Comments on the CEC AB 118 Investment Plan

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South Coast Air Quality Management District

to

CEC AB 118 Workshop

Staff Workshop Regarding the Investment Plan for the Alternative and Renewable Fuel and Vehicle Technology Program

Diamond Bar, CA – February 17, 2009

SCAQMD Staff Recommendations

- We agree with the draft IP focus on low carbon technologies
- Should ULC technologies be commercialized and available within the next two years, the funding distribution should be re-evaluated.

Comments on Investment Plan

- Multiple benefits are better than GHG alone
  - GHG + petroleum displacement + criteria + toxics
- Shorter term gaseous fuels like NG build expertise + "literacy" for H_2 transition
- Infrastructure is the hardest part to rationalize, given the strengths of incumbent fuels
- Balance in Investment Plan is critical
  - Locked in allocations can be too formulaic
  - Each fuel pathway needs careful "feeding"
  - They're all on life support @ low oil prices

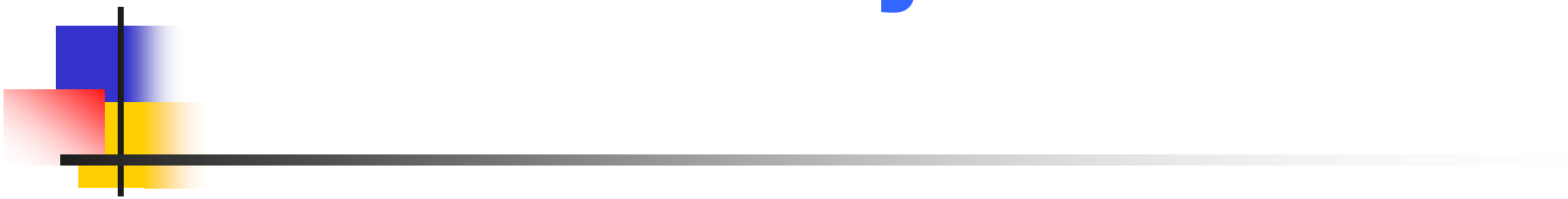
Current Recession Gives Special Importance to Short Term Opportunities

- OEMs need synergies for successful PHEVs
- School Districts need added help
- CA clean tech investors need to leverage public $$$s with greater flexibility
- LCFS depends on unprecedented breakthroughs in biofuel technology
- State Prop B funding moratorium places greater reliance on AB118 funding

Pragmatic Realities

- AB 118 Ranking System
  - A good 1st step
  - Should evolve over time
- Getting accurate data on which to judge WTW distinctions is very difficult and costly
- Enabling technologies have complex pathways
- Timing to commercial viability is very speculative
- Some projects may overlap CEC categories due to synergies, leveraged technologies, etc.
- **Need for flexibility should remain paramount**
  - **LC, ULC, SULC + FEI: should not be rigid definitions**

Project



Recommendations

SCAQMD Technology Priorities and the AB 118 Investment Plan

Category	Sub-Category	Brief Description	SCAQMD 2009 *	SCAQMD Previous
Low Carbon	Natural Gas	Financial incentives for LD, MD, HD vehicles	√	√
		Advanced MD and HD engines, fueling and fuel storage technologies	√	√
		New and retrofit fueling infrastructure	√	√
	Bio/renewable fuels	Fuel blending	√	
Ultra Low Carbon	Biofuels	Transition from corn to biomass feed stocks	√	
		In-state production facilities	√	
		Biomethane/biogas production	√	
		Expand E-85 stations	√	
Super Ultra Low Carbon	Electric Vehicles	Demonstration and deployment of LD/MD/HD applications	√	√
		Upfit and retrofit applications, LD/MD/HD	√	√
		Electric charging infrastructure	√	√
		Non-road applications e.g., TSE, TRU, APUs, cold ironing, forklifts, etc.	√	√
	Hydrogen	High-volume fueling stations	√	√
		Mixed-use fueling infrastructure (HCNG)	√	√
		Production from renewable feedstocks	√	√
Vehicle and Engine Efficiency		LD engine and vehicle components	√	√
		MD and HD hybrid electric and hydraulic hybrid technology	√	√
Non-GHG categories		Workforce training	√	√
		Sustainability		
		Standards and certification	√	√
		Public education and outreach	√	√
		Analytical support	√	√
Manufacturing and Production Incentives		In-state facilities	√	√

