DOCKETED

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Development of the 2017-2018 Investment Plan Update for the ARFVTP

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Fuels and Transportation Division
California Energy Commission

October 27, 2016

Meeting Agenda

10:00 am	Introductions and Opening Remarks
10:15 am	Presentation: Development of the *2017-2018 Investment Plan Update for the ARFVTP*
10:45 am	Staff Presentations on Allocations, Advisory Committee Discussion
12:00 pm	Lunch break
1:00 pm	Staff Presentations on Allocations, Advisory Committee Discussion (continued)
	Public Comment (following advisory committee discussion)

California Transportation Statistics

Vehicles

28.1 millions cars

1.0 million trucks

GHG Emissions

441.5 MMT CO2e (2014)

37% from transportation

Air Quality

Severe Non-Attainment for Ozone

San Joaquin Valley & South Coast

Petroleum Consumption

14.5 billion gallons gasoline

3.6 billion gallons diesel

Purpose of the ARFVTP

"…to develop and deploy innovative technologies that transform California's fuel and vehicle types to help attain the state's climate change policies."

California Health and Safety Code 44272(a)

Complementary state goals:

- Improve air quality
- Increase alternative fuel use
- Reduce petroleum dependence
- Promote economic development

ARFVTP Origins In Statute

Assembly Bill No. 8

CHAPTER 401

An act to amend Sections 41081, 44060.5, 44125, 44225, 44229, 44270.3, 44271, 44272, 44273, 44274, 44275, 44280, 44281, 44282, 44283, 44287, Section 44299 of, the Health and Safety Code, to amend Sections 42885 and 42889 of the Public Resources Code, and to amend Sections 9250.1, 9250.2, 9261.1, and 9853.6 of the Vehicle Code, relating to vehicular air pollution, and declaring the urgency thereof, to take effect immediately.

[Approved by Governor September 28, 2013. Filed with Secretary of State September 28, 2013.]

LEGISLATIVE COUNSEL'S DIGEST

AB 8, Perea. Alternative fuel and vehicle technologies: funding programs.

(1) Existing law establishes the Alternative and Renewable Fuel and Vehicle Technology Program, administered by the State Energy Resources Conservation and Development Commission, to provide to specified entities, upon appropriation by the Legislature, grants, loans, loan guarantees, revolving loans, or other appropriate measures, for the development and deployment of innovative technologies that would transform California's fuel and vehicle types to help attain the state's climate change goals. Existing law specifies that only certain projects or programs are eligible for funding, including block grants administered by public entities or not-for-profit technology entities for multiple projects, education and program promotion within California, and development of alternative and renewable fuel and vehicle technology centers. Existing law requires the commission to develop and adopt an investment plan to determine priorities and opportunities for the program. Existing law also creates the Air Quality Improvement Program, administered by the State Air Resources Board, to fund air quality improvement projects related to fuel and vehicle technologies.

This bill would provide that the state board has no authority to enforce any element of its existing clean fuels outlet regulation or other regulation that requires or has the effect of requiring any supplier, as defined, to construct, operate, or provide funding for the construction or operation of any publicly available hydrogen-fueling station. The bill would require the state board to aggregate and make available to the public, no later than June 30, 2014, and every year thereafter, the number of hydrogen-fueled vehicles that motor vehicle manufacturers project to be sold or leased over the next 3 years, as reported to the state board, and the number of hydrogen-fueled vehicles registered with the Department of Motor Vehicles through April 30. The bill would require the commission to allocate $20 million annually, as specified, until there are at least 100 publicly available hydrogen-fueling

Established by Assembly Bill 118 (Nunez, 2007)

Up to $100 million per year

Extended through January 1, 2024 by Assembly Bill 8 (Perea, 2013)

Guiding Policies and Regulations

Policy Objective	Goals
AB 32 SB 32; E.O. B-30-15 E.O. S-3-05	Reduce GHG Emissions to 1990 levels by 2020, 40% below 1990 levels by 2030, and 80% below 1990 levels by 2050
Low-Carbon Fuel Standard	Reduce carbon intensity of transportation fuels by 10% by 2020
State Alternative Fuel Plan	Reduce petroleum fuel use to 15% below 2003 levels by 2020
Clean Air Act	Reduce NOx by 80% by 2023
E.O. B-16-2012; ZEV Regulations	Infrastructure to accommodate 1 million EVs by 2020 1.5 million EVs by 2025
E.O. B-32-15 Sustainable Freight	Improve freight efficiency and transition freight movement to zero-emission technologies

