic retrofits that decrease fuel consumption;
- Promote alternative and renewable fuel infrastructure development connected with existing fleets, public transit, and existing transportation corridors;
- Provide workforce training related to alternative and renewable fuel feedstock production and extraction, renewable fuel production, distribution, transport, and storage, high-performance and low-emission vehicle technology and high tower electronics, automotive computer systems, mass transit fleet conversion, servicing, and maintenance, and other sectors or occupations; and
- Initiate education and Program promotion within California, and development of alternative and renewable fuel and vehicle technology centers.

The focus of the Program is to deploy alternative and renewable fuels in the marketplace without adopting any one preferred fuel or technology; create a broader, more diverse and competitive market; and decrease, life-cycle, GHG emissions, air and water pollutants; reduce or avoid multimedia environmental impacts; and maintain the sustainability of the state's natural resources.

The significant level of state funding over seven years sends a strong and consistent market development signal. This funding will stimulate private investment in new fuels and vehicle technologies. The legislation allows the Energy Commission to use grants, loans, loan guarantees, revolving loans, and other appropriate measures and provide funding to a broad suite of entities, including: public agencies, private businesses, public-private partnerships, vehicle and technology consortia, workforce training partnerships and collaboratives, fleet owners, consumers, recreational boaters, and academic institutions.

The legislation directs the Energy Commission to create an Advisory Committee to help develop an *Investment Plan*. This *Investment Plan* will determine priorities and opportunities for the Program, and describe how funding will complement existing public and private investments, including existing state programs. This *Investment Plan* must be ambitious, informed, strategic, and aggressive to meet these unprecedented goals. The Energy Commission will adopt this Investment Plan and use it as a guide for selecting projects. All projects funded by the Energy Commission will be consistent with the Investment Plan. This Investment Plan will guide funding decisions during the first two years of the Program (Fiscal Years 2008/09 and 2009/10).

Determining Priorities and Funding Opportunities

The transportation sector is responsible for approximately 40 percent of statewide GHG emissions and for significant degradation of public health and environmental quality due to air and water pollution. More recently, the increasingly harmful economic effect of the doubling of the price of petroleum on the world market has been particularly damaging to the California economy and its citizens.

The California Global Warming Solutions Act of 2006 requires California to reduce statewide GHG emissions to 1990 levels by 2020 and to levels 80 percent below 1990 emissions by 2050. The California Air Resources Board (ARB) is currently developing a low-carbon fuel standard (LCFS) that will reduce the carbon intensity of transportation fuels by 10 percent by 2020. The Energy Commission, in its *2007 Integrated Energy Policy Report*, adopted a goal of increasing the use of alternative and renewable fuels to 26 percent of on-road demand by 2022, which is more than four billion gallons of alternative and renewable fuel. *Meeting this goal will require the addition of more than one million gallons of new supplies of alternative and renewable fuels per day, for the next 14 years. (Over four billion gallons per year, growth and use, is divided by fourteen years, and then divided by 365 days per year.)*

These objectives cannot be fully achieved unless and until significant levels of alternative and renewable fuels and advanced vehicles are deployed. This Program creates the opportunity to begin making existing fuels and vehicles available in the market place to provide immediate GHG and petroleum reduction benefits.

Two important activities must be considered as starting points in determining priorities and opportunities for this Program: the *State Alternative Fuels Plan* (Plan) and the Alternative Fuel Incentive Program.

State Alternative Fuels Plan

AB 1007 (Pavley, Chapter 371, Statutes of 2005) directed the Energy Commission, in partnership with the ARB, to develop a plan that would:

- Evaluate alternative fuels using a full fuel cycle analysis of emissions of criteria air pollutants, air toxics, GHG, water pollutants, and other substances that are known to damage human health.
- Set goals to increase alternative fuels in 2012, 2017, and 2022 assuring no net material increase in air pollution, water pollution, or any other substances that are known to damage human health.
- Recommend policies, such as standards, financial incentives, research, and development programs, to stimulate the development of alternative fuel supply, new vehicles and technologies, and fueling stations.

