Solano Transportation Authority
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SOLANO TRANSPORTATION AUTHORITY

Member Agencies:
Benicia ♦ Dixon ♦ Fairfield ♦ Rio Vista ♦ Suisun City ♦ Vacaville ♦ Vallejo ♦ Solano County

One Harbor Center, Suite 130, Suisun City, CA 94585-2473 ♦ Telephone (707) 424-6075 / Facsimile (707) 424-6074
Email: staplan@sta-snci.com ♦ Website: sta.ca.gov

Solano Express

INTERCITY TRANSIT CONSORTIUM
AGENDA
1:30 p.m., Tuesday, August 27, 2013
Solano Transportation Authority
One Harbor Center, Suite 130
Suisun City, CA 94585

ITEM	STAFF PERSON
1. CALL TO ORDER	Wayne Lewis, FAST
2. APPROVAL OF AGENDA	
3. OPPORTUNITY FOR PUBLIC COMMENT (1:35 –1:40 p.m.)	
4. REPORTS FROM STA STAFF AND OTHER AGENCIES (1:40 –1:50 p.m.)	
5. CONSENT CALENDAR Recommendation: Approve the following consent items in one motion. (1:50 –1:55 p.m.)	
A. Minutes of the Consortium Meeting of June 25, 2013 Recommendation: Approve the Consortium Meeting Minutes of June 25, 2013. **Pg. 5**	Johanna Masiclat
B. FY 2013-14 Transportation for Clean Air 40% Program Manager Funds Recommendation: Forward a recommendation to the TAC and STA Board to approve the following projects and amounts for the FY 2013-14 Solano TFCA Program Manager Funds: 1. Solano Community College Student Bus Voucher Program ($42,000);	Sara Woo

CONSORTIUM MEMBERS

Janet Koster	Wayne Lewis (Chair)	Jim McElroy	Mona Babauta	Brian McLean (Vice-Chair)	Matt Tuggle	Judy Leaks	Liz Niedziela
Dixon Readi-Ride	Fairfield and Suisun Transit (FAST)	Rio Vista Delta Breeze	Solano County Transit (SolTrans)	Vacaville City Coach	County of Solano	SNCI	STA

The complete Consortium packet is available on STA's website: www.sta.ca.gov

2. Safe Routes to School (SR2S) High School Trip Reduction Pilot ($24,981); and
3. Suisun City Electric Charging Station ($2,000).

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6. ACTION FINANCIAL

A. None.

7. ACTION NON-FINANCIAL

A. Legislative Update — Jayne Bauer

Recommendation:

Forward a recommendation to the TAC and STA Board to take the following position:

SB 556 – oppose unless amended to exempt public transportation providers

(1:55 – 2:00 p.m.)

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B. Mobility Management Plan Update — Sofia Recalde

Recommendation:

Forward a recommendation to the TAC and STA Board to:

1. Approve the revised Scope of Work for Countywide Travel Training as specified in Attachment B;
2. Approve the Scope of Work for the development of a Mobility Management Website as specified in Attachment C; and
3. Authorize the Executive Director to issue a Request for Proposal (RFP) and enter into an agreement for Mobility Management Website Development Services.

(2:00 – 2:15 p.m.)

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C. Coordinated Short Range Transit Plan Status Update and Coordination Report — Nancy Whelan and Alan Zahradnik

Recommendation:

Forward a recommendation to the TAC and STA Board to approve:

1. The intercity performance benchmarks in Attachment A; and
2. The Solano County Coordinated SRTP Coordination Report shown in Attachment B.

(2:15 – 2:35 p.m.)

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8. INFORMATIONAL ITEMS – DISCUSSION ITEMS

A. STA Alternative Fuel and Infrastructure Plan Update — Robert Guerrero

(2:35 – 2:45 p.m.)

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B. Personal Care Attendant (PCA) on Fixed Route Sofia Recalde
(2:45 – 2:50 p.m.)
Pg. 225

C. Clipper Implementation Update Wayne Lewis
(2:50 – 3:00 p.m.)
Pg. 227

NO DISCUSSION ITEMS

D. Other Funding Opportunities Summary Sara Woo
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9. FUTURE INTERCITY TRANSIT CONSORTIUM AGENDA ITEMS Liz Niedziela

10. TRANSIT OPERATOR COORDINATION ISSUES Group

11. ADJOURNMENT
The next regular meeting of the SolanoExpress Intercity Transit Consortium is scheduled at **1:30 p.m. on Tuesday, September 24, 2013.**

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INTERCITY TRANSIT CONSORTIUM
Meeting Minutes of June 25, 2013

1. CALL TO ORDER

Wayne Lewis called the regular meeting of the SolanoExpress Intercity Transit Consortium to order at approximately 1:35 p.m. in the Solano Transportation Authority Conference Room.

Members Present:	Janet Koster (By phone)	Dixon Readi-Ride
	Wayne Lewis, Chair	Fairfield and Suisun Transit
	Jim McElroy	Rio Vista Delta Breeze
	Judy Leaks	SNCI
	Liz Niedziela	STA
	Brian McLean, Vice Chair (By phone)	Vacaville City Coach
	Matt Tuggle	County of Solano
Members Absent:	Mona Babauta	SolTrans
Also Present:	Robert Macaulay	STA
	Robert Guerrero	STA
	Sofia Recalde	STA
	Johanna Masiclat	STA
	Sheila Jones	STA
	Elizabeth Richards	STA
	Nancy Whelan	STA Project Manager
	Jasmeen Kaur	HS Intern
	Angela Tsagarakis	HS Intern
Others Present:	***(In Alphabetical Order by Last Name)***	
	Tony Bruzzone	ARUP
	Nathan Newell	County of Solano
	Alan Zahradnik	ARUP

2. APPROVAL OF THE AGENDA

On a motion by Matt Tuggle, and a second by Jim McElroy, the SolanoExpress Intercity Transit Consortium approved the agenda.

3. OPPORTUNITY FOR PUBLIC COMMENT

4. REPORTS FROM CALTRANS, MTC, AND STA STAFF

Robert Guerrero noted that after the June 21st deadline, STA staff will review comments received by the working group and revise the Draft Alternative Fuel Plan accordingly. He added that the revised draft Plan will be re-circulated to the Working Group in July for final comment before tentatively being presented to the STA TAC and Consortium in August and STA Board approval consideration in September.

Judy Leaks presented information about the Solano Napa Commuter Information Call Center.

5. CONSENT CALENDAR

On a motion by Jim McElroy, and a second by Matt Tuggle, the SolanoExpress Intercity Transit Consortium approved Consent Calendar Item A through C.

A. Minutes of the Consortium Meeting of May 28, 2013

Recommendation:
Approve the Consortium Meeting Minutes of May 28, 2013.

B. Fiscal Year (FY) 2013-14 Transportation Development Act (TDA) Matrix - July 2013

Recommendation:
Forward a recommendation to the STA TAC and Board to approve the FY 2013-14 Solano TDA Matrix – July 2013 as shown in Attachment B for Cities of Dixon and Rio Vista.

C. Solano Napa Commuter Information (SNCI) Fiscal Year (FY) 2013-14 Work Program

Recommendation:
Forward a recommendation to the STA TAC and STA Board to approve the Solano Napa Commuter Information Work Program for FY 2013-14 as shown in Attachment A.

6. ACTION FINANCIAL

A. Fiscal Year (FY) 2013-14 State Transit Assistance Funds (STAF) Initial Projects

Liz Niedziela noted staff's recommendation to approve a comprehensive list of studies and projects to be funded by the FY 2013-14 STAF. She identified the proposed projects as Transit Planning and Coordination, Intercity Bus Replacement, Alt Fuel Study/CNG Feasibility Study Match to Benicia and SolTrans, P3 (Phase 2), Suisun City Amtrak Station Rehab and Signage, Transit Coordination Clipper Implementation, Transit Coordination Implementation-Rio Vista, Lifeline, SolanoExpress Marketing, Coordinated SRTP/Transit Corridor/Transit Analysis/Implementation, Mobility Management Program Implementation, Mobility Management Program Implementation, ADA in Person Eligibility, PCC, and Senior and People with Disabilities Committees.

After discussion and input, the Consortium voted to approve Brian McLean's request ***to reduce the project amount under the Transit Coordination Clipper Implementation on Attachment C (FY 2013-14 STAF Priorities) from $150,000 to $100,000***.

Recommendation:
Forward a recommendation to the STA TAC and Board to approve the FY 2013-14 STAF priorities as specified in Attachment C.

On a motion by Jim McElroy, and a second by Brian McLean, the SolanoExpress Intercity Transit Consortium unanimously approved the recommendation to include a modification to Attachment C as shown above in ***bold italics***.

ACTION NON-FINANCIAL

7.

A. Transit Corridor Study - SolanoExpress Service Design and Performance Metrics and Proposed Service Alternatives and Capital Plan

Tony Bruzzone, ARUP, provided the current status of the Transit Corridor Study and the work completed to date which includes proposed service design and performance metrics for development of Intercity SolanoExpress services. He reviewed the peer comparison of the performance metrics with adjustments to the suggested standards requested by the Consortium at their May 28, 2013 meeting.

By consensus, the Consortium voted to table this item until the next regular or special meeting.

B. Coordinated Short Range Transit Plan Status Update and Coordination Report

Alan Zadranick reported that the draft SRTPs for each operator were distributed for review and comment and the Final Draft SRTPs incorporating transit operator comments have been completed and transmitted to the Cities of Dixon, Rio Vista, and Vacaville. He noted that final comments and financial plans for SolTrans were incorporated by the ARUP team and financial plans are near completion for Fairfield-Suisun Transit (FAST). He concluded by stating that the governing boards for each of the transit operators are expected to consider approval of their individual SRTPs before August 31, 2013.

Brian McLean described his concerns regarding Sections 2 and 3 of the technical memorandum in the SRTP Coordination Report. After citing each of his concerns, Nancy Whelan indicated that similar comments were received under the same sections, however after careful review by the team, collective decisions were made to keep the comments "as is" report to avoid further confusion to the technical report.

Since the performance matrix affects SolanoExpress service and SolTrans was note present to provide comments, the Consortium voted to table this item until the next regular or special meeting.

C. Mobility Management Travel Training Scope of Work

Elizabeth Richards presented for review the draft Scope of Work prepared to identify the responsibilities for a STA Travel Training contractor. She noted that if a Request for Proposal (RFP) can be released this summer, a contractor could be secured and available to begin implementing a Travel Training program in the Fall of 2013.

Recommendation:

Forward a recommendation to the STA TAC and Board to approve the following:

1. The draft Travel Training scope of work; and
2. Authorize the Executive Director to issue a request for proposal and enter into an agreement for Travel Training Consultant Services.

On a motion by Jim McElroy, and a second by Brian McLean, the SolanoExpress Intercity Transit Consortium unanimously approved the recommendation.

8. INFORMATIONAL ITEMS – DISCUSSION ITEMS

A. Mobility Management Plan Update

Sofia Recalde provided an update to the new Countywide In-Person ADA Eligibility Program which will start on July 1, 2013. She noted that on June 17th, interested ADA applicants and current ADA certified passenger whose eligibility is about to expire can call to start the ADA certification or re-certification process. She commented that the Call Center will be staffed by C.A.R.E. Evaluator's customer service representatives and will be able to answer questions about the new program. She concluded by citing that the STA is planning to host the next Mobility Management meeting and a date is still pending at this time.

NO DISCUSSION

B. SolanoExpress Ridership Update

C. Legislative Update

D. Other Funding Opportunities Summary

9. FUTURE INTERCITY TRANSIT CONSORTIUM AGENDA ITEMS

10. TRANSIT OPERATOR COORDINATION ISSUES

11. ADJOURNMENT

The meeting adjourned at 3:30 p.m. The next regular meeting of the SolanoExpress Intercity Transit Consortium is scheduled at **1:30 p.m. on Tuesday, August 28, 2013.**

DATE: August 14, 2013
TO: SolanoExpress Intercity Transit Consortium
FROM: Sara Woo, Associate Planner
RE: Fiscal Year (FY) 2013-14 Transportation Fund for Clean Air (TFCA) 40% Program Manager Funds

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Background:
The Bay Area Air Quality Management District (BAAQMD) Transportation Fund for Clean Air (TFCA) 40% Program Manager Funds are administered by each Bay Area county Congestion Management Agency (CMA). The Solano Transportation Authority (STA) is the CMA for Solano County and therefore administers the program for Solano County. Eligible TFCA projects are those that reduce air pollution from motor vehicles. Examples include clean air vehicle infrastructure, clean air vehicles, shuttle bus services, bicycle projects, and alternative modes promotional/educational projects.

Funding for the TFCA program is provided by a $4 vehicle registration fee, with 60% of the funds generated applied toward the TFCA Regional Program and the remainder toward the county 40% Program Manager Program. The BAAQMD, in coordination with the CMA's, establishes TFCA policies for both programs annually. The estimated amount available for FY 2013-14 is $288,981.

The cities of Benicia, Fairfield, Suisun City, Vallejo, and southwestern portions of Solano County located in the Bay Area Air Basin are eligible to apply for these funds. The Yolo Solano Air Quality Management District provides similar funding (i.e. Clean Air Program Funds) for the remaining cities and the County unincorporated area within the Yolo-Solano Air Basin.

Discussion:
On March 13, 2013, the STA Board approved $220,000 for the Solano Napa Commuter Information (SNCI) Solano Commute Alternatives Outreach Program and Incentive Activities. The STA Board issued a call for projects for the remaining balance. Since then, STA staff has received three separate funding requests for the following projects:

1. Solano Community College Student Bus Voucher Program ($42,000)
2. Safe Routes to School (SR2S) High School Trip Reduction Pilot ($24,981)
3. Suisun City Electric Charging Station ($2,000)

The Solano Community College Student Bus Voucher Program is a pilot project to incentivize transit usage to and from each of the three college campuses. The College staff indicated that the goal for this program is to track the success of the program to assist in establishing a permanent program funded with student fees.

The SR2S High School Trip Reduction program is also a pilot program that would provide incentives targeting teen high school drivers. The goal would be to incentivize transit services for these students.

Suisun City's Electric Charging Station is a valuable addition to Solano County's charging station network. The charging station immediately adjacent to where the new charger would be located is over subscribed with users. Further details on each of the three proposed projects are provided as Attachment A.

The BAAQMD staff reviewed all three projects and concluded that they all met the TFCA cost effectiveness eligibility requirements and qualify as clean air projects or programs. Therefore, STA staff is recommending approval for all three requests.

Fiscal Impact:
None to the STA General Fund. Funding recommended for each project and program is provided by the BAAQMD TFCA 40% Program Manager Funds. A total of $288,981is available for FY 2013-14, with $220,000 previously approved for SNCI's Solano Commute Alternatives Outreach Program and Incentive Activities. The recommended projects will use the remaining balance of TFCA funding.

Recommendation:
Forward a recommendation to the TAC and STA Board to approve the following projects and amounts for the FY 2013-14 Solano TFCA Program Manager Funds:

1. Solano Community College Student Bus Voucher Program ($42,000);
2. Safe Routes to School (SR2S) High School Trip Reduction Pilot ($24,981); and
3. Suisun City Electric Charging Station ($2,000).

Attachment:

A. Project Information Sheets for the Solano Community College Student Bus Voucher Program, SR2S High School Trip Reduction Pilot, and Suisun City Electric Charging Station.

PROJECT INFORMATION

A. Project Number: 14SOL01

B. Project Title: Solano Commute Alternatives Outreach Program and Incentive Activities
Provide a concise, descriptive title for the project (e.g., "Elm Ave. Signal Interconnect" or "Purchase Ten Gasoline-Electric Hybrid Light-Duty Vehicles").

C. TFCA Program Manager Funds Allocated: $ 220,000

D. TFCA Regional Funds Awarded (if applicable):$_____

E. Total TFCA Funds Allocated (sum of C and D):$ 220,000

F. Total Project Cost: $ 593,000
Indicate the TFCA dollars allocated (C, D and E) and total project cost (D). Data from Line E (Total TFCA Funds) should be used to calculate C-E.

G. Project Description:

The Solano Commute Alternatives Outreach Program and Incentive Activities will enhance the effectiveness of the regional rideshare program by including the following components:

1. Employer Outreach and Incentives Program: Implement an employer outreach program (Employer Commute Challenge) to promote alternative modes to Solano employers. SNCI will implement incentives to increase employer involvement in reducing drive alone commuting among their employees. This will be accomplished through mailings, calls, on-site visits, materials, incentives, emergency ride home program, marketing campaigns, web-based tools, and events.
2. Bicycle Promotion: Distribute information about bicycling and bicycle incentives. Work with local jurisdictions to produce updated version of *What's New in Bicycling* and *Bicycling on Transit.* Promote bicycling as a travel option to Solano employers and individuals through events and other means. These efforts will be coordinated with the Solano Bicycle Advisory Committee and other bicycle organizations.
3. Incentive Activities: Market, provide financial incentives and administer carpool, vanpool, transit and bicycling incentive programs to increase commuter use of these modes. This will include the Emergency Ride Home (ERH) program for Solano County. Incentives will be evaluated to determine if existing incentives should be maintained and/or new incentives implemented.
4. SolanoExpress Transit Customer Service and Marketing: Directly support customer service and an expanded marketing effort and customer service for SolanoExpress to support the various transit routes in the county with niche marketing and transit information. The program includes various efforts such as personalized transit trip planning to place individuals into transit, the distribution of Transit Connections brochure, displays, presentations, print ads, radio ads bus cards and other strategies to promote transit use for work and other trip purposes.

H. Final Report Content: Final Report form and final Cost Effectiveness Worksheet
Form for Ridesharing, Shuttles, Transit Information, Rail/Bus Integration, Smart Growth, and Traffic Calming Projects. (Includes Transit Bus Signal Priority.)

I. Attach a completed Cost-effectiveness Worksheet and any other information used to evaluate the proposed project. *attached*

J. Comments (if any):

Transportation Fund for Clean Air (TFCA)
County Program Manager Funds
Project Information Form

A. Project Number: 14SOL02

B. Project Title: Solano Community College Student Bus Voucher Program
Provide a concise, descriptive title for the project (e.g., "Elm Ave. Signal Interconnect" or "Purchase Ten Gasoline-Electric Hybrid Light-Duty Vehicles").

C. TFCA County Program Manager Funds Allocated: $ 40,000

D. TFCA Regional Funds Awarded (if applicable): $ 0

E. Total TFCA Funds Allocated (sum of C and D): $ 40,000

F. Total Project Cost: $ 40,000

G. Project Description:

Include information sufficient to evaluate the eligibility and cost-effectiveness of the project. Ex. of the information needed includes but is not limited to: what will be accomplished by whom, how many pieces of equipment are involved, how frequently it is used, the location, the length of roadway segments, the size of target population, etc. Background information should be brief. For shuttle/feeder bus projects, indicate the hours of operation, frequency of service, and rail station and employment areas served. Include a map of the project area.

Solano Community College (SCC) is seeking bus vouchers in the areas of Vallejo, Fairfield and Vacaville for 75 college students traveling to one or more of our three campus centers. This will reduce on average 150 one-way trips per day for 175 days per academic/calendar year. The average trip length for students, according to a 2012 Transportation Survey, is 16 miles one-way.

Many SCC students are dropped off by a family member or friend so that they can attend classes. One such student accounts for four one-way trips each day. We plan to target these students with this program, thus reducing on average 64 miles of travel per day.

We expect to reduce 420,000 miles of car travel in the first project year, for a total of 26,250 trips, with a total project cost effectiveness of $69,906.

To participate in the program, students would pay a transportation fee to the College of $7 (full-time student with 12 units or more) and $5 (part-time student with 11 to six units). The College will use this fee to modify our existing student identification cards or pay for a staff person to manage the dispersal of bus vouchers, or both. No special equipment is needed.

Hours of operation will reflect those of the three local transit providers, SolTrans in Vallejo, FAST in Fairfield-Suisun, and City Coach in Vacaville, which all serve SCC centers. Classes at SCC start as early as 7 a.m. and end as late as 10 p.m. It is our hope that with increased bus ridership, bus service can in the future be extended later in the evening as Fairfield, Suisun and

Vacaville bus-riding students cannot take any evening courses at this time because their bus services end before 7 p.m.

We plan to distribute 15 monthly bus passes each in Vallejo and Vacaville (total of 30) and 45 monthly bus passes in Fairfield. These numbers are proportional to the number of students from these communities attending SCC. For this pilot project, we are buying local city passes to encourage students to attend the SCC campus or center in their home community.

H. **Final Report Content and Cost Effectiveness Calculation Due:**
Estimated Date January 31, 2016

I. **Attach a completed Cost-effectiveness Worksheet and any other information used to evaluate the proposed project.**

J. Comments (if any):
Add any relevant clarifying information in this section.

PROJECT INFORMATION

A. Project Number: 14SOL03

B. Project Title: Suisun City Capitol Corridor Park and Ride Charging Station
Provide a concise, descriptive title for the project (e.g., "Elm Ave. Signal Interconnect" or "Purchase Ten Gasoline-Electric Hybrid Light-Duty Vehicles").

C. TFCA Program Manager Funds Allocated: $ 2,000

D. TFCA Regional Funds Awarded (if applicable):$_____

E. Total TFCA Funds Allocated (sum of C and D):$ 2,000

F. Total Project Cost for Electric Charging Station: $ 10,000

Matching funds provided by Suisun City Capitol Corridor Train Station Improvement Project:
Total project cost: $600,000
OBAG CMAQ - $315,000
OBAG STP - $100,000
TDA Article 3 - $ 35,000
STAF - $150,000

G. Project Description:

The project located within Suisun City on Lotz Way inside the Park & Ride Parking Lot adjacent to the Suisun City Capitol Corridor Train Station. The proposed project includes the construction of a second level 2 charging station to meet the current demand.

The population served by this station is Solano County residents and those traveling along Highway 12 that are in need of a charging station. The Park & Ride Lot where the EV station is located is at least 80% full on weekdays. The existing EV charging station is used daily. Upgrading the EV station will allow the station to serve an even greater population.

H. Final Report Content: Light Duty and Light Heavy - Duty Vehicles or Infrastructure Cost Effectiveness Worksheet and Final Report Form

I. Attach a completed Cost-effectiveness Worksheet and any other information used to evaluate the proposed project.

J. Comments (if any):

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DATE: August 19, 2013
TO: SolanoExpress Intercity Transit Consortium
FROM: Jayne Bauer, Marketing and Legislative Program Manager
RE: Legislative Update

Background:
Each year, STA staff monitors state and federal legislation that pertains directly to transportation and related issues. On March 13, 2013, the STA Board approved its amended 2013 Legislative Priorities and Platform to provide policy guidance on transportation legislation and the STA's legislative activities during 2013. Monthly legislative updates have been provided by STA's State and Federal lobbyists for your information (Attachments A and B). A Legislative Bill Matrix listing state bills of interest is available at http://www.sta.ca.gov/Content/10051/LegislativeAdvocacy.html. A Federal Funding Matrix is included as Attachment C.

Discussion:

State
Senate Bill (SB) 556 (Corbett) would require public agencies, including public transit systems, to "label" employees and vehicles which are independent contractors or operated by independent contractors with a "NOT A GOVERNMENT EMPLOYEE" or "THE OPERATOR OF THIS VEHICLE IS NOT A GOVERNMENT EMPLOYEE" disclosure.

The Solano transit operators requested that STA take the position adopted by the California Transit Association. STA Board Chair Hardy submitted letters to STA's Assembly delegation (Attachment D) urging them to oppose this bill unless it is amended to exempt public transportation providers. SB 556 is scheduled to be heard on the Assembly floor on August 19th. An update will be provided at the meeting. Staff recommends that the STA Board take an official position of "oppose unless amended" for SB 556.

Federal
STA held meetings June 18-20th in Washington DC with Solano County's federal legislative representatives and with key federal agency staff. The strategy focused on the following as they align with STA's Federal legislative priorities (Attachment E):

1. Monitor the Department of Transportation's (DOT) Implementation of Moving Ahead for Progress in the 21st Century (MAP-21) and Comment on Proposed Regulations and Policies, including Buy America
2. Identify and Advocate for Grant Opportunities
3. Reauthorization of MAP-21
4. Support of Solano County Transportation Investment Generating Economic Recovery (TIGER) 2013 Grant Program project priority.

Meetings were held with the following:

Senator Dianne Feinstein staff
Senator Barbara Boxer staff
Congressman John Garamendi
Congressman Mike Thompson staff
Majority Staff, House Committee on Transportation and Infrastructure
Minority Staff, House Committee on Transportation and Infrastructure
Majority Staff, Senate Committee on Environment and Public Works (Highway program issues)
Majority Staff, Senate Committee on Banking, Housing and Urban Affairs (Transit issues)
Federal Transit Administrator, Federal Transit Administration (P3 projects)

For a more detailed summary of each meeting, refer to Attachment B.

Transit Corridor Tour
While in Washington DC, Board members and staff attended a tour of the Rosslyn/Balston transit corridor in Arlington VA. Arlington County Supervisor Mary Hynes and Arlington County Director of Transportation Dennis Leach provided an informative tour of 4 transit stations using multiples modes of transport (Metro, bus, walking). Attendees learned how the transit-oriented development was envisioned, planned and executed, including challenges and opportunities encountered. The tour provided good background information for the Board and staff to relate to Solano County as several agencies go forward in developing multiple rail stations, transit stations and park and ride lots.

TIGER 2013 Grant Funding
STA staff and STA Federal Lobbyist Susan Lent worked closely with the City of Fairfield to coordinate the application and all the required letters of support for the Fairfield/Vacaville Intermodal Station project, which was submitted on June 1st for a $9M rural area set-aside. A decision is expected as soon as late August according to staff from DOT that reviews all of the TIGER applications. The project application was known and well received by all departments with which we met in Washington DC. Congressman Garamendi reached out personally to outgoing DOT Secretary LaHood verbally and in writing advocating for the project. The project garnered letters of support from every state and federal legislator representing Solano County.

Buy America
Congressman Garamendi wrote to incoming DOT Secretary Anthony Foxx expressing his support of the waiver submitted by Caltrans in order to move the I-80/I-680/SR 12 project forward (Attachment E). The Federal Highway Administration issued transitional guidance that would cover the I-80/I-680/SR 12 project. Caltrans subsequently withdrew the Buy America waiver request for the project in light of the FHWA guidance. This issue is now settled, the California Transportation Commission authorized funding for the project at its meeting of August 6, and the project is now moving forward with construction to begin in 2014.

Fiscal Impact:
None.

Recommendation:
Forward a recommendation to the TAC and STA Board to take the following position:

SB 556 – oppose unless amended to exempt public transportation providers

Attachments:

A. Shaw/Yoder/Antwih State Legislative Update
B. Akin Gump Federal Legislative Update
C. Federal Funding Matrix
D. STA Letters to Assembly Delegation re SB 556
E. Garamendi Letter to DOT Secretary Foxx re Buy America Waiver

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SHAW/YODER/ANTWIH, inc.
LEGISLATIVE ADVOCACY • ASSOCIATION MANAGEMENT

June 27, 2013

TO: Board of Directors, Solano Transportation Authority

FM: Joshua W. Shaw, Partner
Shaw / Yoder / Antwih, Inc.

RE: STATE LEGISLATIVE UPDATE – June 2013

Since our last report, major developments in Sacramento have focused on the 2013-14 State Budget, and the "second round" of policy hearings on transportation-related and other bills of interest, as reflected in our updated matrix of bills.

The period has also been notable for what was *not* accomplished, including: the legislature neither moved on creation of a new Cap and Trade investment program, nor achieved substantive movement on efforts to lower the vote threshold for local sales tax measures.

2013-14 State Budget Enacted

On June 15 the legislature sent Governor Jerry Brown a package of bills enacting the 2013-14 Budget. On June 27 he signed that package into law, declaring that this budget represents "California's most stable fiscal footing in well over a decade."

Here's a link to the final enacted budget, including a list of line-item vetoes the Governor accomplished with his "blue pencil" authority –
http://www.ebudget.ca.gov/FullBudgetSummary.pdf

Not mentioned in that summary document, but of possible interest to the Authority: with regards to a long and ongoing conversation between Caltrans and local self-help counties about the proper allocation of each party's costs for Project Initiation Documents (PIDs), on projects that connect to the state highway system, budget subcommittees in both Houses approved Caltrans's request for funding. This included an increased number of reimbursed positions which will allow the Department to better serve local agency projects. The rate for reimbursed work will only include direct overhead from the Department; it will not include indirect charges, which should reduce the costs to local agencies for reimbursed work at the Department by (potentially) 30%. While local agencies would have preferred Caltrans pay for all PID work, this reduced cost to locals can be claimed as a small victory. The Self-Help Counties Coalition has been instrumental in pushing for a victory on this issue.

Tel: 916.446.4656 Fax: 916.446.4318
1415 L Street, Suite 200
Sacramento, CA 95814

Cap and Trade Funding

The final Budget sent to the Governor includes his proposal to loan $500 million in allowance revenue from the Cap and Trade auctions to the General Fund in the budget year. Thus, there will be no investment program from Cap and Trade funding for transportation programs in the budget year. The various groups advocating for such will turn their attention to influencing the Governor's proposed 2014-15 budget.

Lowering Local Vote Thresholds for Transportation Funding Measures

Several constitutional amendments have been introduced this year that would reduce the threshold for passing local tax measures, from two-thirds to 55%. Two of those, **Senate Constitutional Amendment 4 (Liu)** and **SCA 8 (Corbett)** – both supported by the Authority – would specifically apply only to transportation tax measures. A handful of similar bills apply to various other *specific* local government programs, such as libraries or public safety, and one references *general* local government community and economic development programs.

While several of these bills have been heard in committee this year, the Senate President pro Tempore, Darrell Steinberg (D-Sacramento), announced earlier this year that the Senate wants to wait until 2014 for a vote on anything threshold-related. The pro Tem asserts that these measures all invoke aspects of Proposition 13, the ballot measure approved by California voters in 1978 requiring a two-thirds vote for tax increases, and that this year, so soon on the heels of the Proposition 30 tax increase of last year, and the recent restoration of the state's budget health, is too soon to move on these constitutional changes.

At the same time, the pro Tem notes that he wants the legislature to consider these as a package *next* year, and determine which if any should go forward, and in what form. The legislature will have until mid-summer next year to place anything on the November 2014 ballot.

Bills of Interest

1. **AB 935 (Frazier)** expands the membership of the WETA board of directors from five to seven members to include two additional appointments, one by the Senate Committee on Rules, and one by the Speaker of the Assembly. Current law requires that all of the appointed members are residents of a Bay Area county, with three appointments made by the Governor, and one each by the Senate and Assembly. The bill now requires that the Governor select each of his appointees from a list of three nominees submitted by the transportation authority in each of the three respective counties, including the Solano Transportation Authority.

   The STA board Supports the bill. However, due primarily to concerns evinced by the Governor's Office, as well as other Bay Area counties, **the author has determined to make AB 935 a two-year bill**. He will attempt to work with all parties over the summer and fall to achieve consensus on a form of the bill that he would hope to move successfully in January of 2014.

2. **SCA 4 (Liu)** & **SCA 8 (Corbett)** are constitutional amendments that would lower local vote thresholds for tax measures that support transportation programs, from two-thirds to 55%.

   The STA board Supports these bills. Each will be heard in the Senate Transportation and Housing Committee on July 9, and we will testify at the hearing on your behalf. However, as discussed above, we expect that the full Senate will *not* act on these measures this year.

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Akin Gump
STRAUSS HAUER & FELD LLP

M E M O R A N D U M

June 26, 2013

To: Solano Transportation Authority

From: Akin Gump Strauss Hauer & Feld LLP

Re: June Report

Washington, D.C. Meetings

Solano Transportation Authority board members and staff travelled to Washington, D.C. for meetings on June 18 through 20. We scheduled meetings with Department of Transportation officials, members of Congress and congressional staff to discuss STA's priorities, DOT's programs and policies and Congress' priorities so that STA can best develop a strategy for achieving its objectives.

Department of Transportation Meetings

The group met with Rebecca Higgins and Lilly Shoup, policy analysts in the Office of the Secretary, and Paul Baumer in the Office of Innovative Program Delivery**.** STA Board members and staff discussed the P3 study for the transit centers, referenced the TIGER grant application and discussed the geographic significance of Solano County as a commuter and goods movement corridor. The DOT participants discussed the possibility of seeking a TIFIA low interest loan for the transit centers if they are packaged together to total more than $50 million. They also mentioned that the private partners could consider private activity bond financing. The DOT staff was familiar with the Fairfield-Vacaville TIGER grant and spoke positively about it. They noted that CMAQ was a funding source for STA projects. They also mentioned DOT's focus on developing a national freight policy and performance measures. Finally, we discussed the Administration's Livability Initiative and the fact that EPA can provide technical assistance and that HUD may have funding available under its Choice Neighborhoods program.

We met with Federal Transit Administrator Peter Rogoff and Jaymie Blakeslee, Acting Assistant Chief Counsel for General Law. Administrator Rogoff expressed interest in the P3 study STA is undertaking. He noted that for public private partnerships to be successful the public entity must transfer real risk to the private sector. Jayme Blakeslee noted that FTA conducted a webinar on value capture on transit projects. He noted that FTA had issued a Proposed Joint Development Circular in March, but that it would be several months before FTA issues the final circular. The Circular describes eligible activities for FTA funding, the legal requirements applicable to the acquisition, use and disposition of FTA funded real property, and common crosscutting requirements.

Congressional Meetings

We met with Majority and Minority staff of the House Transportation and Infrastructure Committee. We met with Shant Boyajian, Counsel, Jim Tymon, Senior Advisor to the Chairman, Murphie Barrett, Professional Staff Member (highway issues) and Andrew Brady, Professional Staff Member (transit issues) on the Majority staff. We briefed them on STA's priorities and position on the reauthorization of MAP-21. We discussed the issue that PG&E is having with compliance with Buy America on the I-80/I-680/State Route 12 project. We also talked about the importance of discretionary funding for larger-scale projects, such as goods movement projects and transit facilities. The staff was sympathetic to the Buy America issue. They noted that the change in law was requested by Congressman Garamendi and that they had discussed the issue with the Federal Highway Administration. The staff mentioned that the Committee would begin working on a new transportation bill in the fall and had heard from others about the need for discretionary programs; however, the biggest challenge is identifying an approach for funding the transportation bill.

On the Minority staff, we met with Jim Kolb, Staff Director, and Helena Zyblikewycz, Professional Staff Member. Jim and Helena also were sympathetic about Buy America. They did raise a question about why utilities outside of California were not raising concerns. They also mentioned the challenge of identifying funding for the next transportation bill, but noted that Chairman Shuster is working closely with Ranking Member Rahall on a number of issues.

We met with Tyler Rushforth, Counsel, Senate Environment and Public Works Committee. Senator Boxer chairs the Committee which has jurisdiction over the Highway program. Tyler was sympathetic to the Buy America issue as well and we promised to keep him informed on what transpires with the I-80/680 project. We also briefed him on STA's priorities and the need for a national freight policy and discretionary funding for goods movement projects.

We also met with Homer Carlisle, Professional Staff Member (Majority), and Rachel Johnson, Professional Staff Member (Minority). We briefed them on the P3 study and discussed MAP-21 reauthorization. They were interested in how the transit providers handle coordination with human services providers. They discussed the policy in MAP-21, including performance measures. We also discussed the need for discretionary programs for transit facilities.

Finally, we met with Congressman Garamendi, Matt Nelson, Legislative Assistant, Senator Dianne Feinstein, and Tim Daley, Legislative Director, Congressman Mike Thompson.

Our meeting with Congressman Garamendi and Matt Nelson largely focused on Buy America and support for the TIGER grant. Congressman Garamendi expressed frustration that the

utilities cannot comply with Buy America when the law has been in effect for almost one year. He noted, however, that he could potentially support a waiver if it was narrowly tailored to a specific item or items that are not available in the United States. He did say that he would oppose a blanket waiver request. Congressman Garamendi also reiterated that he had called Secretary LaHood to express his support for the Fairfield-Vacaville project. Matt Nelson asked that we keep him apprised on the Buy America issue and let him know how we would like Sen. Feinstein to intervene on the issue. He also suggested that we ask Sen. Feinstein's district staff for a support letter for the TIGER project.

Our meeting with Tim Daley on Congressman Thompson's staff was general in nature and focused on the purpose for STA being in D.C. and STA's broader priorities.

Fiscal Year 2014 Appropriations

On June 25, 2013, the Senate Appropriations Subcommittee on Transportation-Housing Urban Development (THUD) unanimously approved a fiscal year 2014 appropriations bill that would make available $54.0 billion, which is $2.3 billion more than 2013. The bill includes $107.5 billion for transportation programs, $3.1 billion more than in fiscal 2013. Of the total, the bill includes $8.5 billion for transit formula grants and $1.943 billion for transit new starts program, $40.3 billion for the federal-aid highway program, $550 million for TIGER grants, which is $51 million above fiscal year 2013, and $100 million for high speed rail, which was not funded in fiscal year 2013. The Senate bill also includes $50 billion for a new competitive grant program to for bridge repairs. The full Appropriations Committee is expected to approve the bill on Thursday, June 27.

On June 19, the House THUD Appropriations Subcommittee approved a $44.1 billion fiscal year 2014 spending bill, which is $7 billion less than in fiscal year 2013 and $13.9 billion less than the President's budget request. The House bill funds transit and highway formula programs at their authorized levels, but does not fund the TIGER grant program or high speed rail. The House bill includes $1.817 billion for the transit New Starts program, which is a 2.1 percent reduction from the fiscal year 2013 post-sequester level and 8.4 percent below the budget request. The House bill does not fund the TIGER program, High Speed Rail or the bridge program. The full committee of the House will consider the fiscal year 2014 funding bill on Thursday. June 27.

Secretary of Transportation

The Senate is expected to vote to confirm Charlotte Mayor Anthony Foxx as Secretary of Transportation before the July 4 recess. The nomination has proved to be non-controversial.

At his confirmation hearing, Foxx endorsed continued federal spending on transportation infrastructure, including funding for the TIGER grant program and creation of an infrastructure bank. Foxx also supports public-private partnerships and alternative finance, but has stated that private investment cannot address all of the need for infrastructure spending.

National Freight Advisory Committee Meeting

On June 25, DOT Secretary Ray LaHood convened the first meeting of the National Freight Advisory Committee. The Advisory Committee is comprised of 47 voting members from outside the Department of Transportation, who will assist the Department in establishing a national freight strategic plan by September 2015. The plan is expected to recommend policies that will support goods movement and investments to improve the national freight system. Reflecting DOT's determination to take a multi-modal approach in designing the strategy, the membership represents various modes of transportation, policy areas, and geographic regions and includes the following California members: Randell Iwasaki, Executive Director, Contra Costa Transportation Authority; Kristin Decas, CEO & Port Director, Port of Hueneme, California; Genevieve Giuliano, Professor, Director, & Senior Associate Dean, University of Southern California Sol Price School of Public Policy; Fran Inman, Senior Vice President, Majestic Realty Company and Member, California Transportation Commission; and Bonnie Lowenthal, a California State Assembly Member, who represents the Ports of Long Beach and Los Angeles.

The meeting included two areas of focused discussion: 1) Elements of an Effective National Freight Strategic Plan; and 2) Measures of Conditions and Performance. DOT officials were interested in discussing how the individual state plans, currently under development, should be integrated with the national plan. During the discussion on performance measures, DOT officials asked the Committee Members to help identify the relevant measures, consider what data is currently available, address gaps, and rethink the current analysis.

This was an organizational meeting. DOT will establish subcommittees and working groups in the next few months and the Committee is expected to meet in the whole one more time this year with the goal of developing a draft report by May 2014.

Legislation Introduced

On June 6, Congressmen Michael G. Grimm (R-NY), James McGovern (D-MA), Peter King (R-NY), and Earl Blumenauer (D-OR), introduced *The Commuter Parity Act* (H.R. 2288). The bill would make permanent tax credit parity for drivers and public transportation commuters. Without the bill, the tax benefit for transit commuters will be cut almost in half to $125 on

January 1, 2014, when the current extension expires. Drivers would continue to receive the current $245 tax benefit. The bill has 19 cosponsors, including California House Members Mike Thompson (R), Doris Matsui (D), Zoe Lofgren (D) and Jackie Speier (R).

On June 20, House Transportation and Infrastructure Committee Ranking Member Nick Rahall (D-WV) introduced *The Strengthen and Fortify Existing Bridges (SAFE Bridges) Act* (H.R. 2428). The bill provides $2.75 billion in fiscal year 2013 and again in fiscal year 2014 for states to rehabilitate and replace their structurally deficient, functionally obsolete, and fracture-critical bridges identified in DOT's most recent Conditions and Performance Report. The bill establishes a formula that would distribute the funds based on a ratio of the total cost of a project to the total cost to rehabilitate or replace every structurally deficient and functionally obsolete bridge in the country. California would be eligible to receive up to $464 million, according to estimates. Twenty-four Democratic Members of the House T&I Committee cosponsored the bill.

On June 20, Representatives Doris Matsui (D-CA) and David Joyce (R-OH) introduced legislation (H.R. 2468) to require each state to implement a Complete Streets policy within two years that ensures all new federally-funded transportation projects accommodate the safety and convenience of all users. *The Safe Streets Act of 2013* is supported by numerous organizations including: AARP, Transportation for America, the American Society of Landscape Architects, the Safe Routes to School National Partnership, the American Planning Association, the League of American Bicyclists, and the National Association of Realtors.

On June 13, Congressmen Al Green (D-TX) and Bennie Thompson (D-MS) introduced *The Transportation for Heroes Act* (H.R. 2362). The bill would make veterans eligible for discounted fares on public transportation traveling on systems that receive Urbanized Area Formula Grants, similar to discounts currently available to seniors and the disabled.

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STA Federal Funding Matrix

Fund Source	Application Contact	Eligibility	Amount Available	Deadlines	Program Description	Proposed Submittal	Staff Contact
TIGER V Discretionary Grant*	Department of Transportation Office of Secretary - Howard Hill (202–366–0301) TIGERGrants@dot.gov	State, local government authorities, transit agencies, MPOs, others	**$473 million**	06/03/13	Projects that are eligible for TIGER Discretionary Grants include, but are not limited to: (1) Highway or bridge projects eligible under title 23, United States Code; (2) public transportation projects eligible under chapter 53 of title 49, United States Code; (3) freight rail transportation projects; and (4) passenger rail projects; and (5) marine port infrastructure investments. The FY 2013 Appropriations Act specifies that TIGER Discretionary Grants may be not less than $10 million (except in rural areas) and not greater than $200 million. No more than 25% awarded to a single State. Minimum of $120 million awarded in rural areas. Funds can be used for up to 80% of project costs; priority given to projects for which Federal funding is required to complete an overall financing package and projects can increase their competitiveness by demonstrating significant non-Federal contributions. Only available for obligation through September 30, 2014. Projects compete on the merits of the medium to long-term impacts of the projects themselves (not just job creation).	$9M Fairfield/ Vacaville Intermodal Station STA co-sponsor with Vacaville and CCJPA *(applied for $12M in TIGER III and IV – not awarded)*	Steve Hartwig
National Clean Diesel Funding Assistance Program (DERA)	Environmental Protection Agency	U.S. regional, state, local or tribal agencies/consortia or port authorities with jurisdiction over transportation or air quality; School districts, municipalities, metropolitan planning organizations (MPOs), cities and counties	**$9 million**	06/25/13	Funds awarded under this program cannot be used to fund emissions reductions mandated under Federal law. Equipment used for testing emissions or for fueling infrastructure is not eligible for funding. Buses, medium or heavy duty trucks, marine engines and locomotives may qualify for funding. Non-road engines or vehicles used in construction, cargo handling (including at a port or airport), agriculture, mining or energy production (including stationary generators and pumps) also qualify. Grant funds may be used for clean diesel projects that use: • Retrofit technologies that are verified or certified by either EPA or CARB • Idle-reduction technologies that are EPA verified • Aerodynamic technologies and low rolling resistance tires that are EPA verified • Early replacement and repower with certified engine configurations (incremental costs only)		

Fund Source	Application Contact	Eligibility	Amount Available	Deadlines	Program Description	Proposed Submittal	Staff Contact
Building Blocks for Sustainable Communities	EPA - Kevin Nelson(nelson.kevin@epa.gov, 202-566-2835).	Local, county, or tribal government	N/A	Requests for Letters of Interest expected Fall 2013	This technical assistance will help selected local and/or tribal governments to implement development approaches that protect the environment, improve public health, create jobs, expand economic opportunity, and improve overall quality of life. The purpose of delivering these tools is to stimulate a discussion about growth and development, strengthen local capacity to implement sustainable communities approaches, and provide ideas on how to change local policies and procedures to make communities more economically and environmentally sustainable. Assistance will be provided through presentations, meetings with community stakeholders, and/or activities that strive to relay to participants the impacts of the community's development policies. Communities select from 10 tools: (1): Walking Audits Tool; (2) Parking Audits; (3) Sustainable Design and Development; (4) Smart Growth Zoning Codes for Small Cities and Rural Areas; (5) Green Building Toolkit; (6) Using Smart Growth to Produce Fiscal and Economic Health; (7) Complete Streets; (8) Preferred Growth Areas; (9) Creating a Green Streets Strategy; and (10) Linking Water Quality and Land Use.		
Economic Development Assistance Programs - Public Works and Economic Development Facilities Program	Department of Commerce Economic Development Administration	District Organizations; Indian Tribe or a consortiums; State, city, or other political subdivision of a State, including a special purpose unit of a State or local government engaged in economic or infrastructure development activities, or a consortium of political subdivisions; consortiums of or institutions of higher education; or public or private non-profit organizations or associations	**FY2013: $111 million (30 percent for cycle 1; 70 percent for cycles 2, 3 and 4)**	December 13, 2012 for funding cycle 2 of FY 2013; March 13, 2013 for funding cycle 3 of FY 2013; June 13, 2013 for funding cycle 4 of FY 2013 ; and September 13, 2013 for funding cycle 1 of FY 2014	Supports the construction or rehabilitation of essential public infrastructure and facilities to help communities and regions leverage their resources and strengths to create new and better jobs, drive innovation, become centers of competition in the global economy, and ensure resilient economies. Applicants are responsible for demonstrating to EDA the nature and level of economic distress in the region impacted by the proposed project. Applicants are also responsible for defining the region that the project will assist and must provide supporting statistics and other information, as appropriate. To be eligible under this FFO, a project must be located in a region that, on the date EDA receives the application for investment assistance, meets one (or more) of the following economic distress criteria: (i) an unemployment rate that is, for the most recent 24-month period for which data are available, at least one percentage point greater than the national average unemployment rate; (ii) per capita income that is, for the most recent period for which data are available, 80 percent or less of the national average per capita income; or (iii) a "Special Need."		