Investment Plan Purpose

Basis for FY 2017-2018 solicitations, agreements, and other funding opportunities

$100 million funding allocation for a portfolio of fuels, technologies, and supporting elements

Funding allocations for categories (not individual projects)

ARFVTP Funding To-Date

Fuel Type	Cumulative Awards (in millions)	Percent of Funding	Cumulative Number of Projects
Biomethane	$46.1	7%	15
Ethanol	$43.6	7%	18
Biodiesel	$44.4	7%	19
Renewable Diesel	$16.1	3%	5
Electricity	$210.9	34%	163
Hydrogen	$112.3	18%	75
Natural Gas	$97.5	16%	147
Propane	$6.0	1%	30
Multiple/Other	$44.9	7%	77
Total	**$621.9**	100%	**549**

As of September 1, 2016

Investment Plan Update Schedule

Activity	Date
Release Draft Staff Report	October 17, 2016
1st Advisory Committee Meeting	October 27, 2016
Release Revised Staff Draft	By January 10, 2017
2nd Advisory Committee Meeting	Late January 2017
Release Lead Commissioner Report	March 2017
Business Meeting Approval	April 2017

Major Considerations for 2017-2018

Volkswagen diesel emissions settlement

ARB Low Carbon Transportation Investment Program (Greenhouse Gas Reduction Funds)

Sustainable Freight Action Plan

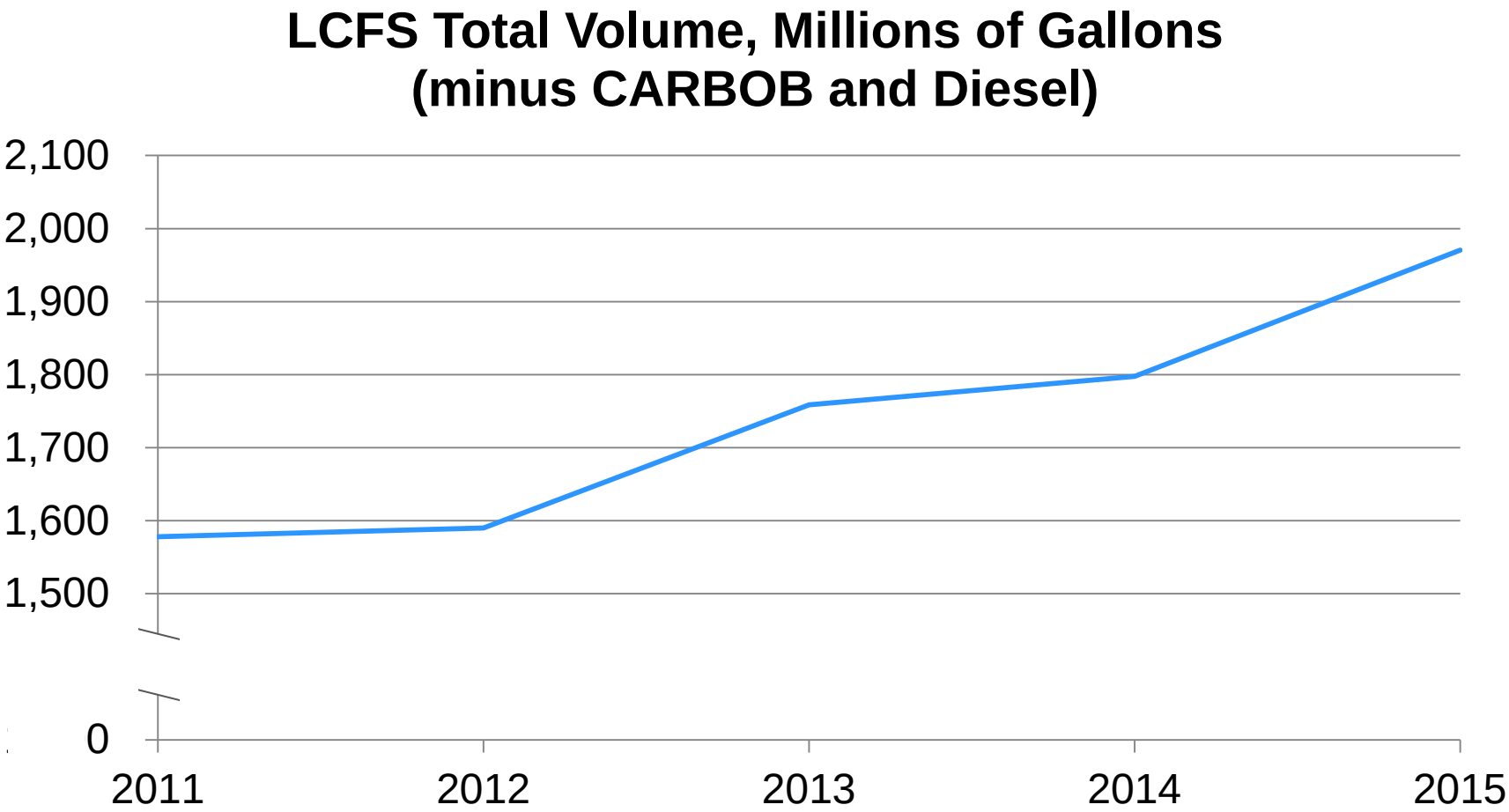
2015 Joint Agency Staff Report on Assembly Bill 8