The Plan was prepared and adopted by the Energy Commission and ARB in December 2007. It presents a five-part strategy to: (1) promote alternative fuel blends with gasoline and diesel in the near- and mid-term and stimulate innovation through the development of the Low Carbon Fuel Standard; (2) maximize alternative fuels in early adopter market niches, such as heavy-duty vehicles, fleets, off-road vehicles, and ports in the near and mid-term; (3) maximize use of alternative fuels in internal combustion engines and develop new transportation technologies, such as electric drive and hydrogen fuel cells, in the mid- to long-term; (4) maximize the use of mass transit, encourage smart growth and land use planning to help reduce vehicle miles traveled and vehicle hours traveled, and encourage improvements in vehicle efficiency to improve fuel economy; and (5) achieve the maximum feasible vehicle improvements to reduce the total energy needed to power California's transportation sector.

The full fuel cycle analysis concludes that alternative fuels can provide substantial GHG emission reduction benefits. Depending on the fuel pathway chosen, fuels such as ethanol, natural gas, liquefied petroleum gas, electricity, and hydrogen have certain advantages over conventionally produced gasoline and diesel fuels. In addition, the use of blends, such as renewable diesel, biomass-to-liquids, and gas-to-liquid, can have significant short-term advantages. The full fuel cycle analysis however, must be refined and updated to address sustainability issues and land use conversion impacts of biofuels.

The Plan also sets alternative fuel use goals of 9 percent by 2012, 11 percent by 2017, and 26 percent by 2022, excluding aviation and rail. These goals were developed using a scenario approach as each alternative fuel was evaluated assuming a business-as-usual, moderate, and aggressive case. The cases differ by the assumptions made about technology maturity, vehicle and infrastructure availability, fuel supply, and fuel type. These cases were based on assessments about the potential market expansion of each alternative fuel, and substantial research and discussions with the alternative fuel industries and other stakeholders.

Generally, the conservative or business-as-usual case assumes market conditions with limited technological advancements or innovation, limited product availability, cost constraints, and slow infrastructure expansion, resulting in modest market growth.

The moderate case assumes increased technology innovation to remove barriers unique to the vehicle and fuel combination, and expanded product availability and significant reduction in vehicle and infrastructure costs, leading to anticipated market growth.

The aggressive case assumes a market where all barriers to competitiveness and use are removed; substantial cost reductions occur ensuring the alternatives are fully competitive with, or, in some cases, enjoy price advantages compared to the conventional fuels; a full range of vehicle product offerings are widely available; and infrastructure expansion keeps pace with the growing alternative fuel vehicle population.

The moderate growth case represents a plausible description of the market circumstances, technology advances, investment requirements, and government incentives necessary for alternative fuels to fulfill the petroleum reduction and proportionate GHG emission reduction goals. The maximum feasible alternative fuel use results for each fuel in the moderate case are shown in Table 1.

Table 1: Moderate Case-Maximum Feasible Fuel Results

[illegible]	[illegible]		[illegible]		[illegible]	
	Fuel Use	GHG avoided	Fuel Use	GHG avoided	Fuel Use	GHG avoided
Propane	47.7	<0.1	173	0.1	282	0.2
Natural Gas	306.1	1.5	518	2.5	885	4.4
E-10 GGE (MW Corn)	1394	3.8	1354	3.8	1327	3.6
E-85 GGE (CA Poplar)	83	0.7	434	3.9	738	6.6
Hydrogen	40	0.3	80	0.6	440	4.4
Electricity	86	2.1	187	5.1	376	6.7
XTLs	320	0	530	0	630	0
Renewable Diesel	130	1	310	2.4	530	4.2
Dimethyl Ether	13	0	62	0	101	0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Fuel Use is measured in million gasoline gallon equivalent (GGE).						
GHG is measured in million metric tons per year.						

Source: State Alternative Fuels Plan, Adopted December 5, 2007.

These results show that although each fuel has increasing petroleum reduction potential through the 2022 timeframe, several fuels, do not have a corresponding potential for GHG reduction. GHG reduction, air quality improvement, waste biofuels production, and petroleum reduction are all important policy drivers in determining priorities and funding opportunities in this *Investment Plan*.

The *Plan* also includes the "2050 Vision" as a roadmap to achieving the 80 percent GHG reduction goal by 2050. The 2050 Vision allows industry, the public, ARB, and the Energy Commission to understand and debate the technology and market changes that are possible and likely necessary to reach an environmentally sustainable transportation system in California. Such a perspective is vital to determine how the strategies and policies included in the Plan can help achieve long-term energy goals and begin the effort to achieve the 80 percent GHG reduction goal for the transportation sector.