Fund Source	Application Contact	Eligibility	Amount Available	Deadlines	Program Description	Proposed Submittal	Staff Contact
Innovative Transit Workforce Development Program	Betty Jackson, FTA Office of Research and Innovation (202) 366–1730 Betty.Jackson@dot.gov	Public transit agencies; state departments of transportation (DOTs) providing public transportation services; and Indian tribes, non-profit institutions and institutions of higher education or a consortium of eligible applicants.	$5 million Authorized under MAP-21	TBD	Funding will be provided to transit agencies and other entities with innovative solutions to pressing workforce development issues. Proposals should target one or more the following areas in the lifecycle of the transit workforce: (1) Pre-employment training/preparation; (2) Recruitment and hiring; (3) Incumbent worker training and retention; and (4) Succession planning/phased retirement. Props pal minimum $100,000 and maximum $1,000,000.		
Ferry Boat Discretionary (FBD) Program		Vehicular Ferries, serving public roads, not on the Interstate system or Passenger Ferries on a fixed roust transit ferry eligible under 49 USC 53 that serve as an alternative to an eligible highway route	**$30 million authorized under MAP-21**	TBD	This is a new transit discretionary grant program authorized under MAP-21. $30 million per year is set-aside from the Urban formula program totals to support passenger ferries. Funding will be awarded on a competitive selection basis.		
Smart Growth Implementation Assistance (SGIA) Program	EPA – Abby Hall (hall.abby@epa.gov, 202-566-2086)	Open to state, local, regional, and tribal governments (and non-profits that have partnered with a governmental entity)	**$75,000 per recipient in contractor support**	03/01/2013	The program provides technical assistance to help communities grow in ways that improve the local economy, the environment, and people's health. The program aims to help applicants develop solutions to local challenges, such as managing stormwater, increasing transit-oriented development, and adapting to climate change, and to share those solutions with other communities. EPA sought applications in the following four categories: 1) Community Resilience to Disasters and Climate Change; 2) Redevelopment for Job Creation; 3) Manufactured and Modular Homes in Sustainable Neighborhood Design ; and 4) Medical and Social Service Facilities Siting.		

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Solano Transportation Authority
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SOLANO TRANSPORTATION AUTHORITY

Member Agencies:
Benicia ♦ Dixon ♦ Fairfield ♦ Rio Vista ♦ Suisun City ♦ Vacaville ♦ Vallejo ♦ Solano County

One Harbor Center, Suite 130, Suisun City, CA 94585-2473 ♦ Telephone (707) 424-6075 / Facsimile (707) 424-6074
Email: staplan@sta-snci.com ♦ Website: sta.ca.gov

July 25, 2013

The Honorable Susan Bonilla
California State Assembly, 14th District
P.O. Box 942849
Sacramento, CA 95814

Re: SB 556 (Corbett) Agency: ostensible: nongovernmental entities
OPPOSE UNLESS AMENDED

Dear Assemblymember Bonilla,

On behalf of the Solano Transportation Authority, I would like to inform you that STA has taken an **OPPOSE UNLESS AMENDED** position on **SB 556 (Corbett)**. SB 556 would prohibit contractors that perform labor or services for a public entity, such as a transit agency, from displaying a seal, emblem, insignia, trade, brand name, or any other term, symbol, or content on a vehicle or uniform that could be interpreted as implying that the labor or services are being provided by employees of the public agency, unless specific disclosure requirements are followed. **We must oppose this bill unless transit systems are exempted from these provisions.**

Transit systems throughout the state utilize independent, outside contractors to provide transit services, such as drivers/operators for buses and rail vehicles. This bill would place a financial burden on both transit systems and the independent contractors in order to meet the disclosure requirement in the bill. Furthermore, the bill would potentially have a detrimental impact to public perception – both internally and externally – for public transit. Transit systems strive to provide a sense of inclusiveness with all employees, and the "nongovernmental employee" disclosure may inadvertently affect morale among employees by creating a sense of division. Secondly, the disclosure requirement would likely cause confusion to the public – transit patrons may perceive that operators and vehicles with the "nongovernment employee" disclosure could somehow reflect lesser qualifications or impact public safety.

Transit systems strive to provide safe, reliable, and quality service to Californians – it is important that transit employees and transit patrons continue to rely on transit as an efficient, affordable, and comfortable way to travel every day, without confusion or potential negative perception on who is providing the service. As a result, we request you to **OPPOSE SB 556 (Corbett), unless amended to exempt transit systems.**

Thank you for your consideration.

Sincerely,

Steve Hardy
Board Chair, STA
Mayor, City of Vacaville

cc: STA Board Members
Daryl K. Halls, STA Executive Director

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July 25, 2013

The Honorable Jim Frazier
California State Assembly, 11th District
State Capitol, Room 3091
Sacramento, CA 95814

Re: SB 556 (Corbett) Agency: ostensible: nongovernmental entities
OPPOSE UNLESS AMENDED

Dear Assemblymember Frazier:

On behalf of the Solano Transportation Authority, I would like to inform you that STA has taken an **OPPOSE UNLESS AMENDED** position on **SB 556 (Corbett)**. SB 556 would prohibit contractors that perform labor or services for a public entity, such as a transit agency, from displaying a seal, emblem, insignia, trade, brand name, or any other term, symbol, or content on a vehicle or uniform that could be interpreted as implying that the labor or services are being provided by employees of the public agency, unless specific disclosure requirements are followed. **We must oppose this bill unless transit systems are exempted from these provisions.**

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Thank you for your consideration.

Sincerely,

Steve Hardy
Board Chair, STA
Mayor, City of Vacaville

cc: STA Board Members
Daryl K. Halls, STA Executive Director

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July 25, 2013

The Honorable Mariko Yamada
California State Assembly, 4th District
P.O. Box 942849
Sacramento, CA 95814

Re: SB 556 (Corbett) Agency: ostensible: nongovernmental entities
OPPOSE UNLESS AMENDED

Dear Assemblymember Yamada,

On behalf of the Solano Transportation Authority, I would like to inform you that STA has taken an **OPPOSE UNLESS AMENDED** position on **SB 556 (Corbett)**. SB 556 would prohibit contractors that perform labor or services for a public entity, such as a transit agency, from displaying a seal, emblem, insignia, trade, brand name, or any other term, symbol, or content on a vehicle or uniform that could be interpreted as implying that the labor or services are being provided by employees of the public agency, unless specific disclosure requirements are followed. **We must oppose this bill unless transit systems are exempted from these provisions.**

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Thank you for your consideration.

Sincerely,

Steve Hardy
Board Chair, STA
Mayor, City of Vacaville

cc: STA Board Members
Daryl K. Halls, STA Executive Director

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Email: staplan@sta-snci.com ♦ Website: sta.ca.gov

July 25, 2013

The Honorable Lois Wolk
California State Senate, 3rd District
State Capitol, Room 5114
Sacramento, CA 95814

Re: SB 556 (Corbett) Agency: ostensible: nongovernmental entities
OPPOSE UNLESS AMENDED

Dear Senator Wolk:

On behalf of the Solano Transportation Authority, I would like to inform you that STA has taken an **OPPOSE UNLESS AMENDED** position on **SB 556 (Corbett)**. SB 556 would prohibit contractors that perform labor or services for a public entity, such as a transit agency, from displaying a seal, emblem, insignia, trade, brand name, or any other term, symbol, or content on a vehicle or uniform that could be interpreted as implying that the labor or services are being provided by employees of the public agency, unless specific disclosure requirements are followed. **We must oppose this bill unless transit systems are exempted from these provisions.**

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Transit systems strive to provide safe, reliable, and quality service to Californians – it is important that transit employees and transit patrons continue to rely on transit as an efficient, affordable, and comfortable way to travel every day, without confusion or potential negative perception on who is providing the service. As a result, we request you to **OPPOSE SB 556 (Corbett), unless amended to exempt transit systems.**

Thank you for your consideration.

Sincerely,

Steve Hardy
Board Chair, STA
Mayor, City of Vacaville

cc: STA Board Members
Daryl K. Halls, STA Executive Director

JOHN GARAMENDI
3RD DISTRICT, CALIFORNIA

ARMED SERVICES COMMITTEE
STRATEGIC FORCES SUBCOMMITTEE
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

TRANSPORTATION AND INFRASTRUCTURE COMMITTEE
RANKING MEMBER
COAST GUARD AND MARITIME TRANSPORTATION SUBCOMMITTEE
WATER RESOURCES AND ENVIRONMENT SUBCOMMITTEE

AGRICULTURE COMMITTEE
GENERAL FARM COMMODITIES AND RISK MANAGEMENT SUBCOMMITTEE

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June 28, 2013

The Honorable Anthony Foxx
Secretary
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Dear Secretary Foxx:

I congratulate you on your unanimous confirmation by the Senate as the 17th Secretary of the U.S. Department of Transportation.

I would like to express my support for the requested waiver the California Department of Transportation (Caltrans) has submitted to the Federal Highway Administration regarding the provisions of the Buy America standards implemented by The Moving Ahead for Progress in the 21st Century Act of 2012 (MAP-21) law. This specific waiver pertains to the Pacific Gas and Electric (PG&E) transfer of utility natural gas service facilities in order to accommodate the Caltrans project referred to as the "Cordelia I-80/I-680/State Route (SR) 12 Project" in Solano County, California.

Although I wholly support the enforcement of the Buy America standards in order to benefit American workers and businesses, I acknowledge that this specific Caltrans waiver application regarding the Cordelia Project provides a complete justification as to why compliance with the law is not possible in this instance; notably for those materials not available domestically or those with significant lead times.

I thank you for your support on this matter.

Sincerely,

JOHN GARAMENDI
Member of Congress, CA-3

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DATE: August 16, 2013
TO: Solano Express Intercity Transit Consortium
FROM: Sofia Recalde, Associate Planner
RE: Mobility Management Plan Update

Background:
Since July 2012, STA has been working with consultants, the Solano Transit Operators, and the Senior and People with Disabilities Advisory Committee to develop a Mobility Management Plan for Solano County. The development of a Mobility Management Plan was identified in the 2011 Solano Transportation Study for Seniors and People with Disabilities as a priority strategy to assist seniors, people with disabilities, low income and transit dependent individuals with their transportation needs. The Solano Mobility Management Plan is gathering information about existing services and programs, exploring potential partnerships, and analyzing how to address mobility needs in Solano County in a cost effective manner.

The Solano Mobility Management Plan proposes to focus on four key elements that were also identified as strategies in the Solano Transportation Study for Seniors and People with Disabilities:

1. Countywide In-Person American Disability Act (ADA) Eligibility and Certification Program
2. Travel Training
3. Older Driver Safety Information
4. One Stop Transportation Call Center

Discussion:
Countywide In-Person ADA Eligibility Program Update
The new Countywide In-Person ADA Eligibility program started July 1, 2013. The following is a summary of the first month of activity.

Appointment Volume: The Call Center started accepting phone calls to schedule appointments on June 15. Between June 15 and July 31, the Call Center scheduled 241 appointments, 127 of which were scheduled for the month of July. On average the Call Center scheduled 7 appointments per day with a minimum of 3 appointments and a maximum of 17 appointments in one day.

New versus re-certification: Of the 127 appointments scheduled, 107 (81%) applicants appeared for their in-person assessment. Sixty-six percent were new applicants and 34% were applicants seeking recertification. This 19% cancellation and no-show rate is consistent with national standards for in-person ADA certification assessments.

Eligibility determinations: Nearly 80% of applicants were given unrestricted eligibility. The remaining applicants were given restricted eligibility, and 2 applicants were denied ADA paratransit eligibility.

Type of Disability: Many of the applicants who completed the in-person assessment presented with more than one type of disability. Nonetheless, the most common type of disability reported was a physical disability (59%) followed by a cognitive disability (19%) and visual disability (17%). This pattern was true in every service area, except Vacaville, where a visual disability was the second most commonly reported disability. An auditory disability was the least commonly reported disability.

Time to scheduled assessment: On average, the time between an applicant call to schedule an in-person assessment and the date of their assessment is approximately 2-3 weeks. Some clients have received appointments within 7 days of their phone call and most receive an appointment within 3 weeks of their phone call. However a few clients have waited 3-4 weeks for a scheduled appointment. As a result, CARE has added more assessment dates to the FAST and SolTrans service area in order to reduce the waiting time. The goal is for clients to receive an appointment within 2-3 weeks of their phone call.

Time to receipt of eligibility determination letter: On average, the time between the applicant's assessment and the receipt of the eligibility determination letter was 16 days. The ADA requirements is 21 days.

Impact on paratransit: As part of the new countywide in-person assessment program, applicants are provided a complimentary trip on paratransit for the applicant and the applicant's Personal Care Attendant (PCA) upon request. Nearly half of the applicants provided their own transportation to the assessment site in July.

Please see attachment A for a graphical representation of the first month's activity, including countywide and individual operator comparisons.

Countywide Travel Training

In June 2013, the Consortium reviewed and approved a scope of work for Travel Training. This item is being brought back to the Consortium as an additional task that is proposed to be added (Attachment B). The added task is to address the need for specialized travel training for people with physical disabilities similar to, but different than, the more intensive travel training for people with cognitive disabilities. In addition, there has been some editing for administrative and clarification purposes.

Mobility Management Website

During the development of the Mobility Management Plan, there has been a strong interest expressed by the stakeholders to be able to access and share information about a wide range of transportation services delivered by not only transit operators, but also from non-profits, social services, private entities, and others. A Mobility Management website had been identified as the forum to share this type of information. Given the high interest in having this information available as soon as possible as well as the current availability of grant funding to pursue this project, the STA has developed a scope of work (Attachment C) as the first step to develop a Mobility Management website.

A preliminary draft scope of work for the Mobility Management website was distributed to the transit operators for review and comment. A meeting was held mid-August to discuss the scope and related issues. The comments received have been incorporated into the revised scope of work attached. In addition, a further revision has been made which was to add a task that the selected consultant would present the website to the Paratransit Coordinating Committee (PCC) and Senior and People with Disabilities committee(s). At this time, the scope of work is being presented to the Consortium for review and recommendation to the STA Board for approval.

The Website Request for Proposal (RFP) will need to be reviewed by Caltrans. Upon approval of the scope by the STA Board and the RFP by Caltrans, the RFP will be released by STA. With an early Fall RFP release and a consultant secured, an initial Mobility Management website is targeted for creation by the end of 2013.

Fiscal Impact:

Travel training: In June 2012, the STA Board approved $289,343 in Regional Paratransit State Transit Assistance funds (STAF) for Mobility Management Program Implementation. In addition, New Freedom and Jobs Access Reverse Commute (JARC) grants have been secured for the implementation of Mobility Management programs, including travel training, and a One Bay Area Grant (OBAG) was also secured for a countywide travel training program. These four fund sources will cover the costs associated with the establishment and implementation of a two-year County Travel Training Program.

In July 2013, the STA Board authorized the Executive Director to issue a Request for Proposal (RFP) and enter into an agreement for Travel Training Consultant Services for an amount not-to-exceed $130,000.

Mobility Management Website: STAF, JARC and New Freedom funds will cover the costs associated with the development and maintenance of a Mobility Management Website.

Recommendation:

Forward a recommendation to the TAC and STA Board to:

1. Approve the revised Scope of Work for Countywide Travel Training as specified in Attachment B;
2. Approve the Scope of Work for the development of a Mobility Management Website as specified in Attachment C; and
3. Authorize the Executive Director to issue a Request for Proposal (RFP) and enter into an agreement for Mobility Management Website Development Services.

Attachment:

A. Countywide In-Person ADA Eligibility: First month progress report
B. Revised DRAFT Scope of Work for Countywide Travel Training
C. DRAFT Scope of Work for Mobility Management Website

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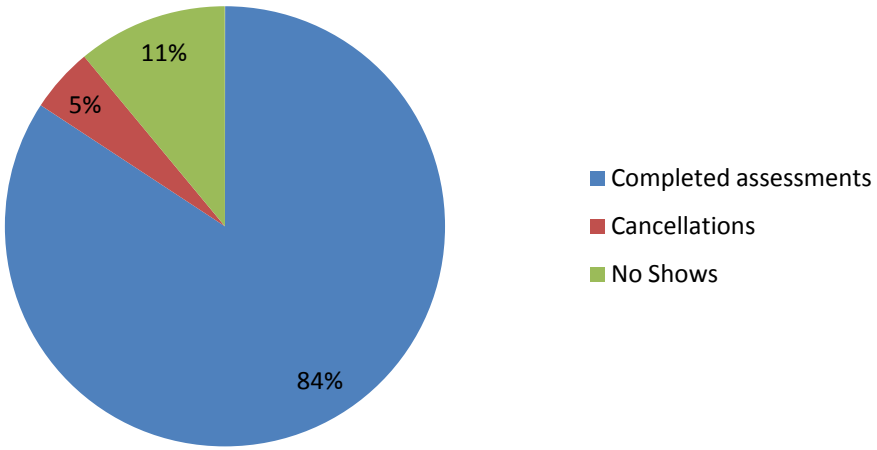
Countywide In-Person ADA Eligibility Program
First Month Progress Report

Countywide Applicant Volume and Productivity



Applicant Volume and Productivity by Location

	Countywide	Dixon Readi-Ride	FAST	Rio Vista Delta Breeze	SolTrans	Vacaville City Coach
Completed	**107**	1	39	1	32	34
Cancelations	**6**	0	1	0	3	2
No-Shows	**14**	0	8	0	6	0
Incompletion Rate	***16%***	*0%*	*19%*	*0%*	*22%*	*6%*

Of the 127 scheduled appointments, 107 (84%) of the applicants appeared for their in-person assessment. Fourteen (11%) applicants were no shows, and six (5%) were cancellations.

Eligibility Results by Service Area

	Countywide	Dixon Readi-Ride	FAST	Rio Vista Delta Breeze	SolTrans	Vacaville City Coach
Unrestricted	**85**	1	31 (79%)	1	25 (78%)	27 (79%)
Conditional	**2**	0	0	0	0	2
Trip-by-trip	**8**	0	1	0	3	4
Temporary	**10**	0	6	0	3	1
Denied	**2**	0	1	0	1	0

Of the 107 assessments that took place in the month of July, 85 (79%) were given unrestricted eligibility, 2 (2%) were denied, 8 (7%) were given tri-by-trip eligibility, 2 (2%) were given unconditional eligibility, and 10 (9%) were given temporary eligibility.

Countywide Eligibility Results by Application Type

NEW	
Unrestricted	57 (80%)
Conditional	1 (1%)
Trip-by-trip	7 (10%)
Temporary	6 (8%)
Denied	0
TOTAL	**71**

RECERTIFICATION	
Unrestricted	28 (78%)
Conditional	1 (3%)
Trip-by-trip	1 (3%)
Temporary	4 (11%)
Denied	2 (6%)
TOTAL	**36**

Transportation to and from In-Person Assessment

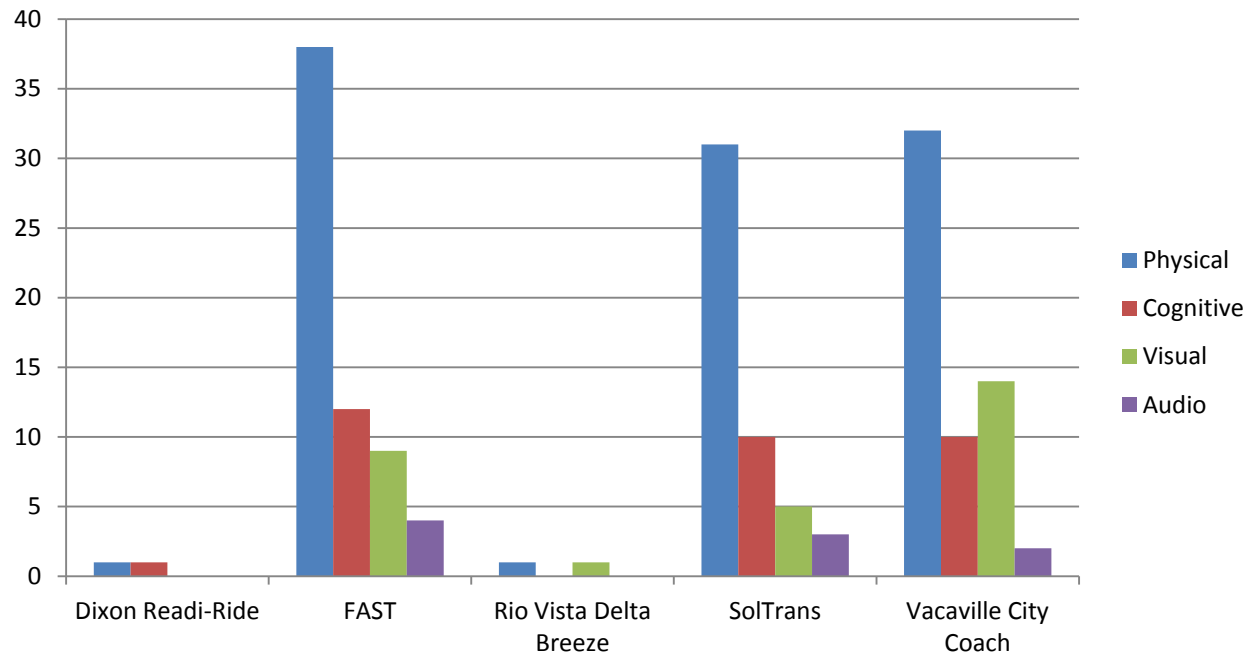
	Countywide	Dixon Readi-Ride	FAST	Rio Vista Delta Breeze	SolTrans	Vacaville City Coach
Own Transportation	**53 (49%)**	0 (0%)	19 (49%)	1 (100%)	17 (53%)	16 (47%)
Complementary Paratransit	**54**	1	20	0	15	18

Forty-seven percent of Vacaville applicants, 49% of FAST applicants, 53% of SolTrans residents, 0% of Dixon residents, and 100% of Rio Vista residents provided their own transportation to the assessment.

Disability Type Countywide and by Service Area

	Countywide	Dixon Readi-Ride	FAST	Rio Vista Delta Breeze	SolTrans N=32	Vacaville City Coach
Physical	**103**	1	38	1	31	32
Cognitive	**33**	1	12	0	10	10
Visual	**29**	0	9	1	5	14
Audio	**9**	0	4	0	3	2

Disability Type by Service Area



Many of the applicants who completed the in-person assessment presented with more than one type of disability. Nonetheless, the most common type of disability reported was a physical disability (59%) followed by a cognitive disability (19%) and visual disability (17%). This pattern was true in every service area except Vacaville where a visual disability was the second most commonly reported disability. An auditory disability was the least commonly reported disability.

Travel Training

Draft Scope of services

Task 1: Administer Travel Training/Transit Ambassador programs:

A. Dixon, Rio Vista and unincorporated area residents

- Primary target market: Travel Training for Seniors, People with Disabilities, and Low-Income
- Initiate new Travel Training/Travel Ambassador programs
- To include in-field one-one one and group in-service training, bus familiarization sessions, and presentations
- Conduct travel training directly and/or recruit volunteers
- Maximize coverage, flexibility, and resources with use of volunteers. Recruitment to be conducted in collaboration with STA, Dixon, and Rio Vista.
- Train and manage volunteers.
- Work with STA in developing policies and procedures of the program
- Coordinate with transit operators and social service agencies.
- Travel train residents for travel within above jurisdictions and to locations outside Dixon and Rio Vista which could include not only locations in Solano County bus also outside the county. Depending upon clients' needs, Travel Training may be on locally operated public transit buses, but would also include on public transit connecting to these services (such as Yolobus, FAST, South County Transit, Tri-Delta, etc.) This could also include Travel Training on intercity ADA paratransit services.
- Work with STA on the development of an outreach plan
- Produce promotional collateral
- Assist with program outreach
- Work with STA to develop a customer service evaluation system
- Track activity and compile performance data to report at least monthly to STA

B. Support SolTrans, FAST and Vacaville City Coach local Travel Training programs

SolTrans and FAST will be initiating new Travel Training programs while Vacaville City Coach has a Travel Training program in place.

- Primary target market: Travel Training for Seniors, People with Disabilities, and Low-Income
- Initiate new Travel Training/Travel Ambassador programs at SolTrans and FAST
- To include in-field one-one one and group in-service training, bus familiarization sessions, and presentations
- Work with SolTrans, FAST, and STA in developing policies and procedures of the program
- Coordinate with SolTrans and FAST and social service agencies in their areas
- Assist SolTrans and FAST recruit, train and manage volunteer Travel Trainers
- Travel Train SolTrans, FAST, and City Coach clients who desire longer distance training such as intercity and intercounty trips as referred by these entities. This could involve travel on locally operated systems, connecting transit systems, and/or travel on local public transit services operated by others (Capitol Corridor, San Francisco Bay Ferry, Napa VINE, etc.)
- Work with SolTrans, FAST, and STA on development of an outreach plan and assist with program outreach
- Travel Training/Transit Ambassador program to be consistent with Transit Training video and Transit Rider Guide
- Track activity and compile performance data to report at least monthly to SolTrans, FAST, and STA.

Task 2: Produce 3-5 transit training videos

- Length of each video: approximately 5 minutes
- Primary target markets are seniors, people with disabilities, and low-income populations
- Create scripts structured similar to existing Vacaville City Coach training video
- Shoot and edit footage to produce videos specific to SolTrans, FAST, and balance of county transit services
- Work collaboratively with STA, SolTrans, and FAST in producing videos
- Narrate videos as needed and edit audio specifically for each transit system
- Produce for on-line viewing as well as DVD distribution directly to individuals as well as for group training purposes
- Video to be consistent and complementary with Travel Training/Ambassador program and Transit Rider Guide

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Task 3: Design and print 3-5 full color Transit Rider Guides

- Size and design to be similar to Vacaville City Coach's current Rider Guide brochure
- Design to be easy to read especially for target market of seniors, people with disabilities and low-income
- Work collaboratively with STA, SolTrans, and FAST in design and printing of brochures specific to SolTrans, FAST, and balance of county
- Handle all aspects of print production
- Transit Rider Guide to be consistent and complementary with Travel Training/Ambassador program and Training Video
- Initial print-run of at least 5,000 of each brochure

Task 4: Administer intensive level Travel Training program

The intensive level of travel training would involve multiple training sessions for individuals who need a higher level of service to master riding public transit independently. The target audience may include people with cognitive disabilities or similar limitations.

- Service is to be available countywide
- This is intended to be an intensive travel training program in which multiple training sessions are likely to be needed for each client. Process to include an initial assessment of rider's abilities to determine the course of the training.
- Preparations for training and the training itself may include some, or all, of the following: trip planning, path of travel review, route and scout, modeling, role playing, shadowing, fading, bus riding and navigation skills,
- Demand for service anticipated to be small initially. Contractor needs to have ability to adjust to increase and be flexible depending upon demand for service.
- Trainers to be experienced in working with people with developmental disabilities and transit with strong interpersonal skills
- Work with STA, transit operators, schools, and social service agencies to promote Travel Training for people with developmental disabilities through the creation of an Outreach Plan
- Produce collateral materials for promotion of program.
- Program is to track activities, compile data and report to STA and transit operators on a monthly basis.

DRAFT

Task 6: Administer Specialized Travel Training countywide travel training program for people with physical disabilities

- Service is to be available countywide
- This is intended to be an intensive travel training program in which multiple training sessions are likely to be needed for each client. Process to include an initial assessment of rider's abilities to determine the course of the training.
- Preparations for training and the training itself may include some, or all, of the following: trip planning, path of travel review, route and scout, modeling, role playing, shadowing, fading, bus riding and navigation skills,
- Demand for service anticipated to be small initially. Contractor needs to have ability to adjust to increase and be flexible depending upon demand for service.
- Trainers to be experienced in working with people with physical disabilities and transit with strong interpersonal skills
- Work with STA, transit operators, schools, social service agencies to promote Travel Training for people with physical disabilities through the creation of an Outreach Plan
- Produce collateral materials for promotion of program.
- Program is to track activities, compile data and report to STA and transit operators on a monthly basis.

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Mobility Management Website
Draft Scope of Work

Task 1: Budget and Schedule

Develop detailed project budget and schedule.

Task 1.1 Kick off meeting with STA and selected consultant to review and finalize scope of work, negotiate final task budget and confirm schedule with milestones to complete website.

Task 1.2 Receive and review initial inventory of transportation services to be included on Mobility Management (MM) website

Deliverable: 1) Finalized budget and detailed project schedule

Task 2: Meet with the STA Staff and Partner Agencies

Task 2.1 Meet with the STA to review timeline for product review process and meeting schedules including any recommendations for phasing of website implementation.

Task 2.2 Based on review of transportation services inventory, identify gaps needed to be filled for inclusion on Mobility Management (MM) website

Task 2.3 As needed, meet with key partner agencies such as transit operators, County Health and Social Services, and/or other public or non-profit agencies with transportation services to be highlighted on website to discuss key content issues.

Deliverables: 1) Memorandum summarizing meeting outcomes
2) List of transportation services information gaps needed to populate website

DRAFT

Task 3: Preliminary website identity and set-up

Task 3.1 Present MM website identity options

Task 3.2 Research possible website addresses available

Task 3.2 Present possible website addresses for consideration

Task 3.3 Confirm identity and secure website address

Deliverable: Create program identity and secure website address

Task 4: Review 2-4 Mobility Management Websites

Task 4.1 Review 2-4 websites designed to deliver content similar to the proposed Solano Mobility Management website.

Task 4.2 Interview agency staff hosting website and any customer evaluations

Task 4.3 Identify and summarize strengths and weaknesses of the websites

Deliverable: Memorandum with recommendations on priority features to include in Mobility Management website

Task 5: Attend Committee Meetings

Task 5.1 Attend 1-3 committee and/or Board meetings

Task 5.2 Present website in its developmental and/or final format

Deliverable: Meeting attendance and presentation(s)

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Task 6: Prepare initial structure of website

Website design is to be user-friendly, ADA accessible and easy to navigate. Website should also be browser friendly and not unfriendly to mobile devices. Content updates and news should be easy to make by website administrator(s). The website will have various levels of search capability to accommodate the public and administrators. Include Spanish equivalent of website or include capability to translate website into at least Spanish,Tagalog, and possibly other languages. Include features for customer evaluation and input on website and transportation services highlighted on website. Include ability to track website usage for evaluation and marketing purposes.

Task 6.1 Prepare and present to STA initial structure of website incorporating recommendations from Task 4.0 and key features identified above

Task 6.2 Present to STA method to update, add and delete website content

Deliverable: Initial draft of website

Task 7: Finalize structure and content of website

Task 7.1 Based on comments on Task 6, finalize website structure and content

Task 7.2 Soft launch website and collect comments on functionality

Task 7.3 Modify website as needed based on soft launch feedback

Deliverables:
1) Final website for soft launch to STA and website partners
2) Revise website as needed based on initial feedback

Task 8: Launch MM website to public

Task 8.1 Bring website live to public

Task 8.2 Create link for website to STA and partner agencies

Task 8.3 Troubleshoot any technical problems that arise with new website

Deliverables:
1) Final website for launch to STA and public

DRAFT

Task 9: Training

Task 9.1 Train STA administrators on full customer service usage of website and how to update content

Task 9.2 Train STA administrators on how to monitor website usage, run statistical reports, post new updates, and any other administrative features

Deliverables: 1) STA staff trained.

v.3

DRAFT

DATE: August 15, 2013
TO: SolanoExpress Intercity Transit Consortium
FROM: Nancy Whelan, Transit Consultant
RE: Coordinated Short Range Transit Plan Status Update and Coordination Report

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Background:
Preparation of the Coordinated Short Range Transit Plan (SRTP) for Solano County and the I-80/I-680/I-780/State Route (SR) 12 Transit Corridor Study are being undertaken concurrently by the consulting team led by Arup. Since the start of the project in September 2012, many tasks have been completed and several deliverables have been reviewed by STA and the transit operators. The purpose of this memo is to provide an update on the status and schedule for completion of the Coordinated SRTP and to present the Draft Final Coordination Report including performance benchmarks for intercity transit services.

Discussion:
The Coordinated Short Range Transit Plan consists of the adopted SRTPs for each transit operator and a Coordination Report that addresses specific MTC requirements. The Coordination Report includes a section on service coordination and addresses MTC's requirement to "establish common performance measures". In addition to addressing this requirement in the Coordination Report, the proposed intercity transit performance benchmarks will be used in the development of the Transit Corridor Study.

Coordinated SRTP Status Update
The Coordinated Short RangeTransit Plan covers all of the Metropolitan Transportation Commission (MTC) requirements for SRTPs for each of the Solano County transit operators. The SRTPs consist of four main sections:

1. Operator Overview
2. Goals, Objectives, Measures and Standards
3. Performance Evaluation
4. Service Plan

The Draft SRTPs for each operator have been reviewed and as of this date, Final Draft SRTPs have been adopted by the City Councils of the Cities of Vacaville, Dixon, and Rio Vista and by the Board of Directors of SolTrans. The FAST SRTP will be considered by the City of Fairfield at the City Council meeting on August 20, 2013.

Coordination Report
MTC requested that the Coordinated SRTP address five specific areas of coordination:

1. Different Fare Structure and Discounts/Standard Fare Structure/Fare Reconciliation
2. Separate ADA Contractors, Eligibility and Rules/Joint Contracting/Eligibility Determination ofADA Paratransit; (to be conducted in the Mobility Management Plan, separately from the Coordinated SRTP)

3. Enhanced Transit Coordination of Capital Planning;
4. Enhanced Coordination of Transit Service Planning; and
5. Integrate bus/rail scheduling software to facilitate schedule coordination and customer travel planning. Establish a regional schedule change calendar.

These requirements were included in STA's contract with MTC to develop the Coordinated Solano County Short Range Transit Plan and were also included in the Request for Proposals for the Coordinated SRTP and in the contract with Arup for this work. The basis for these requirements is rooted in MTC's Transit Sustainability Project (TSP). The TSP was developed to address shortfalls identified in the Regional Transportation Plan and focused on three project elements: financial, service performance and institutional frameworks. The TSP resulted in MTC's adoption of Performance and Investment Policies, and Service, Paratransit, and Institutional recommendations. MTC's Resolution 4060, adopted on May 23, 2012 documents the recommendations.

There are five recommendations in Resolution 4060 providing specific guidance to the development of the Solano Coordinated County SRTP, including:

1. Integrate bus/rail scheduling software to facilitate schedule coordination and customer travel planning. Establish a regional schedule change calendar.
2. Conduct multi-agency Short-Range Transit Plans (SRTPs) at the county or subregion level to promote interagency service and capital planning.
3. Support transit agency operations on major corridors by requiring local jurisdictions to consider transit operating speeds and reliability in projects affecting these corridors.
4. Consider fare policies focused on the customer that improve regional/local connections.
5. Recommendation specific to Solano County: County-level SRTP work is underway in Solano County. MTC will provide funding to the Solano Transportation Authority (STA) to complete the analysis to better inform service planning throughout the county. STA and the Solano transit operators are to use this process to identify service improvements, performance objectives and potential service functional and institutional consolidation opportunities.

For purposes of addressing these recommendations in the Coordinated SRTP, discussion of the schedule coordination and fare coordination began at the Consortium meeting on March 26, 2013. At that meeting the Arup team presented its findings on each of these areas and options for coordinating scheduling software, establishing a common schedule change timeline, and coordinating fares through the future implementation of Clipper.

The Draft Coordination Report identified the current conditions for each of the areas studied, makes findings related to best practices, and recommends adoption of a service change calendar and suggests that several items be included in the Consortium's Annual Work Plan for further study and follow up implementation tasks. The draft Coordination Report was provided to the transit operators on May 21, 2013 and a summary of the report was presented to the Consortium on May 28, 2013. Comments on the draft report were due on June 6, 2013.

Comments were received and revisions were made to the report based on written comments received and discussions at the Consortium meetings onJune 25, 2013 and July 31, 2013. A key topic of review and discussion was the intercity performance benchmarks. The performance benchmarks are included in the Service Coordination section of the Coordination Report.

As requested at the May 28, 2013 Consortium meeting, a peer comparison of the performance metrics was performed and discussed at the June and July Consortium meetings. Based on the peer comparison and the discussion at the meetings the performance standards were re-named to performance benchmarks to better reflect the aspirational nature of the performance metrics and were adjusted to reflect peer performance for these metrics.

The revised intercity performance benchmarks are presented in the attached table, Attachment A and are shown as Table 7 in the Service Coordination report (Attachment B). The performance benchmarks will be used to inform the development of the Transit Corridor Study. The Service Coordination Report will be included in the Coordinated SRTP to be considered for adoption by the STA Board on September 11, 2013.

Fiscal Impact:

The consulting contract for the Coordinated SRTP was funded through an agreement from MTC in the amount of $140,000 in Transportation Development Act (TDA) funds and State Transit Assistance Funds (STAF) in the $240,000 was approved by the STA Board for the Coordinated SRTP and the Transit Corridor Study. The contract is near completion. Approval of the Intercity Performance Benchmarks and the Coordination Report will provide tools for monitoring and managing the fiscal performance of the intercity bus routes in Solano County.

Recommendation:

Forward a recommendation to the TAC and STA Board to approve:

1. The intercity performance benchmarks in Attachment A; and
2. The Solano County Coordinated SRTP Coordination Report shown in Attachment B.

Attachments:

A. Performance Benchmarks
B. Draft Final Coordination Report

Intercity Transit Performance Benchmarks

Service Productivity Measures	**Benchmark**
Passengers per Vehicle Revenue Hour	25.0
Passengers per Trip	15.0
Passengers per Vehicle Revenue Mile	1.0
Peak Corridor Demand (Hourly Demand / Capacity) [A]	85.0%
Capacity Utilization (Passenger Miles / Seat Miles)	35.0%
Cost Efficiency Measures	**Benchmark**
Cost per Vehicle Revenue Hour	$125.00
Cost per Vehicle Revenue Mile	$5.00
Cost per Revenue Seat Mile	$0.10
Cost Effectiveness Measures	**Benchmark**
Subsidy per Passenger Trip	$3.50
Revenue per Revenue Seat Mile	$0.04
Farebox Recovery Ratio (STA)	50%
Farebox Recovery Ratio (RM2 RC)	30%
Farebox Recovery Ratio (RM2 RAD)	20%

Solano County Transportation Authority

Solano County Short Range Transit Planning and Corridor Study

Coordination Analysis

Report Ref

Issue | July 19, 2013

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job numberJob number

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Document Verification

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Job title		Solano County Short Range Transit Planning and Corridor Study			**Job number** Job number
Document title		Coordination Analysis			**File reference**
Document ref		Report Ref			
Revision	**Date**	**Filename**	Task A9 - Coordination Analysis (2013-05-10) - FINAL.docx		
Issue	May 10, 2013	**Description**	Issue		
			Prepared by	Checked by	Approved by
		Name	Al Zahradnik	Corey Wong	Anthony Bruzzone
		Signature			
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			Prepared by	Checked by	Approved by
		Name	Al Zahradnik	Corey Wong	Anthony Bruzzone
		Signature			
		Filename			
		Description			
			Prepared by	**Checked by**	**Approved by**
		Name			
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1 Introduction

1.1 Background

In 2010 the Metropolitan Transportation Commission began the Transit Sustainability Project (TSP), a regional effort to address transit capital and operating shortfalls and to improve transit performance for the customer. In May 2012 MTC adopted Resolution 4060 which contains several policies, strategies and recommendations resulting from the TSP findings. One of the Resolution 4060 recommendations was to conduct multi-agency Short Range Transit Plans at the county or subregional level to promote interagency service and capital planning. On March 12, 2012, Solano County Transportation Authority (STA) approved a scope of work to perform a Solano County Coordinated SRTP. In addition to the customary requirements for the development of the SRTP, at MTC's request STA included the following coordination tasks in the scope of work for the Solano County Coordinated SRTP:

1. **Different Fare Structure and Discounts/Standard Fare Structure/Fare Reconciliation**

   A. Develop a standardized fare structure (may just include standard fare instruments, but could also include standard dollar amounts for each) for Solano County Transit Operators.

   B. Revise current fare policies to conform with Clipper

   C. Analyze the potential revenue impact and/or gains to Solano County operators with the implementation of a standardized fare structure.

2. **Enhanced Transit Coordination of Capital Planning**

   A. Develop and combine data for capital needs for transit operators in Solano County

   B. Data should have the same components as the individual capital planning scope of work in the SRTP

   C. Identify potential funding sources to meet capital needs

   D. Show funding need in graphs by year, type of capital, and operator

   E. Identify potential joint procurement opportunities

3. Enhanced Coordination of Transit Service Planning

A. Identify connection problems of local routes to intercity routes and other regional transportation systems such as BART, the Capital Corridor, and the Bay Area Water Emergency Transit Authority (WETA).

B. Identify changes to enhance service for intercity travel as well as intercity to local, local to intercity, and intercity to intercity/regional

C. Identify potential coordination needs as ridership increases in the future

D. Identify changes needed to align the schedule change calendar among Solano County transit operators and what scheduling software changes should be made, if any to facilitate schedule coordination and customer travel planning

MTC's Resolution 4060 also includes a specific recommendation related to bus scheduling software coordination and is the basis for coordination Task 3.D. (above):

> Integrate bus/rail Scheduling software to facilitate schedule coordination and customer travel planning. Establish a regional schedule change calendar.
>
> The Commission finds that schedule coordination between connecting agencies will increase the attractiveness of public transit but that connecting agencies make schedule changes on different dates and in some cases use incompatible scheduling software systems that make schedule integration difficult. This recommendation would align the schedule change calendar for major schedule changes among the region's operators and require all connecting operators to implement a compatible scheduling software system. Implementation would be subject to each transit agency's future scheduling system procurement timeline, and, for some agencies, may be subject to negotiation of changes to existing labor contract provisions that govern schedule change dates.

A fourth coordination task regarding ADA paratransit service coordination was recommended by MTC as well. STA is preparing a separate Mobility Management Plan that will address ADA paratransit coordination and is referenced in the Solano County SRTP.

1.2 Purpose

The purpose of this Technical Memorandum is to present an analysis of current coordination activities between the public transit operators within Solano County in accordance with the requirements of the STA for preparation of a Solano

County Coordinated Short Range Transit Plan, Task A9. Three areas of coordination are included in this analysis:

- Service Planning Coordination
- Fare Coordination
- Capital Planning Coordination

For each subject area, a description of current coordination activities is presented, followed by a discussion of coordination objectives and an analysis of how well current coordination activities are achieving those objectives, and concluding with identification of opportunities to improve coordination among the transit operators. Recognizing that a separate Mobility Management Plan is being developed by the STA to address ADA paratransit services within the County, the focus of this analysis and presentation is on fixed and flexible route public transit services and, where fixed route services are not provided, general purpose dial-a–ride (DAR) services.

2 Service Planning Coordination

The essential elements of service planning include the determination of transit routes and network, vehicles, span of service, frequency of service, and access or connection points (i.e., stops, stations and transit centers) appropriate to effectively meet the demand for transit services and efficiently utilize the resources available to deliver those services.

2.1 Current Service Coordination Activities

2.1.1 Countywide Public Transit Services Network

Within Solano County there are five public transit operators providing a combination of local and intercity fixed route transit services, general purpose local DAR services, and local and intercity flex route transit services that are available to the general public, without eligibility restrictions. The transit operators also administer taxi scrip programs for local travel by ADA qualified persons. The local service areas of these operators typically follow municipal boundaries:

- Solano County Transit (SolTrans) provides local fixed route bus and complementary ADA paratransit services within the City of Vallejo and between Vallejo and Benicia. SolTrans also provides DAR services and limited fixed route bus service within the City of Benicia.
- Fairfield and Suisun Transit (FAST) provides local fixed route bus and ADA paratransit services within and between the cities of Fairfield and Suisun.
- Vacaville City Coach (VCC) provides fixed route bus and ADA paratransit services within the City of Vacaville.
- Rio Vista Delta Breeze (RVDB) provides DAR and flex route services within and between the City of Rio Vista and the City of Isleton (in Sacramento County).
- Dixon Readi-Ride provides DAR services within the City of Dixon.

Intercity services are provided by three of the five public transit operators in Solano County. Also, the County of Solano administers a taxi scrip program for intercity travel by ADA qualified persons.

- SolTrans operates Route 76 limited weekday fixed route bus service between Vallejo, Benicia and Diablo Valley College in Pleasant Hill in Contra Costa County; Route 78 all day weekday and Saturday fixed route bus service between Vallejo, Benicia and Pleasant Hill and Walnut Creek BART stations in Contra Costa County; Route 80 all day weekday and Saturday fixed route bus service between Vallejo and the El Cerrito del Norte BART station in Contra Costa County; Route 80S Sunday only

fixed route bus service between Vallejo, Benicia and Walnut Creek BART station; and Route 85 all day weekday only fixed route bus service between Vallejo, Solano Community College, and Fairfield.

- FAST operates Route 20 all day weekday and Saturday fixed route bus service between Fairfield and Vacaville; Route 30 limited weekday and Saturday fixed route bus service between Fairfield, Vacaville, Dixon, Davis in Yolo County and Sacramento in Sacramento County; Route 40 limited weekday only fixed route bus service between Vacaville, Fairfield, Benicia and Pleasant Hill and Walnut Creek BART stations; and Route 90 all day weekday only fixed route bus service between Fairfield and El Cerrito del Norte BART station with certain trips also serving Suisun Amtrak station.
- RVDB operates Route 50 limited weekday flex route van service between Rio Vista/Isleton and Fairfield; Route 52 limited weekday flex route van service between Rio Vista/Isleton, Antioch and Pittsburg BART station in Contra Costa County; and Route 54 Wednesday only DAR service between Rio Vista/Isleton and, on alternating weeks, Fairfield, Vacaville, Antioch/Pittsburg and Lodi in Sacramento County.