Technology Areas and Suggested Funding Levels

	SCAQMD Possible Funding	CEC Funding Request
Low Carbon Technologies		
• HD natural gas incentives ($90-100k/truck)		$18M
• NG school buses incentives		$14M
• NG conversions or OEM introduction	$1M	$2M
• HD natural gas engine development	$1M	$2M
• NG infrastructure	$2M	$4M
Super Ultra Low Carbon Technologies		
Electric		
• Plug-in hybrid LD development	$4M	$10M
• Plug-in hybrid MD development	$3M	$5M
• Electric vehicle infrastructure	$1M	$2M
• Electric vehicle incentives	$1M	$2M
Super Ultra Low Carbon Technologies		
Hydrogen		
• Hydrogen infrastructure, sp. multi-use	$3M	$6M
• Transit bus demonstrations	$1M	$2M
Vehicle Efficiency		
Hydraulic hybrid demonstrations	$2M	$4M

Specific Project Examples

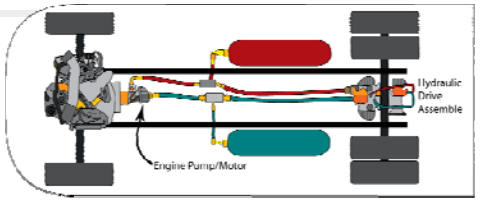
Heavy Duty Natural Gas Engine Development

- The use of natural gas as a transportation fuel provides the opportunity to reduce GHG and criteria pollutant emissions.
- The Cummins ISL G is currently the only natural gas powered engine available for the heavy-duty market.
- **$3M could be used to:**
  - Co-fund the development of natural gas engines by other engine manufacturers
  - Conduct a study the identify heavy-duty vehicle applications that would yield significant air quality benefits from using natural gas.
  - Develop natural gas demonstration vehicles in the targeted vehicle applications.

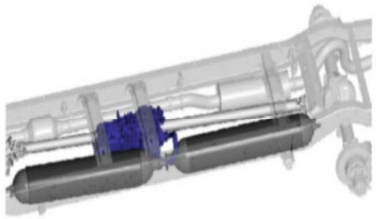
Heavy-Duty Natural Gas Trucks

- Replace pre-2003 heavy-duty diesel trucks with new LNG trucks
- Port and non-Port applications
- Provide $90,000 towards purchase of each new LNG truck
- Significant reductions in criteria pollutants, toxics, and GHG emissions
- **Replace 200 older diesel trucks with new LNG trucks for $18 million**

Hydraulic Hybrid Demonstrations



- Medium- and heavy-duty vehicle segments are responsible for a significant portion of air pollution and fossil fuel consumption.
- Hydraulic hybrids provide the opportunity to reduce both fossil fuel consumption and emissions for these vehicle segments.
- **$6 million in funding could be used to:**
  - Conduct studies to identify medium- and heavy-duty applications suited for hydraulic hybrid drive systems.
  - Conduct study to evaluate hydraulic hybrid use in light-duty vehicles.
  - Conduct studies to evaluate the GHG and criteria pollutant impact of the hydraulic hybrids.
  - Develop and demonstrate parallel hydraulic drive systems in target applications.
  - Develop and demonstrate series hydraulic drive systems in target applications.
  - Utilize advanced technology combustion engines (HCCI) with series hybrid drive system.



Transit Bus Demonstrations

- Fuel cell buses are currently very expensive and rely on FTA funding
- Difficulty keeping some integrators in the market; stacks expensive
- Other integrators and architectures need to be evaluated
  - Battery electric buses with quick charge capability
  - Plug-in fuel cell bus
  - HCNG engine transit bus
- $1-$4M could be used to evaluate at least 2 different technologies and architectures

School Bus Project

- Replace MY 1987-93 diesel school buses with new CNG buses
- Significant reductions in criteria pollutants, toxics, and GHG emissions
- **Provide $140,000 per each new CNG school bus**
- **Replace 100 older diesel school buses with new CNG buses for $14million**

Natural Gas and H_2 Infrastructure Projects *($000)*

Project	AQMD Possible Funding	AB 118 CEC Requested Funding
Support Additional NG Infrastructure: *Industry cost share install up to 7 stations*	**1,500**	**3,000**
Blended Fuel H2 + CNG) Bus Fueling *Promotes infrastructure + potential mpg increase*	**1,000**	**2,000**
Waste-to-pipeline Bio-methane Demo	**1,000**	**1,500**
Waste-to-Pipeline Refuse Derived CH_4	**500**	**1,500**
Waste-to-H_2-to-Energy Demo	**500**	**1,500**
70 MPa Residential H_2 Fueling Appliance	**250**	**500**

Opportunities for CEC / AQMD Partnership

- Program solicitation
- Project administration
- Best practices experience
- Increased leverage
- Synergies with existing projects
- Expedited outreach
- Training and outreach
- Efficient contracting