The following measures could be combined to achieve this goal and can be instructive in developing long-term priorities for this *Investment Plan*:

- Reduce the energy necessary for personal transportation by tripling the energy efficiency of on-road vehicles in 2050 with:
  - Conventional gas, diesel, and fuel flexible vehicles (FFVs) averaging more than 40 mpg.
  - Hybrid gas, diesel, and FFVs averaging almost 60 mpg.
  - All electric and plug-in hybrid electric vehicles (PHEVs) averaging well over 100 mpg (on a GGE basis) on the electricity cycle.
  - Fuel cell vehicles (FCVs) averaging over 80 mpg (on a GGE basis).
- Reduce growth in per person driving to 1990 levels.
- Change the energy sources for transportation fuels to:
  - 30 percent from gasoline and diesel from traditional petroleum sources or lower GHG emission fossil fuels such as natural gas.
  - 30 percent from biofuels.
  - 40 percent from a mix of electricity and hydrogen.
- Produce transportation biofuels, electricity, and hydrogen from renewable or very low carbon-emitting technologies that result, on average, at least 80 percent lower life cycle GHG emissions than conventional fuels.
- Encourage more efficient land uses and greater use of mass transit, public transportation, and other means of moving goods and people.

Alternative Fuels Incentive Program

The 2006 Budget Act (AB 1811) directed ARB and the Energy Commission to prepare a plan to spend $25 million to assist in the development of specific measures reducing air pollution and GHG emissions through the Alternative Fuel Incentives Program (AFIP). The projects funded

through the AFIP are consistent with administration policies, including recommendations identified in Executive Order S-06-06, the Climate Change Action Plan, and the Bioenergy Action Plan. Additionally, the funds have been allocated for meaningful demonstrations of technologies and not for long-term research. In choosing which projects to fund, the ARB focused on projects that would materially move commercialization of an alternative or renewable fuel forward or that would remove barriers to increased use of these fuels. Specifically, ARB identified alternative fuel infrastructure, biofuel production, and incentives to support the near-term introduction of viable zero-emission or near-zero emission technologies (such as plug-in hybrids and fuel cell buses) as the key areas to focus funding. The AFIP funds were allocated as shown in Table 2:

Table 2: Alternative Fuels Incentives Allocation

Alternative Fuel Infrastructure	$5.4 million
Biofuels Production	$6.0 million
Plug-in Hybrids	$5.0 million
Fuel Cell Transit Buses	$2.0 million
Alternative Fuel Vehicle Incentives	$1.5 million
Consumer Education/Outreach	$1.6 million
Research and Testing	$3.2 million

Source: Program Summary, ARB Approval May 2007.

By June 2007, ARB encumbered all the funds. Recipients must expend these funds by June 30, 2009. A detailed characterization of the specific projects funded in the AFIP will be useful to the AB 118 Program. Some of those project details are:

Statewide there are 34 retail E-85 stations, 12 fleet E-85 stations, six electric vehicle fleet station upgrades and one biodiesel 99 percent (B99) retail station now under development.

Recommendation: Currently retail E-85 station development is adequate. However, funding for both retail and fleet alternative fuel stations of other types will be requested and necessary. Considering the fleet needs and the larger volume throughput, fleet fueling facilities offer excellent funding opportunities for all alternative fuels. Retail facilities tied to specific concentrations of alternative fuel vehicles should be considered wherever possible.

Biofuels Production

Biodiesel production dominated this funding category with six projects using cooking oil and vegetable oils (canola, palm, or soy). Four projects funded will generate biogas, either as a gas (from manure) or for liquefied natural gas (LNG) production (from landfills) for use in the transportation market. Ethanol projects proposed from corn were not recommended for funding since they were considered not to be competitive.

Recommendation: It is likely that biofuels production facilities would be proposed for funding, and so the featuring of biofuels, especially those from waste residues and feed stocks, seems a sound policy as the full fuel cycle and land-use impacts are further evaluated.

Plug-In Hybrids

The seven projects recommended for funding all directly relate to "readying the market" for light-duty PHEVs, EVs, and Medium-duty PHEVs, and all fill identified gaps to smooth the transition to PHEVs and EVs.

Recommendation: Additional support of commercialization will be needed in the areas of vehicle technology and charging infrastructure.