All of the public transit operators along with STA and County of Solano coordinate support of intercity fixed route and DAR transit services by participating in the Solano Intercity Transit Consortium (Consortium). Four of the five Solano operators, excluding Rio Vista, along with the County and STA are parties to an Intercity Transit Funding Agreement that sets forth cost sharing and funding formulas for certain intercity fixed route services that achieve specified performance criteria. The services that are included in this funding agreement are: SolTrans Routes 78, 80 and 85; and FAST Routes 20, 30, 40 and 90. These seven routes serve the areas with highest travel demand, carry the most riders, meet the performance criteria of the Intercity Transit Funding agreement, and offer a higher level of service than the other five intercity transit services.

Figure 1 presents a map of Solano County that shows the eleven fixed and flex intercity transit routes within Solano County (Route 54 is a door-to-door service implemented in January 2013 and is excluded from further analysis in this report) and the primary locations where these intercity services currently connect with local transit services for the purpose of transferring passengers. In addition to the local and intercity transit services provided by Solano operators, a few public transit operators from neighboring counties provide regional and inter-regional transit services into Solano County: Napa Vine, Yolo Bus and Capitol Corridor/Amtrak. Private operators providing intercity transit services include Greyhound, various taxi services and corporate shuttles. These primary locations for local, intercity and regional connectivity are:

- Vallejo Intermodal Station (Transit Center and Ferry Terminal)
- Fairfield Transportation Center
- Fairfield's Solano Town Center

- Suisun Amtrak Station
- Vacaville Transportation Center
- Market Lane Park and Ride Lot, Dixon

The combination of these five local public transit systems, eleven intercity public transit routes, and six transit hubs constitutes the current countywide public transit service network that is the result of current service planning conducted individually and collectively through the coordinated efforts of the Consortium; these will be the subject of this Coordination Analysis. In FY2011-12, the total ridership of these intercity bus routes was more than 1 million passenger trips paying more than $3.7 million in fares. About 73,000 service hours were provided at a cost of $9.4 million.

Figure 1: Countywide Transit Network Map

In addition, intercity paratransit services are being offered through an MOU between the County and seven cities which provides a countywide taxi-based intercity paratransit service. The "Phase 1" intercity service currently provides paratransit trips between cities and/or the county unincorporated area to ambulatory riders (those able to enter and leave a taxicab without assistance). The Phase 1 intercity service does not cover intracity paratransit trips, which are provided by the cities under mandate by the Americans with Disabilities Act (ADA), nor does the Phase 1 service cover intercity trips for non-ambulatory riders.

Solano County, the Solano Transportation Authority, SolTrans, and the cities of Dixon, Fairfield, Rio Vista, and Vacaville are coordinating a new MOU which will transition the Phase 1 service into a new taxi-based service with accessible vans which will provide intercity trips to both ambulatory and non-ambulatory riders (those unable to enter and leave a regular taxicab without assistance). The new MOU will establish the County as lead administering agency for the Program, which will involve a contracted paratransit provider. Annual funding for the Program will come from a variety of sources, including Transportation Development Act Article 8 funds from the County and cities, New Freedom federal grant funds, and farebox returns from riders.

The MOU provides the following framework for the Program:

- The County will administer the Program and its contract;
- The other partner agencies will help fund, provide outreach, and determine appropriate farebox percentages;
- Will provide contracted taxi-style intercity service for all eligible paratransit riders;
- Creates a flexible farebox structure to balance demand for the trips within the limitations of funding;
- Establishes contingency funding to provide for unanticipated costs;
- Establishes options for agencies whose service demands outstrip their funding commitments; and
- Is termed for 2 years, but is built to be sustainable as long as there is TDA funding.

The MOU will allow the County and partner agencies to build on the success of the Intercity Taxi Scrip Program, by expanding intercity paratransit service to all paratransit eligible riders.

2.1.2 Countywide Public Transit Level of Services at Transit Hubs

The level of service consists of the span and frequency of service throughout the day and week, and in particular for this Coordination Analysis, at the six locations

of network connectivity. Besides the hours and frequencies of services at these transit hubs, another important factor affecting the connectivity of services is whether or not the transit vehicles are scheduled to meet one another. This is commonly referred to as "pulsing", especially when the meets are at regular intervals (every 30 minutes or 60 minutes, for example). Tables 1 through 6 show the levels of service of the routes serving each transit hub, including notations regarding the presence of scheduled vehicle meets and "pulsing." If no reference is made to a pulse, then that route does not have scheduled meets and does not "pulse."

Table 1: Level of Service at Vallejo Intermodal Station (effective January 2013)

Routes	Weekday Hours and Frequency	Saturday Hours and Frequency	Sunday Hours and Frequency
SolTrans Local	6:30AM – 7:00PM, 30 min peak, 60 min midday, pulse on the hour and half hour	6:30AM – 7:00PM, every 60 min, pulse on the half hour	8:30AM – 7:30PM, every 60 min
SolTrans 76	6:00AM, 1:20PM, 4:50PM – 3 trips	No service	No service
SolTrans 78	6:00AM - 8:50PM, 20 min peak, 120 min midday, meets local pulse SB, offset by 15 min at pulse NB	6:30AM – 8:15PM, every 120 min, meets local pulse SB, offset by 15 min at pulse NB	No service
SolTrans 80	4:30AM – 11:25PM, 15 min peak, 30 min midday, meets local pulse SB, meets BART NB	6:05AM – 11:25PM, every 30 min, meets local pulse SB and NB	No service
SolTrans 80S	No service	No service	8am – 8pm, 8 round trips, meets BART SB and NB
SolTrans 85	5:35AM – 10:20PM, every 60 min, meets local pulse NB	6:35am – 10:20PM, every 120 min, meets local pulse NB	No service
Vine 11	6:15AM – 8:30PM, every 60 minutes	7:45AM – 5:45PM, every 60 minutes	No service
Vine 29	5:16AM – 7:20PM, meets ferries	No service	No service
WETA Ferry	5:30AM – 8:15pm, varies between 30 min and 150 min	8:30AM – 10:00PM, every 90 minutes	8:30AM – 10:00PM, every 90 minutes
WETA 200 Bus	6:00AM – 11:30PM, 6 round trips	No service	No service

Table 2: Level of Service at Fairfield Transportation Center (effective January 2013)

Routes	Weekday Hours and Frequency	Saturday Hours and Frequency	Sunday Hours and Frequency
FAST Local	6:00AM – 7:55PM, every 30 min, pulse on the hour and half hour	9:00AM – 5:55pm, every 60 min, pulse on the hour	No service
FAST 20	6:40AM – 6:40PM, every 60 min	9:40AM – 4:40PM, every 60 min	No service
FAST 30	7 EB trips, 6 WB trips	3 round trips	No service
FAST 40	9 round trips, meets BART	No service	No service
FAST 90	4:10AM – 8:10PM, 15 min peak, 60 min off-peak, meets BART	No service	No service
RVDB 50	Up to 3 round trips + 2 shuttles from Amtrak Station	No service	No service
VINE 21 (future)	TBD	TBD	TBD

Table 3: Level of Service at Solano Town Center, Fairfield (effective January 2013)

Routes	Weekday Hours and Frequency	Saturday Hours and Frequency	Sunday Hours and Frequency
FAST Local	6:15AM – 8:05PM, every 30 minutes, pulse on the quarter hour	9:15AM – 6:05PM, every 60 min, pulse 15 min after the hour	No service
FAST 20	7:30AM – 7:20PM, every 60 min	9:30AM – 5:20PM, every 60 minutes	No service
FAST 30	4 EB trips, 3 WB trips	3 round trips	No service
SolTrans 85	6:25AM – 10:35PM, every 60 min	7:25AM – 9:35PM, every 120 min	No service

Table 4: Level of Service at Suisun Amtrak Station (effective January 2013)

Routes	Weekday Hours and Frequency	Saturday Hours and Frequency	Sunday Hours and Frequency
FAST Local 5	6:10AM – 7:45PM, every 30 min	9:10AM – 5:45PM every 60 min	No service
FAST 90	4:40AM– 7:45AM; 4:20PM-8:00PM, every 15 to 30 min, meets BART	No service	No service
RVDB 50	Up to 3 round trips + 2 shuttles to FTC	No service	No service
Capital Corridor	5:10AM – 10:45pm, every 30 to 60 minutes	6:20AM – 10:05PM, every 60 to 120 min	6:20AM – 10:05PM, every 60 to 120 min

Table 5: Level of Service at Vacaville Transportation Center (effective January 2013)

Routes	Weekday Hours and Frequency	Saturday Hours and Frequency	Sunday Hours and Frequency
VCC Local	6:00AM – 6:30PM, every 30 min, pulse on the hour and half hour	8:00AM – 6:00PM, every 30 min, pulse on the hour and half hour	No service
FAST 20	7:00AM– 7:00PM, every 60 min, meets local pulse on the hour	10:00AM – 5:00PM, every 60 min, meets local pulse on the hour	No service
FAST 30	5 round trips	3 round trips	No service
FAST 40	6 WB and 7 EB trips, meets BART	No service	No service
Yolo 220	8:52AM – 3:38PM, 3 round trips	8:52AM – 4:00PM, 3 round trips	No service

Table 6: Level of Service at Market Lane PnR Lot, Dixon (effective January 2013)

Routes	Weekday Hours and Frequency	Saturday Hours and Frequency	Sunday Hours and Frequency
Readi-Ride Local	7:00AM – 5:00PM, on-demand	9:00AM – 3:00PM, on demand	No service
FAST 30	4 EB and 2 WB trips between 7:00AM and 5:00PM	3 round trips between 9:00AM and 3:00PM	No service

2.2 Service Coordination Objectives

As previously stated, an objective of service planning is to effectively meet the demand for transit services and efficiently utilize the resources available to deliver those services. In the context of a countywide transit service planning coordination analysis, the analysis focuses on the effectiveness and efficiency of transit that serves intercity travel. Furthermore, because the analysis centers on "coordination", it focuses specifically on intercity transit services that require collaboration between operators.[1]

Several questions can be posed as objectives:

- How does Solano County's organizational structure function for collaborative intercity transit service planning?
- Does Solano County have the resources to deliver effective intercity transit services?
- Does Solano County have an effective and efficient intercity transit service network?
- Are Solano County transit operators coordinating schedules of connecting routes?
- Are Solano County transit operators addressing the regional transit coordination requirements of MTC Resolution 3866, which include SB 602 revenue sharing agreements, Clipper implementation, 511 Transit Information support, and Regional Transit Hubs Signage?

2.3 Service Coordination Analysis

2.3.1 Organizational Structure

The organizational structure for collaborative intercity transit service planning in Solano County is the SolanoExpress Intercity Transit Consortium (Consortium) which includes all Solano operators plus STA and the County of Solano.

[1] It is acknowledged that local transit service planning is addressed by the county's five local transit operators.

Established in 1997 by STA and the cities and county of Solano through an amendment to the STA's Joint Powers Agreement (JPA), the Consortium coordinates intercity services that operate within Solano County and between Solano County and Contra Costa, Napa, Yolo and Sacramento counties. The Consortium also functions as an official advisory committee to the STA Board and staff on matters pertaining to planning and implementation of intercity transit. The Consortium was established in response to SB 1474, the Bay Area Transit Coordination bill and successor to SB 602, and is considered one of the model transit coordination efforts among multiple providers throughout the Bay Area. In 2001, the STA adopted, as part of Solano's Comprehensive Transportation Plan, a Transit Element which provided a long-range transit plan that addresses the needs for future intercity transit, park and ride facilities, and ridesharing. The primary corridors for fixed route intercity services parallel Interstate Highways 80, 680 and 780. A companion study to this Coordination Analysis, I-80/I-680/I-780/SR12 Transit Corridor Study Update, an update to the study conducted in 2004, is investigating future improvements to existing intercity services and facilities.

Currently, staff of each agency meets monthly at the Consortium to discuss and address planning, marketing, operating, finance and other intercity transit service management and delivery issues. Staff report back to their respective executive management and policy boards that have authority for decisions related to their individual transit systems. As an official advisory committee to the STA Board, the Consortium works cooperatively with STA staff to ensure that the coordination efforts of the individual agencies produce results that are consistent and effective.

The effective functioning of the Consortium relies on inter-agency cooperation at all levels: staff, management, and boards. The level of cooperation is apparent in the many shared projects and programs which have originated out of the Consortium, such as bus, van and shelter purchases and intercity transit and taxi service agreements. Such cooperation is currently through consensus building and guided by the STA's JPA and a Memorandum of Understanding (MOU) between the participating agencies that describes the purpose, authority, funding and responsibilities of the Consortium. Although the MOU appears to not have been formally executed, the agencies follow its principles and the Consortium annually prepares a work plan for sustaining and improving intercity services. Formal agreements are developed when necessary to secure commitments to support the intercity transit services, such as the Intercity Transit Funding Agreement. This Agreement establishes consistent cost allocation and equitable cost sharing methodologies for intercity routes, as well as guiding principles for service planning and marketing.

The Intercity Transit Funding Working Group (ITFWG), a sub-group of the Consortium, was formed by STA to develop funding stability and equitable cost sharing for intercity services. ITFWG is currently comprised of all funding participants including the County of Solano, STA, and all Solano County transit operators, except Rio Vista. This group meets periodically to discuss funding of the seven intercity routes covered by the Agreement (while the Consortium more

generally supports these 7 routes plus the other 4 intercity routes that are not included in the funding agreement). The ITFWG has effectively shared information and coordinated between the member agencies and provides a good forum for consensus building on funding issues.

2.3.2 Administrative, Operating and Capital Resources

STA and the Consortium coordinate the administrative, operating and capital resources available for intercity transit services. Marketing and customer service for intercity transit services are provided by the transit operators and STA through the Solano-Napa Commuter Information (SNCI) program. SNCI maintains a website where the public can obtain information on intercity transit services and promotions and links to the operators' and MTC's websites. The transit operators and SNCI produce and distribute printed customer informational materials and SNCI also provides personal customer service via an 800 phone line. The three individual agencies that operate the intercity transit routes are responsible for delivering agreed upon intercity services, equipment and facilities.

For example, Vallejo Transit (the predecessor agency to SolTrans) and FAST procured the buses used on the intercity bus routes, include the intercity services in their respective operating contracts, and provide the facilities for vehicle maintenance and service administration (including customer service). The operators provide intercity route, fare and schedule information through their individual websites, printed schedules, customer service and public information centers (like 511.org) and send SNCI updates on their intercity services as needed. The Consortium and STA work together to secure needed capital and operating funding from local, regional, state and federal resources to sustain these intercity services. Through individual operator agreements STA has agreed to develop capital and operating funding plans for Routes 30, 78, and 90.

In late 2012, the STA Board approved a new Intercity Transit Funding Agreement for SolanoExpress Routes for Fiscal Year (FY) 2012-13 and 2013-14. Under the revised agreement, SolTrans, Dixon, Fairfield, Suisun City, Vacaville, and Solano County contribute to the Solano Express network and as a result, make most policy decisions on the service. The service continues to be operated by SolTrans and FAST. The agreement focuses on three principles – stability, efficiency and flexibility. Included in the agreement is a list of service design standards and direction to specify,in the Coordinated SRTP, performance benchmarks that will be used to design and then evaluate the intercity services.

To be included in this Agreement, a route must meet all five of the following criteria:

- Operates between two cities (except between Fairfield and Suisun City where local service is provided by FAST);
- Carries at least 2,000 riders per month;
- Operates at least 5 days per week;

- Has been operating for at least a year and is not scheduled for deletion within the fiscal year; and
- Maintains service that meets at least one of the performance benchmarks identified in the Coordinated SRTP (i.e., service productivity, cost efficiency, and cost effectiveness).

Intercity transit costs are shared among jurisdictions using a formula that is based on two factors: ridership by residence and population. This shared funding is for the cost of these routes after farebox and other non-local revenue are taken into account. The County's share is negotiated annually and is based on either the proportion of the County's population share, or by increasing the County's share from the previous year using the Consumer Price Index. The resulting net cost is shared among the participating jurisdictions based on 20% of their population share and 80% of ridership by residence. The subsidy amounts provided by each jurisdiction are included in the annual TDA matrix prepared by STA and submitted to MTC.

The only other source of funds that are "dedicated" to support operation of intercity (express bus) services were secured by STA from the Regional Measure 2 Regional Express Bus Program (a component of the Resolution 3434 transit expansion program) of the Metropolitan Transportation Commission (MTC). The annual renewal of the Intercity Transit Funding Agreement is critical to sustaining services.

2.3.3 Service Effectiveness and Efficiency

The three transit operators in Solano County providing intercity services employ metrics and standards to evaluate service performance in the context of each agency's internal agency goals and objectives. The Intercity Transit Funding Agreement developed by the operators and STA requires the specification of performance measures and benchmarks for the seven intercity bus routes included in the Agreement. The Transit Corridor Study is developing a set of intercity transit service performance benchmarks based on best practices and to ensure sustainability of intercity services over the long term for consideration by the Consortium and STA. An analysis and evaluation of each of the seven intercity routes using a proposed set of performance benchmarks from the Corridor Study is presented.

The table below depicts the current (FY2012-13) effectiveness and efficiency performance (a lighter color represents performance below the benchmark, while a darker represents performance exceeding the benchmark). These findings are preliminary in that the Corridor Study and its performance benchmarks are still under consideration by the Consortium and have not yet been adopted by the STA.

Table 7: Performance Evaluation of Intercity Transit Funding Agreement Routes

			FAST	FAST	FAST	SolTrans	SolTrans	SolTrans	FAST
Service Productivity Measures		**Benchmark**	**20**	**30**	**40**	**78**	**80**	**85**	**90**
Passengers per Vehicle Revenue Hour	Performance	25.0	14.1	10.8	7.1	8.5	25.5	13.1	16.2
Passengers per Trip	Performance	15.0	6.9	9.4	8.8	8.2	15.8	12.0	14.8
Passengers per Vehicle Mile	Performance	1.0	0.6	0.3	0.2	0.4	0.7	0.4	0.5
Peak Corridor Demand (Hourly Demand / Capacity)	Performance	85.0%	42%	52%	40%	42%	88%	35%	66%
Capacity Utilization (Passenger Miles / Seat Miles)	Performance	35.0%	11%	18%	15%	14%	20%	15%	27%
Cost Efficiency Measures		**Benchmark**	**20**	**30**	**40**	**78**	**80**	**85**	**90**
Cost per Vehicle Revenue Hour	Performance	$125.00	$106.68	$119.94	$103.95	$105.73	$107.06	$99.34	$116.68
Cost per Vehicle Revenue Mile	Performance	$5.00	$4.31	$3.40	$3.43	$5.39	$3.01	$3.29	$3.38
Cost per Revenue Seat Mile	Performance	$0.10	$0.08	$0.06	$0.06	$0.10	$0.06	$0.06	$0.06
Cost Effectiveness Measures		**Benchmark**	**20**	**30**	**40**	**78**	**80**	**85**	**90**
Subsidy per Passenger Trip	Performance	$3.50	$5.65	$7.31	$10.36	$9.01	$1.31	$5.48	$2.94
Revenue per Revenue Seat Mile	Performance	$0.05	$0.02	$0.02	$0.02	$0.03	$0.04	$0.02	$0.04
Farebox Recovery Ratio (STA)	Performance	50%	25%	34%	29%	28%	69%	28%	59%
Farebox Recovery Ratio (RM2 RC)	Performance	30%	N/A	34%	29%	N/A	N/A	N/A	N/A
Farebox Recovery Ratio (RM2 RAD)	Performance	20%	25%	N/A	N/A	28%	69%	28%	59%

Scale:	Performs Worse than Benchmark	Performs Just Below Benchmark	Performs Better than Benchmark

Source: FAST and SolTrans, 2013.

The evaluation indicates that Routes 80 and 90 are high performing, high productivity services. Both routes continue to experience annual ridership increases. However, the evaluation also indicates inconsistent service effectiveness and productivity in general and suggests the following:

- *Connections and ease of transfers are limited by the lack of service frequency on all routes but Route 80. This is compounded by irregular service frequencies that make timed-transfers difficult if not impossible. For example, Route 90 has a consistent 15 minute frequency in the peak hour, but the schedule varies from every 10 minutes to 19 minutes in the shoulders. This creates challenges for connections with local bus services. Route 85 has consistent frequencies (60 minutes), but while it connects with the Vallejo Ferry, coordinated schedules are not possible due to the ferry's inconsistent schedule.*
- *Either all the services need to be scheduled consistently (at a 15 or 30 minute pulse) or all the service has to operate often enough so that the transfer wait time is reasonable (every 15 minutes works for intercity services).*

This conclusion is supported by the level of service information provided in Section 2.1.2 of this Coordination Analysis that shows a lack of frequency and regularity in the scheduled services connecting at the major transit hubs throughout the County, as well as the problem of synchronizing meets (pulsing) at more than one location along a bus route. For example, both FAST Routes 30 and 40 lack uniform headways needed to effectively connect with local bus services pulses at FTC and VTC. In contrast, FAST Route 20 has uniform, hourly, headways that allow it to meet the local bus pulse at VTC. However it misses the pulse at FTC and its lack of frequency results in long wait times between buses. So, both consistency and frequency are needed to help ensure effective service coordination.

The qualitative results of the intercity bus routes performance evaluation included in the Transit Corridor Study are summarized as follows:

- *Solano County intercity bus and ferry services have captured reasonable market share in some markets even without consistent service frequencies and high quality passenger amenities.*
- *The services are also providing better amenities and facilities that contribute to faster speeds and more reliable service appears warranted.*

Both of these findings are being evaluated in the preliminary service alternative recommendations of the Transit Corridor Study to improve the performance of intercity bus routes by modifying or consolidating the existing 7 routes serving transit centers and operating more frequently and on regular headways. At the time of this Coordination Analysis, the Transit Corridor Study recommendations are being refined and discussed, but are expected to enhance service for city-to-city and county-to-county travel, including better connections with local services. The Corridor Study addresses current travel needs as well as forecast future travel. The evaluation and preliminary recommendations of the Transit Corridor Study are incorporated into this Coordination Analysis by reference.

2.4 Schedule Coordination

2.4.1 Current Practice

Table 8 shows the current scheduling practices of the four fixed route bus operators derived from the operators' responses.

Table 8: Solano Fixed Route Transit Operators' Current Scheduling Practices

	Agency			
Item	**SolTrans**	**FAST**	**VCC**	**RVDB**
Schedule Change Dates	July 1 – start of fiscal year or August – start of school year (major), as needed otherwise	Anytime	Typically in January and July	January 2 (minor), July 1 (major)
Schedule Preparation	Staff uses Excel and Contractor inputs schedules to Trapeze for run cutting	Staff with contractor collaboration	Staff with contractor collaboration	Staff with contractor collaboration
Scheduling Software	Excel, Trapeze FX	Excel	Excel	Excel
Inter-Operator Schedule Coordination	Directly with FAST and through Consortium.	With SolTrans, VCC and RVDB through Consortium.	With FAST directly and through Consortium	With SolTrans and FAST through Consortium, directly with Capitol Corridor and Greyhound

	Agency			
Item	**SolTrans**	**FAST**	**VCC**	**RVDB**
Customer Travel Planning Coordination	MTC 511,SNCI	MTC 511, Google Transit, SNCI	MTC 511, SNCI	MTC 511, Google Transit, SNCI

Based on these responses, it appears that operators typically provide each other with the printed and/or Excel files schedules of their connecting bus routes to facilitate schedule coordination at designated transfer points. When changes to local bus services are proposed, the operator initiating the change informs connecting intercity bus operators and provides the changes so the other operators can consider coordinating their intercity bus schedules with the local bus schedules.

In the opposite situation, when changes to intercity bus service are proposed, the operator initiating the change informs the Consortium and only implements changes with approval of the Consortium and, ultimately, STA. The exception to this last procedure is that operators providing intercity services that are not subject to the Intercity Transit Funding Agreement (RVDB Routes 50 and 52 and SolTrans Routes 76 and 80S) are not required to seek Consortium and STA approval. However, they do attempt to coordinate with connecting operators.

2.4.2 Scheduling Software Options

MTC requested that considerations be given to integrating bus/rail scheduling software to facilitate schedule coordination and customer travel planning. This section discusses the advantages and disadvantages of using computerized fixed route schedule systems software, such as Trapeze FX™, to integrate transit services and increase customer convenience. It is worth noting that scheduling software is typically a component of a more robust array of software designed to link service scheduling to the resources needed to provide the service (buses and drivers). The primary value of this software is its ability to determine and optimize (minimize the cost of) the number of buses and drivers needed to deliver daily fixed route service.

A secondary benefit is to provide a data base for route, stop and schedule information that can interface with other systems such as Computer Assisted Dispatch (CAD), Automatic Vehicle Location (AVL), and other information systems. These computer-based systems fall into the category of Intelligent Transportation Systems (ITS) and are subject to the region's Bay Area ITS Architecture protocol.

In regards to coordination, two objectives or benefits of scheduling software are as follows:

- **Output to Customer Service Systems** – 511 Trip Planner and other customer service systems could benefit from receiving input from the 5

operators' scheduling systems in a consistent and readily useable electronic format.

- **Output to Operator Scheduling Systems** - Schedulers could benefit from receiving electronic file input in "native format" from another operator's scheduling system when building schedules for inter-operator coordination at connecting points.

For these outcomes to happen, each operator may or may not have to own a computer based scheduling system. All of the operators develop their own schedules (in Excel) and require their contractor to use the Excel schedule files to perform bus blocking and driver run-cutting and feed on-board Automatic Vehicle Location, Automated Bus Stop Annunciation and Electronic Fare Collection systems. In the case of SolTrans, their contractor uses Trapeze FX software for these purposes. Likewise, staff provides schedules in Excel format to 511.

The options to the existing scheduling methodology would be to: (i) require contractors to provide a particular scheduling system (Trapeze FX, Giro Hastus, etc.) and have them share files to coordinate services; (ii) collectively procure and install a particular scheduling system at each agency and require staff and contractors to use it; (iii) collectively procure a particular scheduling system and create a central scheduling office that all agencies would use; or (iv) hire someone to integrate different scheduling systems outputs on the "back end" for input to each other's customer service and scheduling systems. (This is what 511 does with the disparate outputs it receives from all the region's operators.) These options are detailed in Table 9.

Table 9: Options for Inter-Operator Scheduling Coordination

Option	Scheduling Software Options	Pros	Cons
Status Quo	Continue current manual scheduling practice with each agency staff individually using Excel and sharing files and printed materials.	Uniform scheduling and import/export	Inefficient - requires each agency to manually input schedule data from one system to another Computer assisted resource optimization not comprehensively applied across all services
1	Require contractors to provide common scheduling software, developing schedules and sharing files; Staff continue using Excel for initial schedules.	Uniform scheduling and import/export Possibly more efficient file sharing	Computer assisted resource optimization not comprehensively applied across all services Could increase contract operating cost rates for some operators as contractors cover cost of new software
2	Procure common software for each operator and require all operators' staffs and	Uniform scheduling and import/export Possibly more efficient scheduling and file	Capital cost of implementing new scheduling system at each operator Possible loss of staff

Option	Scheduling Software Options	Pros	Cons
	contractors to use it and share files with others.	sharing Possible improvement in resource optimization for some operators.	productivity during learning period and added operating costs of staff to use new software Computer assisted resource optimization not comprehensively applied across all services.
3	Procure common software; Establish central scheduling office shared by all operators.	Uniform scheduling and import/export Staff efficiency of electronic scheduling and interfaces with other systems Computer assisted resource optimization comprehensively applied across all services.	Capital cost of implementing a new central scheduling system and office Possible organizational challenges and collaboration issues Possible loss of individual operator control over service schedules
4	Existing with integration of disparate data formats at back end for sharing/interface between operators and others.	Uniform scheduling and import/export Possibly more efficient file sharing	Possible increase in operating costs to cover development of and operation of data integration process Computer assisted resource optimization not comprehensively applied across all services

The following recommendations should be further discussed by the Consortium:

- Option 2 is not recommended since it would likely be costly to implement and not suited for small operators without dedicated scheduling staff. For example, SolTrans records for the purchase, installation, training and license fees for Trapeze FX indicate costs to be on the order of $50,000 initially and $15,000 annually, without including staff time.
- Options 1 and 4 could provide some benefit over the existing sharing of Excel files and should be further discussed by the operators.
- Option 3 holds the greatest possibility of providing substantial benefit to service coordination and resource optimization between operators. However, it could also require significant investment to procure and install software, and require organizational change to establish and operate an appropriately staffed central scheduling office that meets the needs of each operator individually and all operators collectively. Therefore, to address the need to be cost effective, the Consortium should consider utilizing the existing Trapeze FX software owned by SolTrans, as well as employing SolTrans staff to provide for inter-operator schedule connectivity and export of schedules to 511 on behalf of the four fixed route operators.

The total number of connections possible is small; as a result, the scale of opportunities for schedule coordination is small and the current system of coordinating Excel files seems to work well. However, if the operators and STA decide that a more formal and systematic scheduling process (perhaps in alignment with future service increases) is desired, then the most reasonable and cost-effective scenario would assign SolTrans the task of developing schedules for the connecting services of all the county operators through its existing Trapeze FX software. This scenario identifies SolTrans as providing a service to the other operators as a contractor and part of its scope-of-services would include schedule coordination across all operators. In addition, consideration should be given to utilizing the SolTrans Trapeze FX schedule interface with customer travel information systems in accordance with Bay Area ITS Architecture protocol.

In summary, the Consortium might consider continuing the system of coordinating Excel files for the next 2 or 3 years, but doing so on a regularly scheduled basis and incorporated into the Schedule Change Calendar recommended below. The need for pulse scheduling should be considered as schedule changes are being proposed. During this 2-3 year time period, SolTrans will have fully implemented Trapeze FX for its purposes, potential intercity bus service changes will be defined in the Transit Corridor Study, and further information about the need and benefit of using a common software for scheduling purposes may be available. At that point, Option 3 can be further considered for implementation.

2.4.3 Schedule Change Calendar

As requested by MTC, consideration was given to how the schedule change calendar might be aligned. The Consortium currently works together through open dialogue to discuss route changes and route change timing to ensure it is performed in a logical and as seamless impact to the public as possible. The added benefits of aligning the schedule change calendar are to facilitate synchronizing schedule changes between connecting operators to assure that there is no disruption to connectivity between services due to the offset of time between separate change dates. It appears that operators have the flexibility to choose a common schedule change date and that July 1 is currently a common date.

An argument against a common date is that it requires changes to occur only on that date which can be too inflexible for operators dealing with specific time sensitive issues. However, it appears that operators currently have the flexibility to request that changes occur on other than a single, common date. Another obstacle would be providing enough lead time to satisfy the affected operators needs to provide adequate notice to the public and to contractors and other stakeholders, including obtaining necessary approvals from policy Boards.

The following recommendations should be discussed and considered for adoption, as appropriate, by the Consortium:

- For the purpose of assuring inter-operator service connectivity,the Consortium should establish common schedule change dates of July 1 and January 1 of each year; and
- The Consortium should consider and discuss procedures to establish a common schedule change timeline, shown below in Table 10, for purposes of inter-operator schedule coordination.
- Operators may make changes to routes and schedules that do not affect established inter-operator connections (for example, minor route changes or schedule adjustments while maintaining the same scheduled time at the connection point) or that are required for budgetary purposes, at any time during the year.

Table 10: Proposed Common Schedule Change Timeline

Month / Date	Activity
February	Meet with Consortium to review potential schedule changes
March	Work with operators to coordinate schedules at key transfer points
April	Present proposed schedule changes, and conduct public process for schedule change acceptance and approval
May	Obtain approvals, finalize schedule changes, disseminate to other agencies
June	Conduct marketing and distribute public information to public
July 1	Schedule changes become effective

2.5 MTC Resolution 3866 Implementation

Resolution 3866 sets the regional coordination rules and requirements for all the region's transit operators, including all five operators in Solano County. Generally speaking, these requirements focus on four coordination activities: (i) SB 602 revenue sharing agreements; (ii) Clipper implementation; (iii) 511 Transit Information support; and (iv) Regional Transit Hubs Signage.

- **SB 602** – This requires all connecting operators to coordinate fares through interagency revenue sharing agreements. In 1997, STA acted to comply with SB 602, and successor SB 1474 legislation, by forming an Intercity Transit Consortium of the transit operators in Solano County through an amendment to the STA JPA for the purpose of coordinating services and fares. A Memorandum of Understanding among the operators was developed and subsequent agreements were enacted. A documents request of the operators has shown that some of the required agreements exist, but many do not. Fares are being coordinated informally, however, through inter-agency staff cooperation, primarily for the exchange of transfers as local fare credits. There is no revenue sharing taking place since transfers credits are reciprocal and no operators anticipate a disproportionate loss of fare revenues. However, the Intercity Transit Funding Agreement addresses the operators' sharing of financial

and administrative responsibilities for supporting intercity bus services. Fare coordination is further described in the next Section.

- **511 Transit Information** – This is the regional web-based customer information service that includes Transit Trip Planner functionality. Transit operators are required to provide 511 with up-to-date route and schedule information to support 511's Trip Planner function and to assist with the implementation of "real time" transit information. As described in Section 2.4.1, all operators are submitting to MTC 511 their routes and schedules, fares and landmarks in Excel files which meet the General Transit Feed Specification used by 511. 511 staff then apply a Quality Control check and adjusts the files as necessary to feed the 511 database. According to 511 staff, it would be preferable to receive operators' route and schedule data in Trapeze format because 511 has automated that feed into the database so it can be done quickly and more accurately than using Excel. SolTrans is the only Solano County operator that owns Trapeze scheduling software. 511 staff also noted that a few of the Solano operators do not submit schedule changes in a timely manner. In addition to the exchange of "static" transit information with 511, SolTrans, Rio Vista, VCC and FAST are working with MTC staff towards providing 511 with real time, "dynamic", fixed route transit information collected by their respective AVL systems. Section 2.4.2 identified the longer term potential of establishing a central scheduling system at SolTrans for all Solano transit operators and utilizing Trapeze FX as a cost-efficient means of coordinating schedules and improving the feed of data to 511.

- **Regional Transit Hub Signage** – This is a program to improve customer information at designated regional transit centers. Solano County has two regional transit hubs designated by MTC: Vallejo Ferry Terminal and Fairfield Transportation Center. City of Vallejo is working with MTC to install new static way-finding signage and general transit information displays and real time messaging signage at the ferry terminal and adjacent bus transit center. The work is estimated to be completed by the end of FY2012/13 at a cost of $716,000 funded by RM2 revenues. Concurrently, SolTrans is pursuing a capital project to install AVL for tracking on-time performance and sending these data to the real time signage. In June 2011, City of Fairfield completed the first phase of the FTC Hub Signage project which is the installation of the static way finding signage. The next phase of the project is the installation of active screens that will show real time information. Staff estimates that the infrastructure will be in place within a year. Prior to that, Fairfield intends to display static information on the screens as an interim measure. The signage work is estimated to be completed by the end of FY2012/13 at a cost of over $100,000 funded by RM2 revenues.

3 Fare Coordination

The essential elements of fare coordination include the fare policies, fare structures, fare media and prices that determine how fare payment affects the potential and existing transit customer. In general, it is desirable that fare payment not be an obstacle to transit use and the fare be commensurate to the value of the service customers receive. As with service planning, the focus of this analysis will be on fare coordination for intercity transit services and those particular customers.

3.1 Current Fare Coordination

There are no countywide policies regarding fares for intercity transit travel. Each operator relies on its particular agency's fare policy, staff and operating environment to establish the structure, media and pricing applied to its piece of the countywide transit network. The result is a variety of fare rules, media and prices overlaying a coordinated inter-operator transfer procedure whereby each operator accepts another operator's paper transfers for a fare credit.

Table 11 shows the fare structure, media and pricing of the five transit operators in Solano County, all of whom have a role providing direct intercity service (SolTrans, FAST, RVDB) and/or the local connecting services (SolTrans, FAST, VCC, Readi-Ride).

Table 11: Solano Transit Operators Fare Structure

	SolTrans	FAST	VCC	RVDB	Readi-Ride
Intercity Fares					
Single Zone	$5.00			$6.00 + $1.00 for deviations	
Multiple Zones		$2.75 - $6.75			
Local Fares	$1.75	$1.50	$1.50	$1.75	$2.00
Discount Fares					
Children	5 and under free	5 and under free	5 and under free	4 and under free	4 and under $1.00
Youth	6-18 $1.50 local, $4.00 zone	none	6-17 $1.25	none	5-17 $1.75
Seniors	65+ half fare	65+ half fare	62+ half fare	55+ $0.75 local, half fare zone	60+ $1.50
Disabled/Medicare	half fare	half fare	half fare	$0.75	
Pre-paid media	Local and Zone 10 ride, Day and Month passes	Local and Zone 10 ride and 31 day passes	Day, Month 20 ride and 30 ride passes	Month and 10 ride passes	20 ride coupon book
Transfers	Inter-operator only, Issued at entry or exit, 90 min WD/120 min WE expiration, local fare credit	Issued at entry or exit, 60 min expiration, $1.50 inter-operator credit	Issued at entry, 15 cent fee, 60 min. expiration, Inter-operator local fare credit	Issued at entry or exit, 60 min. expiration, Inter-operator local fare credit	none

3.2 Fare Coordination Objectives and Analysis

As stated before, it is desirable that fare payment not be an obstacle to transit use and the fare be commensurate to the value of the service customers receive. In addition, for inter-operator fare coordination, it is typical to also avoid or minimize any lost revenue that might be associated with standardizing fares, in particular when one operator has to lower or forego collecting a fare to match another operator.

For intercity travel on a single operator, the rider needs to know that particular operator's fare structure and have the proper amount of cash or a valid pre-paid pass. For intercity travel on two or more operators, the rider needs to know the fare structure of each operator, have the proper cash or passes, and request and understand the transfer rules. While the transfer rules somewhat uniformly offer a

local fare credit when transferring between local and intercity routes, riders need to be aware of discount eligibility and expiration time – especially if using more than two routes to complete their travel.

For example, a full adult cash ride between Vacaville and Vallejo could require a $1.50 local ride on VCC, transfer to FAST #20 for $1.25 ($2.75 - $1.50 local fare credit), transfer to SolTrans #85 for $3.25 ($5.00 - $1.75 local credit), and a final transfer to a SolTrans local route for an additional$1.75 charge. Under the best conditions the trip would likely take over 90 minutes to complete (at a total fare of $7.75) and, since the original transfer received on the VCC bus expires in 60 minutes and since transfers are valid only where routes intersect, the rider would need to ask for additional transfers on the FAST #20 bus. Such an example might be considered a worst case scenario, however it is more likely for travel to and from locations in the northern part of Solano County.

Table 12 shows the number of operators required for intercity travel within the County.

Table 12: Number of Transit Operators Required for Intercity Travel (excludes RVDB #54)

From/To	Vallejo	Benicia	Fairfield/ Suisun	Rio Vista	Vacaville	Dixon
Vallejo		1	1 or 2	2	2 or 3	2 or 3
Benicia	1		1 or 2	2	1, 2 or 3	1, 2 or 3
Fairfield/Suisun	1 or 2	1 or 2		1 or 2	1 or 2	1 or 2
Rio Vista	2	2	1 or 2		2 or 3	2 or 3
Vacaville	2 or 3	1, 2 or 3	1 or 2	2 or 3		1, 2 or 3
Dixon	2 or 3	1, 2 or 3	1 or 2	2 or 3	1, 2 or 3	

Table 13 shows the minimum adult (non-discounted) cash fare required for intercity travel. They assume riding only the intercity bus routes with no need for a local connecting bus ride.

Table 13: Minimum Adult Cash Fare Required for Intercity Travel (excludes RVDB #54)

From/To	Vallejo	Benicia	Fairfield/ Suisun	Rio Vista	Vacaville	Dixon
Vallejo		$5.00	$5.00	$9.25	$6.25	$7.25
Benicia	$5.00		$3.75	$8.00	$4.75	$6.75
Fairfield/Suisun	$5.00	$3.75		$6.00	$2.75	$3.75
Rio Vista	$9.25	$8.25	$6.00		$7.25	$8.25
Vacaville	$6.00	$4.75	$2.75	$7.00		$2.75
Dixon	$7.00	$6.75	$3.75	$8.00	$2.75	

Generally speaking, the pricing of inter-city transit is inconsistent across the county with relatively lower fares required for FAST use between Fairfield, Vacaville and Dixon, compared to the higher fare for comparable distance traveled on SolTrans between Vallejo and Fairfield and Vallejo and Benicia, and the highest fares on RVDB to and from Rio Vista.

It is reasonable to conclude that current fare payment procedures and pricing for inter-operator travel could be an impediment to inter-operator transit use. Fare coordination to improve and simplify inter-operator travel should be a high priority within Solano County.

3.3 Fare Standardization Examples

MTC has requested that the subject of fare standardization be addressed in Solano County. MTC considers fare standardization to possibly be a means to overcome an impediment to inter-operator transit use imposed by multiple transit operators' fare policies and structures. For purposes of discussion, and perhaps to inform the development of common business rules for the upcoming Clipper implementation in Solano and Napa counties, inter-operator fare standardization examples are presented to assess the obstacles to implementing standardized fares in Solano County.

A primary consideration in setting standard fares is to minimize impacts on transit operator ridership and revenue by finding fare values that are nearest to what the existing fares are. The key assumption in determining whether a fare change would result in a revenue gain or loss is the generally accepted low price sensitivity (price inelasticity) of transit riders to fare changes: a fare increase will increase revenue while a fare decrease will reduce revenue because the % change in ridership resulting from a change in fare is usually less than the % change in fare.

Table 11 clearly shows that there is a wide range in the existing fares of the five Solano County transit operators and there is no single fare, in each fare category, which all operators are near. So, an approach to assessing fare standardization is to create two fare standardization examples that identify the range in possible

ridership and revenue impacts. The first example chooses the highest fare value in each category, and raises all lower fare values to equal it. In this manner, no operator will suffer significant revenue loss, and some operators will gain revenue. This is particularly important to operators whose fare recovery is at the minimum levels required by TDA: 20% for fixed route and 10% for DAR. The second example chooses the lowest fare value, in each category, and lowers all higher fare values to equal it. In this manner, no operator will impose a significant fare increase, but some operators will lose revenue.

In this assessment, Dixon Readi-Ride and Rio Vista Delta Breeze fares were not considered since their fares are higher than the other operators reflecting a 100% DFR/DAR rural transit service. Only fixed route urban operator fares are included. Also, for intercity fares, a two-tier "flat" fare was considered consistent with Clipper rules for "express" and "upgrade" fare categories. Two examples were assessed:

- **Fare Example 1**–The SolTrans local fare of $1.75 is used. The SolTrans fare of $5.00 and 4 zone FAST fare of $5.75 represent "Upgrade" and "Express" fares, which would likely be revenue neutral to FAST and SolTrans. This standardized fixed route fare example is presented in Table 14.
- **Fare Example 2**–The FAST and VCC local fare of $1.50 is used. The FAST 2 zone fare of $2.75 and SolTrans intercity fare of $5.00 represent "Upgrade" and "Express" fares, which would not substantially increase current fares. This standardized fare example is presented in Table 15.

Table 14: Standard Fixed Route Fare Example 1

Highest Local Fare	SolTrans	FAST	VCC
$1.75 full cash	No change	25 cent increase	25 cent increase
$1.50 youth ages 6 - 17	No change ages 6 – 17 but 25 cent increase for age 18	No change	25 cents fare increase
$0.85 senior ages 65+	No change	10 cent increase	10 cent increase but $1.00 increase for ages 62 - 64
$0.85 disabled	No change	10 cent increase	10 cent increase
$56 monthly adult pass	No change	$6.00 increase	$20.00 increase

Highest Intercity "Express" Fare	SolTrans	FAST
$5.75 full cash	75 cents increase	No change for 4 zone trip but up to $1.00 increase for 3 zone trip and $1.00 decrease for 5 zone trip
$5.75 youth ages 6 - 17	$1.75 increase ages 6 – 17 but $3.00 increase for age 18	No change for 4 zone trip but up to $1.00 increase for 3 zone trip and $1.00 decrease for 5 zone trip
$2.75 senior ages 65+	$0.25 cent increase	No change for 4 zone trip but up to $.50 increase for 3 zone trip and $.50 decrease for 5 zone trip
$2.75 disabled	$0.25 cent increase	No change for 5 zone trip but up to $.50 increase for 3 zone trip and $.50 decrease for 5 zone trip
$130 monthly adult pass	$16.00 increase	No change for 5 zone trip but up to $20.00 increase for 3 zone trip and $20.00 decrease for 5 zone trip

Highest Intercity "Upgrade" Fare	SolTrans	FAST
$5.00 full cash	No change	$2.25 increase for 2 zone trip
$4.00 youth ages 6 - 18	No change	$1.25 increase for 2 zone trip
$2.50 senior ages 65+	No change	$0.75 increase for 2 zone trip
$2.50 disabled	No change	$0.75 increase for 2 zone trip
$114 monthly adult pass	No change	$24 increase for 2 zone trip

Note: Uses the highest common fare value to ensure that no operator suffers a significant revenue reduction.

While Example 1 protects or increases operators' fare revenue levels (VCC, SolTrans and FAST would all gain revenue in this example), this particular example of standardization would likely result in a range of 10% to 80% fare increases that may not be acceptable to many existing riders and would reduce ridership on public transit.