2016 Annual Evaluation of Hydrogen FCEV Deployment and Hydrogen Fuel Station Network Development

2017-2018 Investment Plan Layout

- Context of the Investment Plan Update
- Alternative Fuel Production and Supply
- Alternative Fuel Infrastructure
- Alternative Fuel and Advanced Technology Vehicles
- Related Needs and Opportunities

Biofuel Production and Supply



Source: California Air Resources Board *LCFS Data Quarterly Summaries*. July 28, 2016.

Biofuel Production and Supply

Non-petroleum diesel substitutes, gasoline substitutes, and biomethane

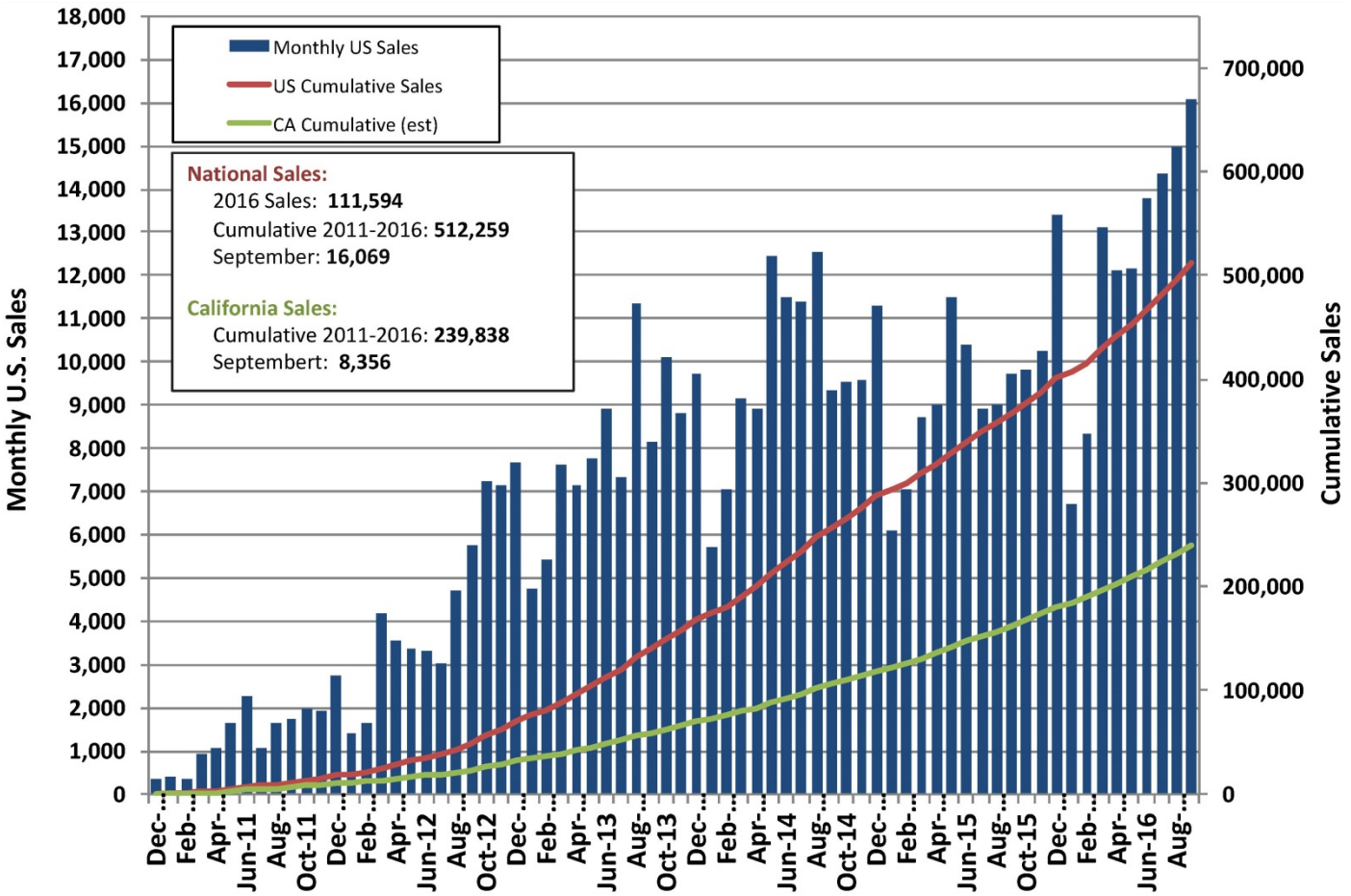
Covers multiple fuel types and multiple phases of technological maturation

