

Launching a California E-85 Refueling Network: Part of a Biofuel Strategy



*Advanced Transportation
Technologies*

*Clean Transportation
Solutions SM*

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Mission Statement

**CALSTART IS DEDICATED TO CREATING AN
ADVANCED TRANSPORTATION
TECHNOLOGIES INDUSTRY AND MARKETS
THAT WILL:**

- **Clean the air;**
- **Improve energy efficiency;**
- **Decrease dependence on foreign oil;**
and
- **Create high quality jobs**



The Needed Transportation Solutions

Air Quality

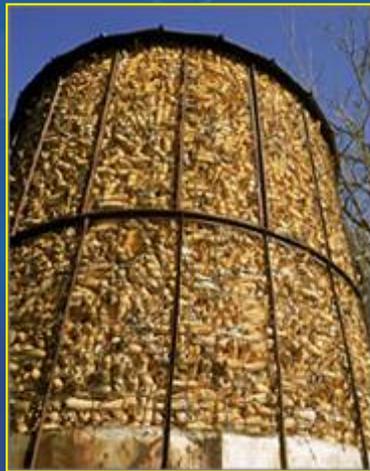
*Balances all
three
competing
needs*

*Integrated
Solutions
Needed*

Energy Security

Global Warming

CA E-85 Network Development



- More than 270,000 cars in CA capable of running on E-85 but there is only one public refueling station
- Important step for petroleum reduction, GHG
- 2nd CA Ethanol Plant opened in Goshen (SJ Valley) in August
- 3rd will open north of Fresno in Q4 2006
- CA needs CA E-85 planning/facilitation effort similar to H2 Highway
- *Long term strategy – start with corn, move to cellulosic and other feedstocks as fuel use grows*



Can Be Price Competitive



Cheaper Today in Denver (May '06)!

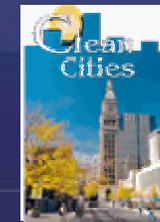


Cheaper Today in Brazil!

California E-85 Partners (DOE Project)



- Roughly \$2.3M project
- Strong private/public team
- DOE funding roughly \$495k (nearly 5:1 match)



Coalitions:
Southern California
Central Valley
Central Coast





15 New E-85 Stations in California

- 15 stations from Orange County to SJ Valley
- 10 stations in South Coast; 4 coastal corridor
- 5 stations to have biodiesel together with E-85





Proposed Station Locations

E85 Station Location	Est. Available FFVs		Est. Gasoline Displacement (gal/yr)	
	Total	25%	Total	25%
2959 N. "M" Street, Tulare, CA 93274	4,000	1,000	3,000,000	750,000
4700 Slauson Ave, Los Angeles, CA 90056	300	75	225,000	56,250
800 N. Western Ave., Los Angeles, CA 90029	637	159	477,750	119,438
21924 Devonshire, Chatsworth, CA 91311	959	240	719,250	179,813
108 Cochran St., Simi Valley, CA 93065	77	19	57,750	14,438
1500 Patricia Lane, Sun City, CA 92585	1,110	278	832,500	208,125
1600 W. Olympic Blvd., Los Angeles, CA 90015	1,108	277	831,000	207,750
601 W. Imperial Hwy, La Habra, CA 90631	1,458	365	1,093,500	273,375
5544 Laurel Canyon Blvd., N. Hollywood, CA 91607	1,356	339	1,017,000	254,250
7900 Beverly Blvd., Los Angeles, CA 90048	52,719	13,180	39,539,250	9,884,813
1776 Cloverfield Blvd., Santa Monica, CA 90404	1,087	272	815,250	203,813
55 Depot Road, Goleta, CA 93101	563	141	422,250	105,563
75 Prado Road, San Luis Obispo, CA 93401	548	137	411,000	102,750
2285 Lillie Avenue, Summerland, CA 93067	951	238	713,250	178,313
890 Alma Real Drive, Pacific Palisades, CA 90272	809	203	606,750	151,688



Additional Support Needed

- Further leverage DOE funding and place additional stations
- Need additional assistance to reach FFV users and specifically inform them of options
- Would be useful to monitor FFV owner use patterns for data on fuel mixing, choice and ideal number of stations and pricing for high E-85 use
- Assistance to plan placement of future station clusters in regions to get optimal saturation



What Next?