Table 15: Standard Fixed Route Fare Example 2

Lowest Local Fare	SolTrans	FAST	VCC
$1.50 full cash	25 cent decrease	No change	No change
$1.25 youth ages 6 - 17	5 cent decrease ages 6 – 17 but no change for age 18	25 cent decrease	No change
$0.75 senior ages 62+	10 cent decrease ages 65+ but $1.00 decrease ages 62 - 64	No change ages 65+ $0.75 decrease ages 62 - 64	No change
$0.75 disabled	10 cent decrease	No change	No change
$36 monthly adult pass	$20 decrease	$14 decrease	No change

Lowest Intercity "Express" Fare	SolTrans	FAST
$5.00 full cash	No change	$0.25 increase for 3 zone trip and $0.75 decrease for 4 zone trip and $1.75 decrease for 5 zone trip
$4.00 youth ages 6 - 18	No change	$0.75 decrease for 3 zone trip and $1.75 decrease 4 zone trip and $2.75 decrease for 5 zone trip
$2.50 senior ages 65+	No change	$0.25 increase for 3 zone trip and $0.25 decrease for 4 zone trip and $0.75 decrease for 5 zone trip
$2.50 disabled	No change	$0.25 increase for 3 zone trip and $0.25 decrease for 4 zone trip and $0.75 decrease for 5 zone trip
$114 monthly adult pass	No change	$4 increase for 3 zone trip and $16 decrease for 4 zone trip and $36 decrease for 5 zone trip

Lowest Intercity "Upgrade" Fare	SolTrans	FAST
$2.75 full cash	$2.25 decrease	No change for 2 zone trip
$2.50 youth ages 6-18	No change	25 cent decrease for 2 zone trip
$1.25 senior ages 65+	$1.25 decrease	No change for 2 zone trip
$1.25 disabled	$1.25 decrease	No change for 2 zone trip
$70 monthly adult pass	$44 decrease	No change for 2 zone trip

Note: Uses the lowest common fare value to ensure that no operator imposes a significant fare increase.

Example 2 avoids imposing large fare increases on existing riders but, in so doing, reduces fares by 10% to 50% for many passenger trips and could significantly reduce operators' fare revenue levels (FAST and SolTrans would both lose revenue in this scenario), unless an unusually large number of new riders switch to public transit. This example would jeopardize meeting TDA fare recovery standards.

Both examples demonstrate the significant challenges to achieving fare coordination by standardizing existing fare values, structures and media of multiple transit operators in Solano County.

3.4 Conclusion and Recommendation

In the upcoming year, Solano and Napa county transit operators are planning to improve fare coordination by collaborating with each other and MTC to develop business rules for the implementation of Clipper. Clipper offers a means to introduce a new fare medium to Solano residents at new prices. Clipper has the potential to improve fare coordination for intercity and inter-operator transit use, for example by providing an automatic intra and inter-operator "e-cash" transfer fare credit and a multi-operator pre-paid transit fare payment media (pass) to replace the current combination of cash, passes and paper transfers.

The Change Notice to Cubic Systems for implementation of Clipper in Solano County and Napa County contains the following language and provisions that guide the development of Clipper business rules by the operators:

> MTC proposed a simplified implementation of these remaining Bay Area agencies that do not yet accept Clipper® as fare payment. As part of the simplified implementation, MTC proposed that the remaining agencies be grouped together and that each group be implemented in the system as a single Clipper® operator, Napa Solano in this case.
>
> *2.1.1 Fare Structure*
>
> Contractor shall implement a single-tag flat fare structure for the Napa Solano Operator. A fare shall be deducted from the Clipper® E-Purse based on the route category selected by the operator. Individual transit routes of Solano County transit operators are grouped into one of the follow categories: local, upgrade, express, baylink.
>
> *2.1.2 Fare Categories*
>
> The Napa Solano implementation shall support the four existing Clipper® fare categories: Adult, Youth, Senior, and RTC. The Youth and Senior ages to be used at launch shall be provided during formal requirements capture.

2.1.3 Fare Products

Contractor shall also implement a monthly pass product for Adult, Youth, and Senior/RTC fare categories that is valid for either free travel or a fare credit on all Napa Solano routes. The passes shall have a validity period of one calendar month, and shall have a vending window and grace period to be defined during formal requirements capture.

2.1.4.1 Intra-Operator Transfer

Contractor shall create time-based, reduced fare intra-operator transfers for patrons transferring between Napa Solano Operator routes. Patrons shall be entitled to transfer credits between Napa Solano Operator routes if the first ride is paid for with E-Cash or a product. The transfers shall provide a one-time E-Cash discount to patrons taking more than one ride on Napa Solano service within a designated period of time. The discount shall be calculated at point of tagging on the second ride. The value of the discount and transfer period will depend on the route selected by the vehicle operator and shall be provided during formal requirements capture.

2.1.4.2 Inter-Operator Transfers

Contractor shall create time-based, reduced fare inter-operator transfers to Napa and Solano County Operators from the following operators:

- AC Transit
- BART
- Golden Gate Transit
- SFMTA
- WETA

The transfers shall provide a one-time E-Cash discount to patrons paying with either E-Cash or a product on the first ride and transferring to Napa and Solano County Operators from the prior operator within a designated period of time. The discount shall be calculated at point of tagging on the second ride. The value of the discount and transfer period for each transfer will depend on the route inputted by the operator and shall be provided during formal requirements capture.

Clipper implementation can be a catalyst for improving and simplifying inter-operator travel for Solano County transit riders. In particular, and consistent with the provisions of the Clipper Change Order, the following aspects of inter-operator fare coordination should be addressed by the Consortium when developing, with Napa, Clipper Business Rules and during formal requirements capture:

- Designate Clipper as the coordinated intercity fare media accepted by all operators;

- Designate “upgrade” and “express” categories for intercity routes and set Clipper fares based on the value of intercity service received, transfer convenience, distance traveled and faster speed of travel, and aspire to avoid fare revenue loss, from those existing riders who would switch to Clipper, on those operators who cannot afford to reduce their current level of fare recovery;
- Provide discounts for frequent travel using pre-paid monthly Clipper passes;
- Continue to give local fare credit for local transfers to/from intercity routes using Clipper and seek consistency in defining the transfer validity period; and
- Seek consistency in defining eligibility for age based Clipper discounts.

4 Capital Planning Coordination

4.1 Current Capital Planning to Support Intercity Transit Services

As described in Section 2.3, the primary forum for collaborative intercity transit planning in Solano County is the SolanoExpress Intercity Transit Consortium (Consortium) which includes all Solano operators plus STA and the County of Solano. The Consortium and STA work with the individual operators to secure needed capital and operating funding from local, regional, state and federal resources to sustain the intercity services. In terms of capital planning coordination, this includes developing a list of capital needs, identifying local revenues that are available to cover the associated expenses, and determining whether additional funding is required to fully fund intercity capital expenses. STA advocates on behalf of all Consortium members to request discretionary funding from other sources outside Solano County, including working directly with regional, state and federal partners.

Most recently, the operators and STA agreed to a 10-year funding plan that provides for replacement of a total of 34 motor coach buses used for intercity services. Using a formula similar to the method for sharing intercity operating costs, the Consortium members each agreed to take on a proportional share of the vehicle replacement costs. STA has requested MTC's participation in this funding plan based on Solano transit operators providing regional service within the SF/Oakland UZA and service connecting to Bay Area Rapid Transit (BART). This coordinated planning process has several benefits. Defining long term capital needs well in advance allows each participating transit operator or jurisdiction to anticipate—and if necessary set aside funding for—future contributions to shared capital investments. And, demonstrating the joint funding commitments of the multiple Consortium members also creates a more effective basis on which to request external support for a portion of local capital needs.

4.2 Objectives and Analysis of Coordinated Capital Planning

The most basic objective of coordinated capital planning is to fully identify capital needs and to make the best possible use of all sources of capital funding available to Solano County, distributing such funds equitably amongst the transit operators. As noted above, existing coordination efforts help to ensure that intercity transit services in Solano County have sufficient resources to maintain a state of good repair and also help to support advocacy efforts when external funding is deemed necessary. This approach can be extended beyond intercity capital needs to address the coordinated capital needs of transit operators for their local services. To the extent that different operators might have overlapping needs, coordination can help ensure that projects do not compete against each other for scarce discretionary resources.

To examine the current transit capital needs in Solano County in more detail, Figure 2 and Table 16below illustrate the 10-year consolidated capital program for all five transit operators, covering all modes and types of service (local fixed route, intercity fixed route, paratransit, and DAR). The graph and table show the total required capital expenses by type of project, regardless of whether full funding has been secured for each project.

In the near term, there is a major spike in capital requirements in FY2012-13through FY2015-16, due to the significant cost of constructing three major passenger facilities:

- The total cost of the new Fairfield/Vacaville Intermodal Station at Peabody Road is approximately $65million, of which about $9 million has already been expended, leaving $56 million in remaining project costs. A full funding plan for this project is currently being assembled, as described in more detail below.
- The total cost of multiple projects in and around the Fairfield Transportation Center (FTC) is about $25 million. This total includes the West Texas Gateway and FTC Utility Relocation, which together cost close to $5 million. Of this amount, approximately half of the funding has been secured. The remaining $20 million would be to construct a parking garage to expand capacity at the FTC, but no funds have been identified for this construction. Due to funding uncertainty about this portion of the FTC improvements, the parking expansion is not shown in the table and chart below.
- The total cost of a parking structure and other improvements to the Curtola Park-and-Ride facility is $10 million. SolTrans is currently developing a funding plan for this project.

STA will be working with local agencies to fully allocate all RM2 funds during the next year. The funding strategy for the Intermodal Station includes transfer of nearly all unallocated RM2 funding from the Fairfield Transportation Center as well as future phases of the Vacaville Transit Center. A $9 million TIGER 2013 grant is being sought from the Federal Department of Transportation to fill the gap remaining after those transfers. After the transfers, the only committed RM2 funding remaining for the FTC projects will be $250,000, which will be used to prepare a scoping document for a design-build construction plan for the parking expansion..

Beyond these three major facilities projects, the sum total of all other capital expenses in the County through FY2017-18 is less than $32 million, of which nearly $14 million are for local fleet vehicle replacement and rehabilitation. More than $28 million of these expenses are anticipated to be funded through committed sources or available reserves. The remaining $3.4 million will be requested from federal discretionary sources.

Beginning in FY2018-19, the bulk of the required capital expenses are for the intercity bus replacements, with a particularly large contribution required in

FY2018-19. The total expense to replace 34 vehicles is over $29 million, with almost $25 million coming due within the next ten years. The Consortium membershave agreed to a preliminary funding plan which is currently being reviewed by MTC.

Figure 2: Consolidated Capital Needs by Project Type

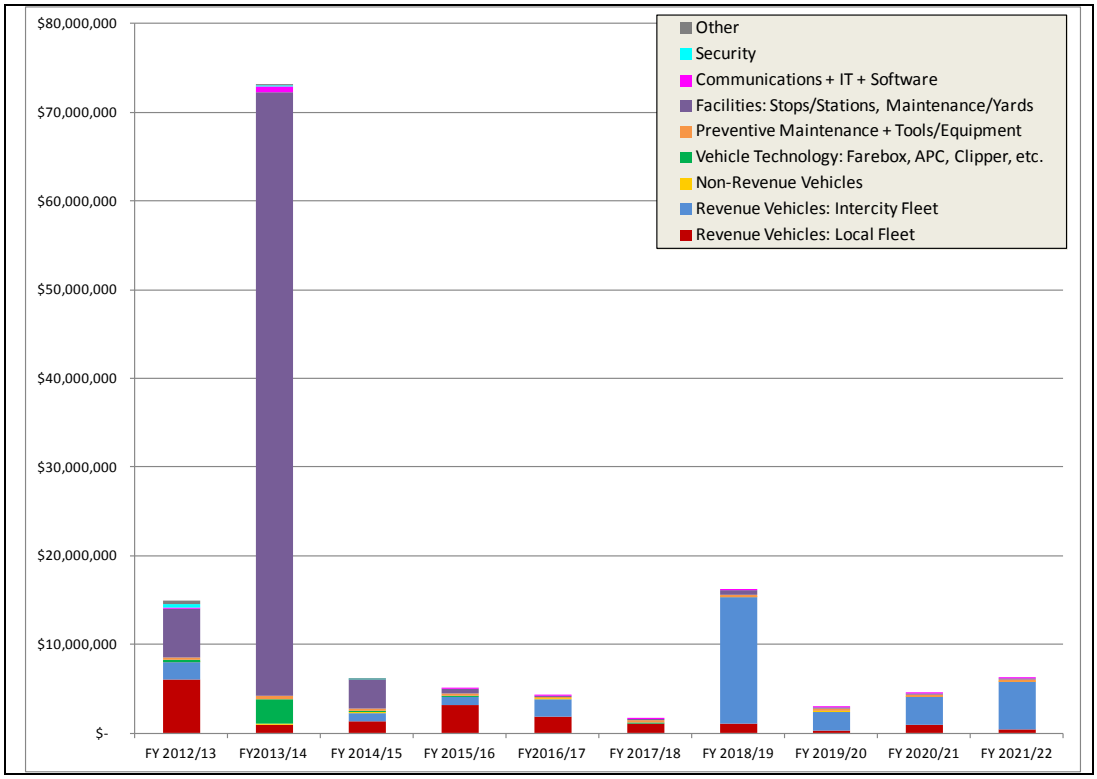

Table 16: Ten-Year Consolidated Capital Plan by Project Type

Detail by Project Type and Funding Source
Prepared on 10-Jul-2013

		Budget	*Forecast*								
		FY 2012/13	FY2013/14	FY 2014/15	FY 2015/16	FY2016/17	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21	FY 2021/22
Capital Expenses By Project Type											
Revenue Vehicles: Local Fleet		$ 6,027,276	$ 874,800	$ 1,272,680	$ 3,109,018	$ 1,890,541	$ 1,041,262	$ 1,005,869	$ 323,473	$ 866,570	$ 351,498
Revenue Vehicles: Intercity Fleet	[1]	$ 1,900,000	$ -	$ 931,730	$ 980,556	$ 1,961,112	$ -	$ 14,282,389	$ 2,081,148	$ 3,184,157	$ 5,413,066
Non-Revenue Vehicles		$ 68,000	$ 150,000	$ 130,000	$ -	$ 35,000	$ -	$ 35,000	$ 132,434	$ 34,461	$ 17,000
Vehicle Technology: Farebox, APC, Clipper, etc	[2]	$ 308,750	$ 2,839,529	$ 135,562	$ 155,562	$ -	$ 175,000	$ -	$ -	$ -	$ -
Preventive Maintenance + Tools/Equipment		$ 273,465	$ 300,000	$ 227,500	$ 230,100	$ 232,700	$ 235,400	$ 238,200	$ 241,000	$ 243,900	$ 246,900
Facilities: Stops/Stations, Maintenance/Yards	[3]	$ 5,425,000	$ 68,132,000	$ 3,311,000	$ 546,000	$ 86,000	$ 86,000	$ 525,000	$ 95,000	$ 85,000	$ 85,000
Communications + IT + Software		$ 171,000	$ 555,000	$ -	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000
Security		$ 406,686	$ 159,700	$ 20,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Other	[4]	$ 290,000	$ 56,250	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL CAPITAL EXPENSES		**$ 14,870,177**	**$ 73,067,279**	**$ 6,078,472**	**$ 5,041,236**	**$ 4,225,353**	**$ 1,557,662**	**$ 16,106,458**	**$ 2,893,056**	**$ 4,434,088**	**$ 6,133,464**

***** NOTE: Operators' contributions for intercity fleet replacements (i.e. TDA cross-claim) removed from line items above, to avoid double-counting these transfers on charts.***

[1] As shown in STA letter to MTC (March 5, 2013) regarding plans to fund replacement of Intercity Solano Express Bus fleet. Total vehicle replacement expense is funded by ITFWG contributions--see line item un Capital Revenues - State category. Includes contributions from transit operators plus other sources (Solano County, STA, MTC, federal grants, etc.).
[2] Includes commitments from FAST and Vacaville, as specified in Clipper cooperative agreement with MTC & Clipper vendor.
[3] Includes cost of multiple planned but unfunded projects including: Curtola P&R, Oliver Road P&R, and Fairfield/Vacaville Intermodal Station at Peabody Rd.
[4] Includes costs for bike racks on FAST Intercity coaches, SolTrans decals/signage, Vacaville Accessible Paths to Transit project, and Rio Vista P&R seal-coat.

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As noted above, one of the single biggest expense items for most Solano County operators is vehicle replacement—both the major expense of replacing the intercity fleet, as well as periodic renewal of their own vehicles used in fixed route local and paratransit services. Table 17 shows a consolidated fleet replacement schedule for all five operators, combined. The existing and future fleets have been grouped into four types: mini-van, cutaway, local bus and motorcoach.[2] The table shows the years that vehicles are physically operating within the active fleet—programming and procurement activities for the new acquisitions would occur in the year(s) prior to the time the acquisitions become active as noted below.

As can be seen in the second section of the table, certain years have much higher numbers of acquisitions than others. If the operators intend to seek federal funding support for a portion of these capital costs, there may not be sufficient funding for all operators to replace all vehicles on the desired schedule. Coordinating the timing of capital funding requests would help to ensure that all vehicles can be replaced as needed to maintain a state of good repair without over-taxing available financial resources.

Table 17: Consolidated Fleet Replacement Schedule

Vehicle Type	Number of Vehicles	FY12/13	FY13/14	FY14/15	FY15/16	FY16/17	FY17/18	FY18/19	FY19/20
Existing Active Fleet Totals									
Paratransit vehicles	**39**	**37**	**33**	**27**	**21**	**19**	**16**	**9**	**1**
Local buses	**66**	**66**	**54**	**54**	**53**	**50**	**50**	**50**	**50**
Over-the-road coaches	**36**	**36**	**36**	**36**	**33**	**33**	**30**	**30**	**16**
Sub-Total: Existing	*141*	*139*	*123*	*117*	*107*	*102*	*96*	*89*	*67*
Annual Acquisitions, by Type									
Paratransit vehicles		0	**3**	**6**	**7**	**2**	**3**	**7**	**8**
Local buses		**3**	**6**	0	**1**	**3**	0	0	0
Over-the-road coaches		0	0	0	**3**	0	**3**	0	**14**
Sub-Total: Annual Acquisitions		*3*	*9*	*6*	*11*	*5*	*6*	*7*	*22*
Cumulative Future Acquisitions									
Paratransit vehicles	**40**	0	**3**	**9**	**16**	**18**	**21**	**28**	**36**
Local buses	**13**	**3**	**9**	**9**	**10**	**13**	**13**	**13**	**13**
Over-the-road coaches	**25**	0	0	0	**3**	**3**	**6**	**6**	**20**
Sub-Total: Acquisitions	*78*	*3*	*12*	*18*	*29*	*34*	*40*	*47*	*69*
Total Active Fleet									
Paratransit vehicles		**37**	**36**	**36**	**37**	**37**	**37**	**37**	**37**
Local buses		**69**	**63**	**63**	**63**	**63**	**63**	**63**	**63**
Over-the-road coaches		**36**	**36**	**36**	**36**	**36**	**36**	**36**	**36**
TOTAL FLEET SIZE		**142**	**135**	**135**	**136**	**136**	**136**	**136**	**136**

To further highlight the relative timing of Solano County capital requirements, Table 18 below shows the ten-year consolidated capital plan by funding source.

[2]The intercity fleet is composed primarily of MCI diesel, dual rear axle over-the-road motor coaches, but FAST also has two Gillig Phantom diesel buses with one rear axle that are used to provide intercity service. The two Gilligs are being replaced as part of the intercity fleet replacement agreement, and are grouped with the other motor coaches to demonstrate that the intercity fleet size is being maintained.

The funding is grouped by type into regional, state, and federal categories. The amounts shown for each source represent funding that has already been committed (e.g. Proposition 1B or FTA 5316 JARC grants), or a source can be used entirely at the discretion of the operator(s) without further approvals required (e.g., TDA-LTF or FTA 5307 Urbanized Area apportionments). Each funding group also has a line at the bottom labeled "Unspecified" which shows funding that each operator intends to request in the future from various funding partners; in most cases, a specific source has not been identified for these amounts. If the requested funds are not awarded, the operators would have to defer or cancel the related projects.

From the table below, it can be seen that the two largest sources of committed capital revenues are Regional Measure 2 (RM2) and TDA-LTF, each of which is expected to comprise more than $18 million in capital funding over the course of the ten years shown. A further $25 million in RM2 is currently committed to other capital projects in Solano County, but is shown as unspecified, because reallocation must be approved by other regional partners. Beyond RM2 and TDA-LTF, other significant individual sources include Proposition 1B, FTA 5307, and FTA 5309, which together total almost $15 million. Most other committed funding line items are less than $2 million.

Some of the large infrastructure projects in the capital plan have already received numerous smaller funding commitments including more than $3 million in local funds, nearly $15 million in state funds, and nearly $3 million in federal funds, for a total of $21 million in committed sources. At the same time, these large projects each have major funding gaps, and need to formally secure approximately $34 million in additional funding in order to proceed. The bulk of the unspecified funding needed is for projects scheduled for construction within the next five years. Due to the timing and scale of additional funding required, it is recommended that the operators continue to work closely with STA, County officials, and regional partners to agree on how to fund these near-term local priorities. The Solano County operators should also track the developments in FTA discretionary grant programs, which have been restructured under the latest federal authorization known as MAP-21. For example, the three separate 5309 programs have now been consolidated into a single "Fixed Guideway" category, with new guidelines and regulations currently under development. It may be that program redefinitions under MAP-21 would improve the eligibility of these larger infrastructure investments, making them better candidates for federal grant support.

One other issue that will need to be addressed is the degree to which the Solano County operators use their flexible capital funding to subsidize transit operations. Based on current guidelines for federal apportionments, all five transit operators in Solano County are permitted to use their FTA formula funding for operating purposes. This applies to FTA 5307 Urbanized Area apportionments (FAST, SolTrans, and Vacaville City Coach) and FTA 5311 Non-Urbanized Area apportionments (Dixon Readi-Ride and Rio Vista Delta Breeze). Some Solano County operators rely heavily on these apportionments to achieve balanced annual operating budgets. To the extent that this money is being consumed by operating and maintenance expenses, it is not available to pay capital expenses required to

maintain a state of good repair. MTC raised this issue with Solano's three largest transit operators which led to expediting the development of the ten year capital replacement funding plan for intercity buses. From the table below, it can be seen that the total amount of capital funding coming from these federal programs is a little over $5 million. The bulk of this amount is for expenditures planned in FY2012-13 and FY2013-14; less than half a million dollars in FTA formula funding is planned to be used for capital expenditures beyond FY2013-14.

While the use of FTA funds for capital projects is somewhat limited, there are significant commitments of local and state revenues to fund planned capital projects. In all years of the plan, the anticipated use of state and local funds exceeds planned use of federal sources for capital. The main reason for shifting the FTA formula funds to operating is to ensure those funds are fully utilized each year, and before the federal apportionment lapses. This allows operators to accumulate TDA carryover reserves which can be used more flexibly than the federal sources. TDA reserves can be an important source of non-federal matching funds for any new federal opportunities that may become available. This is particularly important because Solano County does not have a transportation sales tax.

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Table 18: Ten-Year Consolidated Capital Plan by Funding Source

Detail by Project Type and Funding Source		*Budget*	*Forecast*								
Prepared on 10-Jul-2013											
		FY 2012/13	FY2013/14	FY 2014/15	FY 2015/16	FY2016/17	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21	FY 2021/22
Capital Revenues -- Local											
Regional Measure 2 Capital	[5]	$ 2,130,000	$ 15,960,154	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Air District (BAAQMD / YSAQMD)	[6]	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 12,500
Misc Local Funds (Committed)	[6]	$ -	$ 3,255,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Unspecified Local Funds (Source TBD)	[6,7]	$ 500,000	$ 21,785,000	$ 2,650,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Subtotal: LOCAL Revenue		*$ 2,630,000*	*$ 41,000,154*	*$ 2,650,000*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ 12,500*
Capital Revenues -- State											
TDA: LTF		$ 3,245,487	$ 1,684,893	$ 1,425,523	$ 1,088,269	$ 873,040	$ 1,273,662	$ 9,360,714	$ 1,859,360	$ 2,777,823	$ 3,644,942
TDA: STAF		$ 1,062,464	$ 14,679	$ -	$ 193,822	$ 387,645	$ -	$ -	$ -	$ -	$ -
Prop 1B (e.g., PTMISEA, CTAF)	[8]	$ 2,409,601	$ 829,826	$ 1,072,292	$ 1,422,296	$ 1,573,468	$ -	$ -	$ -	$ -	$ -
(EXTERNAL) ITFWG Fleet Contributions **	[1]	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,791,049	$ 843,839	$ 1,291,073	$ 2,194,824
Misc State Funds (Committed)	[9]	$ 40,000	$ 14,900,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Subtotal: STATE Revenue		*$ 6,757,552*	*$ 17,429,398*	*$ 2,497,815*	*$ 2,704,387*	*$ 2,834,153*	*$ 1,273,662*	*$ 15,151,763*	*$ 2,703,198*	*$ 4,068,896*	*$ 5,839,766*
Capital Revenues -- Federal											
MTC OBAG (Federal sources: STP / CMAQ / TE)		$ 232,000	$ 232,000	$ 232,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
FTA5307: Urbanized Area		$ 2,472,359	$ 2,103,314	$ -	$ 200,000	$ -	$ -	$ 80,000	$ -	$ -	$ -
FTA5307: ARRA (carryover)		$ -	$ 286,061	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
FTA5309: Bus Program		$ 2,360,399	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
FTA5310: Elderly & Disabled		$ -	$ 4,413	$ 134,400	$ -	$ 93,600	$ 284,000	$ -	$ -	$ -	$ -
FTA5311: Non-Urbanized Area (Capital)		$ -	$ 25,000	$ -	$ -	$ -	$ -	$ 70,000	$ -	$ -	$ -
FTA5316: JARC (Capital)		$ 61,282	$ 112,200	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
FTA5339: Bus & Bus Facilties		$ -	$ 541,328	$ 564,257	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Misc Federal Funds (Committed)		$ 631,368	$ 2,333,411	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Unspecified Federal Funds (Source TBD)	[10]	$ -	$ 9,000,000	$ -	$ 2,136,848	$ 1,297,600	$ -	$ 804,695	$ 189,858	$ 365,192	$ 281,198
Subtotal: FEDERAL Revenue		*$ 5,757,408*	*$ 14,637,727*	*$ 930,657*	*$ 2,336,848*	*$ 1,391,200*	*$ 284,000*	*$ 954,695*	*$ 189,858*	*$ 365,192*	*$ 281,198*
TOTAL EXPECTED REVENUES		**$ 15,144,960**	**$ 73,067,279**	**$ 6,078,472**	**$ 5,041,236**	**$ 4,225,353**	**$ 1,557,662**	**$ 16,106,458**	**$ 2,893,056**	**$ 4,434,088**	**$ 6,133,464**

***** NOTE: Operators' contributions for intercity fleet replacements (i.e. TDA cross-claim) removed from line items above, to avoid double-counting these transfers on charts.***

[1] As shown in STA letter to MTC (March 5, 2013) regarding plans to fund replacement of Intercity Solano Express Bus fleet. Total vehicle replacement expense is funded by ITFWG contributions--see line item un Capital Revenues - State category. Includes contributions from transit operators plus other sources (Solano County, STA, MTC, federal grants, etc.).
[5] Committed RM2 only; funds requested but not yet confirmed included in "Unspecified Local Funds (Source TBD)."
[6] Funds to be requested for planned projects; if funding is not received, projects would be deferred/cancelled.
[7] Funds shown as "Unspecified Local" will be requested from Regional Measure 2 program.
[8] Proposition 1B revenue program is expected to sunset in 2017.
[9] FY2012/13 amount is Lifeline STP allocation for VCC Accessible Paths to Transit proj. FY2014/15 amount includes all committed State sources for Fairfield/Vacaville Intermodal Station.
[10] Includes amounts to be requested from federal sources for unfunded balance on Fairfield/Vacaville Intermodal Stn, plus 80% of vehicle replacement/rehab in future years

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4.3 Opportunities to Enhance Capital Planning

Through the Consortium, Solano County transit operators communicate regularly abouttheir respective capital planning and programming activities. As requested by MTC, this section summarizes information about current and potential efforts to improve capital planning and procurement. The "Opportunities" section highlights available methods to reduce costs and streamline delivery. Many of thesestrategies are already being utilized by one or more transit operators in Solano County.

4.3.1 Opportunities

In addition to enhancing the process of planning for future capital needs, coordination can also help reduce the cost of delivering capital projects. One of the most significant opportunities in this area is joint procurement of assets, materials, supplies, and services. Joint procurement provides multiple types of benefits to transit operators which are described below.

One of the simplest types of cooperative capital planning is shared use of capital equipment and facilities as a means to avoid buying or constructing separate assets. For example, the previously mentioned sharing of SolTrans Trapeze scheduling software would eliminate the need for each operator to buy its own system. Also, Rio Vista is planning to buy more advanced fareboxes, and may be able to take used fareboxes from other operators after they are replaced instead of buying entirely new units. Dixon has also considered acquiring used bus shelters from Vacaville City Coach.

When purchases of new materials and equipment are necessary, buying in bulk can potentially result in a lower cost per unit from the manufacturer or supplier. Whether purchasing major assets like vehicles, ordering consumable supplies like fuel and oil, or negotiating service contracts such as landscape maintenance or vehicle cleaning, if operators can consolidate their ordering into a single purchase, they may be able to negotiate lower prices. Though not strictly a capital expense, an effort is currently underway to consider joint procurement of an advertising contract with Napa.

A second area of cost savings could be in the efforts to develop technical specifications for custom items. If the cost of design and engineering can be shared by multiple operators, each can benefit from the financial contributions of others towards the common expense. This can be a particularly effective strategy for items such as buses, bus shelters, bike lockers, fareboxes, and passenger information displays.

In addition to reduced costs, coordinated designs for customer-facing components can also have the co-benefit of promoting increased ridership. For example, a common design for wayfinding, signage, and real-time transit information can reduce barriers to transferring between systems, which increases the viability of transit for more trips. Similarly, a common design for bike lockers allows operators to leverage a common set of marketing and outreach materials to help

customers understand how to use the lockers and allow them to make last-mile connections more easily. Ultimately, incremental passenger ridership generates increased fare revenues and additional bottom line savings.

Taking the joint procurement strategy even further, the Solano County operators benefit from using the California Association for Coordinated Transportation (CalACT) purchasing cooperatives and avoid both design and procurement costs altogether. Specifically, CalACT has undertaken efforts to establish Local Government Purchasing Schedules that can be accessed by any of its members. As explained in CalACT press releases, "these menu-style bids make arrangements with multiple vendors to provide options for goods or service in the future at established prices. Transit agencies realize cost savings because they can select vehicles from a menu of choices from different vendors and manufacturers that best suit their requirements without having to go out to bid."

CalACT has coordinated the development of the purchasing schedules with FTA procurement guidelines and the program is approved by Caltrans. At the present time, there are two CalACT purchasing schedules, one for bus shelters and the other for accessible transit/paratransit vehicles. The vehicle schedule includes CalACT Class A (E350/GM3500 cutaways), Class B and C (E450/GM4500 Cutaways), Altoona tested CNG and hybrid cutaways and Class D (low-floor minivan) vehicles. The vehicle purchasing schedule also includes the ability to purchase optional vehicle features, spare parts, training materials, and manuals. CalACT reports that solicitations for additional vehicle types including larger buses will be considered in the future as workloads permit.

Beyond the initial savings from avoiding design and bid and proposal costs through joint procurement, additional financial benefits can be realized during the life-cycle of assets and equipment that are purchased under the same technical specification. For example, if multiple operators are using the same vehicle design, they can provide coordinated training activities for their operating and maintenance staff, which could be less expensive than individualized training.[3] Also, operators could benefit from having a common inventory of spare parts as their neighbors. This would be a clear opportunity for lower cost bulk ordering as described above, but it could also facilitate inter-operator loans or transfers of critical parts and equipment that may be needed on short notice.

Finally, operators could also consider joint procurement of technical and professional services that support capital planning. Especially for smaller agencies, staffing capacity may be too limited to evaluate a large number of innovative ideas for improving service. Small expansions in scope (and the associated cost) for technical and planning studies being conducted by peer operators might allow an individual study to have wider applicability elsewhere in the County. To the extent that operators need or want similar types of technical

[3] CalACT is also under contract to Caltrans to provide services under the Rural Transit Assistance Program (RTAP) in California. Services include organizing driver safety and skills practice, offering workshops and training to both management and line staff, and maintaining a library of resources including training modules, sample policy documents, and other technical assistance.

assistance that they cannot currently afford to pay for on their own, they could pool resources and evaluate more options with the same budget.

For example, SolTrans has recently announced plans to study the feasibility of transitioning its fleet to CNG, and requested financial assistance from STA that would allow the study to be expanded to consider the merits of wider implementation of CNG elsewhere in the County. This particular study is especially compelling as a joint procurement, because converting to CNG can have long term benefits for operating costs. This positive outcome has been experienced in Vacaville following the conversion of their transit fleet to CNG.

4.3.2 Conclusion and Recommendation

As described above, the transit operators in Solano County have established a successful plan for coordinating to meet the capital needs of the SolanoExpress intercity bus services. The Consortium is an effective forum for information sharing and building partnerships. Given the significant capital costs anticipated in the County over the next ten years, the operators should continue this coordination to ensure that capital needs for local service can be met as well. The advantages of greater cooperation include the possibility of both short-term and long-term cost savings, which could improve overall financial sustainability for transit in Solano County.

It is recommended that the following topics be discussed by the Consortium and considered for inclusion in the annual work plan:

- **Study of Fuel Type Conversion:** As mentioned above, SolTrans is leading a study of the feasibility of transitioning its fleet to CNG. This study scope could easily be expanded to assess the feasibility for other operators in Solano County that have not already made the switch. Leveraging a single study for multiple operators has immediate benefits in terms of saved consulting fees, and can also point the way towards longer term savings.
- **Paratransit Vehicle Replacement Needs:** The Solano county operators should discuss the possibilities for reducing their capital costs for the 36 total mini-vans and cutaways scheduled to be purchased in the next ten years. Many operators currently take advantage of the CalACT purchasing cooperative as mentioned above. CalACT already has a pre-approved price list for multiple types of paratransit vehicles. Given the total number of anticipated acquisitions in relation to the size of the total paratransit fleet, this could be one area in which the existing asset base may not hinder purchasing decisions, and operators may want to consider choosing the same vehicle type as their peers in order to achieve savings on training, spare parts, and shop tools.
- **Fare Collection Technology Needs:** In parallel with the consideration of coordinated fare structures discussed previously, the roll-out of Clipper in Solano County presents an opportunity to review current technology used

for fare payment processing. Many customers will continue to rely on existing fare payment media, but new pricing structures could suggest different requirements for on-board equipment than is currently utilized. Independent of the transition to Clipper, several operators are specifically planning to upgrade and/or standardize the fareboxes in their fleet in the next ten years. The operators should discuss whether there are any opportunities to re-use older equipment or to negotiate lower prices of new equipment ordered in bulk.

- **Schedule Regular Discussion of Procurement Needs:** As a part of the Consortium's annual work plan, schedule a discussion of all operators' planned procurements over the next 18 – 24 months with the intent of identifying opportunities for shared procurements. This annual discussion would provide a forum for the transit operators to discuss specific capital needs and schedules, procurement issues, opportunities for piggybacking on other agencies' procurements, and to share successful procurements. Opportunities identified in this annual process may be placed on future agenda for discussion or follow up with the Consortium or with a subset of the operators who are undertaking common procurements.

DATE: August 20, 2013
TO: SolanoExpress Intercity Transit Consortium
FROM: Robert Guerrero, Project Manager
RE: STA Alternative Fuel and Infrastructure Plan

Background:
The STA began the development of the Alternative Fuel and Infrastructure Plan in June 2012 with assistance for the consultant group ICF International. The purpose of the plan was to review major choices for alternative fuels and vehicles, assesses their benefits and costs, and identifies implementation actions to help overcome barriers to greater use of alternative fuels. The plan was intended to be a tool to assist member agencies in future decisions for fleet conversions and infrastructure improvements; it was not intended to be a vehicle replacement plan.

The Alternative Fuels and Infrastructure Plan is intended to also serve as an advocacy document for future grant funding for STA's member agencies. In addition, the Plan will provide a resource document to guide potential discretionary clean air funds available through the Bay Area Air Quality Management District and Yolo Solano Air Quality Management District. Both Air Districts have been active partners and participants in the Plan's development.

A Technical Working Group was established to provide technical support and feedback as the Plan is being developed. The Working Group consisted of fleet managers, public works, planning, transit, and Air District staff. Since the start of the Plan's development, the Working Group has met three times to review technical reports supporting the draft Alt. Fuels and Infrastructure Plan. In addition, the Alternative Modes Policy Sub-Committee of the STA Board provided overall policy guidance in the plan's development and was provided updates regarding the Plan's development.

Discussion:
The Plan's Technical Working Group met on Thursday, June 6th to discuss an early draft of the Alt. Fuels and Infrastructure Plan. The Draft document reflected technical reports and survey information previously reviewed by the Working Group. The Working Group provided good input and direction on the draft Plan at their meeting and agreed to provide additional, more detailed, comments at a later deadline.

STA staff and ICF have since collected the general comments received from the June 6th meeting and subsequent detailed comments. Attachment A is a matrix of illustrating comments received and how it was addressed in the document. The Technical Working Group's comments have since been incorporated in the draft Alternative Fuels and Infrastructure Plan (Attachment B). In

summary, the changes included updated transit bus cost, revised lifecycle cost references, and caveats related to cost assumptions and benefit charts. STA staff is providing the revised draft to the Technical Working Group, STA TAC and SolanoExpress Intercity Transit Consortium for a final technical review.

The schedule for the technical review and adoption recommendation is as follows:

Aug 27th and 28th	-	Cons. and TAC Final Technical Review begins
Sept 13th	-	Deadline for comments
Sept 24th and 25th	-	Cons. and TAC recommendation to approve draft for public input
Oct 9th	-	STA Board considers approval of draft for public input
Nov 26th and 27th	-	Cons. and TAC Recommendation to approve final draft
Dec 11th	-	STA Board considers approval of final draft

STA staff will also meet with the Technical Working Group members to obtain their final input during the months of August and September.

Fiscal Impact:
Funding for the Alternative Fuels and Infrastructure Plan was approved by the STA Board and included in the STA FY 2013-14 Budget for $75,000 from State Transit Assistance Funds.

Recommendation:
Informational.

Attachments:

A. Alternative Fuels and Infrastructure Plan Technical Working Group Comments and Response
B. Draft Alternative Fuels and Infrastructure Plan

ICF Response to Comments on Draft Alternative Fuels and Infrastructure Plan dated 5-16-13

#	Comment	ICF Response and Action Taken
	Comments Received at Technical Work Group Meeting #3	
1	Committee members expressed their desire for additional time to provide comments and another chance to look at a revised draft before the STA Board considers approving it.	Comment noted
2	Overall comment was need to add caveats and disclaimers to charts and graphs, particularly when discussing Lifecycle Costs (see below for further detail). The committee thought some of the charts were misleading and need to have more explanation of what was included and not included (e.g. infrastructure costs and training).	Multiple edits made in Sections 4.2 and 5.2 to identify the costing the analysis as not lifecycle
3	Committee wanted to revise the term Lifecycle	Multiple edits made in Sections 4.2 and 5.2 to identify the analysis as not lifecycle
4	Cost for Sample Bus Cost Comparison should be updated	Edits made in Section 4.2 reflect bus costs from the MTC price sheet
5	Report needs to acknowledge that FFVs can have higher maintenance costs than gasoline vehicles.	Edit made in Section 4.2 of the report
6	Report should not suggest that fleet managers need to be educated about FFVs in their fleets. Others may need this education.	Edits made in Section 5.1 of the report
7	Report needs to discuss fuel shelf-life issues for B20. For this reason, biodiesel may not work for seasonal vehicles (chippers, etc.). And shelf-life issues are more significant with higher blends. Report needs discuss of the limitations and challenges of converting to biodiesel.	Edits made in Sections 2.2 and 5.2 related to shelf-life.
8	Report needs to make clear that transitioning to biodiesel will likely require installation of a new tank, since some equipment (chippers, etc.) will need to continue to use conventional diesel.	Edits made in Section 5.1
9	Cost assumptions for new UST are likely too low. Cost to Solano County was $175K for a new UST.	Edit made in Section 5.1
10	Report needs to discuss that there can be a major difference between going to B5 vs. going to B20. B20 is more challenging and not every fleet will want to make that transition.	Edit made in Section 5.1
11	Report needs to discuss the cost of constructing or retrofitting a vehicle maintenance facility if converting fleet to natural gas. Can be $500K.	Edit made in Section 4.2 and 5.2
12	Report needs to discuss the higher maintenance costs for CNG fueling facility compared to conventional fuels.	No change - Already mentioned in Section 4.2: "CNG fueling infrastructure also involves maintenance costs that are likely to be

		higher than for conventional fuel infrastructure"
13	Report needs to acknowledge that fleet conversion to natural gas involves a big commitment and likely makes sense only for larger fleets. Can't dip your toe in the water.	Edits made in Section 5.2
14	Report needs to acknowledge that natural gas does not work for all applications. Does not make sense for dump trucks, backhoes, etc. Has power issues.	Edits made in Section 5.2
15	Report needs to discuss possible differences in driver acceptance of BEVs vs. HEVs. Some drivers of municipal fleet vehicles may not accept BEVs.	Edits made in Section 5.3
16	Suggestion to include more discussion of pros and cons of HEVs.	Edits made in Section 2.6 and 4.2
17	Report needs some implementation steps related to hybrid electric vehicles, give the potential large mpg gains from diesel hybrid buses.	Edits made in Section 4.2
18	Suggestion that the report articulate a long-term vision of electrification.	Added text at the outset of Section 5.3
19	Report needs to discuss the challenges of installing EVSE at older municipal fleet buildings. There can be high cost to retrofit with the necessary electrical power. This is a barrier to municipal fleet adoption of EVs.	Edits made in Section 5.3 Municipal Fleets
20	All the charts in this section (4.2) need to be retitled, because the report does not present true lifecycle costs. Suggestion to title the charts: "Vehicle Purchase and Fueling Costs"	Changes made throughout Section 4.2
21	Text in this section (4.2) needs to clearly articulate that it is not presenting full lifecycle costs, to guard against possible mis-use of this information. For example, vehicle resale value is not included, amortized fueling infrastructure cost not included, etc. Also, CARB rules may require engine replacement every 6 years, which adds to fleet costs.	Changes made throughout Section 4.2
22	Assumptions for new bus costs do not reflect recent purchases. Need to update these. Suggest using MTC's cost numbers for bus prices.	Edits made in Section 4.2 reflect bus costs from the MTC price sheet
23	Discussion of potential Low Carbon Fuel Standard (LCFS) credits needs to be made more prominent and also better clarify who is a regulated party and who can voluntarily opt-in. Include mention of LCFS credits under funding options.	Edits made in Section 4.5
24	Report text needs to better align with charts – particularly in the discussion of emission benefits of natural gas.	Edits made in section 4.3
25	Chart of criteria pollutant emissions impacts should be structured like the GHG charts – show gasoline/diesel as 100%, and then emission reductions are shown as shorter bars.	
26	Report should acknowledge NGV ammonia issue and uncertainty regarding PM emissions impacts.	Edits in Section 4.3
27	Suggestion that the report comment on city-level GHG benefits from fleet conversions (not just per-vehicle benefits).	Figures with per vehicle benefits have been included in

		Section 4.4
28	Entire implementation section (Ch 5) needs to make clearer that these are optional steps and are recommended only for those agencies that are interested in pursuing a particular fuel. They are not blanket recommendations for all fleets in the county.	Edit made in Section 5 intro
29	Request to add qualifiers to the Vision Statement such as "where feasible" or "where cost effective.	Change made
	Commenter A	
30	Vision statement should include "where feasible and/or cost effective".	Change made
31	Sample transit coach cost comparisons should be updated and suggest using MTC's price structure.	Edits made in Section 4.2 reflect bus costs from the MTC price sheet
32	Certain charts and graphs are misleading. Lifecycle costs don't include maintenance costs, infrastructure costs (both capital and ongoing), regulatory compliance, training and ROI.	Edits made in Sections 4.2 and 5.2 to identify the costing the analysis as not lifecycle
33	The report does not address differences in vehicle weights based on fuel type and how that may affect local road conditions and/or costs.	Edit in transit bus cost subsection of Section 4.2
34	Highlight that FFV's have a higher overall maintenance cost than their gasoline counterparts.	Edit made in Section 4.2 of the report
35	Highlight that FFV's get 25% less MPG than when run on gasoline and the cost for a gallon of E-85 is higher than 87 Octane gasoline.	Already mentioned in 2.1 and 4.2. Figures of Section 4.2 illustrate this point with the higher fuel cost of the E85 vs. gasoline Ford Focus
36	Separate infrastructure may need to be added to facilities if some vehicles/equipment in a fleet are not able to run on E-85.	Section 4.2 in the Fueling Infrastructure subsection discusses that new refueling equipment is required for E85 including pumps and tanks.
37	The report does not discuss shelf life issues that can be a problem for some fleets. B20 has more shelf life issues than B5 and should be addressed. Costs could significantly increase if fuel separates prior to being utilized.	Edit made in Sections 2.2 and 5.1 related to shelf-life.
38	Adding biodiesel most likely will include adding infrastructure such as a new tank and dispensing system. Mixed fleets would still need to utilize regular diesel.	Edits made in Section 5.1
39	Consider cost of adding infrastructure using local California numbers instead of national averages.	We looked for California average costs. Many of values used are based on estimates from the California Energy Commission.
40	Consider cost of Fleet Management Information System (FMIS) additions for new infrastructure in order to bill fuel to customers.	Added mention of this in Section 4.2
41	There are major differences between B5 and B20 that should be discussed. Some fleets may not be able to convert vehicles due to	Edits made in Section 5.1

	low usage and high costs.	
42	Consider the cost and feasibility of retrofitting a maintenance facility to accommodate CNG vehicles. Some shops may not be able to or cost effectively be converted.	Added mention of this cost in Section 4.2. Cost is already discussed in Section 5.2.
43	Initial cost of CNG compression station, dispensers, annual maintenance cost of fueling facility and utility cost should be compared to conventional fuels.	Section 4.2 already mentions range of costs for new CNG station. More reference to CNG infrastructure cost added in Section 5.2 Comparison to conventional fuel was not done, since (1) many elements go into cost, so generalized comparison has limited value, and (2) most fleets already have conventional fueling, so do not face question of one vs. the other.
44	Report should take into consideration how long a fleet may need to recoup initial costs for infrastructure, what percentage of vehicles can be purchased each year and how many gallons of throughput each year are expected. This would give fleets better information in deciding if CNG is right for them.	A detailed lifecycle assessment is beyond the scope of this study. Infrastructure costs vary so widely that using averages is not meaningful for a given fleet. STA planning a CNG feasibility study to answer some of these questions.
45	Many fleet vehicles are not cost effective or available for purchase as CNG powered such as loaders, stump grinders, air compressors, etc.	Edits made to Section 5.2
46	Some fleet operators may not utilize BEV's and therefore defeats the purpose.	Edits made to Section 5.3
47	Include more information on light duty through heavy duty hybrids. Include pros and cons of each type such as the GEMS system from Altec, Volt, Prius, Proterra, etc.	Edits made in Section 2.6, 4.2 and 5.3
48	Infrastructure challenges of older government buildings are not addressed and that adequate power may not be available in the building to add one or more electric vehicle charging stations.	Edits made in Section 5.3 Municipal Fleets
49	Discussion of electric rates from PG&E for peak vs. non-peak charging.	Addressed in Section 5.3 Municipal fleets
50	Charts do not represent true lifecycle costs and only show vehicle purchase price and raw cost of fuel.	All text and charts edited to address this comment
51	Update vehicle purchase price assumptions.	MTC bus price sheet used to revise bus costs
52	Better clarify Low Carbon Fuel Standard (LCFS) credits to include pros and cons of "opting in".	Edits made to Section 4.5
53	CNG charts are misleading by showing substantially lower emissions than other fuels while report text contradicts.	Edits in Section 4.3 to address this comment
54	The report doesn't properly address CNG ammonia output and	Clarified text in Section 4.3

	the uncertainty relating to PM emission output.	regarding this issue.
55	What would total fleet GHG reductions be annually when phasing in a particular fuel type?	Edits made and figures added to Section 4.3
56	This chapter discusses implementation steps, with an emphasis on near-term actions that can be led by Solano County public agencies. This should be clarified to only participants of the working group or all Solano County public agencies should be represented in the working group and have a say what's in the report.	No change made. ICF believes Section 5 contains information that could be useful to any interested public agency.
57	Report does not recommend heavy duty hybrid vehicles as a possible implementation step. Some heavy duty hybrids such as GEMS type bucket trucks and diesel/electric hybrid transit coaches used on local routes have had very good reductions in fuel burned and GHG reductions.	Edits made in Section 2.6, 4.2 and 5.3 to add more discussion of hybrids.
58	The entire implementation section needs to make it very clear that these are optional steps and not blanket recommendations for all fleets in the county.	Added introductory language like this to Section 5.1., 5.2, and 5.3. See Comment #78.
59	Update Fairfield non-safety on road vehicles	Edits made in Section 3.1
	Commenter B	
60	Connecting this plan with City's and the County's Climate Action Plan	Figures included in Section 4.2 showing per vehicle benefits for light-duty and transit bus
61	GHG emissions reductions are shown as % decreases in the report - I'd prefer to see it as metric ton equivalent (MTCO2e) the standard measure in climate action plans	Figures included in Section 4.2 showing per vehicle benefits for light-duty and transit bus
62	electric vehicle charging stations in Benicia need to be updated to: (a) 2 Level II stations @ City Hall (Clipper Creek and Chargepoint) (b) 1 DCFC station @ City Hall (just kicked off the project; should be operational by August 2013)	Edit made in Section 3.1
	Commenter C	
63	adding an Executive Summary that summarizes the content of the plan and its recommendations and actions	
64	In Figure 3-1, consolidate the text within the pie chart text on p 26	Edits made in Section 3.1
65	Under Regional Funding on p. 54, Spell out Yolo-Solano Air Quality Management District Clean Air Funds	Edits made in Section 4.5
66	Under Regional Funding, add the Sacramento Metropolitan Air Quality Management District's Regional Funding Program as a potential funding source for new heavy duty technologies: Private business and public agencies that operate heavy-duty vehicles or mobile off-road equipment in the Sacramento Federal Non-Attainment Area (SFNA) which includes the eastern portion of Solano County, including Vacaville, Dixon and Rio Vista, can receive funds to defray the costs of new lower emission technologies that meet cost effectiveness criteria. The program can help fleets pay for new lower emission engines, lower emission retrofits, and new equipment replacements under the	Edit made in Section 4.5

	AQMD's Heavy-Duty Low-Emission Vehicle Program	
67	Include an additional or alternative strategy that municipal fleets using diesel may want to consider which is the use of heavy duty hybrid vehicles. Heavy duty hybrids would achieve significant reductions in diesel particulates due to factory installed particulate filters, GHG's and petroleum displacement as a result of a 20-40 percent reduction in fuel use with no increase in NOx emissions. Although vehicle purchase prices are significantly higher than conventional diesel vehicles, the ARB's Hybrid Truck and Bus Voucher Incentive Program (HVIP) is available to offset the incremental cost by approximately 50 percent as indicated on page 53 of the plan. In addition there are several hybrid truck types available with limited or no additional infrastructure or increased maintenance facility needs compared to biodiesel and heavy duty CNG vehicles that are generally limited to transit buses, refuse trucks and one light duty model	Edits made in Section 2.6, 4.2 and 5.3
68	STA may want to consider holding at least one workshop to allow for public input on the draft prior to presenting the plan for adoption to the STA Board	Comment noted.
69	Soften a statement in the plan about needing to be all in with CNG	Inconsistent with Comment 13
70	The scope of the plan should be clearly defined in terms of what specific municipal fleets are covered under the plan, at least for the initial phase. For example transit, public works, police, etc.	Introduction was revised to make clear that the plan is intended for all Solano County public agencies. This includes municipal governments, transit agencies, and other public agencies.
71	In addition to providing the general implementation steps, the plan should provide recommended actions and guidelines for each jurisdiction/municipal fleet based on consultation with fleet managers. Factors to consider include, but are not necessarily limited to, fleet composition and size, on/off road, duty cycles, available and future potential infrastructure, and life cycle costs.	This level of detail is outside the scope of this study.
72	The plan should include more discussion of hybrid vehicle options, both passenger cars and medium and heavy duty trucks/buses. Hybrids require no additional infrastructure with potentially significant fuel and GHG savings, petroleum displacement and comparable emission reductions	Edits made in Section 2.6, 4.2 and 5.3 to address this comment.
73	For general information, for those fleets with existing CNG infrastructure available, there is and will continue to be increasing CNG vehicles options available over time as more vehicle manufactures are offering this option again. Chrysler and General Motors are offering bi-fuel versions of their Ram, Chevrolet Silverado, and GMC Sierra trucks. These trucks have two fuel tanks to run on either natural gas or gasoline similar to flex fuel or E85 vehicles	Comment noted.