Proposed $20 million allocation

Policy Goals Supported:

- GHG Reduction
- Petroleum Reduction
- In-State Biofuels Production
- Low Carbon Fuel Standard

Electric Charging Infrastructure



Source: California Plug-In Electric Vehicle Collaborative. October 4, 2016.

Electric Charging Infrastructure

Additional resources expected from Investor-Owned Utilities and VW settlement

Refocusing of category

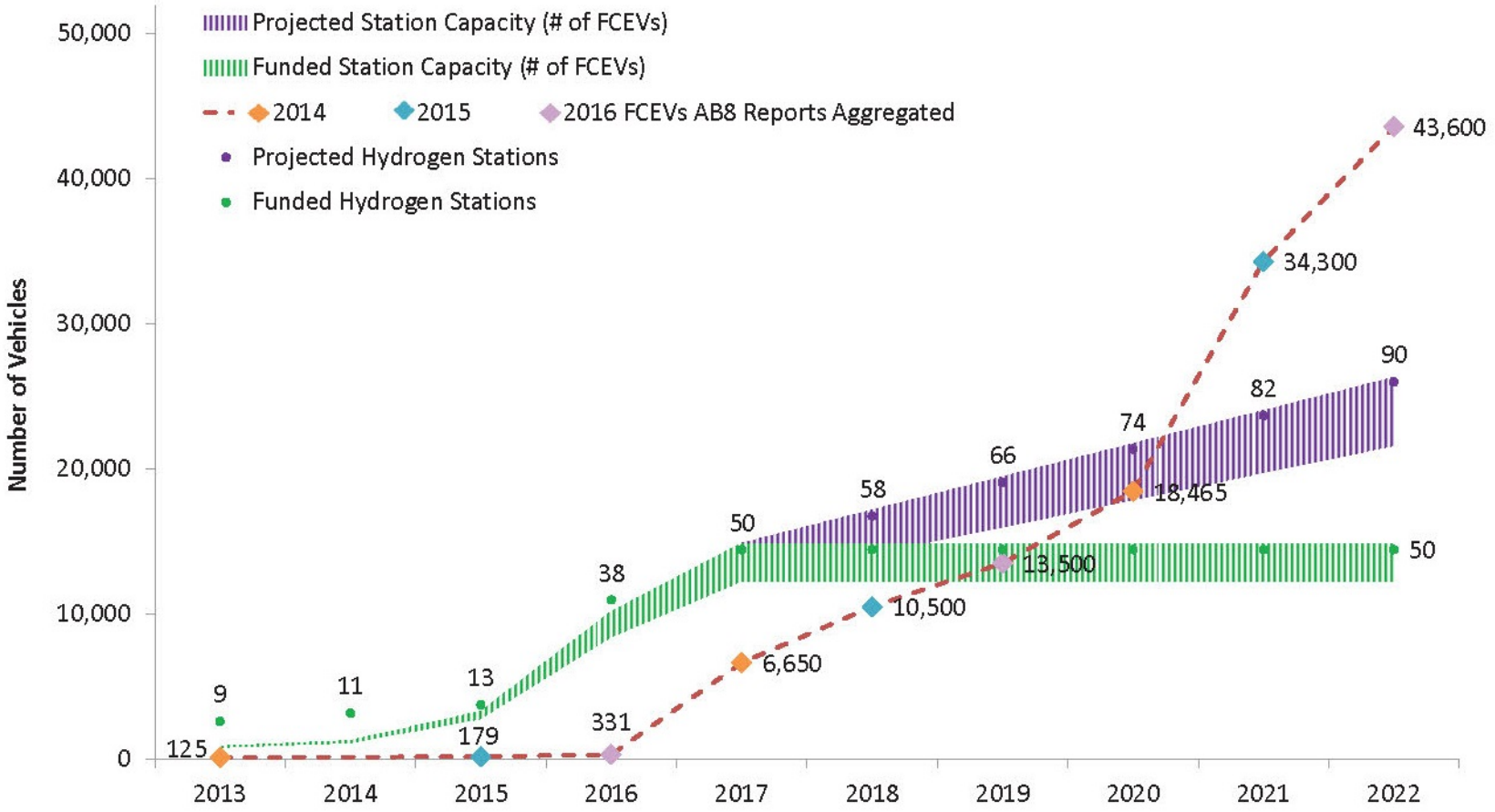
- Geographic areas and sectors not covered by larger programs

