Alternative and Renewable Fuel and Vehicle Technology Program

FY 2011-2012 Investment Plan Advisory Committee Meeting

California Energy Commission
Hearing Room A

March 7, 2011

Meeting Agenda

9:00-9:10	Opening Remarks and Introductions
9:10-9:20	Agenda Overview and Investment Plan Schedule
9:20-9:40	Previous Advisory Committee Meeting and Review
9:40-10:00	Program Status Update
10:00-10:40	Review of the Staff Draft 2011-2012 Investment Plan
10:40-12:00	Advisory Committee Discussion of Investment Plan
12:00-1:15	Break for Lunch
1:15-3:30	Advisory Committee Discussion of Investment Plan, cont.
3:30-4:30	Public Comment

Schedule for 2011-2012 Investment Plan Adoption

- March 7 –Advisory Committee Meeting
- March-April – Revise into Committee Draft
- Early May – Advisory Committee Meeting
- Late May – Remote Public Workshops
- June – Release of Commission Report and Public Hearing
- June 29 – Business Meeting Adoption of Investment Plan

Review of November 30, 2010 Advisory Committee Meeting on Program Review

Previous Advisory Committee Meeting

Goal: Identify the challenges and issues that slow disbursement of Program funding, and seek recommendations on how to improve the Program's processes.

- The Energy Commission, Advisory Committee, and awardees recognized common concerns.
- Awardees unable to maintain project schedules, scope and match funding due to slow pace of fund disbursement.
- Request for early match funding authorization
- Energy Commission working actively to increase Program efficiency in response to concerns raised by awardees.

Factors Affecting Fund Disbursement and Project Development

Solicitation Development & Proposal Review

- Broadly written solicitations
- Large numbers of proposals
- Lack of technical experts for some technologies

Agreement Development

- Internal process
- Staff resource constraints
- CEQA
- Localized Health Impact Reporting

Solicitation Development and Proposal Review

Remedies

- Craft more tightly focused solicitations with more clearly defined technology categories, scoring criteria and minimum performance standards where appropriate
- Investigate use of Pre-Proposals
- Develop continuous solicitations and vehicle buy down programs
- Expand partnerships and pass-through grants
- Spread solicitations across multiple funding years
- Fund high-scoring projects from previous years with current year money (Headroom)

Agreement Development – CEQA & Match Expenditures

Commission Actions

- Vigorous review of CEQA and AB 118
  - Current statutes and regulations do not allow for modified interpretation
  - Match expenditure may be allowed after CEQA complete and project approved at Business Meeting

- Modify solicitations to better define CEQA obligations & pre-identify categorical exemptions

Agreement Development Processes

Commission Staff Actions

- Projects at risk due to delays in funding identified and given priority / expedited treatment
  - 4 projects completed prior to Dec. 31 due to critical risk
  - Triage priority list established
- Working to fill staff vacancies in accordance with hiring freeze rules
- Establish a single point of contact within the Commission for each awardee
- Provide a draft grant agreement as part of application manual

Propane and Natural Gas Vehicle Funding Delays

- **Issue:** Despite allocations in previous Investment Plans, funding for propane and natural gas vehicles has not yet materialized.
- **Remedy:** In late March, the Energy Commission will issue a vehicle Buy Down Incentive program for gaseous fuels vehicle deployment.
  - $14.54 million will be available for natural gas vehicles
  - $4.35 million will be dedicated for propane vehicles

Delays Related to Localized Health Impact Report Requirements

- **Issue:** According to regulations, Localized Health Impact Reports must be prepared by Commission staff for all projects requiring air district permits. A report must be posted for public comment 30 days prior to a project's approval at a Business Meeting.
- **Remedy:** Staff is revisiting the reporting requirements and preparing LHI reports only for projects that:
  - Have potential to affect public health due to project-related emissions
  - Require discretionary permits from local, state or federal agencies
  - Are located in Communities at Risk due to economics, ethnic composition and existing levels of public health risk