	Commenter D	
74	Was this [the Technical Working Group vision for the plan] voted on by the group or a mandate set by the STA Board	The Vision was discussed at the first meeting of the TWG.
75	This [although these costs are not factored into the hypothetical lifecycle cost examples] should be BOLD, as it is an important criteria for fleet managers and cities.	Edit made in Section 4.2
76	This is an assumption [same maintenance costs for gas, FFV, HEV and CNG] – what facts are behind it to substantiate? Yes, as technology continues to improve you could make this assumption but it could take decades to reach this point.	Edit made in Section 4.2 of the report
77	…"the differences are expected to be small" [maintenance costs for EVs vs gasoline] This is an assumption. Again, what are the substantiating facts that support this assumption.	EVs are expected to have lower maintenance costs, since they do not require oil or transmission fluid changes, and will have lower brake wear. Because the current generation of EVs is relatively new, there is no long-term data on maintenance costs. The report statement about small differences reflects a conservative assumption and the lack of empirical data.
78	As we discussed in the TAC meeting today, each [implementation] section should be prefaced with language that is similar to "In considering a move to an alternative fuel, the following recommendations should be considered. In addition, as this is a high-level analysis, a more site and operating-environment specific investigation is recommended to understand the full long term benefits and drawbacks that any one alternative fuel type offers.	Added introductory language like this to Section 5.1., 5.2, and 5.3.
79	We are not including the school districts, sewer districts and other public agencies? [intro section of implementation steps]	All public agencies are a potential audience. Intro to Section 5.1 revised to clarify this.
80	I understand what you mean here, but the Fleet Managers job spans an enormous range of tasks and responsibilities. As I see this, I don't need to be told to do this, it's part of my job. Maybe some word-smithing is needed. [Going forward, when a new FFV is brought into the fleet, the fleet manager should create an FFV designator so the E85 capability remains recognized and E85 use can be tracked.]	Edit made in Section 5.1
81	Please Note, Vacaville led this charge in many respects, winning awards for work along the way. There should be some recognition here of Vacaville's leading role as well. [EV charging infrastructure]	Edits made in Section 3.2 and 5.3 to reflect this.

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Solano Transportation Authority

SOLANO COUNTY

Alternative Fuels & Infrastructure Plan

REVISED DRAFT

Solano County Alternative Fuels & Infrastructure Plan

DRAFT

August 2013

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List of Acronyms

A	amperes
AB	Assembly Bill
ABAG	Association of Bay Area Governments
AC	alternating current
AC Transit	Alameda-Contra Costa Transit District
AFDC	Alternative Fuels Data Center
ARB	California Air Resources Board
AST	aboveground storage tank
BAAQMD	Bay Area Air Quality Management District
BACT	best available control technology
B5	5% biodiesel blended with conventional diesel
B20	20% biodiesel blended with conventional diesel
B100	pure biodiesel
BEV	battery electric vehicle
CAFE	corporate average fuel economy
Caltrans	California Department of Transportation
CEC	California Energy Commission
CH_4	methane
CMAQ	Congestion Mitigation and Air Quality Improvement
CNG	compressed natural gas
CO	carbon monoxide
CPUC	California Public Utilities Commission
DC	direct current
DERA	Diesel Emissions Reduction Act
DOE	U.S. Department of Energy
DPM	diesel particulate matter
E10	gasoline mixed with 10% ethanol
E85	85% ethanol blend
E100	pure ethanol
EIA	U.S. Energy Information Administration
EPA	U.S. Environmental Protection Agency
EV	electric vehicle
EVSE	electric vehicle supply equipment
FCV	fuel cell vehicle
FFV	flexible fuel vehicle
FHWA	Federal Highway Administration

List of Acronyms (continued)

FTA	Federal Transit Administration
FY	fiscal year
g/CO_2e/MJ	grams of carbon dioxide-equivalent per megajoule
GGE	gasoline gallon equivalent
GHG	greenhouse gas
HDV	heavy-duty vehicle
HEV	hybrid electric vehicle
ICE	internal combustion engine
kWh	kilowatt-hours
LCFS	Low Carbon Fuel Standard
LDV	light-duty vehicle
LEV	low emission vehicle
LNG	liquefied natural gas
LPG	liquefied petroleum gas
M85	85% methanol blended with 15% gasoline
MTC	Metropolitan Transportation Commission
NAAQS	National Ambient Air Quality Standards
NGV	natural gas vehicle
NOx	nitrogen oxides
NRG	NRG Energy, Inc.
OEM	original equipment manufacturer
PEV	plug-in electric vehicle
PG&E	Pacific Gas and Electric Company
PHEV	plug-in hybrid electric vehicle
PM	particulate matter
PM2.5	fine particulate matter
PON	Program Opportunity Notice
psi	pounds per square inch
RFA	Request for Application
RFS2	revised Renewable Fuel Standard
SAE	Society of Automotive Engineers
SMR	steam methane reformation
SolTrans	Solano County Transit
SOx	sulfur oxides
SPI	small paddle inductive
STA	Solano Transportation Authority

List of Acronyms (continued)

STP	Surface Transportation Program
SUV	sport utility vehicle
TCRP	Transit Cooperative Research Program
ULSD	ultra-low sulfur diesel
UST	underground storage tank
V	volt
VOC	volatile organic compound
ZBUS	zero emission bus
ZEV	zero emission vehicle

Executive Summary

Local governments, transit agencies, and other vehicle owners are increasingly interested in using alternative transportation fuels because of their environmental benefits, ability to reduce dependency on petroleum, and potential cost savings. Although alternative fuel vehicles have been used in Solano County for more than a decade, the last several years have brought new opportunities through a wider variety of vehicle and fuel options, improvements in vehicle performance, and lower costs.

Recognizing both the potential benefits of, and obstacles to, alternative fuels for transportation, the Solano Transportation Authority (STA) Board unanimously approved the development of the first countywide plan for alternative fuels and related infrastructure for Solano County in September 2011. The STA Board identified four initial goals for the plan, which were subsequently clarified by the Alternative Fuels and Infrastructure Plan Technical Working Group. The goals are as follows:

1. Reduce greenhouse gas emissions
2. Reduce criteria pollutant emissions
3. Encourage alternative fuels and vehicle technologies that provide economic benefits to Solano County public agencies, residents, and businesses
4. Take advantage of alternative fuel funding opportunities

This plan is intended to help local government and other public agencies to increase the use of alternative fuels within their jurisdictions and achieve the four goals identified by the STA Board. The plan should be considered a starting point and not a detailed investment strategy; any fleet or agency considering major investments in new vehicles or fueling infrastructure will likely need to conduct more specific analyses of costs and engineering feasibility. It is hoped that this plan will help to elevate interest in alternative fuels, highlight the most promising options and implementation steps, and foster new collaboration among public agencies and between the government and the private sector.

Types of Alternative Fuels

The major alternatives to gasoline and diesel include biofuels (ethanol and biodiesel), fossil fuel alternatives (natural gas and propane), and emerging transportation energy sources (hydrogen and electricity). These fuels differ widely in terms of their sources and applications.

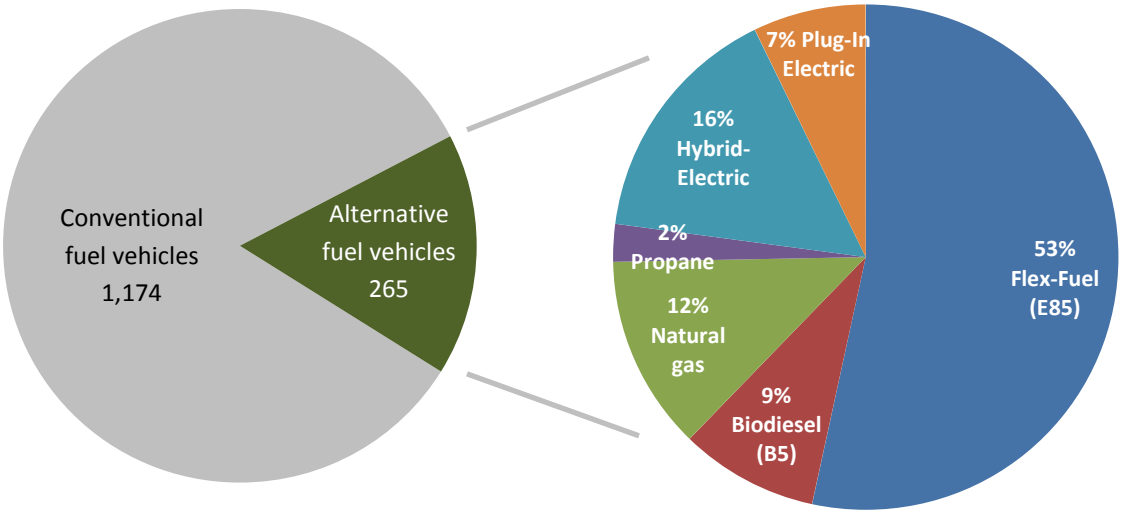
- **Ethanol** is a renewable fuel made primarily from corn. Nearly all gasoline used for transportation in the United States contains up to 10% ethanol. Flexible fuel vehicles (FFVs) can run on 85% ethanol blended with gasoline (E85). FFVs are widely available from nearly every major auto manufacturer.
- **Biodiesel** is a renewable fuel, typically made from soybean or waste oils. Most biodiesel is used in low-level blends with diesel, typically B5 or B20, and can be used in many engines without modification. Pure biodiesel (B100) often requires equipment changes.

- **Natural gas** is an odorless, gaseous mixture of hydrocarbons, predominantly methane. Vehicles can run on compressed natural gas (CNG), which is stored on-board a vehicle in pressurized cylinders. CNG models are available for light-, medium-, and heavy-duty vehicles. Liquefied natural gas (LNG) is also used as a transportation fuel, primarily for heavy-duty vehicles.
- **Propane**, or liquefied petroleum gas (LPG), is produced either as a byproduct of natural gas processing or by crude oil refining. Propane is mainly used in light-duty pickup trucks, taxis, medium-duty vans, and heavy-duty school buses. Most propane vehicles are converted from gasoline vehicle, rather than produced by an original equipment manufacturer (OEM).
- **Electricity** can be used to power all-electric vehicles (also referred to as battery electric vehicles or BEVs) and plug-in hybrid electric vehicles (PHEVs). All electric vehicles (EVs) draw electricity from the electricity grid and store the energy in batteries. In a BEV, the battery powers the motor. PHEVs also have an electric motor that uses energy stored in a battery, as well as an internal combustion engine that can run on conventional or alternative fuel. Although technically they do not use alternative fuels, hybrid electric vehicles (HEVs) are an advanced technology that can accomplish many of the same objectives as alternative fuel vehicles, including emissions reduction and fuel savings.
- **Hydrogen** is an emerging fuel and not widely used for transportation at this time. Extensive government and industry research and development are focused on hydrogen production and hydrogen fuel cell vehicles (FCVs). In FCV applications, the fuel cells generate electricity by using hydrogen as a fuel. While several transit agencies in California are operating hydrogen buses, significant challenges with respect to cost and durability of the hydrogen FCV must be resolved before mass production is possible.

Current Alternative Fuel Vehicles and Infrastructure

Solano County and its seven incorporated cities and public transit agencies currently operate approximately 1,400 on-road vehicles, including automobiles and light-duty trucks, medium- and heavy-duty trucks, vans and minibuses, and full-size transit buses. Approximately 18% of these vehicles use, or are capable of using, alternative fuels, as shown in Figure ES-1.

Figure ES-1. Percent of Alternative Fuel Vehicles in Solano County Municipal Fleets



The most common type of alternative fuel vehicle in the County (and nationally) is a flexible fuel vehicle that can operate on gasoline, E85, or a mixture of the two. Other examples of current alternative fuel vehicles in the County include:

- **Biodiesel**. Solano County's 22 diesel vehicles operate on B5 (5% biodiesel blend).
- **Natural gas vehicles**. Vacaville City Coach's entire fleet of 15 transit buses runs on CNG. Vacaville also operates 8 CNG Honda Civic sedans and 7 CNG pick-up trucks and vans. Suisun City has a CNG pick-up truck.
- **Propane vehicles**. Solano County owns 6 propane pick-up trucks.
- **Hybrid-electric vehicles**. Solano County Transit (SolTrans) operates 21 diesel-hybrid buses and Fairfield and Suisun Transit (FAST) operates 7 hybrid buses. Benicia has hybrid-electric sedans and SUVs. Fairfield has a hybrid-electric sedan and SUV, and Rio Vista has a hybrid-electric SUV.
- **Battery-electric vehicles**. Vacaville operates 17 Toyota RAV4 BEVs, and another BEV is operated by Rio Vista. Benicia has 2 plug-in hybrid electric vehicles.

In terms of alternative fuel infrastructure, Solano County is limited as compared the Sacramento region and the rest of the Bay Area. As shown in Table ES-1, most of the alternative fueling stations are located in Vacaville and Fairfield, and many are not available to the public.

Table ES-1. Number and Location of Alternative Fuel Infrastructure in Solano County

Fuel Type	Public Fueling Stations	Private Fueling Stations
E85	2 (Vacaville and Fairfield)	1 (Fairfield and Solano County Corporation Yard)
Biodiesel	none	2 (Travis AFB and Solano County Corporation Yard)
Natural Gas	1 (Vacaville)	2 (Fairfield and Vacaville Corporation Yard)
Propane	1 (Vacaville)	1 (Solano County Corporation Yard)
Electric Vehicle Charging	26+ (various locations)	2 (Vacaville)

Costs and Benefits

Alternative fuel vehicles vary widely in terms of their cost implications for vehicle fleets and their environmental benefits. While it is difficult to compare costs with a high degree of precision, the following generalizations can be made:

- Among **light duty vehicles**, most alternatives to gasoline vehicles carry a higher initial purchase price, including hybrid-electric, battery electric, CNG, and propane vehicles. However, the annual fueling costs for alternative fueled light duty vehicles are often lower, especially in the case of CNG, hybrids, and EVs. Whether this fuel cost savings offsets the higher purchase price over the vehicle lifetime depends on how much the vehicle is driven, the fuel cost differential, and other factors.
- Among **transit buses**, a CNG and hybrid bus typically cost 12% and 35% more than their conventional diesel counterpart, respectively. Fueling costs for hybrid and CNG buses are lower. If the agency owns its CNG fueling facility, CNG bus fleets can enjoy fueling costs that are as much as 3-4 times lower than diesel.

Nearly all alternative fuel vehicle options will reduce air pollutant and greenhouse gas emissions to some degree. From a public health standpoint, the pollutants of greatest concern in Northern California are nitrogen oxides (NOx), volatile organic compounds (VOCs), fine particulate matter (PM2.5), and diesel particulate matter (DPM). The greatest air pollution benefits come from BEVs, which produce zero tailpipe emissions. CNG and B100 also produce large emission reductions for several pollutants; both fuels eliminate DPM. E85 and low-level biodiesel blends reduce most pollutants by 10% - 20%.

Greenhouse gas (GHG) emissions benefits depend not only the fuel and vehicle type but also on the source of the fuel. BEVs have the lowest GHG emissions – typically 65% lower than a gasoline vehicle. CNG and propane have GHG benefits in the range of 10 – 30%. The GHG benefits of E85 depend heavily on source of the ethanol. Typical corn-based ethanol has only marginal GHG benefits compared to gasoline. Ethanol made from plant waste matter can have GHG benefits as large as 60%.

Implementation Steps

For agencies that are interested in increasing use of alternative fuels, the implementation steps listed in Table ES-2 should be considered. These recommendations are based on a high-level assessment; a more detailed assessment that considers specific sites and operating environments would be needed to fully understand the benefits and drawbacks that any one alternative fuel type offers.

Table ES-2. Summary of Implementation Steps to Increase Use of Alternative Fuels

Fuel Category	Implementation Steps and Action Items
Biofuels	**E85** • Educate vehicle operators about FFVs already in fleets that can utilize E85 • Investigate modifying fueling infrastructure to install E85 by either retrofitting existing or installing new storage tanks and dispensers • Engage local retail fueling station owners and E85 infrastructure providers to determine the feasibility of expanding E85 to the general public • Identify grant opportunities to support public and private expansion of E85 **Biodiesel** • Check engine warranties to determine if any buses or heavy trucks are incompatible with low-level biodiesel blends (e.g., B5) • When renegotiating contracts with diesel suppliers, require B5 as part of the specification (assuming no engine warranty concerns) • To prepare for a future move to B20 for diesel fleets: (1) update procurement procedure to account for B20, (2) confirm engine warranties for current vehicles are covered with B20, (3) confirm existing underground storage tanks are B20 compatible and, if incompatible, (4) seek to update tanks for compatibility

Fuel Category	Implementation Steps and Action Items
Natural Gas	**Expanding Fueling Infrastructure** • Identify potential refueling station locations • Perform feasibility studies of these locations to determine station cost and proximity to current or future natural gas vehicle fleets • Investigate options for new natural gas station development (station built by local agency vs. private developer) **Overcoming Incremental Vehicle Costs** • Pursue federal, state and regional funding sources to reduce NGV incremental costs **Overcoming Unfamiliar Maintenance and Operation Procedures** • Contact the local fire marshal and utility to help identify safety guidelines • Contact other local fleets that have installed natural gas stations and maintain their own fleets to help identify any required upgrades or improvements and changes to maintenance practices • Participate in Natural Gas Transit Users Group, which shares lessons learned and problem-solving techniques; provides a technical forum for fleet maintenance staff; and communicates safety issues, codes, and standards
Electricity	**Expanding Infrastructure Deployment** • Utilize the Bay Area Plug-In Electric Vehicle Readiness Plan to identify new locations for potential public charging infrastructure • Pursue identified potential EVSE deployment funding sources **Ensuring EV Readiness for Local and Regional Governments** • Review the checklist of recommendations from the Bay Area Plug-In Electric Vehicle Readiness Plan • Identify steps to implement the prioritized items with an emphasis on (1) building codes, (2) permitting and inspection practices, and (3) zoning, parking rules and local ordinances **Deploying EVs in Municipal Fleets** • Identify potential fleets in the County interested in EVs • Perform feasibility studies for fleets, including vehicle and infrastructure costs, infrastructure and vehicle credits and rebates, and potential LCFS revenue from the sale of credits • Contact local fleets that invested in EVs and have taken advantage of federal, state, and regional credits, rebates and funding sources (such as Alameda County), to help in determine accurate costs for feasibility studies • Identify opportunities to deploy hybrid-electric vehicles for municipal fleets or transit.

1. Introduction and Background

This document is a plan for expanding the use of alternative transportation fuels in Solano County. Many local governments, transit agencies, and other vehicle owners are interested in alternative fuels because of their environmental benefits and potential to reduce dependency on petroleum. Although alternative fuel vehicles have been used by Solano County for more than a decade, the last several years have brought a wider variety of vehicle and fuel options, improvements in vehicle performance, and lower costs. This plan reviews the major choices for alternative fuels and vehicles, assesses their benefits and costs, and identifies implementation actions to help overcome barriers to greater use of alternative fuels.

Challenges and Opportunities with Alternative Fuels

Alternative transportation fuels are not entirely new. Electric-powered vehicles were first introduced in the early days of the automobile. During the energy crisis of the 1970s, alternatives to petroleum began to receive serious consideration. Vehicles were introduced that could run on alcohol-based fuels such as ethanol and methanol. During the 1990s, the State and several transit agencies experimented with operating automobiles and buses running on 85% methanol blended with 15% gasoline (M85); more than 15,000 M85 flex-fuel vehicles were on the road in California in the late 1990s. Around that time, General Motors introduced the EV-1, the first mass-produced electric vehicle from a major automaker.

Despite the public and private sector efforts over the last several decades, alternative fuels have failed to make more than a small dent in the transportation fuels market, long dominated by gasoline and diesel. These conventional fuels benefit from an extensive and efficient system of fuel production, distribution, and retailing that helps to keep gasoline and diesel convenient and relatively cheap. Vehicle manufacturers reinforce the status quo by offering the greatest variety and lowest prices for vehicles that run on gasoline and diesel. Today, alternative fuel vehicles make up only approximately 0.5% of all vehicles on the road in the United States.

While the current market share is small, there are indications that alternative fuels may be poised to gain a significant toehold in the transportation sector. State and federal mandates and incentives are helping to drive private research and development, with a goal of producing alternative fuels that are cleaner and cost-competitive. Technology advances have lowered the cost of batteries and other key components of alternative fuel vehicles. The abundant supply and low price of natural gas is generating tremendous interest from private sector fleets as well as some government fleets. To cite a few examples of these recent developments:

- Consumption of biodiesel in the United States has grown from essentially zero in 2000 to nearly 900 million gallons in 2011.
- California now has 60 retail stations selling 85% ethanol blend (E85, a blend of 85% ethanol and 15% gasoline by volume), double the number available in 2009.

- More than 50,000 plug-in electric vehicles were sold in the U.S. in 2012, up from 345 vehicles in 2010. Nearly all major automobile manufacturers will offer plug-in electric vehicles within the next several years.
- Approximately 19% of buses nationwide now operate on natural gas, and natural gas buses account for fully one-third of the new buses on order by transit agencies.

The advantages of using alternative fuels can be substantial. For many, the most compelling reason to switch to alternative fuels is the environmental benefits. Most alternative fuel vehicles produce lower emissions of particulate matter, nitrogen oxides, and other pollutants that cause air pollution and adverse public health effects. Most alternative fuel vehicles also produce fewer greenhouse gas (GHG) emissions that contribute to global climate change. In some cases, using alternative fuels, particularly natural gas and electricity, can also reduce vehicle operating costs. Even if alternative fuels do not reduce operating costs, they may be less subject to the price volatility that has plagued petroleum-based fuels in recent years and creates challenges for public agencies operating on tight budgets. Buyers of alternative fuel vehicles may also be able to take advantage of incentive funding available from federal, state, and regional public agencies.

Role of Local Governments and Other Public Agencies

Local governments and other public agencies can accelerate the transition to alternative fuels in a number of ways. By operating alternative fuel vehicles, public agencies lead by example, helping to support nascent markets and demonstrating to businesses and residents the feasibility of the vehicles. Opportunities exist to expand the use of alternative fuels among municipal fleets in Solano County, given that 85% of the county's approximately 1,400 municipal vehicles run on conventional gasoline and diesel. In some cases, limited fueling or charging infrastructure may be hindering the use of alternative fuels; in these instances, governments can help to expand the needed infrastructure through direct investment or by facilitating public and private partnerships. Local government planning and permitting actions can also encourage private sector deployment of alternative fuel infrastructure and vehicles.

While many elected officials and city staff recognize the promise of alternative fuels, the path forward is often unclear. The numerous options for alternative vehicles and fuels, and their environmental benefits, can be confusing. Further complicating the choices are the differences in fuel costs and requirements for alternative fueling infrastructure. Some options necessitate a large up-front investment, with the potential for longer-term cost savings and major environmental gains. Other options bring more modest benefits but can be achieved relatively quickly and with little capital cost.

Plan Goals and Vision

Recognizing both the potential benefits of, and obstacles to, alternative fuels for transportation, the Solano Transportation Authority (STA) Board unanimously approved the development of the first countywide plan for alternative fuels and related infrastructure for Solano County in September 2011. The STA Board identified four initial goals for the plan, which were subsequently clarified by the Alternative Fuels and Infrastructure Plan Technical Working Group. The goals are as follows:

5. Reduce greenhouse gas emissions
6. Reduce criteria pollutant emissions
7. Encourage alternative fuels and vehicle technologies that provide economic benefits to Solano County public agencies, residents, and businesses
8. Take advantage of alternative fuel funding opportunities

The Technical Working Group also agreed on the following vision for the plan:

> ***Solano County will maximize alternative fuel use where feasible to protect public health, mitigate the effects of climate change, and capture economic benefits while continuing to serve the mobility needs of the county's residents and businesses.***

This plan is intended to help local government and other public agencies to increase the use of alternative fuels within their jurisdictions and achieve the four goals identified by the STA Board. The plan should be considered a starting point and not a detailed investment strategy; any fleet or agency considering major investments in new vehicles or fueling infrastructure will likely need to conduct more specific analyses of costs and engineering feasibility. It is hoped that this plan will help to elevate interest in alternative fuels, highlight the most promising options and implementation steps, and foster new collaboration among public agencies and between the government and the private sector.

Plan Organization

The remainder of this plan is organized in four main sections.

- **Chapter 2** provides an overview of the six major transportation alternative fuels: ethanol, biodiesel, natural gas, propane, hydrogen, and electricity.
- **Chapter 3** presents a summary of the vehicle fleets owned and operated by Solano County's municipal agencies, including alternative fuel vehicles. This chapter also describes the current state of infrastructure to supply alternative fuels in the county.
- **Chapter 4** reviews the benefits and costs of alternative fuel vehicles in four categories: fleet cost impacts, air pollution and health impacts, greenhouse gas emissions impacts, and funding sources.
- **Chapter 5** presents implementation steps for achieving the plan goals, with an emphasis on near-term actions that can be led by Solano County public agencies.

The information most relevant to the four plan goals established by STA and the Technical Working Group is contained in Chapter 4.

2. Overview of Alternative Fuels for Transportation

The major alternatives to gasoline and diesel include biofuels (ethanol and biodiesel), fossil fuel alternatives (natural gas and propane), and emerging transportation energy sources (hydrogen and electricity). These fuels differ widely in terms of their sources and applications. This section provides an overview of the six major transportation alternative fuels.

2.1. Ethanol

Description

Ethanol is a renewable fuel made from various plant materials collectively referred to as *biomass*. Also known as *ethyl alcohol*, it is a clear, colorless liquid. Ethanol can be made from corn grain (typical in the United States), sugar cane (mainly in Brazil), or cellulosic feedstocks (non-food based feedstocks such as crop residues). Currently, the United States produces almost all of its ethanol from corn feedstocks, with small niche markets using other materials. Ethanol is produced largely in the Midwest, corresponding with the bulk of the nation's corn production. The U.S. ethanol industry includes more than 200 operational production facilities and a number of facilities currently under construction.[1]

Cellulosic ethanol is produced from dedicated energy crops, such as wood chips or crop residues. While it is more difficult to release the sugars in these feedstocks for ethanol production, they offer several advantages over starch and sugar crops. Cellulosic feedstocks are more abundant and can include waste products or feedstocks that can be grown on land not appropriate for other crops. In addition, less energy is required to grow, collect, and convert these feedstocks to ethanol. Researchers are currently addressing challenges associated with cellulosic ethanol production. For example, enzymes and microbes are currently under development that can accelerate deconstruction of cellulosic biomass into the sugars used for ethanol production.

Ethanol's octane number is greater than gasoline, making it ideal for blending with gasoline (octane increases vehicle power and performance). The energy content of ethanol is less than that of gasoline; 1 gallon of pure ethanol (E100) contains approximately 34% less energy than 1 gallon of gasoline.

More than 95% of gasoline used for transportation in the United States contains up to 10% ethanol to boost octane levels, meet air quality requirements, or satisfy mandates such as the U.S. Environmental Protection Agency's (EPA's) Renewable Fuel Standard. E10 (gasoline mixed with 10% ethanol) can be used in any gasoline-powered vehicle. Other low-level blends of ethanol are also available, and E15 was

recently approved by EPA for use in conventional gasoline vehicles that are model years 2001 and newer.

While the use of ethanol in the California retail motor fuels market is largely dominated by E10, more ethanol is being introduced into California (and the United States in general) through the expansion of E85. The remainder of this report focuses on these higher level ethanol blends.

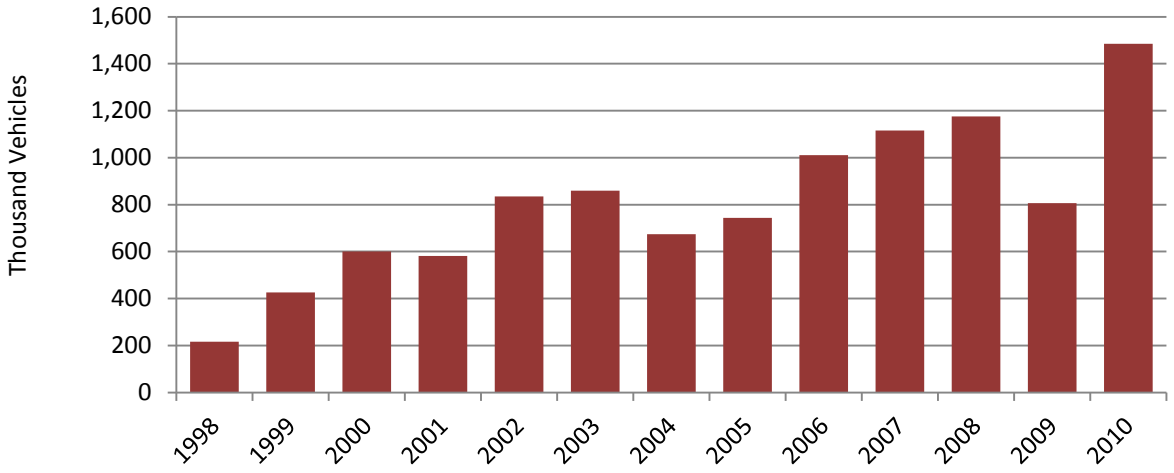
Current Uses

Ethanol is used as a substitute for conventional gasoline in light-duty vehicle (LDV) applications. While low-level blends can be used in gasoline-powered vehicles without alterations, E85 has different properties than gasoline. Consequently, only automobiles with compatible fuel systems and powertrain calibration can operate using the fuel. These vehicles are referred to as flexible fuel vehicles (FFVs). FFVs have an internal combustion engine (ICE) and are capable of operating on gasoline, E85, or a mixture of the two. From the driver's perspective, the only difference between FFVs and conventional gasoline-powered vehicles is the reduced fuel economy when using E85 or other mid-level blends. Gasoline-powered vehicles can be converted to FFVs, although it requires extensive modifications to the original vehicle.

FFVs are widely available from nearly every major auto manufacturer, in part because manufacturers are able to earn credits toward the federal corporate average fuel economy (CAFE) standards by selling FFVs. Ford, Chrysler, and General Motors offer the widest variety of FFVs. Most models of pickups, sport utility vehicles (SUVs), and vans, as well as many sedans, are available with an FFV option. The price of a new FFV is typically similar or identical to its gasoline counterpart.

Figure 2-1 shows the growth in the number of on-road FFVs that were sold, leased, or converted in the United States between 1998 and 2010. Presently, E85 FFVs account for two of every three alternative fuel vehicles in use nationwide. It is important to note, however, that many (perhaps most) FFVs are fueled primarily with gasoline.

Figure 2-1. E85 Flexible Fuel Vehicles Sold, Leased, or Converted per Year in the U.S. (1998–2010)



Source: Alternative Fuels Data Center, http://www.afdc.energy.gov/

In California, it is estimated that approximately 360,000 FFVs are currently using E85 (see Table 2-1). The FFVs are spread throughout all counties and account for 1–2% of all LDVs in each county.

Table 2-1. E85 Flexible Fuel Vehicle Population in California

Vehicle Class	Flexible Fuel Vehicles	All Vehicles	%
Passenger car	62,376	14,106,362	0.4%
Sport utility vehicle	128,658	5,368,323	2.4%
Van	50,884	1,816,770	2.8%
Pickup truck	121,012	4,135,251	2.9%
Total	**362,930**	**25,426,706**	**1.4%**

Source: ICF International, 2011, "Technical Analysis for Alternative and Renewable Fuel and Vehicle Technology Program, Task 2—Evaluate Alternative and Renewable Fuel Infrastructure and Distribution Development for E85." Prepared for the California Energy Commission, June

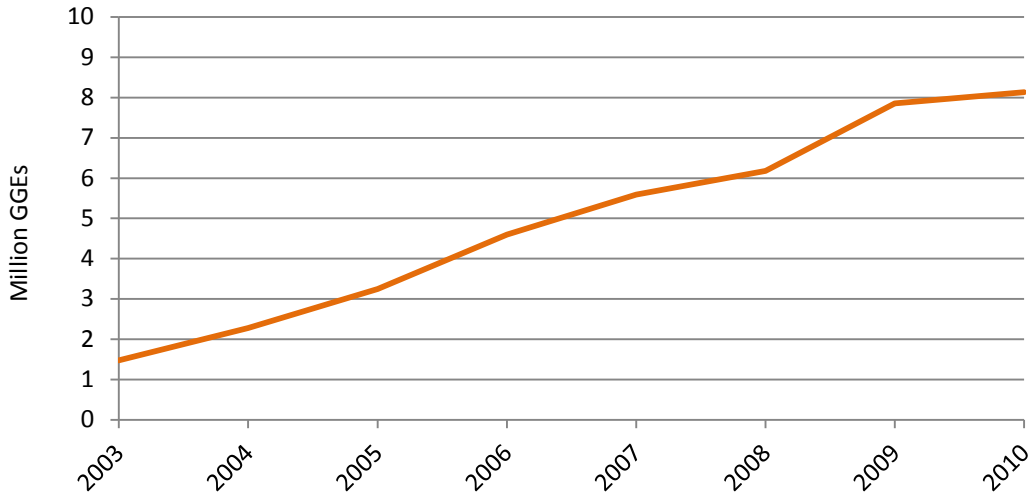
In Solano County, local governments currently operate more than 130 FFVs, including 120 FFVs owned by the County. Solano County's Corporation Yard #1 includes an E85 fueling facility (shown below).

E85 Fueling Facility at Solano County Corporate Yard

Fuel Supply, Demand, and Price

In 2010, the total amount of E85 consumed in California was 8,134,000 gasoline gallon equivalents (GGE), or approximately 0.4% of total gasoline consumption.[2] Consumption of E85 in California has increased five-fold between 2003 and 2010, as illustrated in Figure 2-2. Despite the strong growth in E85 consumption, however, use of the fuel is still dwarfed by other alternative transportation fuels. E85 accounts for only 6% of total alternative transportation fuel use in California, on a GGE basis.

Figure 2-2. E85 Consumption by Motor Vehicles in California (2003–2010)

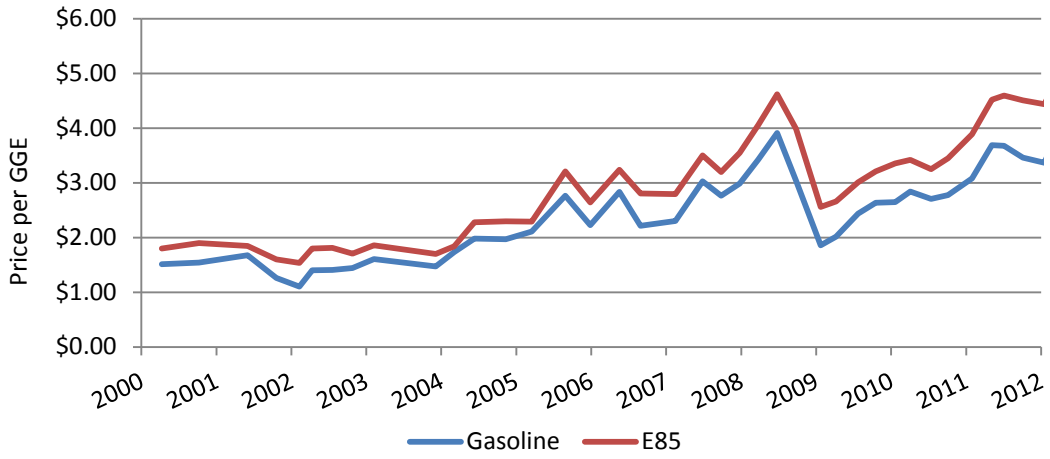


Source: Alternative Fuels Data Center, http://www.afdc.energy.gov/

As of January 2013, the average price for E85 on the West Coast was $3.34/gallon.[3] As mentioned above, 1 gallon of E85 contains less energy than 1 gallon of gasoline; therefore, using E85 results in a lower fuel economy compared to gasoline, amounting to an approximately 25% decrease in miles per

gallon. Since 2000, the price of E85 has generally followed retail gasoline prices (see Figure 2-3). The prices shown for E85 have been adjusted to account for the lower energy content of ethanol.

Figure 2-3. Price of E85 and Gasoline, Nationwide (2000–2012)



Source: Alternative Fuels Data Center, http://www.afdc.energy.gov/

2.2. Biodiesel

Description

Biodiesel is a renewable fuel made by reacting animal or vegetable fats with alcohol. Approximately 70% of the nation's biodiesel is produced in the Midwest, where soybean oil is the dominant biodiesel feedstock.[4] California currently has six biodiesel producers, with total capacity of 90 million gallons per year (approximately 5% of the total U.S. production capacity). Most California plants have multi-feedstock capabilities and use a variety of feedstocks, including waste cooking oils, waste animal fats, and waste corn oil from ethanol production.[5] Currently, California' biodiesel comes primarily from waste oils.[6]

Most biodiesel is used in low-level blends, usually as 5% or 20% biodiesel blended with conventional diesel, referred to as B5 or B20, respectively. B20 is the most common blend in the United States as it provides good cold-weather performance, is generally cost effective, and can be used in most engines without modification. Pure biodiesel (B100) is available in the marketplace and can be used in some engines without modification, although equipment changes may be necessary in other engines.

Approximately 80 fueling stations are currently selling B20 or higher level blends in California. Of these, approximately 50 stations are available to the public; the remaining stations primarily are operated by federal government fleets. The only station currently dispensing B20 in Solano County is at Travis Air Force Base.

Uses and Applications

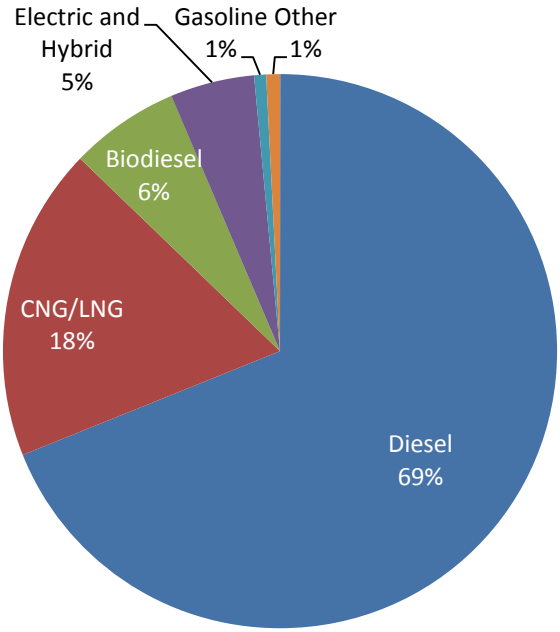
In contrast to most other alternative fuels, biodiesel does not require a specific alternative fuel vehicle. Depending on the blend level, biodiesel can be used in most conventional diesel vehicles. High-level blends tend to have a solvent effect that cleans a vehicle's fuel system and releases deposits accumulated from previous petroleum diesel use. Once released, these deposits may initially clog filters and require filter replacement in the first few tanks of high-level biodiesel blends. As such, vehicle operators should consult their vehicle and engine warranty statements before using biodiesel, particularly before using biodiesel blends higher than B5.

Biodiesel can have a limited shelf life due to factors such as contamination and exposure to air, extreme temperatures, and additives. Shelf life issues are a greater concern with higher blends. Proper fuel management can dramatically extend biodiesel's shelf-life to a year or more, which is on par with conventional diesel.

A majority of the biodiesel used in the United States is consumed by commercial fleets and government entities, including transit agencies, waste haulers, and school districts. The San Francisco Municipal Transportation Authority operates more than 500 vehicles (mostly transit buses) on biodiesel (B20), making up the largest municipal biodiesel fleet in the nation.[7] The California Department of Transportation (Caltrans) fuels most of its diesel fleet with B5, and more than 500 of the San Diego Unified School District school buses will run on biodiesel blends by 2015.[8] Figure 2-4 shows that, as of 2009, 6% of transit buses nationwide were using biodiesel in some blend. More recent information from the American Public Transportation Association suggests that this fraction is now closer to 8%.[9]

B20 is the common blend, and most heavy-duty diesel engine manufacturers state that using up to B20 will not void engine warranties. Many fleets have successfully used B50 to B99 blends for several years or more.[10] In 2008, the American Society for Testing and Materials adopted biodiesel standards for blends up to B20 and for B99.