Fuel Cell Transit

The two projects funded will demonstrate fuel cell buses in transit districts. The project for the City of Burbank will feature a battery-dominant fuel cell system, which may prove to be an evolutionary advancement for the technology. The other project provides $630,000 to the Bay Area Zero Emission Bus Advanced Demonstration supporting placement of up to 12 new fuel cell buses for revenue service.

Recommendation: Transit will continue to be an important area to demonstrate and deploy alternative and renewable fuels and advanced vehicle technologies. The *Investment Plan* should emphasize the need for a broad array of advanced technologies in addition to fuel cell systems.

Alternative Fuel Vehicle Incentives

This category is expected to be completely subscribed by the end of 2008.

Recommendation: Additional support is needed to encourage the purchase of alternative and renewable fuel vehicles that are currently available to consumers and expected to be available in the near term.

Consumer Education and Outreach

Four projects were recommended for funding in this important "readying the market" category. Most notable is a $1 million project for a public relations campaign for alternative fuels and vehicles and a grant of $400,000 to San Diego's Ecocenter, a facility for educating over 10,000 school children per year that is co-located with an alternative fuel station that dispenses, natural gas, propane, E-85, biodiesel, and provides for electric charging, all at the same location.

Recommendation: Additional support is needed for a more aggressive media campaign and for the development of a broader educational curriculum.

Research and Testing

Six projects in this area were funded; four of these involve the emission and multi-media assessments of biodiesel. This activity is quite important given the current needs for biodiesel standardization, and evaluation of its fate of storage and emissions profile. The other two projects are for the development of a certification and test procedure for PHEVs, and for research and development of biofuel refueling equipment.

Recommendation: Additional research and testing for alternative and renewable fuels and advanced vehicle technologies may be required as the Program proceeds. As further needs arise during the AB 118 Program, those needs will be coordinated with the CEC's PIER Transportation Program and the appropriate staff of the ARB.

Additional Considerations

Market change will require a serious, strategic, and dedicated effort to leverage the funding provided, form partnerships with key industries, businesses and public agencies, and "ready the market" for this long-awaited start to move from petroleum to non-petroleum transportation fuels.

Additional considerations could help provide more focus and clarity in determining priorities and opportunities. The Energy Commission believes that consumer choice, economic development, technological excellence, building on existing investments, and the use of biomass waste and renewable energy, comprise the right sextant to guide the state's investment of Program funds.

Provide Consumer Choice

Today, consumers in California have little or no discretion in the fuels they use in their vehicles. In some respects, the expanded use of nonpetroleum fuels in the near term will be invisible to most consumers as it will likely be limited largely to those non-petroleum blend fuels that can be produced, distributed, and dispensed through the existing infrastructure.

Crude oil, gasoline, and diesel fuel prices are unregulated and increasing. The expanded use of non-petroleum blend will not guarantee that prices at the pump will be any more affordable. Offering choice to consumers, businesses, and public and private fleets in the fuels and vehicle technologies they use is a major objective in this *Investment Plan*. Currently, such choices are limited, but do exist. Enabling a broader suite of fuel sources and vehicle technologies to gain market acceptance allow consumers to choose options that will increase competition and provide additional means to achieve potential air quality and climate change benefits.

Increase Economic Development

To provide consumers and businesses a choice in the fuels or vehicles they use, new markets must be created and existing markets significantly grown. The impetus of fostering an alternative and renewable fuels industry, coupled with a "state of the science" vehicle technology development industry, are most significant and compatible with the multiple-year term of the Program, and the sending of the strong 'market signal'.

Production of alternative and renewable fuels and vehicle technologies in California have the potential to strengthen California's economy by attracting and retaining clean technology

businesses, stimulating high-quality job growth, and helping to reduce the state's vulnerability to petroleum price volatility. Research, development, demonstration, and deployment of alternative and renewable fuels and vehicle technologies will also result in new skill and occupational demands in California industries.

A priority also should be placed on using alternative and renewable fuels and advanced vehicle technologies to help improve air quality to foster opportunities for cleaner economic growth and establishing and using "clean energy enterprise zones" for business development. Also, increasing efforts to train the "green collar" workers will be essential to sustain the transition from petroleum. It is clear that California state government can play a major role in the development, production and deployment of alternative fuels, the development and manufacturing of advance technology vehicles, energy storage systems and vehicle components, and creation of new jobs and the well-trained workforce to fill those new jobs. California business development, workforce development and jobs creation should be the hallmarks of this effort.