PROGRAM UPDATE

2008-2010 Solicitations and Awards

Solicitation Number	Description of Solicitation	Total Award (Initial Plus Headroom)	Total Number of Projects
ARRA	Federal Cost Sharing	$36.5 million	9
PON 09-003	Biomethane production from waste feedstocks	$26 million	5
PON 09-004	Medium- and heavy-duty vehicle demonstration of alternative fuels and advanced technologies	$12 million	8
PON 09-006	Plug-in electric vehicle charging stations and upgrades, natural gas fueling stations and upgrades, E85 fueling stations, and biomass-based diesel distribution infrastructure	$16.2 million	20
PON 09-604	Biofuels production	$17.1 million	13
PON 09-605	Manufacturing plants for alternative fuel vehicles, vehicle components, and batteries	$24.9 million	11
PON 09-607	Ethanol production incentive	$6 million	TBD
PON 09-608	Hydrogen fueling stations	$15.7 million	3
Total		**$154.2 million**	**69**

FY 2008-09 and 2009-10 Public Agency Agreements

Funding Category	Funds Awarded (Millions)
Workforce training and development (EDD, ETP, CCCCO)	$15.0
Fuel standards development (CDFA)	$4.0
Plug-in Prius demonstration (DGS)	$0.6
Light duty vehicle deployment (ARB)*	$2.0
Woody biomass sustainability research (US Forest Service)*	$1.5
UC Irvine STREET model (UCI)*	$.75
National Renewable Energy Laboratory (NREL)*	$1.2
Hydrogen fueling station (AC Transit)*	$3.0
*Agreement under development	**Total: $28.1**

Funding Status Report
FY 2008-09 and 2009-2010

- 8 Solicitations
  - 313 proposals reviewed, requesting $1.2 billion
- Grant Awards and Agreements
  - $154.2 million among 69 grant awards*
  - $28.1 million among 10 agreements
  - Total: $182.3 million
- Percent of FY 2008-09 and 2009-10 Funds Committed: **96.3%**

* Includes $13.8 million from FY 2010-11

Status of 69 Grant Agreements 2008-2010 Funding Cycle

Agreements fully executed or with Recipient for execution	Completing agreements with grant Recipients	Recipient completing CEQA
17	**37**	**15**

Summary of Awards to Date

FY 2009-10 AB 118 Funding Awards and Results

2009 ARRA and AB 118

- $36.5M AB 118 match for nine projects to leverage $105M in Federal funding for California
  - 2,860 electric vehicle charging stations
    - Support Nissan Leaf and Chevrolet Volt deployments in California
    - State-wide public EV charging
  - 75 E85 retail fueling stations
  - Demonstrate >700 MD-HD NG and hybrid-electric trucks
  - Workforce development and training

Alternative Fueling Infrastructure Results

- 32 grants totaling $31.7 million for statewide alternative fuel infrastructure
  - EV Infrastructure
    - Update 500 EV charge-points statewide
    - Approximately 500 new charge-points
  - Natural Gas Fueling Infrastructure
    - 19 new and upgraded stations
  - E-85 Fueling Stations
    - 10 new stations
  - Hydrogen
    - 11 new and upgraded stations

Biofuels Production Results

- 18 grants totaling $43.1 million for in-state biofuels production for transportation
  - Biomethane from municipal solid waste, wastewater treatment plants, and agricultural and rendering plant waste
  - Liquid biofuels from agricultural and forestry waste
  - Fuels from algae

Electric Vehicle Component Manufacturing Results

- 11 grants totaling $24.9 million for in-state EV component manufacturing
  - Lithium ion battery assembly
  - Electric motorcycles
  - Electric drivetrain components
  - Class 8 electric truck assembly

Medium- and Heavy-Duty Vehicles Results

- 8 grants totaling $12 million for in-state demonstrations of advanced and alternative fuel medium- and heavy-duty vehicles
  - Electric and natural gas hybrids
  - Hydraulic hybrids
  - Battery-powered lifts for utility trucks

2010-11 Funding Status

FY 2010-11 Funding Status

- $108 Million Initial Allocation
  - Less 20% reduction due to lower revenues from smog abatement fees and vehicle and vessel registration fees ($21.6 million)
  - Less $1.73 million for monitoring, validation and evaluation activities
  - Less $13.8 million allocated to high-quality projects from previous solicitations
- TOTAL FUNDS AVAILABLE $70.85