Figure 2-4. Alternative Fuel Transit Buses in Service, Nationwide (2009)



Source: American Public Transportation Association, 2011, "Fact Book"

Solano County uses B5 (5% biodiesel blend) in all of its 22 diesel vehicles, which are fueled at the County Corporation Yard. The County has plans to increase biodiesel blend levels to B10 or B20 in the near future.

Fuel Supply, Demand, and Price

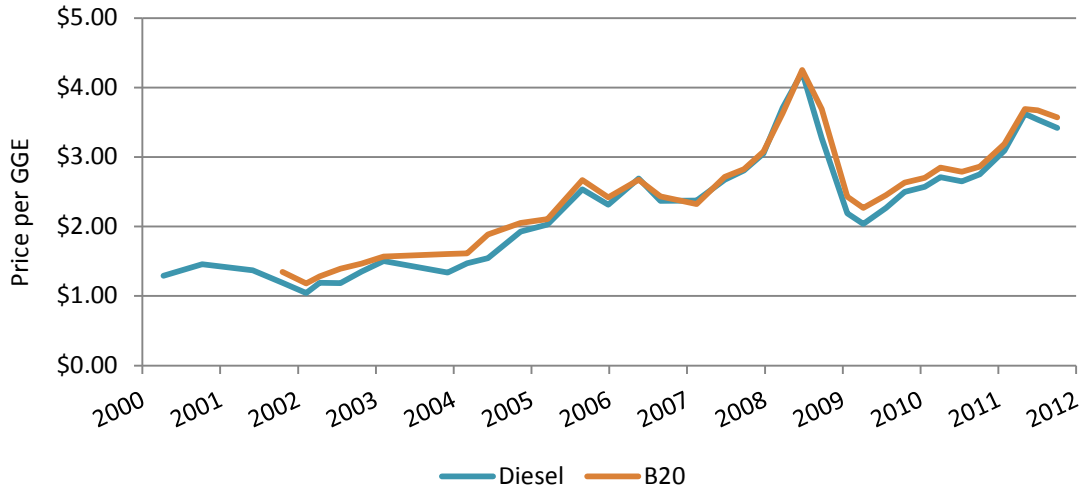
Total U.S. biodiesel consumption in 2011 was 878 million gallons, or 1.5% of all diesel fuel consumed.[11] While biodiesel accounts for only a small fraction of all diesel used, biodiesel consumption in 2011 reflects more than a three-fold increase over 2010 levels.

Growth over the last decade has generally been strong; however, production and consumption of biodiesel has fluctuated widely in the last several years, due in part to changes in tax laws. In 2008, U.S.-based producers generated approximately 678 million gallons of biodiesel. This production level fell to 311 million gallons in 2010, largely due to the temporary expiration of the $1.00-per-gallon federal tax credit for biodiesel blenders. The credit was allowed to expire on December 31, 2009, and resulted in a 49% drop in biodiesel production between 2008 and 2010. The credit was retroactively reinstated in December 2010. In 2011, the biodiesel industry saw record-breaking biodiesel production, which was also supported by EPA's revised Renewable Fuel Standard (RFS2) volume requirements. The biodiesel tax credit was renewed again in January 2013.

On the West Coast, the average price for biodiesel (B20) as of January 2013 was $4.19/gallon, approximately 2% higher than the average West Coast price of diesel ($4.11/gallon). Since 2002, B20 prices have closely tracked diesel prices, typically with a small price premium. Figure 2-5 compares the price of B20 and diesel nationwide from 2000 to 2012. As noted above, the federal $1.00-per-gallon

retailer tax credit expired on December 31, 2011. While biodiesel prices have continued to shadow conventional fuel prices in 2012, expiration of the tax credit could result in a more dramatic affect if diesel prices come down. Biodiesel does contain approximately 8% less energy than petroleum diesel, which translates to a 1–2% difference when using B20; however, most users report no noticeable difference in fuel economy.

Figure 2-5. Price of B20 and Diesel, Nationwide (2000–2012)



Source: Alternative Fuels Data Center, http://www.afdc.energy.gov/

Greater use of biodiesel has been constrained by California's limited distribution and local fueling infrastructure, and the current price disparity between biodiesel and ultra-low sulfur diesel (ULSD), which is required in California.[12]

2.3. Natural Gas

Description

Natural gas is an odorless, gaseous mixture of hydrocarbons, predominantly composed of methane (CH_4). One-quarter of the energy used in the United States is produced by natural gas. With plentiful reserves bolstered by newly accessible gas in shale formations, natural gas is a reliable, primarily domestic source of clean-burning fuel. Natural gas is typically extracted from gas and oil wells, as well as from supplemental sources such as biomass and coal. Gas trapped in reservoirs is extracted through drilling. Advances in hydraulic fracturing technologies have provided access to large volumes of natural gas from shale formations. In addition, natural gas can be derived from biogas, which is produced through anaerobic digestion of organic matter in biomass waste materials.

California receives most of its natural gas supply from Arizona, Nevada, and Oregon, with approximately 15% of the natural gas supply coming from in-state sources.

Natural gas in compressed (CNG) or liquefied (LNG) form has been used as transportation fuel in California for more than 20 years. The high octane number of natural gas makes it suitable for spark ignition (gasoline) engines with some modifications. Heavy-duty natural gas vehicles are also available. Some use spark ignition natural gas systems, while others use high-pressure direct injection in a compression ignition (diesel) cycle.

CNG is stored onboard a vehicle in cylinders pressurized at 3,000–3,600 pounds per square inch (psi). A CNG-powered vehicle has a similar fuel economy to a gasoline vehicle on a GGE basis, with a GGE equal to approximately 5.66 pounds of CNG. CNG is used in light-, medium-, and heavy-duty vehicles (HDVs).

Purifying natural gas and super-cooling it to -260°F creates LNG. Because it must be kept at cold temperatures, LNG is stored in double-walled, vacuum-insulated pressure vessels. Liquid is more dense than gas (CNG), so LNG is beneficial for vehicles that require a longer driving range—as more energy can be stored by volume in an LNG tank. As such, LNG is typically used in medium- and heavy-duty vehicles. A gallon of LNG has approximately 66% of the energy in a gallon of gasoline; consequently, a GGE equals approximately 1.5 gallons of LNG.

California has been a leader in natural gas vehicles and currently accounts for approximately one-half of the nation's use of natural gas for transportation. Moreover, demand for natural gas as a transportation fuel has been growing rapidly, due in part to the price advantages (discussed below). Approximately 250 CNG stations and 12 LNG stations are located in the state. Most CNG fueling stations compress the gas on site. Only a few large-scale liquefaction facilities provide LNG fuel for transportation nationwide; otherwise, LNG must be delivered to stations by truck.

Uses and Applications

Natural gas can be used in virtually all types of on-road vehicles. There are actually three different types of natural gas vehicles (NGVs):

- Dedicated, which run only on natural gas;
- Bi-fuel, which use natural gas or gasoline; and
- Dual-fuel, which run on natural gas and use diesel for ignition assistance.

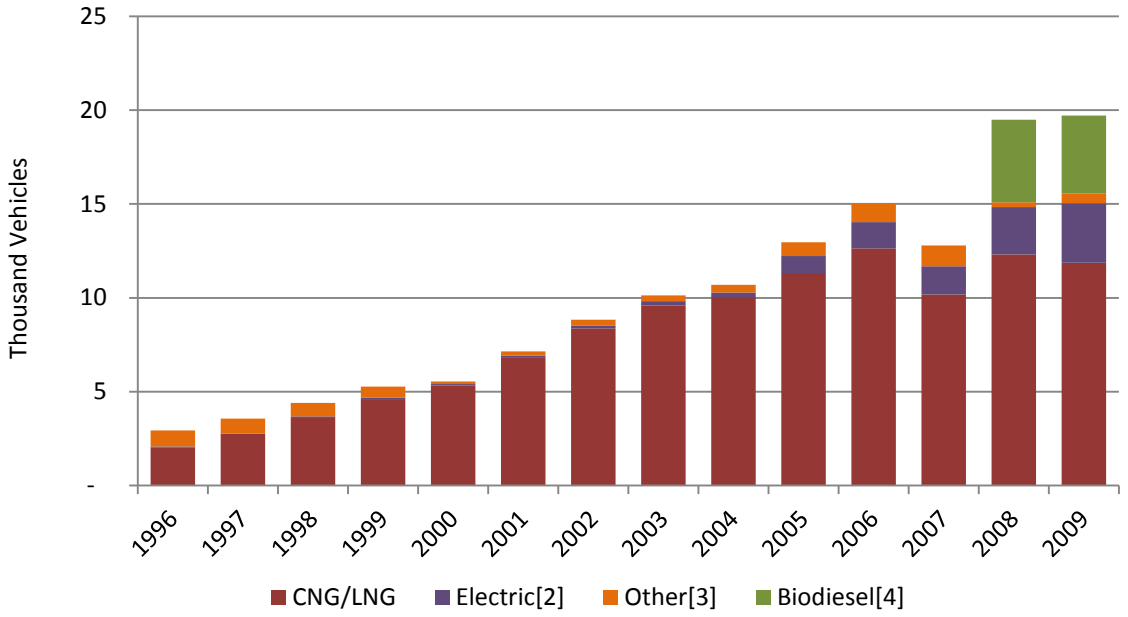
Dual-fuel vehicles are traditionally limited to HDVs. Dedicated NGVs tend to demonstrate better performance and produce lower emissions than bi-fuel vehicles. Because dedicated NGVs have only one fuel tank, they weigh less than bi-fuel NGVs and offer more cargo capacity. Although extra storage tanks can increase the range of an NGV, the additional weight may decrease the amount of cargo the vehicle can carry.

For light-duty uses, the only natural gas vehicle currently available from an original equipment manufacturer (OEM) is the CNG Honda Civic. More models are available for medium-duty truck and van applications. For example, a 2013 GMC Savana cargo van is available in a CNG version.[13] Many of the other on-road NGVs in use today are conversions.

For medium- and heavy-duty trucks, natural gas options are widely available. For example, medium-duty natural gas trucks are available from Ford, Freightliner, Kenworth, and Peterbilt, among others. Natural gas street sweepers and refuse trucks are produced by several manufacturers.

Among transit buses, natural gas has been the dominant alternative fuel. Approximately 12,000 natural gas transit buses are in operation nationwide, or 19% of the national bus fleet. As of 2010, transit agencies in California used an estimated 5,138 CNG and 327 LNG vehicles.[14] The Los Angeles County Metropolitan Transportation Authority contributes significantly to this count, with over 2,200 CNG transit buses in their fleet; these buses have logged over 1 billion miles.[15] Figure 2-6 shows the number of alternative fuel transit buses operating nationwide, from 1996 to 2009, as collected by the U.S. Energy Information Administration (EIA).

Figure 2-6. Alternative Fuel Transit Buses, Nationwide (1996–2009)



Notes: [1] Data not continuous between 2006 and 2007 due to new data sources and improved accuracy; [2] "Electric" includes catenary-electric, battery-electric, and hybrid-electric; [3] "Other" category includes propane, hydrogen, biodiesel (until 2008), and various blends; [4] "Biodiesel" category was counted in "Other" until 2008.

Source: American Public Transportation Association, Fact Book, 2011, http://www.apta.com/resources/statistics/Documents/FactBook/2011_Fact_Book_Appendix_A.pdf

In Solano County, Vacaville has been a leader and an award winner in the use of alternative fuels, especially natural gas, for transportation. Vacaville City Coach opted to transition to CNG for its bus fleet approximately 10 years ago, partly in response to the ARB "Fleet Rule for Transit Agencies," which required transit agencies to select a "diesel path" or "alternative fuels path" to comply with more stringent emissions standards for buses. All of the Vacaville's 15 full-size buses now run on CNG. In addition, Vacaville has been incorporating CNG sedans and pick-ups into its fleet, and currently has 15 CNG light duty vehicles. The city operates its own CNG fueling facility, and recently entered into

agreement to sell CNG to Vacaville's private refuse hauling fleet. Suisun City also operates a CNG pick-up truck.

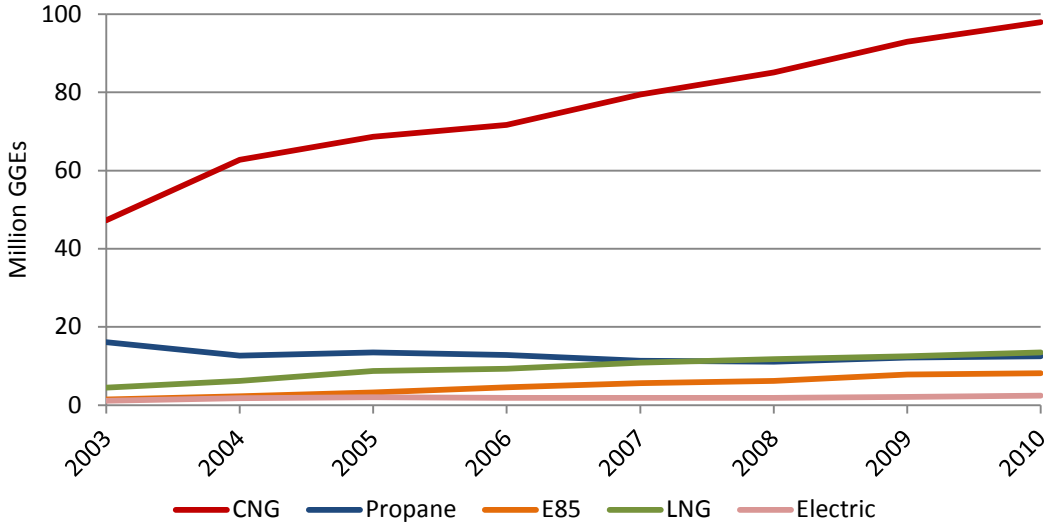
Vacaville City Coach CNG Bus

Vacaville CNG Honda Civic

Fuel Supply, Demand, and Price

Over the last decade, use of natural gas for transportation has grown significantly and continues to do so. Figure 2-7 shows that transportation natural gas consumption has doubled since 2003.

Figure 2-7. Consumption of Alternative Fuels in the Transportation Sector in California (2003–2010)

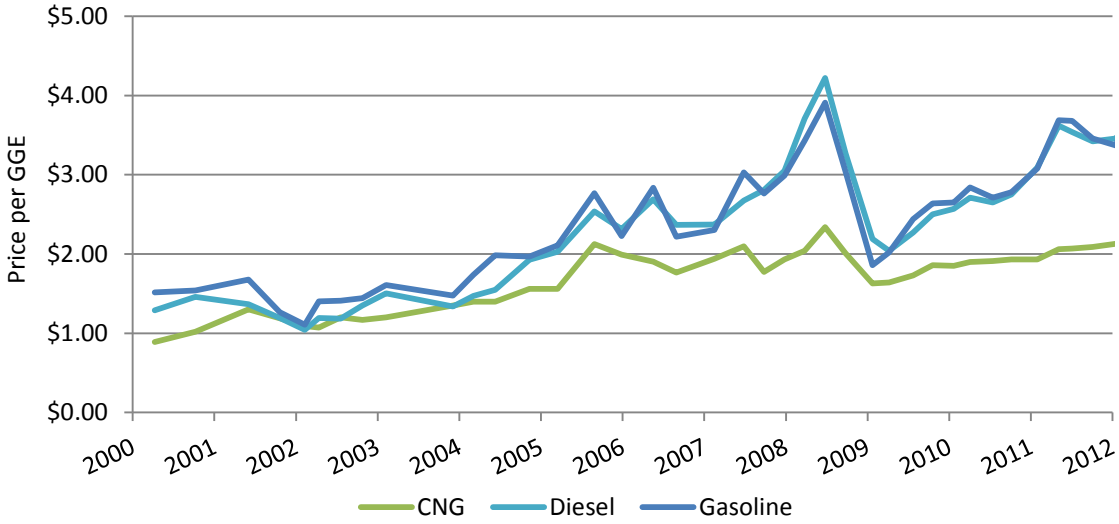


The strong interest in natural gas is due primarily to its price advantage over gasoline and diesel. As of January 2013, the average retail price for CNG on the West Coast was $2.39/GGE, compared to $3.54/gallon for gasoline and $4.11/gallon for diesel. A CNG-powered vehicle has approximately the same fuel economy as a conventional gasoline-powered vehicle on a GGE basis. Figure 2-8 shows that

the price of CNG has remained relatively steady since 2000, while conventional fuel prices have fluctuated dramatically at times and increased overall.

For a fleet with its own CNG fueling station, natural gas prices are often much lower than retail. The station operator typically purchases bulk natural gas from the utility (e.g., Pacific Gas and Electric Company [PG&E]) and compresses the gas on site. The bulk purchase price for natural gas is in the range of $0.80–$0.90 per GGE, or approximately one-quarter the price of gasoline.

Figure 2-8. Retail Price of Natural Gas, Diesel, and Gasoline, Nationwide (2000–2012)



Source: Alternative Fuels Data Center, http://www.afdc.energy.gov/

2.4. Propane

Description

Liquefied petroleum gas (LPG) is commonly referred to as *propane. Autogas* is another term specific to propane used in transportation. Propane turns into a colorless, odorless liquid when stored under pressure inside a tank. As pressure is released, the liquid propane vaporizes and turns into a gas, which is used for combustion. Propane presents no threat to soil, surface water, or groundwater. Additionally, propane has a high octane rating, which allows for increased vehicle power and performance.

Nearly all U.S. propane supply is produced in North America either as a byproduct of natural gas processing or by crude oil refining. Pipelines, railroads, barges, trucks, and tanker ships are used to ship propane from its points of production to bulk distribution terminals. Trucks are filled at the terminals, and propane dealers then distribute propane to end users, which include retail fuel sites. Currently, approximately 230 propane stations are found in California, the majority of which are available to the public. Public propane fueling locations in California are located at large propane distributor facilities

such as AmeriGas, Ferrellgas, and Suburban Propane; smaller propane distributor locations; U-Haul facilities; and conventional fueling locations.

Uses and Applications

Propane is mainly used in light-duty pickup trucks, taxis, medium-duty vans, and heavy-duty school buses. Propane is well suited for spark ignition engines, and gasoline engines can be converted relatively easily to use propane. The high octane rating of propane (104–112 compared to 87–92 for gasoline), combined with low carbon and oil contamination characteristics, results in engine life that can last up to two times longer than a gasoline engine. Propane can be stored onboard a vehicle as a liquid at a low pressure—between 100 and 200 psi, allowing for refueling times comparable to gasoline refueling.

The cruising speed, power, and acceleration of propane vehicles are similar to those of gasoline-powered vehicles. Propane has approximately 73% the energy content of gasoline per gallon; therefore, the typical range of an LDV equipped with a 20-gallon tank is approximately 250 miles. Driving range can be increased by adding additional storage tanks; however, the added weight displaces payload capacity.

Because few propane vehicles are offered by OEMs, propane normally requires conversion of a gasoline vehicle. Companies providing propane conversions include Baytech Corporation, Bi-Phase Technologies, CleanFuel USA, Emissions Solutions, Inc., and Roush CleanTech.

Propane has a small niche among transit fleets. As of 2010, an estimated 742 propane buses were in use in California. California transit agencies operate a total of 18 propane vehicles; the remaining buses are operated by school districts, other local government agencies, and private fleets.[16] For example, in addition to their extensive CNG bus fleet, Los Angeles County Unified School District operates 126 propane school buses.[17]

Propane can also be well suited to off-road applications such as fork lifts, commercial mowers and other grounds maintenance equipment, and airport ground support equipment.

Solano County owns and operates 6 propane pick-up trucks. The County's Corporation Yard includes a propane refueling facility (shown below).

Solano County's Propane Fueling Station

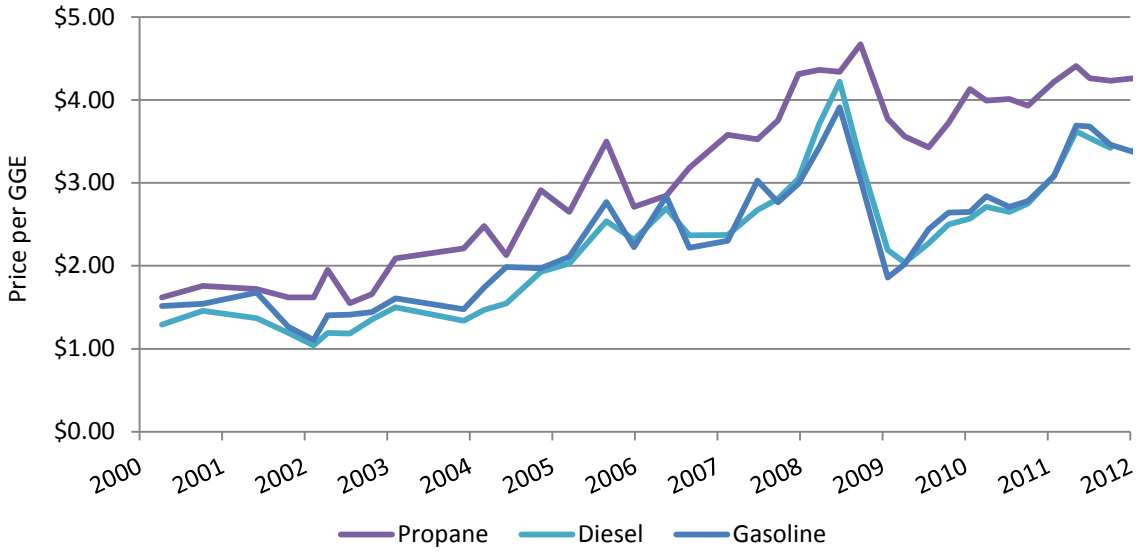
Fuel Supply, Demand, and Price

Motor vehicles in California used 12 million GGEs of propane in 2010, or 0.1% of total gasoline use in the state. Propane consumption for transportation has steadily declined in recent years, due in part to limited vehicle offerings, limited fueling stations, and heightened interest in other alternative fuels. Nationwide, 2010 propane consumption for transportation was 44% lower than in 2003.

As of January 2013, the average price for propane on the West Coast was $2.93/gallon, compared to $3.54/gallon for gasoline. Note that these propane prices are reflective primarily of public stations reporting to the U.S. Department of Energy's (DOE's) Clean Cities Program. Private refueling station prices are generally lower, and a dedicated transportation fleet using propane could likely secure lower prices. In January 2013, the price for propane at private fueling stations was 20% lower than at public fueling stations.

As noted above, the energy content of propane fuel is approximately 73% of that of gasoline. This energy content difference is reflected in vehicle fuel economy. Propane vehicle providers report that the new liquid injection technologies appear to have only a 10–15% fuel efficiency disadvantage in practice, although there is currently no independent verification of these claims. Over the last several years, the price gap between propane and gasoline has narrowed; on a GGE basis, the two fuels are now quite similar in price, as shown in Figure 2-9.[18]

Figure 2-9. Price of Propane, Diesel, and Gasoline, Nationwide (2000–2012)



Source: Alternative Fuels Data Center, http://www.afdc.energy.gov/

2.5. Hydrogen

Description

Hydrogen (H_2) is a colorless, odorless gas at earth-surface temperatures; however, it is rarely found in nature alone and is usually bonded with other elements. Hydrogen is found in large quantities in water (H_2O), hydrocarbons (such as methane), and other organic matter.

Presently, hydrogen is not widely used as a transportation fuel. Extensive government and industry research and development are focused on hydrogen production and hydrogen fuel cell vehicles (FCVs). The energy content in 2.2 pounds (1 kilogram) of hydrogen gas is approximately the same as the energy content in 1 gallon of gasoline. To ensure that FCVs have a driving range comparable to conventional vehicles, it is essential that an FCV store enough fuel on board to make up for hydrogen's low volumetric energy density. While some hydrogen storage technologies are currently undergoing additional research and demonstration, the majority of storage technologies are still under development—including bonding of hydrogen chemically with a material such as metal hydride. Hydrogen storage technologies currently undergoing demonstration include compressing gaseous hydrogen in high-pressure tanks at up to 10,000 psi and cooling liquid hydrogen cryogenically to -423°F (-253°C) in insulated tanks.

Most hydrogen used in the United States is produced near its end use location, typically at large industrial sites. Because there is no widespread demand for hydrogen as a transportation fuel, an effective hydrogen distribution system (e.g., a pipeline) has yet to be created for widespread use of FCVs. Of the approximately 50 hydrogen fueling stations in the United States, 23 are in California, and few are open to the public.[19] Hydrogen infrastructure development in California was bolstered by the California Hydrogen Highway Network Project, an effort introduced in 2004 to develop public hydrogen

fueling stations in the state. The project has focused on cluster areas, including Los Angeles County, Orange County, Sacramento, and the San Francisco Bay Area. Currently, eight public hydrogen stations are located in the state—one in Emeryville and seven in Southern California.[20]

Most of the existing stations produce hydrogen using on-site electrolysis, with several using "green" electricity to power the electrolyzer. Several stations produce hydrogen using on-site solar arrays to power the electrolyzer. In addition, several stations plan to generate hydrogen in the future using on-site steam methane reformation. This development will largely depend on the stations transitioning toward a mass market opportunity, rather than a niche market that serves fewer than 10 vehicles.

Uses and Applications

Hydrogen can be used as a fuel in both LDV and HDV applications. For years, hydrogen in FCVs has been considered attractive because of its zero tailpipe emissions, high efficiency, and fuel source diversity. For transportation, hydrogen is currently used primarily as a compressed gas, stored at 5,000 psi in both passenger car and transit bus applications. Although hydrogen FCVs have been under development since the 1970s, efforts to develop a pathway to commercialization took off in the late 1990s with investments from automakers, European and Japanese governments, and DOE.

The two main vehicle strategies are use of hydrogen fuel in an ICE vehicle or in an FCV. The main benefit of the ICE is the relatively low cost of converting a gasoline or diesel engine to use hydrogen. However, the amount of hydrogen that can be carried onboard an ICE vehicle in terms of energy content is quite small, equivalent to approximately only 4–5 gallons of gasoline. This makes the range of a hydrogen-fueled ICE vehicle quite low. Consequently, there has not been much interest in the hydrogen ICE vehicle. Nevertheless, it may be a bridging technology for FCVs.

In FCV applications, the fuel cells generate electricity by using hydrogen as a fuel in an electrochemical process. This electricity generated by a stack of cells is then used to drive an electric motor, which drives the vehicle. In some cases, the electric motors driving the vehicle are powered solely by a fuel cell, while others use a hybrid drive system that includes a battery pack or other power source for peaking requirements. This results in a zero emission vehicle, where the only exhaust products are water and heat.

Significant challenges with respect to cost and durability of the hydrogen FCV must be resolved before mass production is possible. While no light-duty hydrogen FCVs are commercially available on a nationwide basis at this time, Honda has begun leasing its FCX Clarity sedan to residents in Southern California (Torrance, Santa Monica, and Irvine). The company plans to lease 200 of the vehicles in the first 3 years of its program. In addition, Mercedes-Benz is planning a limited leasing program for their B-Class F-Cell vehicle in the Los Angeles and San Francisco Bay areas.[21]

Hydrogen buses are currently being tested in transit applications in California. A fuel cell bus demonstration project funded by DOE placed buses into revenue service at the Alameda-Contra Costa Transit District (AC Transit), Santa Clara Valley Transportation Authority, and SunLine Transit Agency in the Coachella Valley. Data collected from the buses involved in this effort have helped to evaluate FCV performance, emissions, costs, and operating characteristics.[22] AC Transit is now taking delivery of 12 new fuel cell buses with more sophisticated power systems.

Fuel Supply, Demand, and Price

Hydrogen is an emerging fuel, and little is currently used in the transportation sector. Thus, fuel supply, demand, and price information are not comparable to information available for other fuels. The outlook for hydrogen vehicles is a long-term vision based on low carbon production options, zero tailpipe emissions, and the benefits of an electric drive system.

The market penetration of FCVs is affected by California's zero emission vehicles (ZEV) mandate, since battery electric vehicles (BEVs) and FCVs are the only technologies able to receive pure ZEV credits. In the near term (2012), the number of hydrogen LDVs being leased and tested in California is expected to reach approximately 200–300. Several auto manufacturers anticipate a 2015–2018 timeframe for FCV commercialization but, because of the underdeveloped fueling infrastructure, it is unclear how accepting consumers will be of these offerings.

In addition, California's zero emission bus (ZBus) regulation may affect market penetration, particularly in urban bus fleets. Under this regulation, beginning in 2011, transit agencies with a fleet of 200 or more urban buses must ensure that 15% of their new annual bus purchases are zero emission buses. In January 2010, the California Air Resources Board (ARB) postponed implementation of this regulation until the agency develops and approves new purchase requirements.

The DOE and others, including the California Fuel Cell Partnership and the California Energy Commission (CEC), have examined the long-term cost targets, with projections of $3–$6 per kilogram as a retail price. DOE's target price is $2–$4 per GGE, delivered and untaxed—a value at which hydrogen is competitive with gasoline.

2.6. Electricity

Description

Electricity can be used to power all-electric vehicles (also referred to as battery electric vehicles or BEVs) and plug-in hybrid electric vehicles (PHEVs), collectively known as electric vehicles (EVs). All EVs draw electricity from off-board electrical power sources (i.e., the electricity grid) and store the energy in batteries. In a BEV, the battery powers the motor. PHEVs also have an electric motor that uses energy stored in a battery, as well as an ICE that can run on conventional or alternative fuel.

Although technically they do not use alternative fuels, hybrid electric vehicles (HEVs) are an advanced technology that can accomplish many of the same objectives as alternative fuel vehicles, including emissions reduction and fuel savings. Hybrid electric technology increases vehicle efficiency by

introducing an electric motor and generator, an energy storage device (e.g., a battery), and power electronics. The electric motor and generator absorb energy via regenerative braking and store that energy in a battery to offset the acceleration and power demands of the vehicle. HEVs reduce petroleum consumption but do not utilize grid electricity to offset addition petroleum fuel consumption.

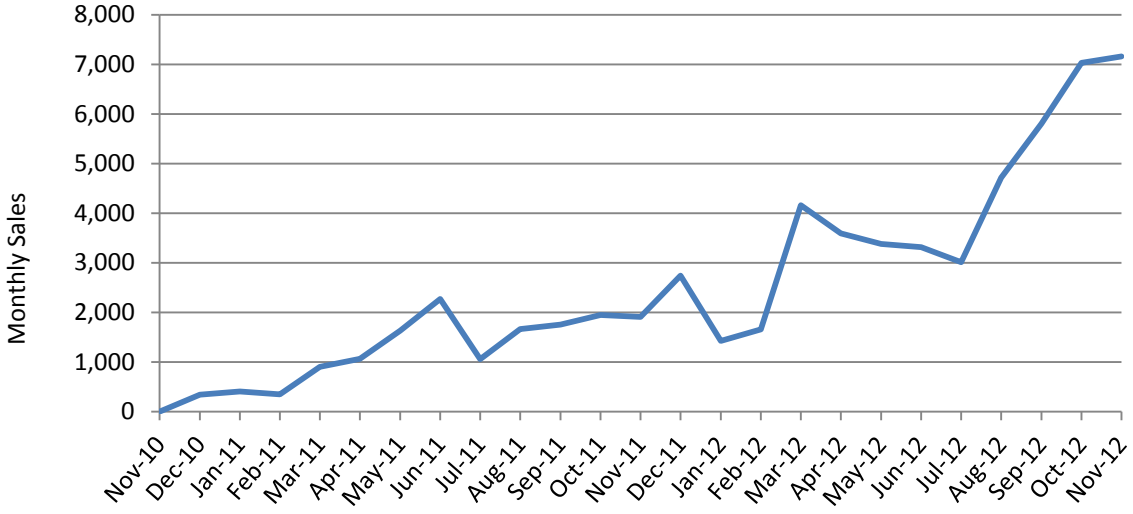
EVs are charged by plugging into EV-charging infrastructure. This equipment is classified by the rate or speed at which the batteries are charged. Charging times vary and can range from 15 minutes to 20 hours or more, depending on factors such as battery size and type, and the type of charging equipment used. Today, three types of equipment are in use, with others under development. Level 1 chargers use a 120-volt (V) alternating current (AC) plug. Level 2 chargers are rated at less than or equal to 240-V AC. Direct current (DC) fast charging has a 480-V input. In addition, inductive charging uses an electromagnetic field to transfer electricity to an EV without a cord; this is still being used in certain areas where it was installed for EVs in the 1990s.

Currently, more than 12,000 EV charging outlets are located across the country, and at least 2,800 are in California (not including residential infrastructure).[23] Infrastructure expansion is occurring rapidly, a trend that is expected to continue.

Uses and Applications

Both heavy-duty and light-duty EVs are commercially available, although the current focus is on the light-duty market. Since 2010, several manufacturers have begun to introduce light-duty BEV and PHEV models, and more vehicle models are expected to be released in 2013 and 2014. Figure 2-10 shows the number of EVs that were sold in the United States between November 2010 and November 2012, not including low-speed or neighborhood electric vehicles. As manufacturers increase their model year offerings, sales are expected to increase. EVs currently make up 0.6% of all U.S. light-duty vehicle sales.

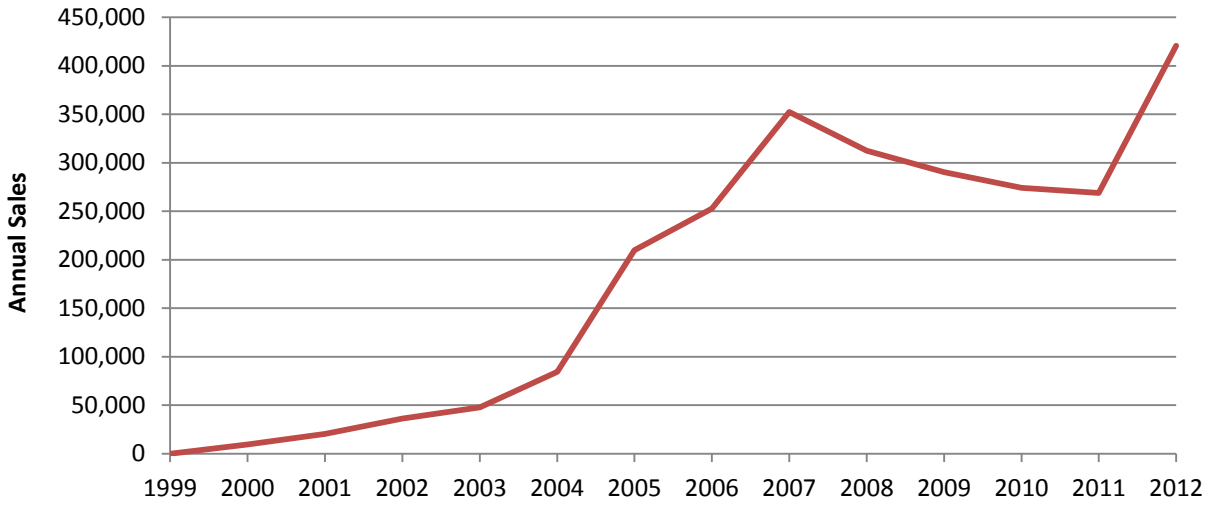
Figure 2-10. Monthly Electric Vehicle Sales in the United States (November 2010 – November 2012)



Source: www.hybridcars.com, Hybrid Market Dashboard

HEVs were first sold in the United States in 2000, when the Toyota Prius and Honda Insight were introduced into the U.S. market. HEV sales grew rapidly between 2003 and 2007, topping 350,000 vehicles in 2007, and then declined somewhat along with the broader U.S. automobile market, as shown in Figure 2-11. HEV sales picked up in 2012, topping 400,000 vehicle sales. HEVs currently make up approximately 3% of all U.S. light-duty vehicle sales.

Figure 2-11. Annual Hybrid Electric Vehicle Sales in the United States (1999–2012)



Source: Alternative Fuels Data Center, http://www.afdc.energy.gov; www.hybridcars.com

Hybrid electric medium- and heavy-duty trucks have been introduced only in the last several years, although all major truck makers now offer HEVs. Nationwide, approximately 4,000 HEV medium- and heavy-duty trucks are in use. Many of these are in California, due in part to ARB's Hybrid Truck and Bus Voucher Incentive Project (HVIP).

Electric buses are currently being used by a number of transit agencies in California. Trolley buses powered by electricity from overhead wires have been used in San Francisco for several decades. These buses have auxiliary power units allowing them to travel off-wire for several blocks.[24] In addition, as of 2010, an estimated 28 BEVs operating independently of overhead wires were in use by transit agencies in California. In Bakersfield, for example, an electric bus refurbished to look like the historic Bakersfield electric trolley offers free rides along a 1-mile loop in the city. Foothill Transit (Los Angeles County) operates three 35-foot electric buses made by Proterra, purchased using federal stimulus funds. The San Joaquin Regional Transit District (Stockton) is now adding two of the same Proterra electric buses to its fleet.

Hybrid electric buses are widely used in transit service. First introduced in the late 1990s, hybrid buses have been gaining market share and now account for approximately 9% of buses nationwide. More than 60 transit agencies now operate gasoline-electric or diesel-electric hybrid buses.[25]

Hybrid-electric technology can also be used to provide auxiliary power for vehicles such as utility trucks. For example, the "JEMS" technology offered by Altec uses stored electrical energy to power truck aerial

device, tool,s and exportable power. The energy storage system can be recharged by plugging into grid power or by the truck's internal combustion engine.

In Solano County, a number of municipal agencies operate hybrid and battery electric vehicles. Vacaville was one of the first local governments in the nation to operate BEVs. The city obtained 24 Toyota RAV4 BEVs approximately 10 years ago, a "first generation" electric vehicle that uses an inductive charging paddle rather than the current SAE J1772 charging standard. The city still operates many of these vehicles, although their production has since been discontinued in favor of "second generation" EVs. Solano County Transit (SolTrans) operates 21 diesel-hybrid buses, and Fairfield and Suisun Transit (FAST) operates 7 hybrid buses. The City of Benicia operates 6 HEVs and 2 PHEVs. Rio Vista's fleet includes a hybrid-electric SUV and battery-electric vehicle. Fairfield also operates 2 HEVs.

Vacaville Toyota RAV4 Electric Vehicle

SolTrans Diesel-Hybrid Bus

Fuel Supply, Demand, and Price

Because only in the last 2 years have there been significant OEM offerings of EVs, available statistics on electricity use for transportation are not meaningful. EIA estimates that electricity demand in the transportation sector in 2020 will be approximately 0.03 quadrillion British thermal units, reflecting 3.5% annual growth.[26] For perspective, to keep up with this demand, it is estimated that the number of Level 2 chargers in 2020 would need to be as high as 1,250,000 for residential and 3,200,000 for non-residential, as illustrated in Table 2-2.

Table 2-2. Forecasted Electric Vehicle Charger Population, Nationwide (2020)

Scenario	Vehicle Population (millions)	Residential Chargers (thousands)		Non-Residential Chargers (thousands)	
		L-1	L-2	L-2	DC Fast Charging
Low	0.56	448	112	280	28
Moderate	1.25	812	438	1,070	180
High	2.5	1,250	1,250	3,200	550

Notes: Level 1 (L-1) chargers use a 120-volt (V) alternating current plug; Level 2 (L-2) chargers are rated at less than or equal to 240-V AC. Direct-current (DC) fast charging has a 480-V input.

The price of electricity varies widely depending on the rate schedule and the time of day of use (peak, partial-peak, off-peak). PG&E rates can vary from as low as $0.10 per kilowatt-hour (kWh) to as high as $0.24 per kWh. For sake of comparison, a light duty vehicle that pays $4.00 per gallon of gasoline is equivalent to about $0.45 per kWh.

3. Solano County Government Fleets and Alternative Fueling Infrastructure

This chapter presents a summary of the vehicle fleets owned and operated by Solano County's municipal agencies, including alternative fuel vehicles. The chapter also describes the current state of infrastructure to supply alternative fuels in the county.

3.1. Municipal Fleets

Based on a survey conducted for this study in 2012, Solano County and its seven incorporated cities and public transit agencies currently operate approximately 1,400 on-road vehicles. These vehicles include automobiles and light-duty trucks, medium- and heavy-duty trucks, vans and minibuses, and full-size transit buses.

Table 3-1 summarizes the number of vehicles operated by type and by agency. The county's municipal fleets operate more than 1,000 light-duty vehicles and more than 170 medium- and heavy-duty trucks. The largest fleets are operated by Solano County, Vacaville, and Fairfield. The county's five transit agencies collectively operate 126 full-size transit buses and 54 minibuses and paratransit vans.

Table 3-1. Municipal Fleet Vehicles in Solano County by Vehicle Type (2012)

Agency	Passenger Cars and Light-Duty Trucks	Medium- and Heavy-Duty Trucks	Minibuses and Paratransit Vans	Transit Buses (35+ feet)	Total
Solano County	447	8	-	-	455
City of Benicia	8	27	-	-	35
City of Dixon	44	11	9	-	64
City of Fairfield	243	43	4	-	290
FAST	6	0	11	44	61
City of Rio Vista	10	13	4	-	27
Suisun City	16	9	-	-	25
City of Vacaville	283	52	-	-	335
Vacaville City Coach	-	-	6	15	21
City of Vallejo		16	-	-	16
SolTrans	23	-	20	67	110
Total	**1,080**	**179**	**54**	**126**	**1,439**

Table 3-2 shows the same municipal fleet vehicles organized by fuel type. Gasoline and diesel fuel are used by the vast majority (82%) of the municipal vehicles; the remainder are capable of operating on some type of alternative fuel, as discussed below.

Table 3-2. Municipal Fleet Vehicles in Solano County by Fuel Type (2012)

	Fuel Type								
Agency	Gasoline	Diesel	Flex-Fuel (E85)	Biodiesel (B5)	Natural Gas	Propane	Hybrid-Electric	Plug-In Electric	Total
Solano County	307	-	120	22	-	6	-	-	455
City of Benicia	7	20	-	-	-	-	6	2	35
City of Dixon	40	11	13	-	-	-	-	-	64
City of Fairfield	252	22	14	-	-	-	2	-	290
FAST	8	44	2	-	-	-	7	-	61
City of Rio Vista	23	2	-	-	-	-	1	1	27
Suisun City	18	6	-	-	1	-	-	-	25
City of Vacaville	252	51	-	-	15	-	-	17	335
Vacaville City Coach	2	4	-	-	15	-	-	-	21
City of Vallejo	-	16	-	-	-	-	-	-	16
SolTrans	43	46	-	-	-	-	21	-	110
Total	**952**	**222**	**149**	**22**	**31**	**6**	**37**	**20**	**1,439**

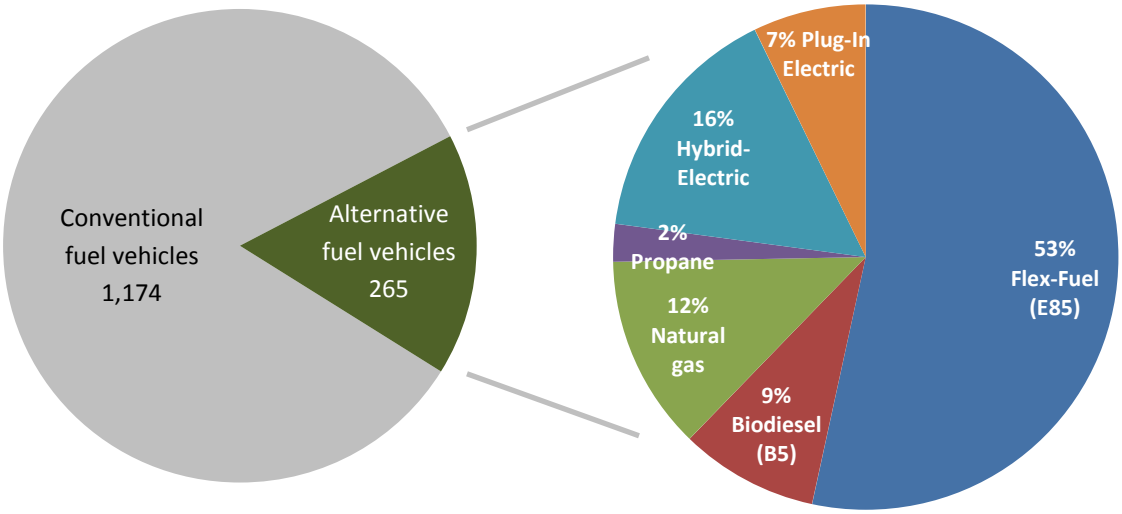
The AFVs operated by Solano County public agencies in 2012 include the following:

- **Flex-fuel (E85) vehicles**. These are light-duty vehicles that can fuel with gasoline or E85. They include 120 FFVs owned by Solano County, 14 owned by Fairfield, and 13 FFVs leased by the Dixon Police Department.
- **Biodiesel**. All 22 Solano County diesel vehicles operate on B5 (5% biodiesel blend).
- **Natural gas vehicles**. Vacaville City Coach's entire fleet of 15 transit buses runs on CNG. Vacaville also operates 8 CNG Honda Civic sedans and 7 CNG pick-up trucks and vans. Suisun City has a CNG pick-up truck.
- **Propane vehicles**. Solano County owns 6 propane pick-up trucks.
- **Hybrid-electric vehicles**. Solano County Transit (SolTrans) operates 21 diesel-hybrid buses and FAST operates 7 hybrid buses. Benicia has hybrid-electric sedans and SUVs. Fairfield has a hybrid-electric sedan and SUV, and Rio Vista has a hybrid-electric SUV.

- **Battery-electric vehicles**. Vacaville operates 17 Toyota RAV4 BEVs, and another BEV is operated by Rio Vista. Benicia has 2 plug-in hybrid vehicles.

Figure 3-1 illustrates the percentages of alternative fuel vehicles currently in use among Solano County municipal and transit agency fleets.

Figure 3-1. Percent of Alternative Fuel Vehicles in Solano County Municipal Fleets



3.2. Alternative Fuel Stations

Alternative fuel infrastructure is available throughout Solano County and in the greater Northern California region. Data on alternative fuel facilities were collected through a survey of fleet managers and from the U.S. Department of Energy, Alternative Fuels Data Center (www.afdc.energy.gov).