Proposed $17 million allocation

Policy Goals Supported:

- GHG Reduction
- Petroleum Reduction
- Low Carbon Fuel Standard
- Air Quality
- ZEV Regulations

Hydrogen Refueling Infrastructure



Source: California Air Resources Board.

Hydrogen Refueling Infrastructure

Initial 100-station network expected in 2023

Proposed $20 million allocation

- Consistent with recommendation in 2016 AB 8 Annual Evaluation
- Estimated to be sufficient for 8 or 9 stations, plus O&M

Policy Goals Supported:

- GHG Reduction
- Petroleum Reduction
- Low Carbon Fuel Standard
- Air Quality
- ZEV Regulations

Natural Gas Fueling Infrastructure

Prioritization for school districts and other municipal fleets with restricted access to capital

Proposed $2.5 million allocation

Policy Goals Supported

- Petroleum Reduction
- Air Quality
- Low Carbon Fuel Standard
- GHG Reduction (w/ biomethane)

Natural Gas Vehicles

Continued demand for incentive funding

- Additional funding for NGVIP now available

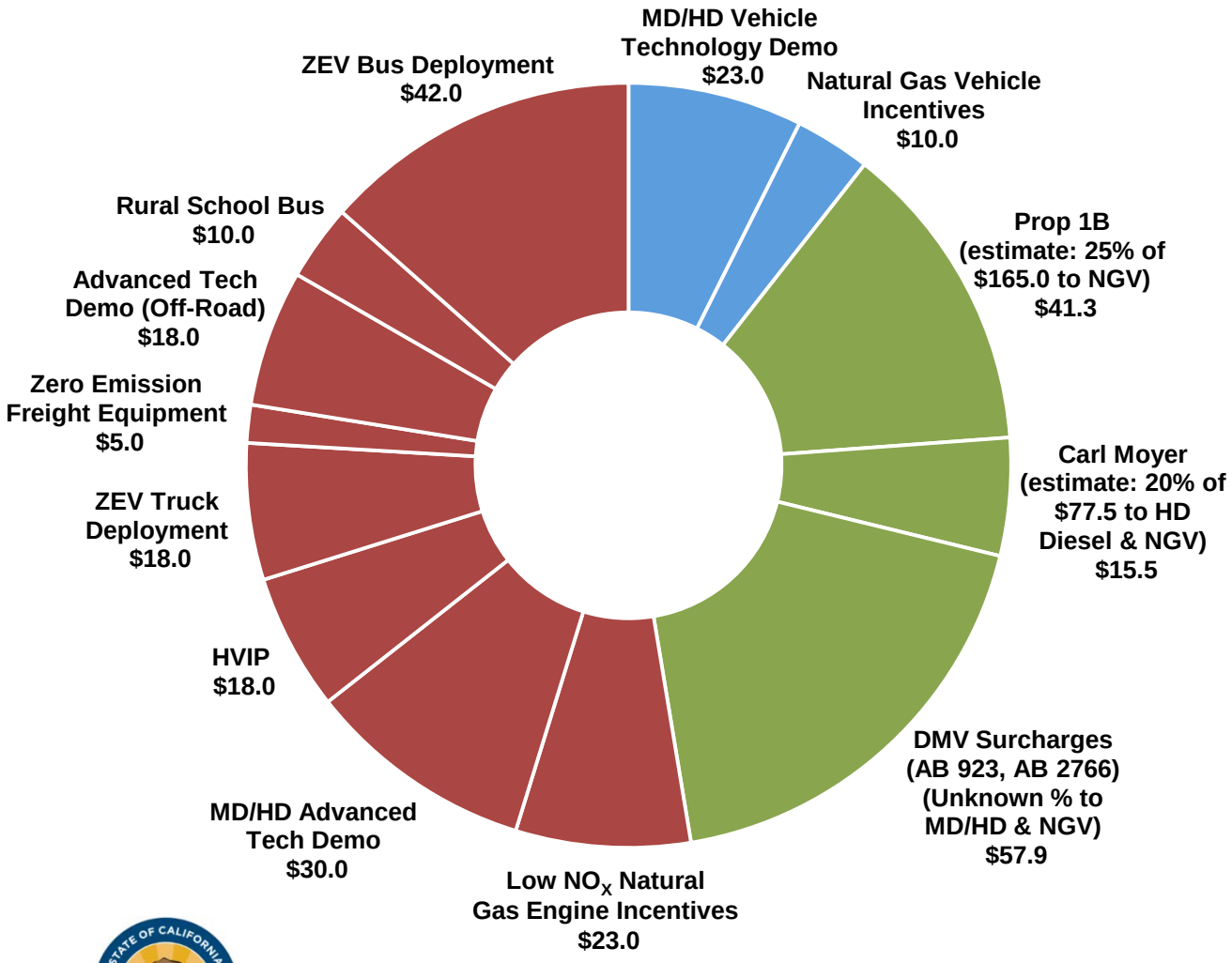
Change in natural gas – diesel price differential

Proposed $10 million allocation

Policy Goals Supported:

- Petroleum Reduction
- Air Quality
- Low Carbon Fuel Standard
- GHG Reduction (w/ biomethane)

Medium- and Heavy-Duty Vehicle Funding



FY 2016-2017 Funding

ARB:

Up to $164.0 million

Air Districts:

Est. $114.7 million