Expand Technological Excellence

Investing in the development of innovative and pioneering technologies will advance the state's leadership in clean technologies, achieve the state's petroleum reduction objectives, and clean air and GHG emission reduction objectives, develop public-private partnerships, and ensure a secure and reliable fuel supply.

California's college and university system has pushed advancements in all aspects of transportation alternative and non-conventional fuels, fuel efficiency, vehicle development, alternative fuels characterization, production and use. "Centers of Excellence" have been established to focus efforts in many areas of fuel use, vehicle efficiency and emissions improvement. The University of California (UC) Davis' Institute of Transportation Studies, the UC Irvine National Fuel Cell Research Center, and the UC Riverside College of Engineering Center for Environmental Research and Technology, are a testament to the state's commitment to innovation and to the technological improvement that is possible, and necessary, to achieve the goals for the commercializing non-petroleum alternative fuels and advanced vehicle technologies.

Private organizations such as CalStart and the Environmental Business Cluster, are examples of efforts for which the purpose is to foster promising alternative fuels and advanced vehicle technologies from research and development to commercialization and deployment. These and other organizations are focused to 'fill this gap', and are a stable force for innovation and sustained market creation for the most promising fuel and vehicle technologies.

Build on Existing Investments

The *Investment Plan* can and should allocate funds to existing alternative fuel and vehicle "assets" in which the state and private businesses have invested in the past. The existing alternative fuels infrastructure for natural gas, propane, electricity and E-85 can be supported

immediately to renovate, refurbish, and increase fuel capacity and throughput, and to "protect our past investments". Many institutions such as Clean Cities Coalitions, Community Colleges, education centers, local area governments, Transportation Management Authorities, cities, counties, and special districts, have also been active in advancing transportation alternatives and choices and could be used as avenues to create immediate fuel and vehicle choice, and market change. Investment in these fueling infrastructure and "human capital" assets meet an immediate need, and will pay dividends through the near-, mid- and long-term of this necessary transition.

Use California's Waste

As the controversy grows regarding biofuels production that use food crops or purpose-grown energy row crops, the emphasis of this Program should be focused on making certain the state's vast waste stream, from agricultural, food processing, landfill, forestry, municipal or water treatment waste are used. These waste streams now represent a large and growing societal and environmental challenge for the state, and the traditional solutions are overtaxed and ineffectual.

The resource potential for California for this large and continuing waste stream is exceptional since the state is ranked first in agricultural production, and the most populous state in the nation. The potential for fuels production from these waste resources has been identified and quantified. On April 25, 2006, Governor Arnold Schwarzenegger issued Executive Order S-06-06, establishing targets for the use and production of biofuels and biopower and directing state agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. The Governor directed the existing Biomass Inter-Agency Working Group to develop an integrated and comprehensive state *Bioenergy Action Plan* to substitute biomass for natural gas and petroleum, and electricity generation. Biofuels, especially derived from waste resources, offer substantial potential volume of alternative, renewable transportation fuels in California.

The Bioenergy Action Plan provides the following five broad policy objectives:

- Maximize the contributions of bioenergy toward achieving the state's petroleum, climate change, renewable energy, and environmental goals.
- Establish California as a market leader in technology innovation, sustainable biomass development and market development for bio-based products.
- Coordinate research, development, demonstration, and commercialization efforts across federal and state agencies.
- Align existing regulatory requirements to encourage production and use of California's biomass resources.
- Facilitate market entry for new applications of bioenergy including electricity, biogas, and biofuels.

Use Renewable Energy Resources

The Investment Plan should encourage the state's renewable resources as process energy in the production of alternative and renewable fuels in California. For example, The California Hydrogen Highway Network is a state initiative to promote the use of hydrogen as a means of diversifying our sources of transportation energy while ensuring environmental and economic benefits. The *Hydrogen Highway Blueprint Plan* outlines a path that will help set the stage for full-scale commercialization of hydrogen as a fuel source. Key findings of the *Blueprint Plan* call for deployment of 50 to 100 publicly accessible hydrogen fueling stations sited to provide convenient fueling for hydrogen vehicles and that the California Hydrogen Highway Network should use at least 20 percent new renewable resources in the production of hydrogen for use in vehicles by 2010 and increase annually thereafter.

Likewise, ethanol can also be produced in conjunction with the generation of electricity at biomass-fired power plants throughout the state. Such co-production offers improved costs and reduced environmental impacts.