Approximately 35 alternative fueling sites were identified within Solano County. More than 80% of these sites are EV charging stations, concentrated in Vacaville and Fairfield. Of the remaining sites, only two or three locations were identified for biodiesel, E85, natural gas, and propane. The information presented here includes a mix of both publicly available and private fueling stations.

In the remainder of this section, maps show the location and distribution of different fueling stations; several tables follow that provide more information on each station.

Ethanol

As illustrated in Figure 3-2, ethanol (E85) is widely available in Northern California. The Sacramento area alone hosts 29 stations that provide E85. The fuel is not widely available in Solano County, however, as only three stations in the county provide it. Two of these stations offer public access: one in Vacaville and one in Fairfield. The third station providing E85 is the Solano County Corporation Yard #1 in

Fairfield, which does not offer public access. Table 3-3 lists the stations in Solano County that provide E85 fuel.

Figure 3-2. E85 Fueling Infrastructure in and around Solano County (2012)

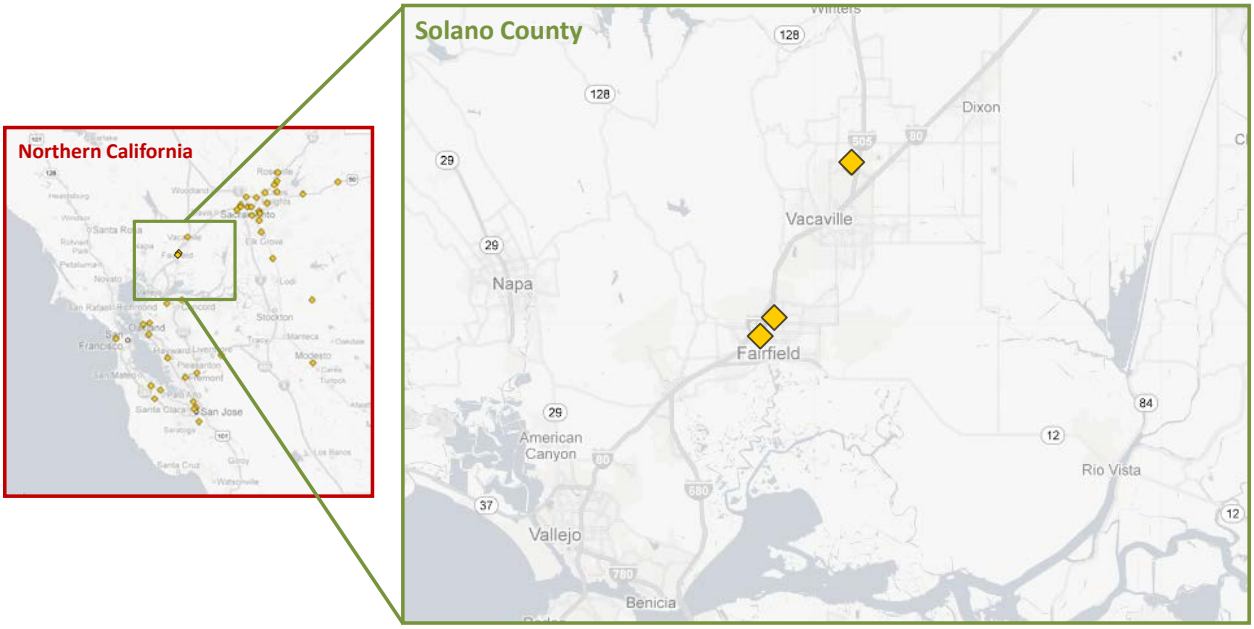


Table 3-3. E85 Fueling Infrastructure in Solano County (2012)

Station Name	Street Address	City	Access
Solano County Corporation Yard #1	3255 North Texas Street	Fairfield	Private
Pacific Pride – Interstate Oil Co	917 Cotting Lane	Vacaville	Public
Plaza Oliver Valero	1009 Oliver Road	Fairfield	Public

Biodiesel

The County has two biodiesel fueling stations: Solano County's Corporation Yard #1 (located in Fairfield) and a facility at Travis Air Force Base. Neither station offers public access. As illustrated in Figure 3-3, the Sacramento region has 7 biodiesel fueling stations; 18 stations are located throughout the remainder of Northern California. Table 3-4 lists the stations in Solano County that provide biodiesel fuel.

Figure 3-3. Biodiesel Fueling Infrastructure in and around Solano County (2012)

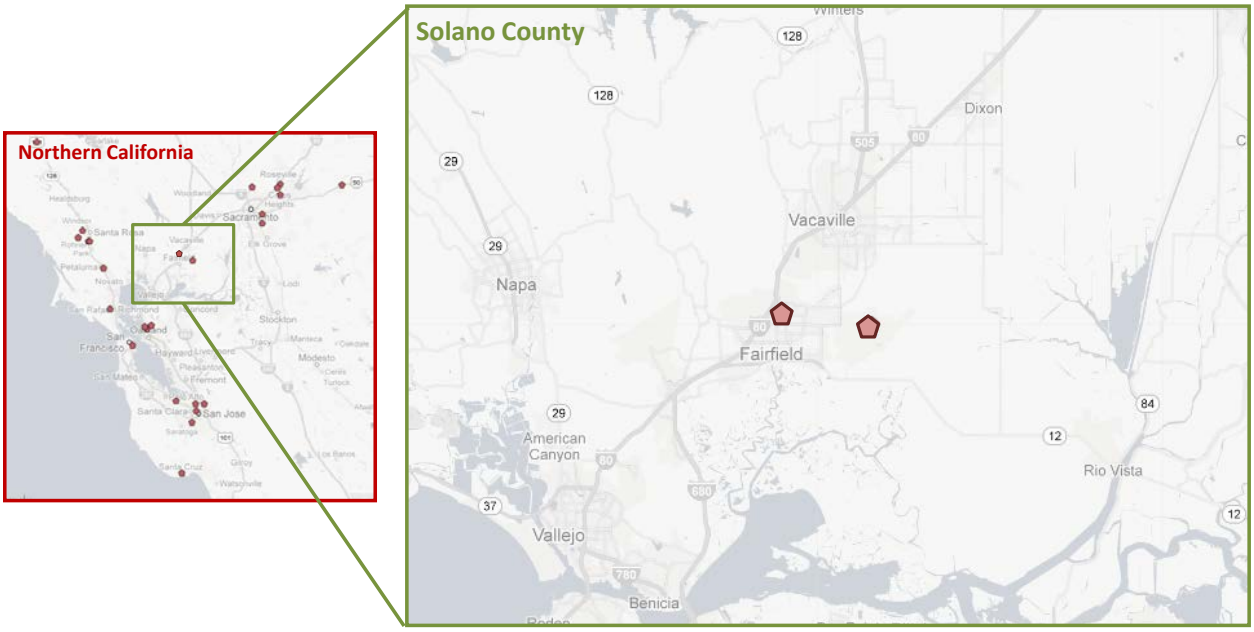


Table 3-4. Biodiesel Fueling Infrastructure in Solano County (2012)

Station Name	Street Address	City	Access	Biodiesel Blends Available
Solano County Corporation Yard #1	3255 North Texas Street	Fairfield	Private	B5 (B10 planned in 2013)
Travis Air Force Base	430 Hangar Avenue	Fairfield	Private	B20

Natural Gas

As shown in Figure 3-4, natural gas fueling infrastructure is distributed widely throughout Northern California. CNG is more common than LNG and is found at many public, utility, and private locations. Three CNG stations are located in Solano County, including a PG&E facility in Vacaville with public access; the City of Vacaville Corporation Yard; and an LNG/CNG facility in Fairfield, which is one of only four LNG facilities in Northern California. The two CNG facilities located in nearby Davis are outside Solano County; one of these stations serves the Davis transit agency, Unitrans, while the other offers public access. Table 3-5 lists the stations in Solano County that provide natural gas fuel.

Figure 3-4. Natural Gas Fueling Infrastructure in and around Solano County (2012)

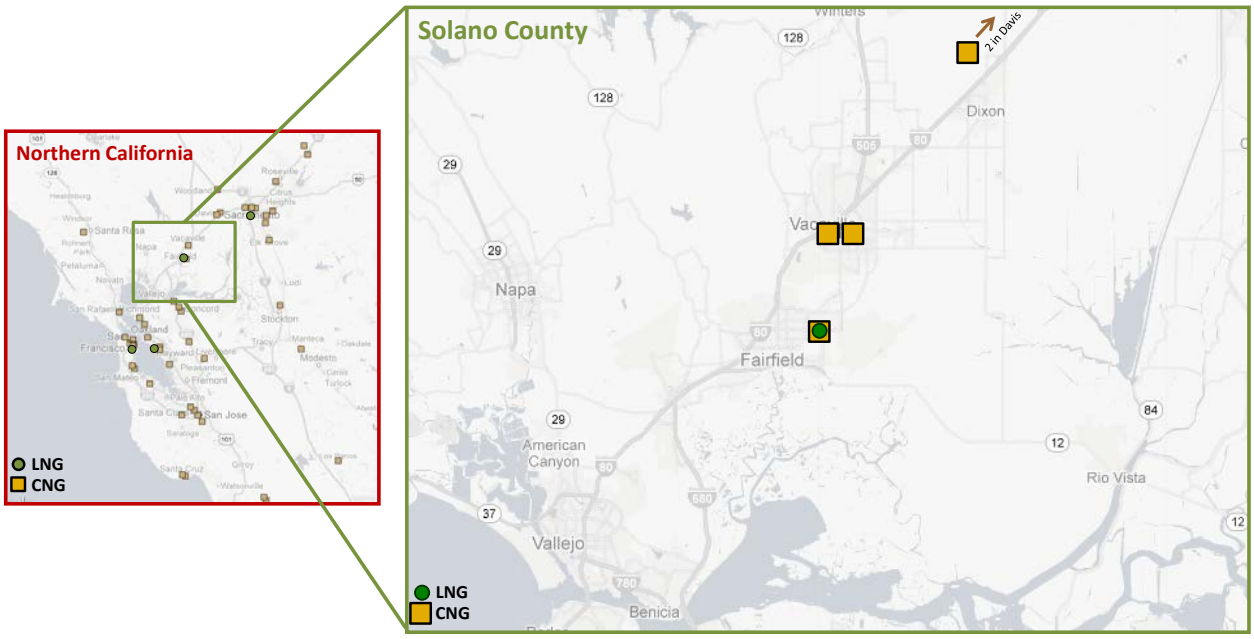


Table 3-5. Natural Gas Fueling Infrastructure in Solano County (2012)

Fuel Type	Station Name	Street Address	City	Access	Details
LNG/CNG	Solano Garbage	1930 Walters Court	Fairfield	Private	Quick fill; 3000 and 3600 psi
CNG	PG&E Vacaville Service Center	158 Peabody Road	Vacaville	Public	Quick fill; 3000 psi
CNG	City of Vacaville Corporation Yard	1001 Allison Drive	Vacaville	Private	N/A

Propane

Propane fuel (for transportation uses) is available throughout Northern California, with large clusters in Alameda County and Sacramento County (Figure 3-5). In Solano County, the fuel is less common, found at only two stations. One station, located in Vacaville, offers public access. The other station is located in the Solano County Corporation Yard #1, with no public access. Several public-access stations offer propane near Rio Vista, just outside Solano County**.** Table 3-6 lists the stations in Solano County that provide propane fuel.

Figure 3-5. Propane Fueling Infrastructure in and around Solano County (2012)

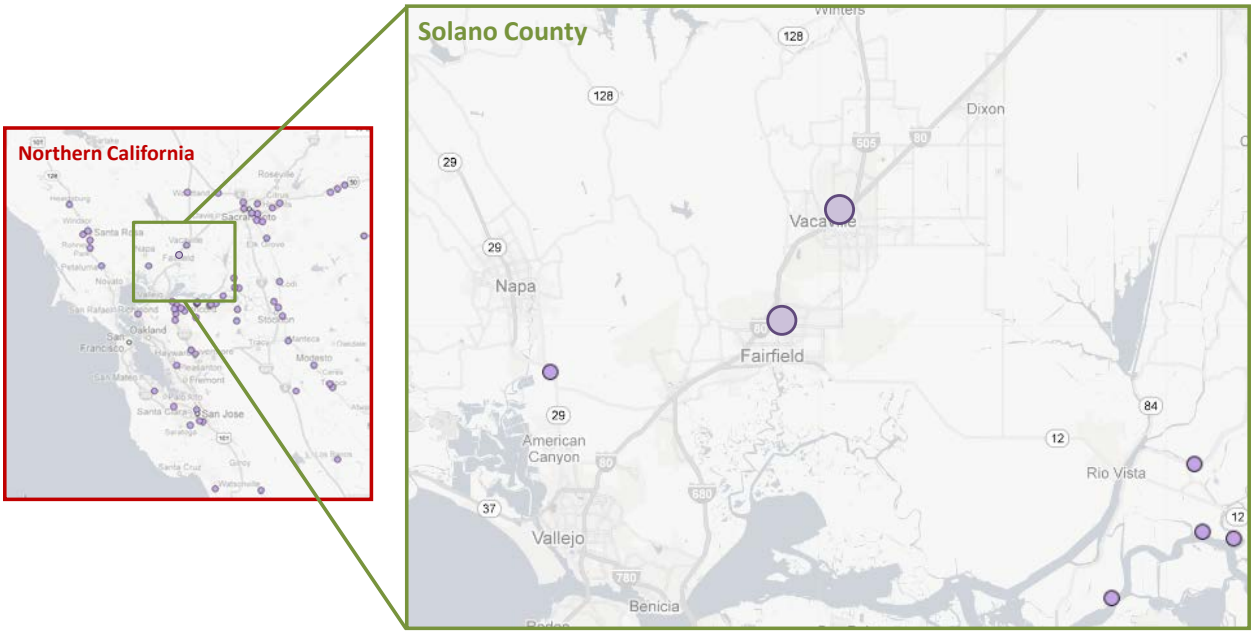


Table 3-6. Propane Fueling Infrastructure in Solano County (2012)

Station Name	Street Address	City	Access
Solano County Corporation Yard #1	3255 N. Texas Street	Fairfield	Private
U-Haul	1240 E Monte Vista Avenue	Vacaville	Public

Electric Vehicle Charging Stations

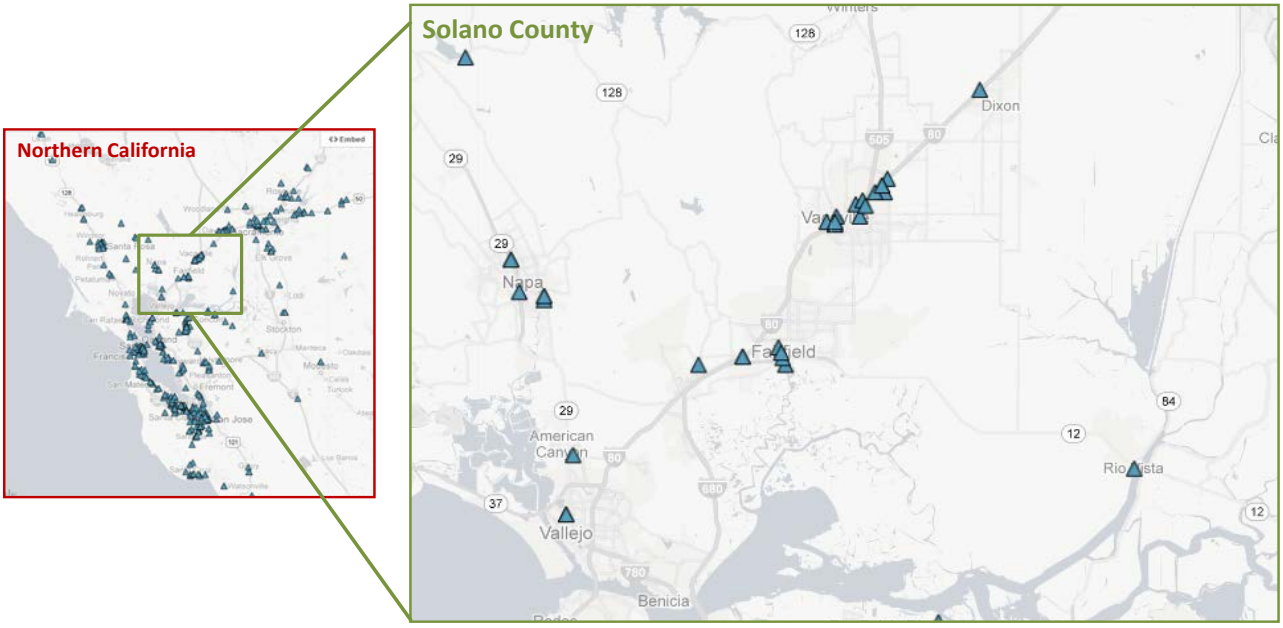
Approximately 28 electric vehicle charging stations are located throughout Solano County (Figure 3-6). The current charging station standards established by the Society of Automotive Engineers (SAE) differentiate between three levels:

- Level 1 AC – These use standard 120-volt (V), single-phase service with a three-prong electrical outlet at 15–20 amperage (A).
- Level 2 AC – These are used specifically for EV charging and are rated at less than or equal to 240 V AC, and less than or equal to 80 A.
- DC fast-charging units – These provide power much faster than the AC counterparts, with a 480 V input.

In addition, some older charging stations are built to the small paddle inductive (SPI) charging standard. Vehicle support for SPI was phased out starting in 2001, when ARB adopted the current conductive charging standards. In Solano County, the majority of sites host multiple charging stations, and one-half

provide at least two types of equipment—current Level 2 charging equipment and the older SPI standard. Fourteen charging stations are built on municipal sites, and 14 are on private property (Table 3-7). Vacaville in particular has been a leader in the installation of EV charging infrastructure.

Figure 3-6. Electric Vehicle Charging Infrastructure in and around Solano County (2012)



Notes: Maps accessed September 17, 2012; includes public and private stations; does not include planned and residential charging stations; each triangle represents one charging location, which may include more than one port; refer to Table 3-7 for a full list of infrastructure.

Table 3-7. Electric Vehicle Charging Infrastructure in Solano County (2012)

Station Name	Street Address	City	Access	Charging Infrastructure Available
Benicia City Hall	250 East L Street	Benicia	Public	2 Level 2 and 1 DCFC station
Pitt School Plaza	1440 Ary Lane	Dixon	Public	1 Level 1; 1 SPI; 1 Tesla conductive
Fairfield City Hall	1000 Webster Street	Fairfield	Public	2 Level 2
Fairfield Transportation Center	2000 Cadenasso Drive	Fairfield	Public	2 Tesla conductive
Momentum Nissan	2545 Auto Mall Parkway	Fairfield	Public (dealer) & private (service center)	2 Level 2
Solano Community College	4000 Suisun Valley Road	Fairfield	Public	3 Level 2; 1 SPI
Solano County Government Center Parking Structure	501 Union Avenue	Fairfield	Public	1 SPI; 4 Level 2
Rio Vista City Hall	1 Main Street	Rio Vista	Public	1 Level 1; 1 Level 2; 1 SPI
Suisun Amtrak Station Park & Ride Lot	650 Lotz Way	Suisun City	Public	1 Level 2; 1 SPI
Suisun City Civic Center	701 Civic Center Boulevard	Suisun City	Public	1 Level 2; 1 SPI

Station Name	Street Address	City	Access	Charging Infrastructure Available
Kaiser Permanente – Vacaville	1 Quality Drive	Vacaville	Public	3 SPI; 1 Avcon conductive
Leisure Town Center	100 Sequoia Drive	Vacaville	Public	1 Level 2; 1 SPI
Vacaville Cultural Center	1000 Ulatis Drive	Vacaville	Public	1 Level 2; 1 SPI
Stars Recreation Center	155 Browns Valley Parkway	Vacaville	Public	3 Level 2; 1 SPI
Nut Tree Village	1651 East Monte Vista Avenue	Vacaville	Public	1 Level 1; 1 SPI
Vacaville Regional Transport Center	190 Hickory Lane	Vacaville	Public	3 Level 2; 1 SPI
Vacaville Premium Outlets	321 Nut Tree Road	Vacaville	Public	2 Level 2
Office of Housing & Redevelopment	40 Eldridge Avenue	Vacaville	Public	2 SPI
KUIC Parking Lot – Lot 9	500 Catherine Street	Vacaville	Public	1 Level 2; 1 SPI
Kohl's	570 Orange Drive	Vacaville	Public	1 Level 1; 1 Level 2
Vacaville City Hall	650 Merchant Street	Vacaville	Private	2 Level 2; 7 SPI
Vacaville Police Headquarters	660 Merchant Street	Vacaville	Private	2 SPI
Nissan of Vacaville	671 Orange Drive	Vacaville	Public (dealership) & private (service center)	2 Level 2
Bella Vista Road Park & Ride Lot	782 Davis Court	Vacaville	Public	3 Level 1; 4 Level 2; 1 SPI
Leisure Town Road Park & Ride Lot	Leisure Town Road & Orange Drive	Vacaville	Public	1 Level 2; 1 SPI
Vallejo City Hall	555 Santa Clara Street	Vallejo	Public	2 Level 2
Vallejo Nissan	3287 Sonoma Boulevard	Vallejo	Public (dealership) & private (service center)	2 Level 2
Vallejo Ferry Terminal	495 Mare Island Way	Vallejo	Public	2 SPI; 1 Avcon conductive; 1 Tesla conductive

Notes: Information accessed September 17, 2012; includes public and private stations; does not include planned and residential charging stations; each row represents one charging location, which may include more than one port.

Tesla conductive chargers are used for Tesla EVs only. Avcon conductive chargers are a predecessor to the current SAE J1772 standard for chargers and require an adaptor box to be used with most EVs currently in production.

Source: U.S. Department of Energy, Alternative Fuels Data Center, http://www.afdc.energy.gov/

4. Benefits and Costs of Alternative Fuel Vehicles

Local governments in Solano County may be interested in alternative fuels for different reasons. Some communities may be primarily concerned about climate change and looking for opportunities to reduce GHG emissions. Another city may be considering alternative fuels primarily as a way to minimize fleet operating costs and petroleum dependence, or to satisfy regulatory requirements. And others could be seeking funding opportunities. This chapter reviews the benefits and costs of alternative fuel vehicles in four main areas:

- Regulatory requirements
- Fleet cost impacts
- Air pollution and health impacts
- Greenhouse gas emissions impacts
- Funding sources

4.1. Regulatory Requirements

The California Air Resources Board (ARB) has authority to adopt regulations that apply to California vehicles and fuels. In the past, some fleets have switched to alternative fuels as a way to comply with ARB regulations. Table 4-1 summarizes current and recent regulations that could affect public transit and municipal fleets; a brief discussion of each regulation follows. At present, there are no regulations that would necessitate use of alternative fuels by municipal or transit fleets.

Table 4-1: Summary of ARB Regulations and their Impact on Transit or Municipal Fleets

Regulation	Impact on Transit or Municipal Fleets
Transit Fleets	
Fleet Rule for Transit Agencies	Required agencies to upgrade buses to cleaner standards by 2011. Currently, no additional upgrade requirements. Annual reporting required.
Zero Emission Buses	Would require large transit agencies to purchase battery or fuel cell buses for 15% of its annual purchases. Currently suspended by ARB, pending further review.
On-Road Heavy-Duty Diesel Vehicles Regulation	Requires agencies to replace or upgrade heavy-duty trucks to meet 2010 engine standards. Transit fleets are exempt.
Municipal fleets	
Fleet Rule for Public Agencies and Utilities	Required agencies to upgrade trucks to cleaner standards by 2011. Currently, no additional upgrade requirements. No annual reporting is needed, but there are recordkeeping requirements.
In-Use Off-Road Diesel	Requires agencies to upgrade or retrofit their off-road equipment fleets to meet

Regulation	Impact on Transit or Municipal Fleets
Vehicle Regulation	cleaner standards, starting in 2014 through 2023. Deadlines are extended for medium and small fleets.
Other Regulations	
Low Emission / Zero Emission Vehicles	No requirements for transit or municipal fleets. Cleaner passenger cars will be available for purchase.
Low Carbon Fuel Standard	No requirements for transit or municipal fleets. The rule will accelerate introduction of low carbon fuels for transportation.

Fleet Rule for Transit Agencies

In February 2000, ARB adopted the Fleet Rule for Transit Agencies, which includes several provisions designed to reduce harmful criteria pollutant and air toxic emissions from urban buses and other transit vehicles. These requirements were designed to be phased in between 2002 and 2010, and are largely in-place as of 2012. The Transit Fleet Rule requires transit agencies to upgrade its urban bus fleet to meet more stringent emissions standards, phased in gradually through 2009. The rate of this phase-in depended on the "fuel path" that fleet managers chose to meet the standards. Under the "diesel path," transit agencies were to meet emission reductions of 85% in 2007 (compared to 2002 baseline) through a combination of retrofitting existing diesel buses and purchasing new diesel buses. In the "alternative fuel path," transit agencies were given two additional years to meet the standards but were required to adopt alternative fuel buses as the majority of new bus purchases or leases. Also included in this regulation is the Zero Emission Bus mandate, discussed below.

Solano County transit agencies already comply with this rule. ARB still requires annual reporting of each agency's transit fleet, which can be done using the agency's online reporting tool.

Zero Emission Bus Rule

The Zero Emission Bus (ZBus) mandate was enacted as part of the Transit Fleet Regulation in 2000. This ambitious program was designed to jump-start research, development, and deployment of new bus technologies, which were not available at the time the rule was introduced. ARB's goal was that by the time the ZBus requirement would become binding, the advanced bus market would have sufficiently matured to reduce the burden of compliance. The original ZBus rule required large transit agencies (those with more than 200 buses in their fleets) to meet a minimum purchase requirement for zero emission buses. The regulation originally required transit agencies to acquire 15% of all new annual bus purchases as ZBuses, beginning in year 2011.

Due to agency feedback and the delays in market-ready ZBus technologies, ARB has delayed components of the regulation. In January 2010, the agency postponed the ZBus requirement until a feasibility study determines that the technology is sufficiently matured. As an indicator of market

readiness, ARB has informally set a threshold of 125% for the cost of a ZBus compared to a conventional bus. As of 2009, the agency estimated the cost premium as 275%.

If implemented, the ZBus regulation has the potential for significant impacts to transit agencies, in that it would require purchase of hydrogen fuel cell or battery electric buses. However, there is no certainty when or even if the rule will be implemented. Moreover, as currently written, the regulation only applies to large transit agencies (with more than 200 buses). The largest Solano County transit fleet (SolTrans) currently has approximately 60 buses. For more information about the Zero Emission Bus rule, visit www.arb.ca.gov/msprog/bus/zeb/zeb.htm .

On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation

In 2007, ARB adopted the On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation, known as the "Truck and Bus Rule." This regulation requires that older heavy-duty trucks must be upgraded with cleaner equipment starting January 2012, and replaced starting January 2015. By full project phase-in in 2023, nearly all trucks and buses must meet emission standards for model year 2010 engines.

This rule does not apply to public transit agencies or local governments, so has no direct impact on Solano County government fleets.

Fleet Rule for Public Agencies and Utilities

The Fleet Rule for Public Agencies and Utilities was enacted in 2005 to reduce emissions from older heavy-duty trucks operated by municipalities or utilities. The regulation excludes vehicle types covered under other mandates, including transit buses, as well as trucks newer than model year 2007, which already meet the emission standard. Depending on the truck model year, municipalities must phase-in "Best Available Control Technology" (BACT) to reduce particulate matter emissions. This can be achieved by installing Diesel Particulate Filters to remove particulates from a truck's exhaust stream.

For most public agencies, including those in Solano County, this rule required updates to municipal fleets by 2011. For Solano County agencies, these updates have likely been completed and there are no further compliance requirements.

In-Use Off-Road Diesel Vehicle Regulation

In July 2007, ARB approved the In-Use Off-Road Diesel Vehicle Regulation, structured with similar requirements as the On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation. All existing off-road vehicles (including construction equipment, street sweepers, landscaping vehicles, and others) would need to meet strict pollution standards, through upgrades, retrofits, or replacement. In 2010 the agency delayed the implementation date for cleaner emission standards, due to effects of the recession on the industry and a delay in obtaining a necessary waiver from EPA. Under amendments to the ruling in December 2010, the emission standards will begin to take effect in 2014 for large fleets, 2017 for medium fleets, and 2019 for small fleets. The new standards will be fully phased in by 2023 for large and medium fleets and 2028 for small fleets.

This regulation may have significant impact on Solano County municipalities, depending on the size and age of its off-road fleet. The new standards phase in starting in 2014 for large fleets (more than 5,000 combined horsepower) and finishing in 2023. This schedule is delayed for medium (more than 2,500 combined horsepower) and small fleets. The regulation also includes requirements for reporting and labeling off-road equipment. In addition, fleets must limit equipment idling. ARB designed this regulation so fleets could comply with the standards by upgrading current diesel vehicles or replacing old trucks with new diesel vehicles. A fleet does not need to introduce alternative fuel equipment in order to meet the regulation's emission standard. For more information about the Off-road Equipment Rule, visit www.arb.ca.gov/msprog/ordiesel/ordiesel.htm .

Low-Emission Vehicle / Zero-Emission Vehicle Regulations

For more than 20 years, ARB has regulated emissions from passenger cars through increasingly stringent emission standards. The first Low-Emission Vehicle (LEV) regulations were enacted in 1990, followed by tighter LEV II standards in 1998 and LEV III in 2011, applied to new cars sold between 2015 and 2025. LEV III standards will reduce smog-forming emissions by 75% and GHG emissions by 34%. In tandem with LEV III, CARB enacted a Zero-Emission Vehicle (ZEV) program to accelerate the sales and use of electric and fuel cell vehicles. ZEV mandates require manufacturers to meet ZEV sales targets as a portion of their overall new vehicle sales within California. In total, the regulation will result in 1.4 million ZEVs sold in 2025, accounting for 15.4% of all sales.

LEV III and ZEV regulations have been combined into ARB's Advanced Clean Car Rules. These regulations do not contain any provisions that specifically apply to transit or municipal fleets. As manufacturers upgrade their vehicles to meet the LEV/ZEV rules, fleet owners will have more choices available if they choose to purchase low-emission or zero-emission passenger cars

Low Carbon Fuel Standard

In 2010 ARB enacted the Low Carbon Fuel Standard (LCFS), which requires a 10% reduction in the carbon intensity of transportation fuels in 2020. LCFS is designed as a framework to encourage the use of alternative fuels in place of gasoline or diesel. The regulation places mandates on "regulated parties," primarily the refiners and blenders of gasoline, diesel, and their substitutes, to meet a schedule for reducing the carbon intensity of their fuel through 2020.

One goal of LCFS is to encourage the availability of alternative fuels in the marketplace, specifically the availability of ethanol, biodiesel, bio-natural gas, and other low-carbon substitutes. Like the ZEV standards, in most cases LCFS does not impose restrictions directly on transit or municipal fleets; however, LCFS should ease barriers to introducing alternative-fuel vehicles and infrastructure by making the fuels more readily accessible.

In some cases, LCFS directly may apply to transit or municipal fleets, due to the definition of a "regulated party." For conventional natural gas fuel (as opposed to biogas), LCFS defines the regulated party as the entity that owns the natural gas fueling equipment. In these cases, a transit or municipal agency may choose to opt-in to LCFS requirements in order to be eligible to earn credits from using low-carbon fuels, although this is not required.

4.2. Fleet Cost Impacts

Fleets considering the purchase of new vehicles often compare choices based on *lifecycle* costs, which include all the costs associated with a vehicle during its lifetime in the fleet, such as the purchase price, resale value, fuel costs, maintenance costs, and any fueling infrastructure costs. It is difficult to estimate and compare lifecycle costs with a high degree of precision because they vary from fleet to fleet depending on factors such vehicle annual mileage, usage and duty cycle, fleet size, existing maintenance facilities and staff experience, existing fueling infrastructure, and financing mechanisms. This section does not perform a full lifecycle analysis; rather, it presents information on vehicle purchase price, fuel costs, and (for some vehicle types) maintenance costs, comparing each alternative fuel to its conventional fuel counterpart.

Information is also presented on fueling infrastructure costs, although these costs are not factored into the cost examples because the differences in infrastructure costs can make side-by-side comparisons misleading. Any agency making decisions about fleet purchasing and infrastructure investment will need to perform a more detailed and agency-specific calculation of lifecycle cost and return on investment. The following sections provide examples of generalized purchase price, operations and maintenance, and fuel costs for light-duty sedans, light-duty trucks, medium- and heavy-duty trucks, and transit buses. A summary discussion of fueling infrastructure costs is found at the end of the section.

Light-Duty Vehicle Costs

Vehicle Purchase Price

The alternative fuels currently available to light-duty vehicles for fleet purchases are E85, CNG, propane, and electricity. No light-duty hydrogen fuel cell vehicles currently are commercially available for purchase, although Mercedes Benz (B-Class F-CELL) and Honda (Clarity) offer a fuel cell vehicle for lease in California. Table 4-2 shows sample incremental vehicle prices for light-duty sedans. These values represent the additional purchase price when compared to a conventional gasoline vehicle. The Honda Civic and Ford Focus were chosen for the comparison because together they can illustrate the alternative fuels for light-duty sedans. Table 4-3 shows sample incremental vehicle prices for light-duty trucks compared to conventional gasoline trucks.

Table 4-2. Sample Incremental Vehicle Prices for Alternative Fuel Light-Duty Sedans Compared to Gasoline Vehicles

Honda Civic				Ford Focus		
Gasoline	HEV	CNG	Propane	Gasoline	E85	BEV
Baseline	$5,195	$7,500	$6,000	Baseline	$0	$11,749

Table 4-3. Sample Incremental Vehicle Prices for Alternative Fuel Light-Duty Trucks Compared to Gasoline Vehicles

Chevrolet Silverado 1500			Chevrolet Silverado 2500		GMC Sierra 2500	
Gasoline	E85	HEV	Gasoline	Propane	Gasoline	CNG Bi-Fuel
Baseline	$0	$17,445	Baseline	$6,500	Baseline	$17,445

The price differences of alternative fuel vehicles are driven by several factors, including the following.

- The retail price for an **E85 flex fuel vehicle** is usually identical to its conventional gasoline counterpart. Although the cost to produce an FFV is slightly higher than for a comparable gasoline vehicle, manufacturers have typically set identical prices as a way to encourage FFV sales, which can earn federal CAFE credits for auto makers.[27] For several models, most of the available light-truck configurations are designated as FFV.
- **CNG vehicles** carry a price premium over their conventional fuel counterparts. The primary reason for the price premium is the cost of CNG fuel tanks, as well as the lower production volumes.
- **EVs and HEVs** carry a higher price than their conventional fuel counterparts, mainly because of the cost of the batteries. Both BEV and PHEV sedans are eligible for the current federal tax credit of up to $7,500, as well as a state incentive up to $2,500 (the Clean Vehicle Rebate Project). BEV and PHEV light-duty trucks , are eligible for up to $30,000 of incentives through the HVIP. These incentives can significantly reduce the purchase price of EVs and, when combined with the fuel cost savings, make these sedans competitive with gasoline vehicles over the life of the vehicle. HEVs, while cheaper than EVs, do not achieve the same level of petroleum reduction and use no low cost grid electricity as a fuel source.
- Because few **propane vehicles** are offered by OEMs, propane usually requires conversion of a gasoline vehicle. The current price of a bi-fuel conversion that enables a conventional fueled vehicle to operate on both propane and gasoline is approximately $5,500–$6,500 ; the incremental costs of converting to a dedicated propane light-duty vehicle is approximately $11,600.

Operations and Maintenance Costs

The overwhelming component of operations costs for all vehicles is fueling costs. Owners of alternative fuels fleets need to weigh the following factors related to the costs of alternative fuels.

- While **E85** is typically cheaper per gallon at the pump, vehicle operating costs are often higher because of the lower mileage per GGE of FFV vehicles. Based on current prices, the annual cost of fuel for an FFV running on E85 will be 25% greater than for a comparable gasoline vehicle.

- At the current low natural gas prices, **natural gas** vehicles achieve a significant fuel savings compared to their conventional fuel versions. Natural gas fuel prices at public retail stations are higher than at private stations, which are usually owned and operated by private fleets or transit agencies.
- The impacts of **propane** on operating costs depend heavily on its price differential with gasoline. The average retail price of propane is currently slightly higher than gasoline on a GGE basis (i.e., accounting for the lower energy content of propane). However, private propane stations typically offer significantly lower prices than public stations, which can result in a lower effective fuel price.
- Because **electric drive** vehicles have significantly better mileage than their gasoline and diesel counterparts, their annual fueling costs are lower. With many light-duty vehicle models now available, the fuel economy advantage of EVs and HEVs depends on the specific model, as well as the amount of highway vs. city driving.

Table 4-4 and Table 4-5 show the lifetime fueling costs of light-duty sedans and trucks, respectively, assuming 10,000 miles per year, 50% highway and 50% city operation, and a 10-year vehicle life.

Table 4-4. Sample Light-Duty Sedan Lifetime Fueling Costs

Honda Civic						Ford Focus		
Gasoline	Hybrid	CNG Public	CNG Private	Propane Public	Propane Private	Gasoline	E85	BEV
$11,100	$8,500	$7,200	$3,000	$16,700	$12,800	$11,500	$14,500	$3,600

Table 4-5. Sample Light-Duty Truck Lifetime Fueling Costs

Chevrolet Silverado 1500			Chevrolet Silverado 2500			GMC Sierra 2500		
Gasoline	E85	HEV	Gasoline	Propane Public	Propane Private	Gasoline	CNG Bi-Fuel Public	CNG Bi-Fuel Private
$21,900	$27,300	$17,800	$27,800	$31,400	$24,000	$33,700	$24,900	$10,600

In terms of maintenance costs, some fleets report that FFVs have higher overall maintenance costs than their gasoline counterparts; others report no significant difference in FFV maintenance costs. The caustic nature of alcohol found in E85 fuel creates more wear on (non-synthetic) rubber components such as gaskets or seals. However, modern FFVs have been designed with synthetic rubber components to avoid this outcome.

CNG and propane vehicles burn cleaner than conventionally fueled vehicles, and field reports indicate that engine life is extended and general engine maintenance may be less than required for gasoline vehicles. On the other hand, most propane vehicles use engines that were originally designed for gasoline (e.g., lacking hardened valves) and therefore may require additional maintenance. Additional training requirements and lack of certified maintenance facilities also can increase costs for propane

fleets. The net impact on maintenance costs related to the use of alternative fuels will depend on a variety of factors and is difficult to generalize.

Because the EVs currently available to consumers have been introduced only in the last 3 years, information is limited related to their maintenance costs. Most researchers assume that BEVs will cost less to maintain than ICE vehicles because their engines have fewer moving parts and maintenance needs. For example, BEVs will not need oil changes, air filter replacements, spark plug replacements, or timing chain adjustments. Because they use regenerative braking, both HEVS and EVs will experience less brake wear.

Because current maintenance cost information is not extensive and the differences are expected to be small, maintenance costs are not included in the cost comparisons below.

Purchase and Fuel Cost Comparison

Based on the purchase price and operations cost assumptions described above and in the preceding tables, Figure 4-1 and Figure 4-2 present a sample cost comparison for light-duty sedans and light-duty trucks, respectively.

Figure 4-1. Sample Light-Duty Sedan Purchase and Lifetime Fuel Cost Comparison

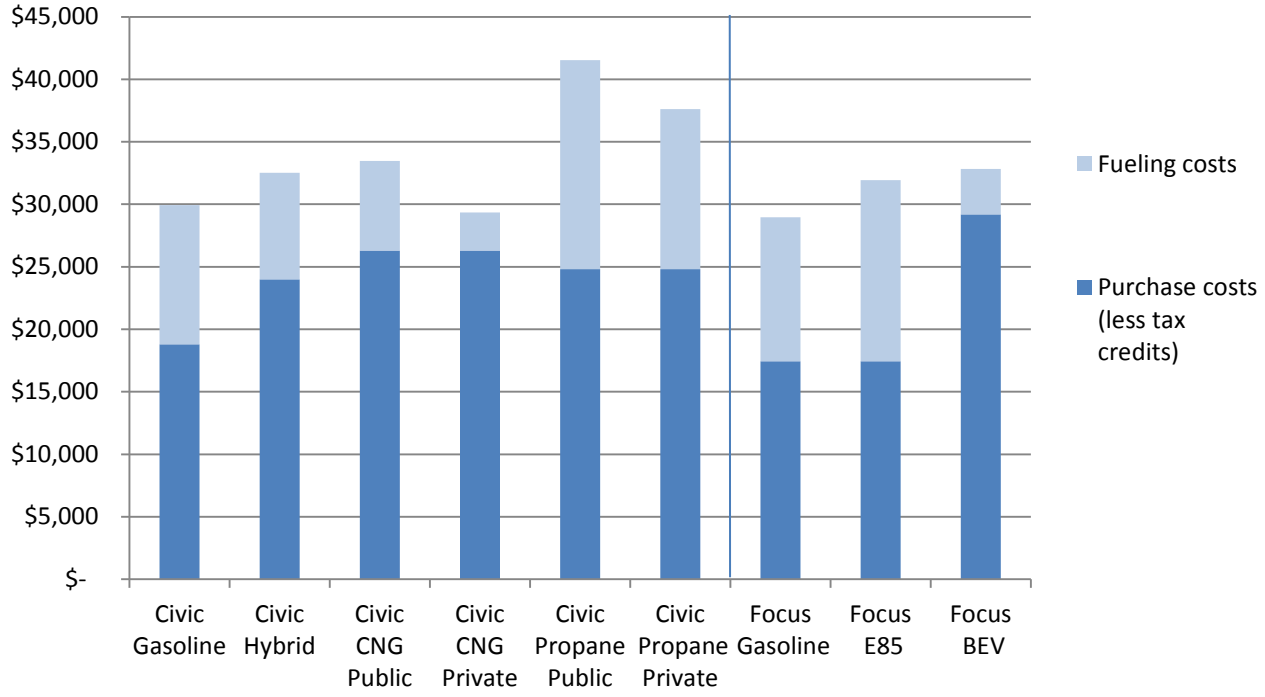
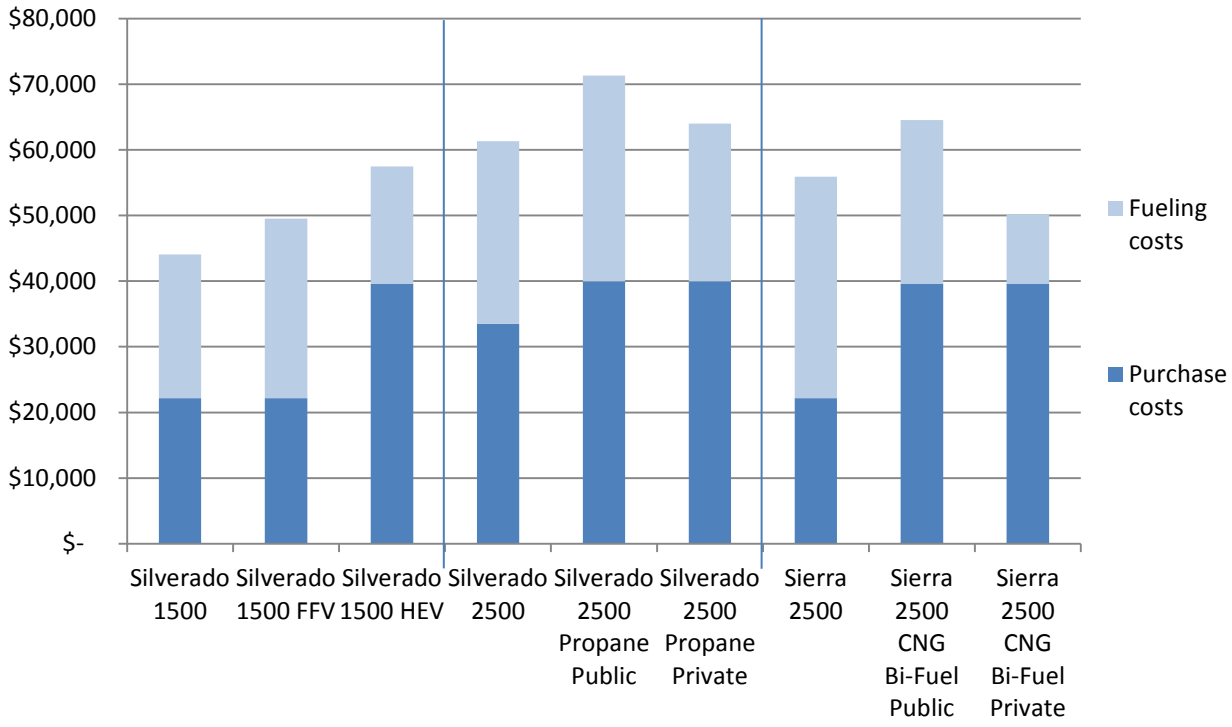


Figure 4-2. Sample Light-Duty Truck Purchase and Lifetime Fuel Cost Comparison



For most of the sample light-duty vehicles included in the preceding figures, alternative fuels result in an increase in purchase plus fuel costs over the baseline gasoline vehicle. The exceptions are the CNG vehicles (Civic sedan and GMC Sierra 2500) fueled at a private (fleet-owned) facility. For many other options, the lifetime cost increase is modest. For example, the E85 and BEV Ford Focus cost 10% and 13% more, respectively, than a gasoline Focus over the vehicle lifetime. Also note that these are sample vehicle models; other HEV and BEV options may result in lifetime cost savings.

Medium- and Heavy-Duty Truck and Transit Bus Costs

Vehicle Purchase Price

Because biodiesel can act as a drop-in replacement for diesel fuel, costs for biodiesel vehicles are comparable to those for conventional diesel vehicles. Biodiesel will run in most diesel vehicles without need for retrofit or conversion. B5 is approved by manufacturers in all diesel engines. B20 has been shown to perform well in diesel vehicles, even in cold weather and in older vehicles.[28] Based on bus price assumptions supplied by the Metropolitan Transportation Commission (MTC) for fiscal year 2013-2014, the total purchase price for 40 foot diesel, diesel HEV, and CNG buses are $544,000, $733,000, and $607,000, respectively. MTC guidance notes that the federal government covers, on average, 80.64% of the bus purchase price, and the local government pays the remaining 19.38%. Using these assumptions, a local government would typical pay $105,416, $142,041, and $117,624 for a diesel, diesel HEV, and CNG bus, respectively.