Energy Commission:

$33.0 million

Source: California Energy Commission.

Advanced Freight and Fleet Technologies

Formerly the *Medium- and Heavy-Duty Vehicle Technology Demonstration and Scale-Up* category

On-road fleet and non-road freight vehicles

- Class 3 through 8 fleet vehicles (GVW 10,000+ lb)
- Non-road freight vehicles
- Non-propulsion projects for these vehicles

New focus on fueling infrastructure projects

Sustainable Freight Action Plan and Ports Collaborative

Advanced Freight and Fleet Technologies

Continued, stable funding for advanced freight and fleet vehicle projects

Proposed $18 million allocation

Policy Goals Supported:

- Petroleum Reduction
- Air Quality
- Low Carbon Fuel Standard
- GHG Reduction

Manufacturing

No allocation since FY 2014-2015

- Merged into MD/HD Technology Demonstration and Scale-Up
- Allowed for small “scale-up” manufacturing projects related to MD/HD demonstration projects
- Absence of Manufacturing category excluded manufacturing for light-duty vehicles, vehicle components, vehicle accessories

Proposed $5 million allocation

Policy Goals Supported:

- GHG Reduction
- Air Quality
- Petroleum Reduction

Related Needs and Opportunities

Emerging Opportunities

- Proposed $4 million allocation based on projected demand
- Potential for renewable hydrogen production demonstration