- CEC believes we need eventually 900-1800 E-85 stations rolled out over time (10-20% of gasoline sites)
- Need in 2007 to roll out 20-30 stations in new locations to keep momentum rolling
- Also need next 20-30 stations in Southern region
- Leverage AB 1881 (\$25M)





The Best FFV in the Market?

Optimized
for both
ethanol
and
gasoline &
mileage
differences
can be
small!



SAAB 9-5 with +25hp & -18% mpg with E85
Another big ethanol mileage increase when hp held to gasoline hp



Hybridization and Biofuels

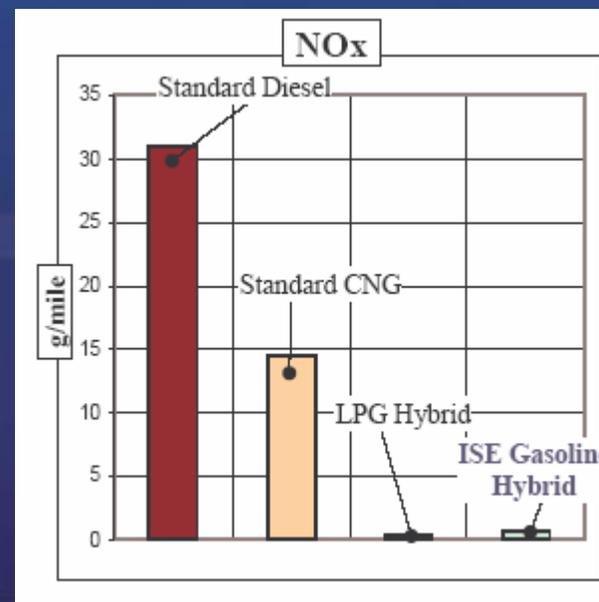


- Tremendous opportunities to encourage and test biofuels (such as E-85) in hybrid vehicles
- Toyota, others looking at FFV hybrids
- Medium-duty trucks exploring gasoline-electric hybrid drives; could assist with including E-85/flexfuel hybrid option
- Gasoline-electric transit hybrid from ISE could add FFV variant, test E-85
- Large petroleum reduction benefits; hybridization can further reduce emissions



Nation's First E-85 Hybrid Bus

- E-85 (85% ethanol) Hybrid Bus would clean air and reduce oil dependence
- We need to move toward domestic renewable fuels
- 100+ orders for New Flyer/ISE gasoline hybrid
- Need to develop and test E-85 compatible engine
- Low fuel and engine costs offer tremendous near term commercial potential





BioFuel Plug-in Hybrid Electric Vehicle



1992 Volvo Plug-in Hybrid EV

- A hybrid that you can plug-in
- 20 mile range or better on electric power alone
- Fuel would be E-85
- Potential to go 250 miles on a gallon of gasoline
- Energy bill provided authorization for program
- CALSTART has partnered with a qualified vehicle manufacturer to develop a PHEV



CA Biofuels Industry Can Grow the State's Economy

- Primary jobs creation in collection, construction, and facility operations
- Secondary jobs through local and regional economic impacts.
- RFA: For corn-to-ethanol facilities, direct employment runs 1 to 1.5 jobs per million gallons per year capacity.
- CEC: 34 million tons per year of technical biomass resource potential in CA could yield:
 - 2.3 billion gallons per year of (primarily cellulosic) ethanol
 - \$8.5 billion in investment
 - creation of 3,600 primary jobs



CA Biofuels Industry Can Build Off State's History of Innovation

- **Biotechnology**
 - Strong state history of leadership and innovation
 - Focus on new crop utilization and efficient energy extraction of biomass could significantly boost biofuel potential and CA economy
 - e.g.: Diversa