Status of Upcoming Solicitations 2009-10, 2010-11 and Partial 2011-12 Funds

Technology	Amount (Millions)	Anticipated (CY 2011)
Gaseous Fuels – LD, MD-HD Vehicle Deployments	$14.5	Q1
MD-HD Demonstrations – Electric Drive and Gaseous	$15	Q2
Hydrogen Fueling	$10.2	Q2
Biofuel and RNG Production and Feasibility	$36.7*	Q2
Alternative Fuel Infrastructure	$25.5*	Q2
PEV Planning Support	$1	Q2
Innovative Technologies and Federal Cost Sharing	$6.3	Q2
Market and Program Support	$9.4	Ongoing
Total	**$118.6****	

* Includes staff recommendations for $38.7 million of 2011-12 funding. Subject to change.
** $8 million of the total is carryover funding from FY 2009-10

Staff Draft FY 2011-2012 Investment Plan

Role and Purpose

- First draft of third Investment Plan, covering FY 2011-2012
- Basis for FY 2011-2012 solicitations, agreements and other funding opportunities
- Identifies critical needs, priorities and opportunities for Program funding
- $100 million funding allocation for a portfolio of fuels, technologies, and supporting elements

Changes from Previous Plans

- More comprehensive look at upstream issues
- Addition of section on medium- and heavy-duty vehicles
- Deeper look into workforce and training development
- Measurement, verification and evaluation separated

Plug-in Electric Vehicles

- Accelerating market demand for plug-in electric vehicles (PEVs)
  - All major automakers have announced plans for PEVs by 2015
  - Immediate consumer demand has, so far, outstripped supply for the Nissan Leaf and Chevrolet Volt
  - By 2020, deployment may range from under 3% to nearly 14%

- Anticipated deployment of PEVs prompted the creation of the PEV Collaborative
  - *Taking Charge* report outlines the state's strategy for promoting and adapting to PEVs

Plug-in Electric Vehicles

- Vehicle incentives covered by other sources (ARB, Federal Tax Credit)
  - Up to $5,000 for light-duty PEVs through ARB's Clean Vehicle Rebate Program
  - Up to $30,000 for medium- and heavy-duty hybrid vehicles and PEVs through ARB's Hybrid Vehicle Incentive Program
  - Up to $7,500 tax incentive (or future rebate?) through federal government
- Ample funding for battery research and development
  - Federal stimulus package ($2 billion)
  - National lab research and development efforts

Plug-in Electric Vehicles

- PEV Collaborative formed to coordinate state's PEV efforts
- As identified in the Collaborative's *Taking Charge* report, charging infrastructure remains an important hurdle
- Anticipated survey results will further inform need for California charging infrastructure
- Challenging business model for public chargers
- Public support for PEV charging is critical

Plug-in Electric Vehicles

- Early progress has been made in establishing charging infrastructure

Region	Public/ Commercial	Fast Charge	Battery Swap
Bay Area	3,841	55	5
Los Angeles	657		
San Diego	2,300	60	
Sacramento	331		
Other	3		
Total	7,132	115	5

Plug-in Electric Vehicles

- 2011-2012 Investment Plan allocates $8 million for charging infrastructure
  - PEV regional readiness planning ($1 million)
  - Residential PEV infrastructure ($1 million)
  - Multi-dwelling residential PEV infrastructure ($1 million)
  - Workplace and fleet PEV infrastructure ($1 million)
  - Commercial, public, and fast charging infrastructure ($4 million)

Hydrogen

- Steady increase in light-duty fuel cell vehicles (FCVs) is anticipated, based on manufacturer survey data
- Vehicle costs remain uncertain
- Fuel production costs declining, and SB 1505 requirements ensure a lower-carbon fuel
- Increasing reliance on lower-cost centralized fuel production, with trailer delivery

Hydrogen

- Vehicle deployments require fueling infrastructure
- Infrastructure costs decreasing, installation time decreasing, and retail experience improving
- Infrastructure remains expensive, and initial return on investment may be slow, so public funding is needed
- AB 118 Program links vehicle deployments with anticipated funding need for fueling infrastructure

Hydrogen

- FCV commitments in survey data have dropped in the short-term, while long-term commitments remain significant

	2011	2012	2013	2014	2015-17
2009 Survey	330	495	769	1,839	47,800
2010 Survey	253	312	430	1,389	53,000
% Change	-23%	-37%	-44%	-24%	+11%