Proposed Investments for the First Two Years

This first *Investment Plan* covers the first two years of the Program (Fiscal Years 2008/09 and 2009/10). A listing of recommended funding areas for the first and second years is provided in Table 3 below. It is expected that this list will be refined as the planned market assessment is completed, the California-adapted Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model is updated and improved, and incentive evaluation and analysis is performed. It also is important to note that the recommendations in Table 3 are multi-year in duration. The notation of a given recommendation either in the first- or second-year is simply a statement of when the given recommended project can reasonably be expected to begin. Once initiated, the activity will span more than one year and can be modified and renewed in subsequent years.

Table 3: Recommended Funding Areas for the First and Second Years

First-Year Recommendations (Fiscal Year 2008/09)

• Implement an incentive program to purchase new alternative and renewable fueled light-, medium-, and heavy-duty vehicles • Implement an incentive financing program through the California Alternative Energy and Advanced Transportation Financing Authority to develop in-state facilities that manufacture low-carbon and zero-emission vehicles and related technologies • Implement an incentive program to purchase new alternative and renewable fuel vehicles for city, neighborhood and off-road purposes • Increase procurement of alternative and renewable fuel vehicles for state and local fleets • Establish a medium- and heavy-duty Center of Excellence to demonstrate and deploy alternative and renewable fuel and advance vehicle technologies	• Implement an incentive financing program through the California Alternative Energy and Advanced Transportation Financing Authority to develop in-state facilities that produce low-carbon alternative and renewable fuels			• Inform owners of FFVs of the availability of E-85 fuel • Implement a "Flex Your Power" type of campaign highlighting to consumers the availability and benefits of alternative and renewable fuel vehicle options

Second-Year Recommendations (Fiscal Year 2009/10)

• Implement an incentive program to upfit and retrofit light-, medium-, and heavy-duty vehicles with ARB-certified equipment • Support an "X Prize" competition for advanced alternative and renewable fuel and highly efficient vehicles	• Create an "Alternative and Renewable Fuel Reserve" to help stabilize supply and prices • Implement a program to provide production incentives for alternative and renewable fuels produced at in-state facilities from waste feed stocks • Support entities seeking ARB certification of fuel dispensing systems • Support emissions and performance testing of advanced alternative and renewable fuels and vehicles and ARB certification • Support the development and commercialization of more efficient and lower-cost technologies to produce fuel from waste feed stocks	• Implement an incentive program to install new alternative fuel dispensing facilities at retail outlets in proximity to existing AFVs • Implement a program to provide alternative fuel purchase discounts for consumers and fleets • Install new alternative fuel pumps at state and local government fleet facilities	• Support development of science curriculum that includes information about alternative and renewable fuels and vehicles • Support development of curriculum in community colleges, colleges, and universities that will lead to the preparation of the green collar workforce in the future.	• Implement a program with new car dealers to encourage the delivery and sale of alternative and renewable fuel vehicles

Program Implementation

The substantial funding level for the Program, approximately $120 million per year for over seven years, sends a strong and consistent market signal for the unprecedented development and commercialization of alternative fuels and advanced vehicle technologies. This funding also provides the critical infusion of competition into what is now a one-source, non-competitive, and price-volatile transportation fuels market. A well-thought out and aggressive *Investment Plan* that leverages funding can change the market now and result in improved energy security, reduced environmental degradation, and economic stability and opportunity, can accrue to the state on a gallon-by-gallon basis, with this market transformation and new competition.

This *Investment Plan* will form the basis for funding decisions under the Program. The Energy Commission is committed to continuing a public process in planning and developing funding mechanisms after the *Investment Plan* has been adopted.

The Energy Commission is dedicated to developing a strong information base for the alternative fuels and advanced vehicle technologies including their potential market entry or expansion;, their environmental profile (through the updated California GREET model, and other publicly reviewed and verified information inputs), their potential for market creation or market share increase, and their potential long-term, positive business and economic opportunity for the state. Currently, there is no existing rubric for this type of program, so the development and consideration of the most current information available at the time will prove essential.

Further, it is planned that this Program be evaluated each year to assimilate new information, modify the Program to improve its effectiveness, and track "progress against plan" in meeting the state's alternative fuel, GHG, air quality, and biofuels policy objectives. It is expected that the Program will have market effects and changes, year to year, and the annual program evaluation will provide flexibility to modify the Program emphases and solicitations.

Existing Public and Private Investments

This section is currently under construction.

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