Workforce Training and Development

- Proposed $3.5 million allocation based on anticipated need
- Potential expansion into high school career paths

Regional Readiness

- Sufficient funds remain from previous fiscal years
- No allocation proposed for FY 2017-2018; revisit next year

Measuring ARFVTP Success – Past

August 2016 Workshop

Benefit-Cost Score

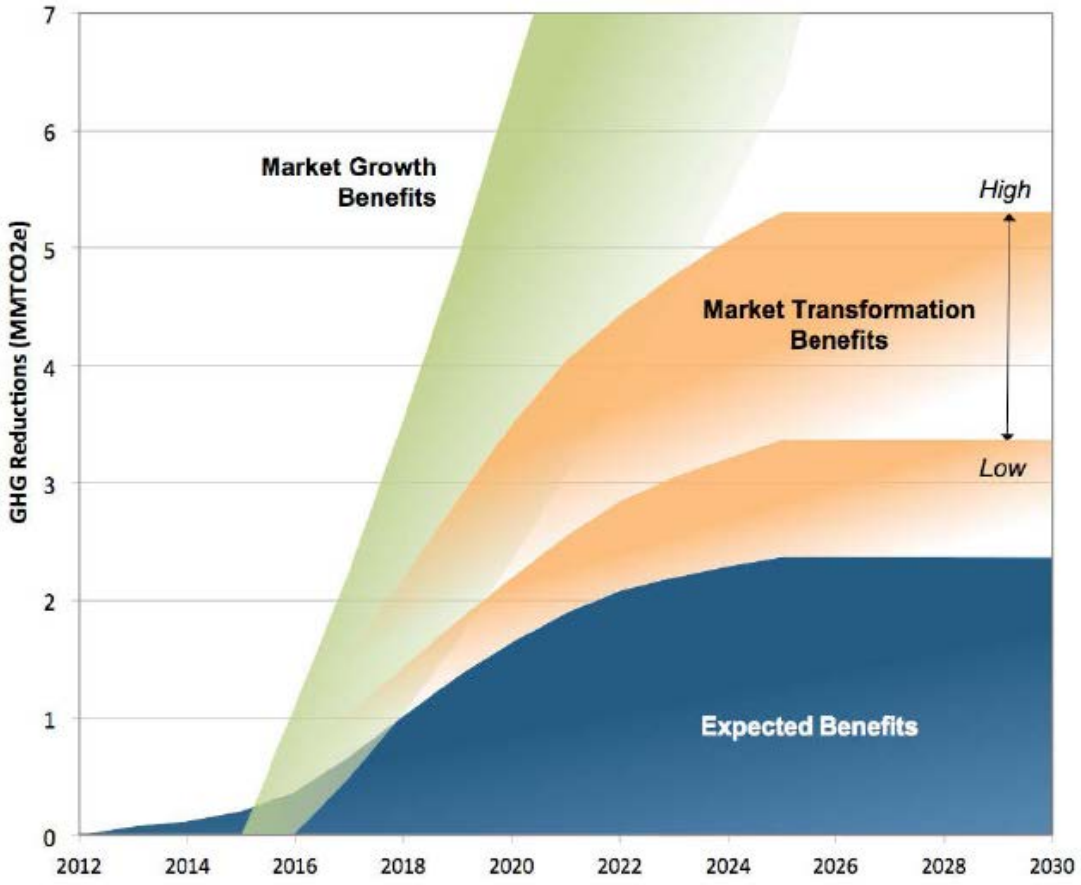
- Required by AB 8 (2013)
- GHG reductions / ARFVTP $ = Benefit-cost score
- Applied to competitive solicitations when scoring projects