Hydrogen

- Program funding in 2010
  - Provided 9 new and 2 upgraded fueling stations
  - More than 2,000 kg/day of additional fueling capacity
  - Matched to automakers' vehicle commitments
  - At least one-third renewable hydrogen
  - Stations will be online no later than 2012

- Based on 2010 Program funding and reduced survey numbers, funding for FY 2011-2012 is reserved for fuel cell transit fueling ($3 million)

Natural Gas

- Natural gas reserves are high, and prices are low (relative to petroleum fuels).
- Natural gas offers an immediate petroleum displacement option with moderate GHG emission reductions.
- The expansion of biomethane development will further reduce the carbon intensity of vehicles utilizing natural gas.
  - This is discussed in more detail in the “Biofuels” section

Natural Gas

- Light-duty natural gas vehicle (NGV) options remain limited
  - Honda Civic GX
  - Chevrolet Express and GMC Savanna on the horizon
  - Light-duty NGVs account for 69% of the NGV population, but consume only 12% of the natural gas used for transportation
- Increasing numbers of medium- and heavy-duty NGVs are being deployed to meet air quality standards and reduce long-term costs
  - From less than 2,000 vehicles in 2000 to more than 12,500 vehicles in 2009
  - More details in the “Medium- and Heavy-Duty Vehicles” section

Natural Gas

- Natural gas fueling infrastructure is limited
  - Publicly accessible stations: 130 CNG, 13 LNG
  - Private stations: 85 CNG, 19 LNG
- To be successful, new stations must match the needs of particular fleets and natural gas customers
- Interstate Clean Transportation Corridor development
  - Connects Los Angeles, San Joaquin valley, Sacramento, Bay Area, and other western states
- FY2011-2012: $8 million for new and expanded fueling infrastructure

Propane

- Like natural gas, propane offers a low-cost opportunity to displace petroleum fuels, with a modest GHG reduction
- Due to the low cost and availability of propane infrastructure, propane is especially popular as an alternative fuel in rural communities
- Research into propane production from renewable resources offers an opportunity for lower-carbon propane in the future

Propane

- Only one light-duty propane vehicle (Roush F-150) is currently certified by both U.S. EPA and ARB
  - However, Roush is seeking further certifications for F-250 trucks and E-series vans
- An upcoming solicitation will provide an incremental incentive for propane light-duty vehicles
  - FY 2011-2012 allocation of $1 million will continue the support for these vehicles through June 2012
- Additional funding for heavier propane vehicles is described in the “Medium- and Heavy-Duty” section

Propane

- FY 2011-2012 funding allocation of $500 thousand for fueling infrastructure
  - Will help establish 10 key fueling stations along the I-5 corridor in Northern California.
  - Supports a larger pilot project to expand propane use in the region, which will also serve as a demonstration for propane's broader potential in rural communities
  - Pilot project also integrates vehicle deployment and workforce development

Biofuels

- Wide variety of waste-based and purpose-grown feedstocks exist for biofuel production
- The vast majority of biofuels produced and consumed in California continue to be derived from purpose-grown feedstocks
  - Corn ethanol and soybean biodiesel are the predominant domestic biofuels
  - Sugar can and palm oil are also significant in international biofuels
- California waste-based feedstocks offer a significant volume and GHG emission reduction potential (often 85%)

Biofuels

Waste-Based Feedstock	Volume Available	Biomethane Potential (BCF)	Biofuel Potential (m gge)	Diesel Potential (m dge)
Agricultural Residue	4.3 MBDT	9.3	302	261
Animal Manure	3.8 MBDT	14.6	127	110
Fats, Oils, Greases	14.4 M lbs	Unknown	63.6	55
Food Wastes	.8 MBDT	1.9	56	48
Forest Waste (cel. ethanol)	14.2 MBDT	N/A	784	678
Forest Waste (gasified)	14.2 MBDT	30.7	1,000	864
Landfill Gas	79 BCF	39.5	368	318
Municipal Solid Waste	10 MBDT	25.9	704	608
Waste Water Treatment	9.6 BCF	4.8	45	39
Total		126	2,566	1,755

Biofuels

- In addition to volume, the write-up details the economic value, market barriers, sustainability, and likely fuel pathway for each major feedstock
- Fuel conversion processes are also discussed in similar terms in Appendix D