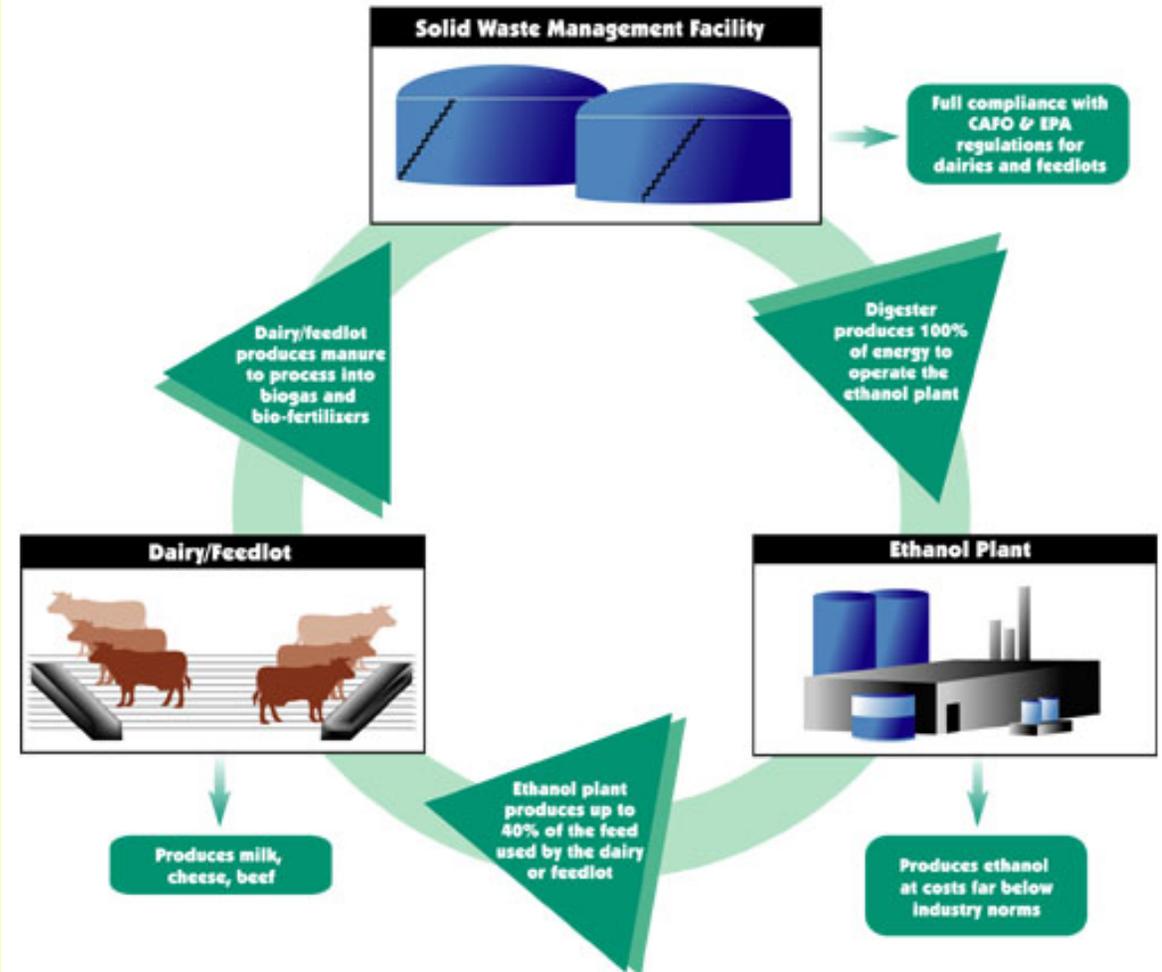
Diversa, based in San Diego, is working on processes to mimic nature's efficient conversion of biomass to energy

E3 Biofuels – Kansas Closed Loop System



Not all corn
ETOH created
equally -
Great (5X)
energy balance
& lower
production cost
for E3 Biofuels
CORN ethanol

A Self-Sustaining Closed Loop System for Waste Management, Ethanol and Dairy/Beef Production





Summary

- **First refueling network launching from Southern California**
- **Need to build on network here and expand to other regions (SJV, Sacto, Bay Area)**
- **Monitor and learn from use profiles and possible impacts**
- **Encourage/support optimized FFVs, hybrid FFVs**
- **Support medium and heavy biofuel hybrids (such as E-85 FFV)**

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