ARFVTP Benefits Report

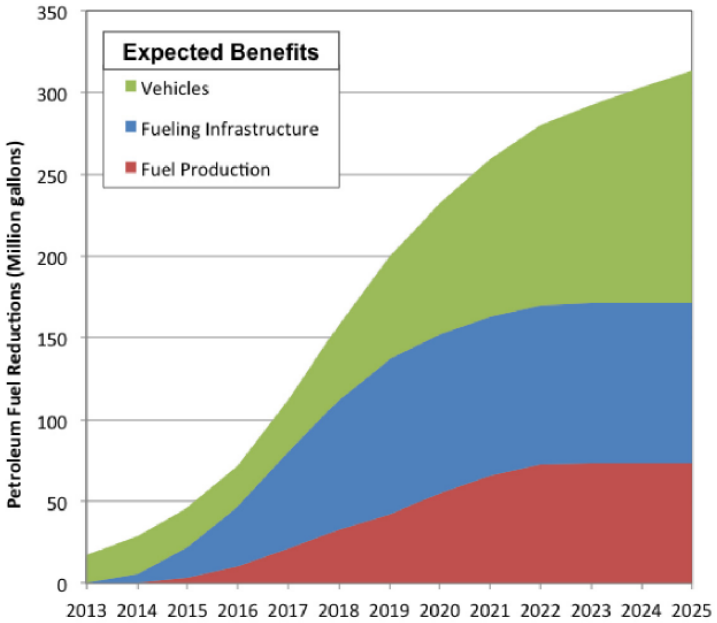
- Four editions to date (2011, 2013, 2014, 2015)
- Summary of all ARFVTP projects' benefits
- GHG, air quality, alternative fuel, petroleum displacement, jobs

2015 ARFVTP Benefits Report

GHG Emission Reduction



Petroleum Displacement



Criteria Reductions

- By 2025, 2-5 tons of PM2.5 reduced per year from ZEV investments alone
- Monetized benefit: $4 million to $8 million per year

Measuring ARFVTP Success – Future

2017 Benefits Report

- Draft materials and workshop in Spring/Summer 2017

Fuel- and Technology-Specific Progress Benchmarks

- Developing unique benchmarks for each project type
- Unique market barriers → Unique benchmarks for progress
- Key questions: What do we expect? How much have we progressed? At what cost?
- Short-, medium- and long-term
- Potential incorporation into Revised Staff Draft

Examples of Potential Benchmarks

Biofuel Production

- In-state production capacity increased by ARFVTP
- Average carbon intensity of ARFVTP-funded projects
- Increase GHG emission reduction capacity

Hydrogen Refueling Stations

- Number of stations open/operating
- Total statewide fueling capacity
- Renewable content of hydrogen

Measuring ARFVTP Success – Future

Hypothetical Example: Biofuel Production

Type and Status	Goal	By 2020	2021-2025	2026-	Progress
Biofuel Production $153M Funded 56 Awards	Increase annual biofuel production capacity in CA (DGE)	≥300M DGE	≥500M DGE	≥800M DGE	Increased capacity by 84.3M DGE (2016)
	Produce biofuels with a low average CI (g CO_2e / MJ)	≤35 gCO2e / MJ	≤35 gCO2e / MJ	≤25 gCO2e / MJ	Current average: 15 (2016)
	Increase capacity for GHG reductions from in-state production ($MMTCO_2e$)	2.7 $MMTCO_2e$	4.5 $MMTCO_2e$	8.3 $MMTCO_2e$	Increased capacity by 1 $MMTCO_2e$ (2016)

Measuring ARFVTP Success – Future

Progress Benchmark Considerations

- Identifying important benchmarks
- Incorporating quantifiable *and qualitative* goals
- Balancing aspirations and expectations
- Assumptions regarding ARFVTP funding
- Assumptions regarding project type funding

Next Steps

Seeking feedback from all stakeholders

- Comments requested no later than November 10, 2016
- E-commenting available at:

http://energy.ca.gov/altfuels/2016-ALT-02/

Release Revised Staff Draft by January 10, 2017

Second Advisory Committee meeting in late January or early February 2017

Proposed Funding Allocations

Category	Funded Activity	Proposed Funding Allocation
Alternative Fuel Production	Biofuel Production and Supply	$20 million
Alternative Fuel Infrastructure	Electric Charging Infrastructure	$17 million
	Hydrogen Refueling Infrastructure	$20 million
	Natural Gas Fueling Infrastructure	$2.5 million
Alternative Fuel and Advanced Technology Vehicles	Natural Gas Vehicle Incentives	$10 million
	Advanced Freight and Fleet Technologies	$18 million
Related Needs and Opportunities	Manufacturing	$5 million
	Emerging Opportunities	$4 million
	Workforce Training and Development	$3.5 million
	Total Proposed	$100 million