Biofuels

- Ethanol will continue to play a significant role in meeting long-term state and federal policy goals
  - Low Carbon Fuel Standard (LCFS)
  - *Bioenergy Action Plan* goals
  - Renewable Fuel Standard

- Nearly 1.5 billion gallons of ethanol were consumed in California last year. California production capacity is 240 million gallons per year
  - Demand growth reflects a shift to 10% ethanol blending; increases if a 15% blending standard is established.
  - LCFS scenarios range from 2.2 billion to 3.1 billion by 2020; Bioenergy Action Plan establishes a lesser target of 2 billion gallons (for all biofuels) by 2020

Biofuels

- Meeting California's aggressive goals for biofuel consumption will entail a significant expansion of vehicles that can utilize an 85% blend of ethanol (E85)
- The incremental cost of a flex-fuel vehicle is relatively minor; the greater barrier is in fueling infrastructure
- More support is needed to establish E85 fueling stations. The FY 2011-2012 funding allocation of $5 million would cover 50-75 stations

Biofuels

- California ethanol production capacity is 240 million gallons per year, but much of it has idled in recent years
  - All other ethanol is imported from out-of-state
- California Ethanol Producers Incentive Program (CEPIP) provides support for in-state producers during rough times
  - Participating facilities are required to meet certain requirements to lower their carbon intensities, and to repay any state funding during favorable market conditions
  - With Program support, two of five eligible facilities have rehired workers and are producing ethanol
  - Near-record commodity prices for corn raises questions about whether the CEPIP can sustainably offset changes in the market

Biofuels

- California's significant supply of waste and other low-carbon feedstocks, combined with its aggressive biofuel policy goals, suggests an opportunity for advanced ethanol production facilities
- LCFS and Renewable Fuel Standard credits will have a significant role in ensuring the continued operation of advanced ethanol facilities
- To encourage further ethanol production from cellulosic resources, the Investment Plan includes a $7.5 million for FY 2011-2012

Biofuels

- Similar to cellulosic ethanol, California's policies and supply of waste and low-carbon feedstocks also encourage the development of diesel substitutes
- California's 12 biodiesel production plants have a combined 76 million gallons of capacity, though they produced less than 25 million gallons in 2010
- LCFS scenarios range from .7 to 1.0 billion gallons of diesel substitutes by 2020
- FY 2011-2012 allocation: $7.5 million for new plants and expansions

Biofuels

- Beyond production, upstream fuel storage and blending remains a significant barrier to the further expansion of diesel substitutes
- These facilities store unblended fuels and dispense blended fuels for truck delivery to retail sites
- Modifications for diesel substitutes will promote an simpler, cheaper, and quicker loading of biofuels
- FY 2011-2012 allocation: $4 million for modifications

Biofuels

- Biomethane, when sourced from waste-based feedstocks, represents one of the lowest carbon-intensity fuels available
  - Can be used to fuel NGVs, produce renewable hydrogen, or produce renewable electricity
- Pipeline injection of biomethane remains a barrier
  - Alternatively, biomethane can be combined with natural gas at the point of compression or liquefaction
- FY 2011-2012 allocation: $8 million for biomethane production and support

Medium- and Heavy-Duty Vehicles

- Medium- and heavy-duty vehicles reorganized into a separate section of the Investment Plan.
- These vehicles are more distinct than light-duty passenger vehicles, with a wide variety of weight classes and vocations.
- These vehicles represent less than four percent of California vehicles, but constitute roughly 16 percent of the state's petroleum fuel consumption and GHG emissions within the fuel sector.

Medium- and Heavy-Duty Vehicles

- On a per-vehicle basis, medium- and heavy-duty vehicles are an excellent opportunity to reduce petroleum and GHG emissions

Vehicle Type	Incremental Cost for Alternative Fuel Vehicle	Petroleum Reduction (gal/year)	GHG Emission Reduction (mt CO2e/year)
Class 8 Diesel Truck	$40,000 (for CNG)	6,701	12.0
Light-Duty Sedan (30 mpg; 12,00 miles per year)	$10,000 (for BEV)	400	3.2

Medium- and Heavy-Duty Vehicles

- Natural gas and propane vehicles have rapidly expanded into medium- and heavy-duty vehicles.
  - As of 2009, there were more than 11,292 CNG medium- and heavy-duty vehicles, displacing nearly 50 million gallons each year.
  - Almost 2,000 propane vehicles displacing more than 6 million gallons.
- For some weight classes and vocations, long-term natural gas and propane vehicle costs are approaching market parity with diesel vehicles.
- FY 2011-2012 allocation: $12 million for NGVs, $3 million for propane vehicles

Medium- and Heavy-Duty Vehicles

- Advanced vehicle technologies, such as hybrid hydraulics, batteries, and fuel cells, are just entering the medium- and heavy-duty market
- The qualities of these technologies must be carefully matched to the duty cycles of a customer's vehicle
  - In early years, more likely to serve niche applications, where the payback period is most attractive
- ARB's Hybrid Incentive Program covers up to $40,000 for vehicle deployment
- FY 2011-2012 allocation: $7 million for demonstration

Manufacturing

- California has previously attracted significant amounts of venture capital for in-state vehicle technology
- Expanding from focusing on electric vehicles to include other alternative fuels
- The Energy Commission has made substantial investments in early manufacturing projects. As these companies expand customers and production orders, it will be important to ensure that these commercial-scale plants remain in California
- FY 2010-2012 allocation: $10 million

Workforce Training and Development

- Skilled workers and training opportunities are necessary to expand and support the rollout of alternative fuels and vehicles

- Efforts are coordinated with, and implemented through, state agency partners
  - Employment Development Department
  - California Community Colleges Chancellor's Office
  - Employment Training Panel

- This multifaceted approach best serves the needs of the clean transportation industry and its workers

Workforce Training and Development

- Employment Training Panel
  - Provides financial assistance to California businesses to support customized workforce training
  - To date, over 2,400 individuals in the alternative fuels industry have received training through this program; however, there is significant demand for additional funds

- Community Colleges Chancellor's Office
  - Assesses industry needs, and evaluates current courses and curriculums accordingly
  - Develops instructor training and course materials based on industry assessments

Workforce Training and Development

- Employment Development Department
  - Engages with local workforce training programs and industry groups to provide workforce training

- FY 2011-2012 allocation: $5.5 million
  - $5 million for workforce training delivery
  - $.25 million for workforce outreach
  - $.25 million for workforce needs study

Market and Program Development

- As the Energy Commission focuses deeper on individual feedstocks, sustainability analyses will be critical to ensure minimizing biofuel investments
  - FY 2011-2012 allocation: $2.5 million
- Market and outreach efforts will continue, but there is no current need for additional funding
- There will be an on-going need for technical assistance in identifying Program priorities and opportunities
  - FY 2011-2012 allocation: $2.5 million

Market and Program Development

- Through funding for measurement, verification and evaluation of Program projects, the Energy Commission will examine:
  - The expected benefits of individual projects
  - The overall contribution of the Program toward its policy goals
  - Key obstacles and challenges to meeting these goals
  - Recommendations for future actions
  - FY 2011-2012 allocation: $3 million

	Project/Activity	Funding Allocation
Plug-in Electric Vehicles	Charging Infrastructure	$8 Million
Hydrogen	Fueling Infrastructure	$3 Million
Natural Gas	Fueling Infrastructure	$8 Million
Propane	Light-Duty Vehicle Incentives	$1 Million
	Fueling Infrastructure	$.5 Million
Ethanol	E85 Retail	$5 Million
	Advanced Cellulosic Ethanol Production Plants	$7.5 Million
Diesel Substitutes	Bulk Terminal Rack and Fleet Infrastructure	$4 Million
	Advanced Diesel Substitute Production Plants	$7.5 Million
Biomethane	Pre-Landfill Biomethane Production	$8 Million
Medium- and Heavy-Duty Vehicles	Deployment Incentives for Natural Gas Vehicles	$12 Million
	Deployment Incentives for Propane Vehicles	$3 Million
	Develop and Demo Advance Technology Vehicles	$7 Million
Manufacturing	Manufacturing Facilities and Equipment	$10 Million
Workforce Training	Workforce Development and Training Agreements	$5.5 Million
Market and Program Development	Sustainability Studies	$2.5 Million
	Technical Assistance and Analysis	$4.5 Million
	Measurement, Verification and Evaluation	$3 Million