The price differential for purchase of natural gas buses is smaller in percentage terms compared to the difference in purchase price for natural gas light-duty sedans and trucks. The purchase price of a CNG bus is approximately 12% higher than that of a diesel bus, compared to a 40–75% purchase price increase for natural gas light-duty sedans and trucks.

Table 4-6. Sample Incremental Vehicle Prices for Alternative Fuel Medium-Duty Trucks and Transit Buses Compared to Diesel Vehicles

Medium-Duty Truck		Transit Bus (Local Portion)			
Diesel	B20	Diesel	B20	Diesel HEV	CNG
Baseline	$0	Baseline	$0	$36,625	$12,208

Maintenance and Operations Costs

Biodiesel has a solvent quality that will clean the fuel delivery system. Even at low-level blends, initial use of biodiesel will require changing fuel filters more often as the fuel accumulates contaminants in the fuel system. After the fuel system is clean, fuel filter service intervals return to normal.[29]

Once any initial maintenance costs associated with a transition to biodiesel have been incurred, regular maintenance costs should be similar to those for conventional diesel vehicles. A study for the Federal Transit Administration (FTA) reported that maintenance costs for a fleet of 100 buses using B20 would be slightly lower than for using ULSD ($0.14 vs. $0.15 per mile).[30] In a study examining transit buses running on B20 for 100,000 miles, the National Renewable Energy Laboratory found no difference in fuel economy, engine maintenance costs, or road calls between buses operating on B20 and those operating on diesel.[31]

Maintenance costs for CNG buses are reported to be higher than for diesel buses based on a survey of transit agencies.[32] While maintenance costs varied across surveyed agencies, the median cost was found to be 15% higher, at $0.68 per mile compared to $0.59 per mile for diesel. Note that some of these reports of higher CNG maintenance costs may be based on experiences with “first generation” CNG buses, as was the case with Vacaville. Some agencies report that newer CNG buses have no significant maintenance cost differences compared to diesel. Also note that fleets introducing natural gas for the first time will face significant costs associated with constructing or retrofitting a maintenance facility that can service CNG vehicles.

In terms of fueling costs, biodiesel in B20 blend currently costs approximately 2% more than conventional diesel, and the fuel has slightly lower energy content. Switching to B20 would increase annual fueling costs by 3–4%. Thus, for medium-duty trucks, sample lifetime fuel costs would be $39,200 for diesel and $40,400 for B20.

The fuel savings from hybrid electric buses depends on factors such as the number of stops per mile, average speed, and topography. Since the electric battery is recharged through braking, hybrids can be much more fuel efficient than their conventional counterparts in stop-and-go traffic, while their fuel economy advantages are less in freeway traffic. The San Francisco Municipal Transportation Agency

(SFMTA) has seen a 25% improvement in fuel economy with its hybrids. New York City MTA (which has the nation's largest hybrid bus fleet) has experienced a 10% to 30% fuel economy improvement, and one study found a 27% improvement for King County Metro Transit in the Seattle. Fairfield has observed a 35% - 50% fuel economy improvement compared to diesel buses of similar model year. Note that the fuel economy of hybrid buses has improved nearly 50% over the last seven years, due mainly to technology improvements.[33] So the newest hybrid buses will likely achieve greater fuel savings than older models.

Table 4-7 shows sample lifetime operations and maintenance costs for diesel and several transit bus alternative fuel options. These calculations assume a transit bus life of 12 years.[34]

Table 4-7. Sample Transit Bus Lifetime Operations and Maintenance Costs

Cost Type	Diesel	B20	Diesel HEV	CNG Public	CNG Private
Fuel costs	$487,500	$502,400	$390,000	$367,000	$163,400
Maintenance costs	$283,200	$283,200	$283,200	$326,400	$326,400

Purchase and Fuel Costs

Using the purchase price and maintenance and operations costs discussed above, Figure 4-3 and Figure 4-4 show a sample cost comparison for medium-duty trucks and transit buses, respectively.

Figure 4-3. Sample Medium-Duty Truck Purchase and Lifetime Fuel Cost Comparison

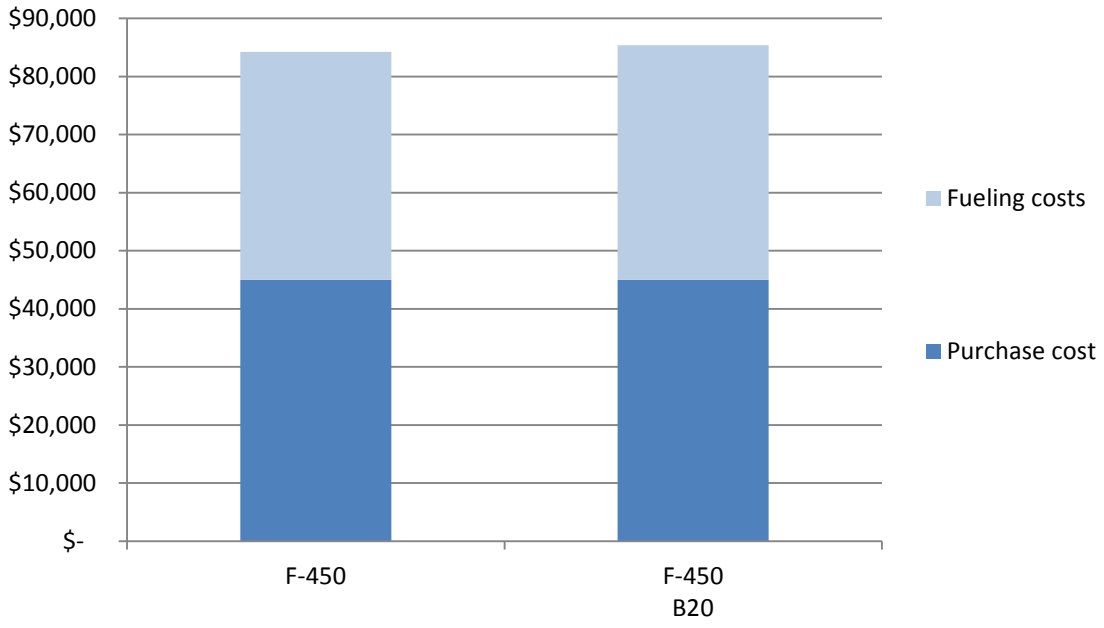
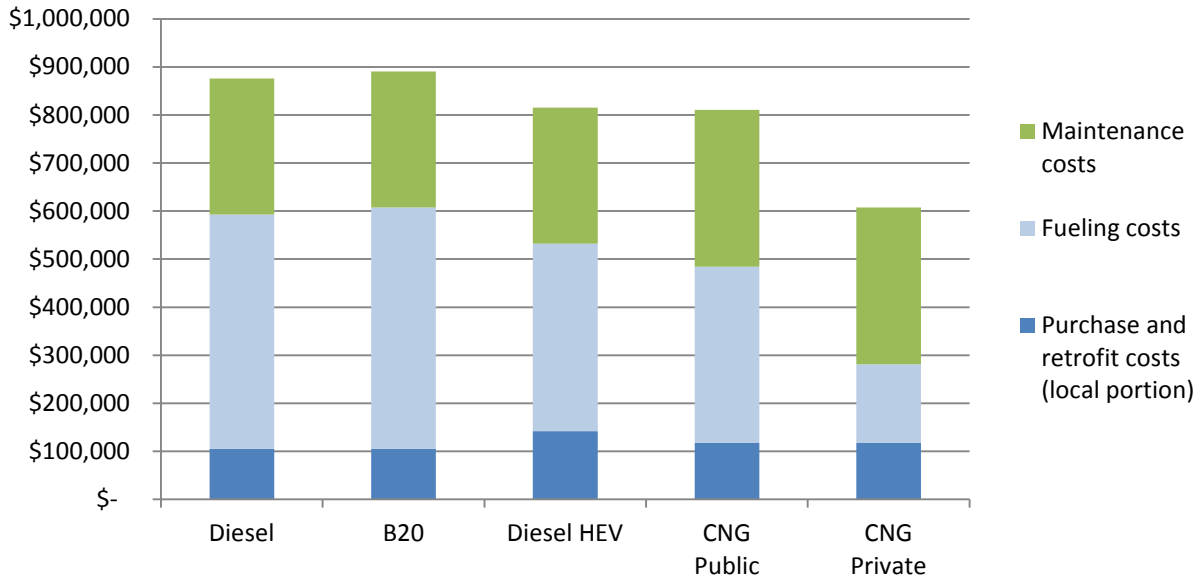


Figure 4-4. Sample Transit Bus Purchase and Lifetime Maintenance and Fuel Cost Comparison



As shown in these figures, biodiesel for medium-duty trucks and transit buses have slightly higher costs due to increased fuel costs. The lower fuel costs for the diesel HEV over the 12-year life offsets the higher purchase cost of the diesel HEV compared to the diesel bus. CNG buses have a lower cost due to the much lower fuel costs of CNG compared to diesel, particularly in the case of CNG purchased from private stations.

When considering costs associated with heavy-duty vehicles, it should be recognized that vehicles that have an axle weight of over 16,000 lbs can significantly affect pavement on non-arterial roads. If a certain type of bus (CNG, Diesel, Hybrid, etc.) is heavier on one or both axles, it can cause more damage to a road. It is possible that a cost savings to a transit agency could result in premature and costly repairs for a local public works agency if there is a significant increase in weight on the bus axles.

Fueling Infrastructure Costs

E85 vehicles require dedicated infrastructure for fuel storage and refueling. E85 fuel is delivered as a blend to the station. A fleet with E85 vehicles can choose to “fill up” at public stations or install dedicated infrastructure alongside conventional gasoline tanks. A typical cost for a new E85 station is $150,000.[35] If a single ethanol pump and new fuel tank are added to an existing station, a typical cost is $60,000; adding E85 capacity by converting an existing tank costs approximately $11,000.[36] Currently, only three E85 fueling stations are located in Solano County: the Solano County Corporation Yard #1 facility in Fairfield and publicly available stations in Vacaville and Fairfield.

CNG vehicle fleets require a dedicated on-site natural gas station or accessible public facilities. For small CNG fleets, especially those consisting of passenger cars and light-duty trucks, public infrastructure would likely be sufficient if a source is nearby. Large CNG fleets and bus fleets would likely require on-site infrastructure. The CEC estimates that the cost of a new CNG fueling station would range from

$600,000 to $5 million, depending on the size of the facility and other factors.[37] CNG fueling infrastructure also involves maintenance costs that are likely to be higher than for conventional fuel infrastructure. A Transportation Research Board study found the annual maintenance cost of CNG fueling infrastructure to be 6.8% of the infrastructure capital cost.[38] The cost of LNG infrastructure fits within the range above.

The cost of building a propane fueling station is similar to that for a comparably sized gasoline dispensing system, and propane refueling infrastructure can often be added to existing service station infrastructure. The cost of a typical fleet fueling facility capable of serving 10–30 vehicles would range from $25,000 for a 500-gallon tank with a non-electronic turnkey dispenser skid system up to $60,000 for a fully integrated electronic fuel dispenser system with a 2,000-gallon tank.[39]

The per-vehicle refueling station cost depends on the number of vehicles served by the facility. Because of the relatively low facility costs and the quick fill capability of a propane station, most private fleet facilities operate well below their vehicle capacity. Based on a typical fleet size of 10–20 vehicles, the cost of a dedicated fleet propane refueling station would be approximately $2,000–$3,000 per vehicle. The per-vehicle costs drop quickly for facilities serving larger fleets.

Similar to operations and maintenance costs, there is relatively little experience with installation of hydrogen fueling infrastructure. The examples to date have likely incurred much higher costs than will future hydrogen fueling stations. AC Transit opened a hydrogen fueling facility in April 2012 to serve its fleet of 12 demonstration fuel cell buses.[40] The total cost of the facility was approximately $6 million, funded in part by a state grant.[41] The agency is building another hydrogen fueling station in Oakland.

Use of EVs by public agencies requires the availability of charging infrastructure, sometimes referred to as electric vehicle supply equipment (EVSE). The cost of EVSE depends heavily on the type of charger, as well the extent of any trenching and concrete work needed to bring electrical service to the charger. Costs typically range from $3,800 to $11,000 for Level 1 EVSE, from $5,600 to $14,000 for Level 2, and from $17,000 to $42,000 for DC fast charging.

Table 4-8 shows a summary of the estimated costs for alternative fuels infrastructure. In addition to the equipment costs for infrastructure, there are potential increases in costs for additions to the Fleet Management Information System (FMIS) that would need to be included.

Table 4-8. Estimated Infrastructure Costs for Alternative Fuels

E85		CNG	Propane	Hydrogen	EV		
Existing Station	New Station	New Station	New Station	New Station	Level 1	Level 2	DC Fast Charging
$60,000	$150,000	$600,000 – $5 million	$60,000	$6 million	$3,800 – $11,000	$5,600 – $14,000	$17,000 – $42,000

Vacaville's Experience with Natural Gas

Among Solano county agencies, Vacaville has the most experience with using natural gas for transportation. In 2001, Vacaville built an on-site CNG compression station and retrofitted its bus maintenance facility to handle CNG. The cost of the compression station was approximately $800,000. Vacaville City Coach then began operating five 30-foot CNG buses. These vehicles were among the first generation of CNG buses and suffered from maintenance problems, mostly because of the undersized bus body rather than the fuel. In 2009 and 2010, the agency switched to 35-foot New Flyer low-floor CNG buses, following successful operation of this model by Golden Gate Transit. Vacaville's 15 CNG buses have performed well, with maintenance costs comparable to a conventional diesel bus. On the general fleet side, the city now has approximately 15 CNG cars and trucks in its fleet. The CNG Honda Civic has become the sedan of choice as gasoline-powered sedans are replaced.

Because of the low cost of CNG, Vacaville's fleet now enjoys significantly lower operating costs. While the price of natural gas fluctuates, the city has typically paid $0.90 - $1.00 per diesel gallon equivalent (DGE) for gas delivered to city's yard via pipeline. Compressing the gas adds about 10% to the cost. Vacaville can also take advantage of a federal tax rebate for natural gas. The net cost to the city is approximately $0.80 - $0.90 per DGE, as compared to recent diesel prices of $4.00 per gallon and higher. These substantial cost savings allow Vacaville City Coach to achieve a higher farebox recovery ratio (the portion of operating costs covered by bus fares).

Vacaville is currently investigating the prospect of providing CNG for the city's refuse hauling contractor. Within a few years, the refuse hauler will operate 38 CNG vehicles in Vacaville, all of which could be potentially fueled at the city's corporate yard CNG station. This arrangement has the potential to provide additional revenue for the city, while also providing discounted CNG to the refuse hauler and reducing diesel emissions in the city's neighborhoods.

4.3. Air Pollution and Health Impacts

The air pollutants of greatest concern in Northern California are nitrogen oxides (NOx), volatile organic compounds (VOCs), fine particulate matter, and diesel particulate matter (DPM). These are termed *criteria pollutants*. NOx and VOCs are the two major components in the formation of ground level ozone, or smog. Ground level ozone can trigger a variety of health problems including aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses like pneumonia and bronchitis. The EPA has designated the San Francisco Bay Area as a marginal nonattainment area for ozone, indicating some exceedances of the National Ambient Air Quality Standard (NAAQS).

Particulate matter (PM) is directly emitted from engines and is produced by motor vehicle tire and brake wear. PM is also created when emissions of NOx or sulfur oxides (SOx) react with other compounds in the atmosphere to form particles. Many scientific studies have linked breathing PM to significant health problems, including aggravated asthma, chronic bronchitis, and heart attacks. The most significant health impacts are caused by fine particulate matter (PM2.5), which consists of particles less than 2.5 microns in diameter. The San Francisco Bay Area is designated as a nonattainment area for PM2.5, indicating an unacceptable air pollution level for this finer particular matter.

DPM is of particular concern because it is widely believed to be a human carcinogen when inhaled. DPM carries heavy metals and toxic hydrocarbons into the body, and is the primary cancer-causing agent in vehicle exhaust. Studies in Southern California have found that 70% of the air pollution inhalation cancer risk in the region was caused by DPM, most of which comes from goods movement sources.[42]

Biofuels and Blends

Unlike GHGs, which are measured on a lifecycle basis, criteria pollutant emissions focus exclusively on the vehicle—including both vehicle tailpipe exhaust or evaporations from the fueling system. Vehicle criteria pollutant emissions are a significant source of air quality problems within urban areas, including smog and cancer-causing chemicals. E85 emissions of NOx (a precursor to smog) are 27% lower than those for gasoline, while VOCs show a small decrease.[43] NOx emission benefits are due to the lower combustion temperature for E85. Notably, NOx emissions for the lower-ethanol content E10 blend are slightly higher than those for gasoline. It is important to note that FFVs meet the same emissions standards as conventional vehicles, regardless of their using gasoline or E85.

B20 biodiesel shows small emission benefits across most criteria pollutants. VOCs and carbon monoxide (CO) are reduced by approximately 20% and 10%, respectively. These values are relatively small compared to emissions for diesel, as the B20 blend is primarily diesel fuel. Biodiesel has been show to slightly increase and decrease NOx emissions, depending on the study. The change in NOx emissions varied between plus and minus 2% for B20 in EPA testing.[44] When considering diesel emissions, the most significant pollutant is DPM, primarily in the form of soot emitted from the tailpipe. As noted, DPM carries heavy metals and toxic hydrocarbons into the body, and is the primary cancer-causing agent in diesel vehicle exhaust. B20 reduces DPM by approximately 10%.[45] However, because new diesel vehicles have pollution controls such as diesel particulate filters, DPM emissions are low in new vehicles even

without the use of B20. B100 reduces DPM by 100%. Figure 4-5 shows the percent change in emissions for E85, B20, and B100 compared to petroleum-based fuels.

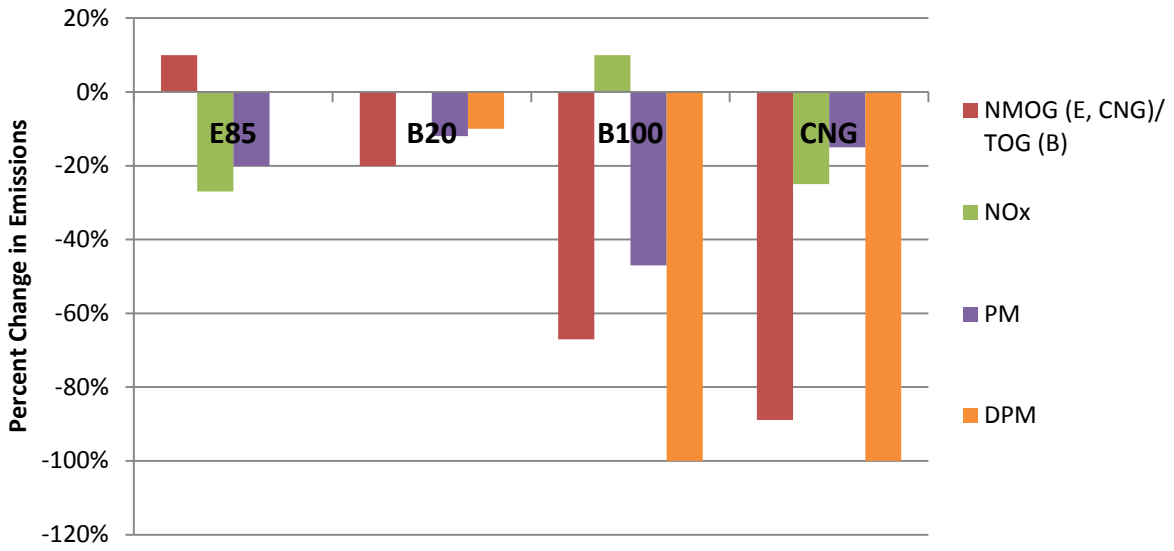
Natural Gas and Propane

In passenger cars, EPA reports that the criteria pollutant emissions benefits of CNG are small compared to gasoline vehicles with modern emission controls. EPA's emission standards do not differentiate among fuel types, and CNG vehicles are held to the same standard as gasoline vehicles. Nevertheless, NGVs offer emissions benefits compared to gasoline vehicles, especially when replacing older vehicles.[46] Emissions certifications for light-duty trucks (both original engine manufacturer and after-market conversion) show a range of lower and slightly higher emissions for criteria pollutants but always below the emissions standard.[47]

In bus transit fleets, CNG historically has produced significant emissions reductions compared to diesel. However, with the introduction of low-emission diesel buses that meet the EPA 2007/2010 emissions standards, the benefits of CNG are more modest because both diesel and CNG heavy-duty engines must meet the same stringent emissions standards. There has been little in-use testing of emissions from new CNG buses for comparison to diesel. Based on natural gas engines certified for HDVs, NOx emissions reductions appear to be in the range of 20–30%, with 25% represented in the chart below.[48] [49] The effect on PM emissions is less certain. New natural gas engines for trucks have been certified at PM emissions levels significantly lower than diesel. However, natural gas trucks operated at the Port of Los Angeles have shown greatly increased ammonia emissions relative to diesel trucks.[50] Ammonia can produce secondary particulates that could offset the PM benefits of natural gas. Newer natural gas vehicles may eliminate this problem. The effect of natural gas vehicles on PM emissions is an area of on-going research. For this report, PM benefits were assumed in the range of 10–20% (15% represented in the chart below) in comparison to conventional diesel. In CNG applications that displace 100% of diesel, DPM is also decreased by 100%.

Propane burns cleaner than gasoline or diesel. However, compared to modern gasoline and diesel vehicles, propane does not offer significant criteria pollutant emissions benefits. Emissions certification data for propane conversions of gasoline engines show both slight increases and decreases in criteria pollutant emissions, depending on the size of the engine and vehicle converted.[51] The emissions control systems of conventional vehicles have improved to the extent that gasoline or diesel emissions are already at a very low level. As with natural gas vehicles, EPA emissions standards apply equally to all fuel types.[52] Also, similar to CNG, propane shows a 100% reduction of DPM. Figure 4-5 shows the percent change in emissions for CNG compared to petroleum-based fuels.

Figure 4-5. Emissions Reductions of Biofuels, Biofuel Blends, and CNG Compared to Petroleum-Based Fuels



Note: NMOG is non-methane organic gases (presented for E85 and CNG). TOG is total organic gases (presented for B20 and B100).

Hydrogen and Electricity

Hydrogen and electricity are considered the two main advanced fuels. From a tailpipe perspective, the criteria pollutant and air toxic benefits of hydrogen depend on the vehicle technology used. For FCVs, vehicles emit only water vapor with trace amounts of hydrogen, eliminating all tailpipe pollutants. A major benefit of BEVs is the total elimination of tailpipe emissions. Consequently, BEVs can greatly contribute to improving local air quality.

The benefits of PHEVs and HEVs are less because these vehicles burn gasoline during a portion of operation. However, with emission control technology in place, criteria pollutant emissions from PHEVs and HEVs are equivalent to or less than those from conventional gasoline and diesel vehicles. In contrast, hydrogen ICE vehicles produce quantities of NOx in the combustion process. Hydrogen's higher flame temperature compared to gasoline drives higher NOx emissions, although these emissions can be greatly reduced in an after-treatment process.

4.4. Greenhouse Gas Emissions Impacts

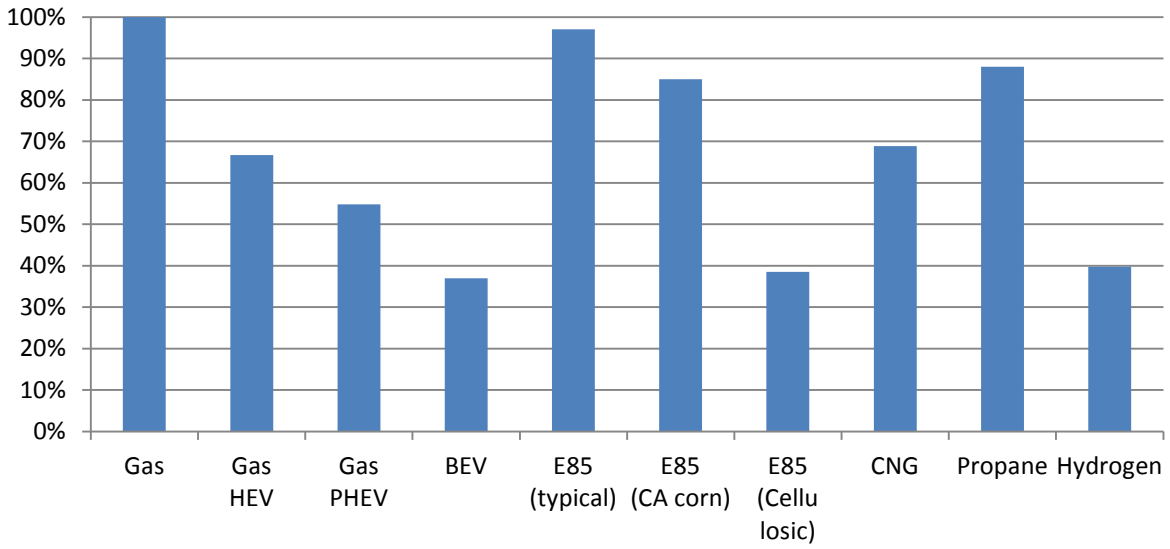
This section discusses the GHG benefits of alternative fuels and technologies for the gasoline/light-duty sector and the diesel/medium- and heavy-duty sector.

Gasoline/Light-Duty Vehicles

For gasoline/light-duty vehicles, the alternative fuels and technologies to reduce GHGs are hybridization, electricity, ethanol, natural gas, propane, and hydrogen. Figure 4-6 compares the GHG emissions of alternative technologies and fuels to the emissions of conventional gasoline vehicles.

The GHG emissions benefits of ethanol vary considerably, depending on the feedstock that is used and the method of refining the fuel. The most common feedstock in use for ethanol in California today is a blend of Midwest corn and California feedstock. Because relatively high GHG emissions are associated with crop production, the net GHG emissions resulting from typical ethanol are just 4% less than those of gasoline. If ethanol is produced exclusively in California, there is a potential for a 19% carbon intensity reduction due to the increased efficiency of California ethanol plants. This translates to a 15% carbon intensity reduction for E85 using California corn ethanol. Ethanol produced from sugar cane is cleaner, with GHGs that are on average 23% less than those from gasoline. Cellulosic ethanol produced from forest waste would reduce greenhouse gas emissions by 78% compared to gasoline. Note that the GHG emissions benefits of various ethanol blends will be less than the benefits of pure ethanol, depending on the ratio of ethanol to gasoline.

Figure 4-6. GHG Emissions Benefits of Alternative Technologies and Fuels for Light-Duty Vehicles Compared to Conventional Gasoline



Natural gas has GHG emission benefits when used as an alternative to gasoline. The most prevalent form of natural gas compressed to CNG has a lifecycle carbon intensity of 31% less than gasoline. The benefits of LNG are smaller, primarily due to the energy needed to liquefy the fuel. When natural gas is delivered from overseas sources, the carbon intensity is higher due to transportation needs. While the carbon intensity of propane is lower than conventional fuels, it is among the highest of alternative fuels listed in this report. With a carbon intensity of 86.9 grams of carbon dioxide-equivalent per megajoule (g CO2e/MJ), GHG emissions from propane are 12% less than those of gasoline.[53]

Although hydrogen FCVs can produce significantly lower GHG emissions than gasoline on a lifecycle basis, the benefits depend heavily on how the hydrogen is produced. The difference lies in the feedstock source—whether hydrogen is produced from natural gas (using steam methane reformation [SMR] technology), produced from water using "dirty" electricity with a high-carbon intensity, or produced from "clean" electricity from renewable sources. SMR-produced hydrogen has higher carbon intensity

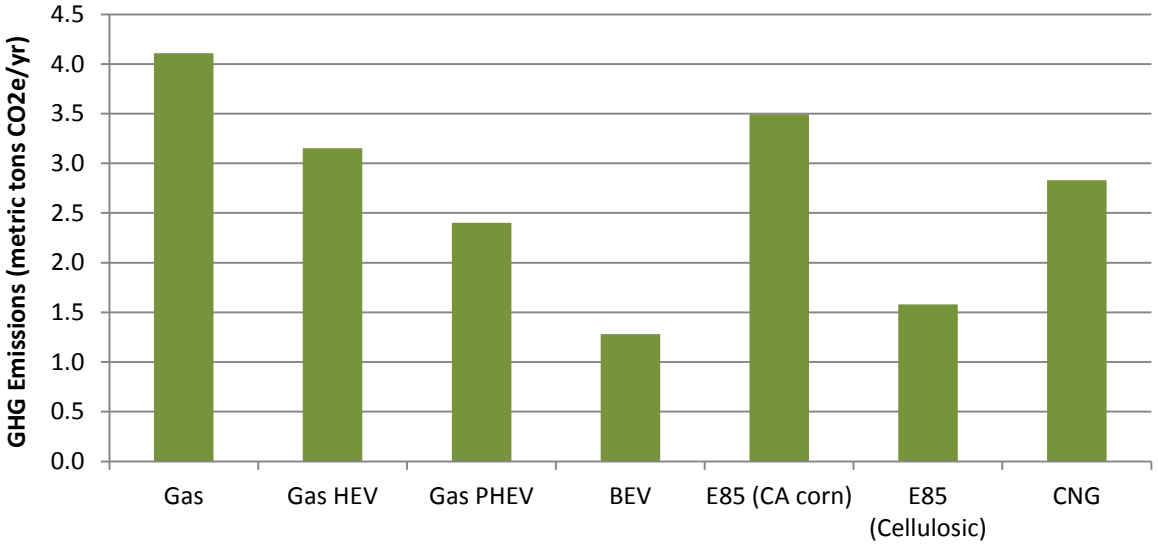
than conventional gasoline, at 95.86 g CO2e/MJ; when the efficiency of a FCV is taking into account, however, hydrogen has 60% lower GHG emissions than gasoline.[54,55]

Hybridization does not change the type of fuel consumed but lessens the amount of fuel used by increasing the fuel economy. Reviewing newer EPA-rated fuel economies of hybrid vehicles compared to their gasoline counterparts, hybridization increases fuel economy by an estimated 50%. HEVs typically see a 33% reduction in GHG emissions compared to a comparable gasoline ICE vehicle.

The GHG emissions of EVs depend on fuel mix and vehicle type. For purposes of the Low Carbon Fuel Standard (LCFS), ARB estimated that EVs are three times more energy efficient than conventional gasoline ICE vehicles. For a typical BEV, the net effect is a 71% reduction in GHG emissions per mile, compared to a gasoline ICE vehicle. The emissions benefits of PHEVs are less because they are designed to operate on a mix of electricity and gasoline. A typical PHEV produces 48% fewer GHG emissions per mile. Note that increased usage of EVs will increase demand for electricity. The effects of EVs on the electric grid are minimized if EVs can be charged during off-peak times (e.g., night time).

For cities wishing to estimate the GHG benefit of alternative fuel vehicles on a tonnage basis, Figure 4-7 shows annual GHG emissions per vehicle across the various fuel and technology options. These estimates use the same assumptions for annual mileage and fuel economy as discussed in Section 4.2. The emissions benefits can be multiplied by the number of alternative fuel vehicles in a fleet to estimate the total GHG impact.

Figure 4-7. Annual GHG Emissions of Alternative Technologies and Fuels for a Light-Duty Vehicle Compared to Conventional Gasoline



Diesel/Medium- and Heavy-Duty Vehicles

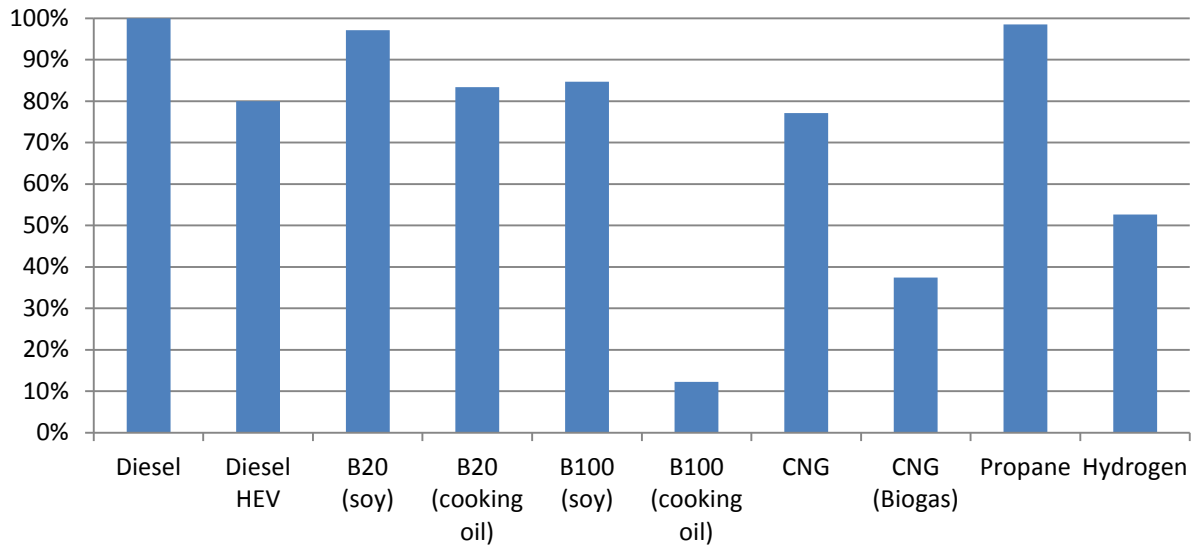
For diesel/medium- and heavy-duty vehicles, the alternative fuels and technologies to reduce GHGs are hybridization, biodiesel, natural gas, propane, and hydrogen. Figure 4-7shows the GHG emissions of these technologies and fuels compared to conventional diesel vehicles.

Similar to ethanol, the CO_2 emissions at the tailpipe from a vehicle running on biodiesel are roughly equivalent to those from a vehicle running on conventional diesel. The GHG emission benefits of biodiesel are apparent only when viewed on a lifecycle basis that considers fuel production.

Biodiesel is currently produced from several feedstocks, in three main categories: waste oils such as used cooking oil, plant oils such as corn or palm oil, and crops such as Midwest soybeans. In the case of waste cooking oil and other waste streams (such as corn oil when extracted from distillers grains), the total biodiesel GHG emissions are very low. For example, when produced from used cooking oil, biodiesel reduces GHG emissions by approximately 85%.[56] When produced from soybeans, however, the reductions are only 12%, due to emissions related to cultivation of the soybeans.[57] The land use effects similarly reduce the GHG emissions benefits of using virgin corn oil and palm oil as a biofuel feedstock. These GHG emissions benefit figures apply to pure biodiesel. When blended with conventional diesel, the emission benefits would be reduced, depending on the ratio of the blend.

Natural gas, in compressed or liquid form, has GHG emissions benefits when used as an alternative to diesel. The most prevalent form of natural gas has a lifecycle carbon intensity of 23% less than diesel when taking into account the 10% efficiency loss of natural gas compared to diesel. The benefits of LNG are smaller, primarily due to the energy needed to liquefy the fuel. Natural gas produced from biogenic sources produces much less CO_2 (on a lifecycle basis) than conventional natural gas or diesel. No crop production emissions are associated with gases collected from waste streams. CNG produced from landfill gas (biomethane) has a lifecycle carbon intensity that is 63% less than conventional diesel when taking into account the 10% efficiency loss of natural gas compared to diesel. While the carbon intensity of propane is lower than conventional fuels, it is among the highest of alternative fuels listed in this report.[58]

Figure 4-8. GHG Emissions Benefits of Alternative Technologies and Fuels for Medium- and Heavy-Duty Vehicles Compared to Diesel

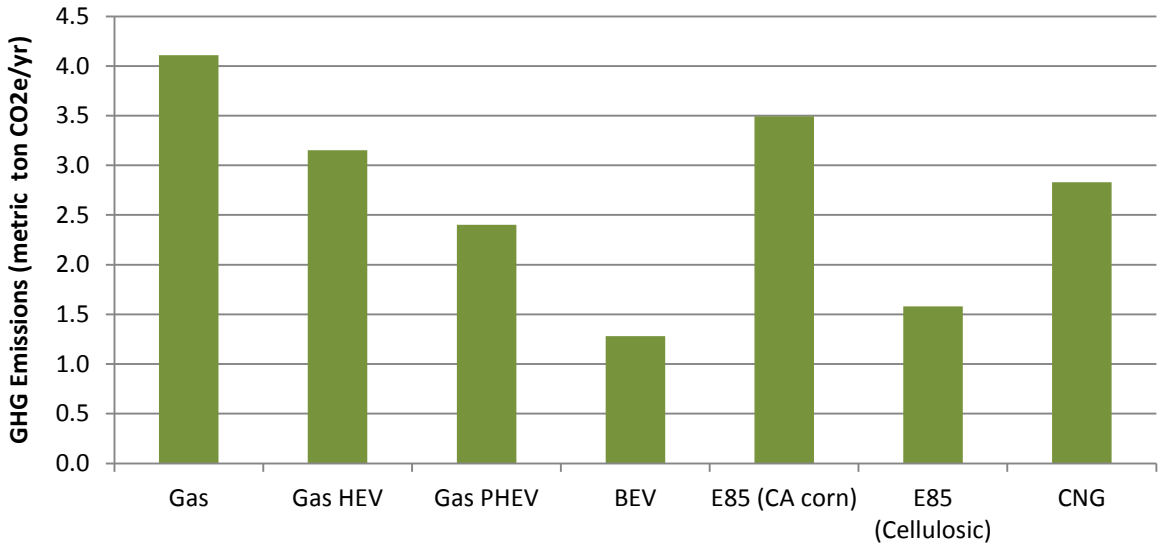


Similar to gasoline, hydrogen FCVs can produce significantly lower GHG emissions than diesel on a lifecycle basis; reduced GHG emissions depend heavily on how the hydrogen is produced. SMR-produced hydrogen has higher carbon intensity than diesel, at 95.86 g CO2e/MJ; when the efficiency of an FCV is taking into account, however, hydrogen has 60% lower GHG emissions than diesel.[59,60]

When compared to diesel, the most prevalent electrification technology is hybridization and not pure battery electric technologies. This is due to the extremely high incremental cost of battery electric medium- and heavy-duty vehicles. Hybrid-electric diesel vehicles, including transit buses, have an estimated increased efficiency of 25%, resulting in a 20% decrease in fuel consumption and GHG emissions. Hybrid-electric diesel vehicles using biodiesel blends would result in additional GHG emissions reductions.

Figure 4-9 below, using the same assumptions in Section 4.2 for annual fuel consumption, shows the estimated annual GHG emissions for a selection of alternative fuels for a transit bus. For cities wishing to estimate the GHG benefit of alternative fuel buses on a tonnage basis, the emissions benefits can be multiplied by the number of alternative fuel vehicles in a fleet to estimate the total GHG impact.

Figure 4-9. Annual GHG Emissions of Alternative Technologies and Fuels for a Transit Bus Compared to Diesel



4.5. Funding Sources

A variety of federal, state, and regional funds are available to fleets for alternative vehicles and infrastructure. Described below are available sources of funding starting at the federal level and working down to the regional level.

Federal Funding

The main sources of funding for fleets and transit agencies at the federal level are Congestion Mitigation and Air Quality Improvement (CMAQ) funds; FTA Grants, including the Transit Investments for Greenhouse Gas and Energy Reduction (TIGGER) Program and the Clean Fuels Grants Program; Diesel Emissions Reduction Act (DERA) funding; and federal vehicle and infrastructure tax credit.

Congestion Mitigation and Air Quality Improvement Program. The CMAQ Program funds transit improvements, travel demand management strategies, traffic flow improvements, and public fleet conversions to cleaner fuels. The federal share for most CMAQ-eligible projects is 80%. Establishment of alternative fuel refueling facilities and related other infrastructure is eligible for funding if the facility is publicly owned or leased. However, if private alternative fuel stations are reasonably accessible, CMAQ funds may not be used to fund publicly owned refueling stations. Grants from this program can pay for the incremental cost of purchasing natural gas vehicles and can be used to fund alternative fuel refueling projects, although the projects must have 20% local or regional co-funding, and funding is allowed for private/public partnerships.

Federal Transit Administration Grants. The FTA provides grants to help fund transit buses for local and regional public transit systems. FTA helps communities support public transportation by issuing grants to eligible recipients for planning, vehicle purchases, facility construction, operations, and other purposes. Two of FTA's programs are described below.

Transit Investments for Greenhouse Gas and Energy Reduction Program. The TIGGER Program is managed by FTA's Office of Research, Demonstration and Innovation in coordination with the Office of Program Management and FTA regional offices. The TIGGER Program works directly with public transportation agencies to implement new strategies for reducing GHG emissions and for reducing energy use within transit operations. These strategies can be implemented through operational or technological enhancements or innovations. To align the TIGGER Program with other strategic initiatives, FTA encourages project implementation that will enhance operational efficiencies, demonstrate innovative electric drive strategies, and create an environment prioritizing public transportation through intelligent transportation systems or other related technology approaches to achieve efficiency and sustainability goals. Eligible recipients include public transportation agencies, federally recognized tribes, and state departments of transportation. Eligible activities include capital investments that assist in reducing the energy consumption of a transit agency and capital investments that reduce greenhouse gas emissions of a transit agency.

Clean Fuels Grants Program. The Clean Fuels Grants Program has a two-fold purpose. First, the program was developed to assist nonattainment and maintenance areas in achieving or maintaining the NAAQS for ozone and CO. Second, the program supports emerging clean fuel and advanced propulsion technologies for transit buses and markets for those technologies. Eligible recipients include entities authorized to receive federal urbanized formula funds and located in areas that are designated as maintenance or non-attainment for ozone or CO. Eligible activities include assisting recipients to purchase or lease clean fuel buses and to construct or lease clean fuel bus facilities or electrical recharging facilities and related equipment; and projects relating to clean fuel, biodiesel, hybrid electric, or zero emissions technology buses that exhibit equivalent or superior emissions reductions to existing clean fuel or hybrid electric technologies. Facilities and related equipment for clean diesel buses are not eligible for these grants.

Examples of Federal Transit Administrations' Transit Investments for Greenhouse Gas and Energy Reduction (TIGGER) and Clean Fuels Grants Programs

The fiscal year 2011 Sustainability Awards for the TIGGER and Clean Fuels Programs granted a total of $13.7 million to California recipients. These included the following grants:

- TIGGER Program grant of $6.7 million to Long Beach Public Transportation Company to replace diesel buses with all electric buses for a pilot program
- TIGGER Program grant of $4.9 million to Sunline Transit Agency to assist in building two fuel cell hybrid buses
- Clean Fuels grant of $2 million to Long Beach Public Transportation Company to replace aging diesel buses with gasoline/electric hybrid buses
- Clean Fuels grant of $700,000 to Monterey-Salinas Transit to replace gas minibuses with diesel hybrid electric buses

Diesel Emissions Reduction Act Program. The DERA Act of 2010, or DERA 2, reauthorizes the DERA grant program to award up to $100 million per year for fiscal year (FY) 2012–2016. DERA 2 removes the

requirement that 50% of funds be used for public fleets and removes restrictions on using funds for programs mandated by state or local law. DERA funds will continue to support projects that strategically reduce diesel emissions. EPA distributes DERA funds through seven regional collaboratives, with 70% of funds awarded on a nationally competitive basis and 30% allocated for state programs. The collaboratives issue regional Requests for Applications (RFAs). New natural gas vehicles and natural gas conversion systems certified by EPA or ARB are eligible for all categories for which the collaboratives issue an RFA.

Federal Tax Credits. The last main federal funding source is federal tax credits. Three main federal tax credits are available to transit districts and fleets:

- Fueling equipment for natural gas, liquefied petroleum gas (propane), electricity, E85, or diesel fuel blends containing a minimum of 20% biodiesel installed between January 1, 2006, and December 31, 2013, is eligible for a tax credit of 30% of the cost, not to exceed $30,000. Fueling station owners who install qualified equipment at multiple sites are allowed to use the credit toward each location.
- A fuel cell vehicle tax credit of up to $4,000 is available for the purchase of qualified light-duty FCVs. Tax credits are also available for medium- and heavy-duty FCVs ($10,000 – $40,000, depending on vehicle weight). This tax credit expires on December 31, 2014.
- PHEVs purchased in or after 2010 may be eligible for a federal income tax credit of up to $7,500. The credit amount varies based on the capacity of the battery used to fuel the vehicle.

State Funding

The three main state funding opportunities are the Alternative and Renewable Fuel and Vehicle Technology Program (Assembly Bill [AB] 118), the California Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) and the Light-Duty Clean Vehicle Rebate Project.

Alternative and Renewable Fuel and Vehicle Technology Program. AB 118 authorizes the California Energy Commission (CEC) to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies. The CEC has an annual program budget of approximately $100 million to support renewable and alternative transportation fuel projects. The statute allows the CEC to use grants, loans, loan guarantees, revolving loans, and other appropriate measures. Eligible recipients include 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 2013–2014 program funding proposes infrastructure funding for EV charging ($7 million), hydrogen fueling ($20 million), and natural gas fueling ($1.5 million). There is also $12 million of proposed funding for NGV deployment. The CEC releases Program Opportunity Notices (PONs) for available funding that involves submitting competitive applications.

AB 118 Natural Gas Funding Opportunities

The California Energy Commission, through PON-12-605 Natural Gas Fueling Infrastructure, awarded funding on March 18, 2013, of almost $4 million, with a significant share going to cities and school districts. Most of this funding was to assist building new CNG stations or upgrading existing stations. Applicants receiving grants included the City of Sacramento; County of Santa Clara; City of Santa Clarita; City of Anaheim; and the Lodi, Murrieta Valley, and Poway Unified School Districts. For example, the City of Sacramento plans on using its awarded $600,000 grant plus a match of $600,000 to upgrade and expand the existing LNG infrastructure.

Through PONs 10-603 and 10-604, AB 118 offers grants to buy down the incremental cost of natural gas and propane vehicles. Grant amounts range from $3,000 to $32,000 per natural gas vehicle and from $3,000 to $20,000 for propane vehicles. Grant amounts are based on vehicle weight. These grant opportunities are available until April 1, 2014, or until the funds are exhausted.

California Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project. The HVIP Program is intended to speed the early market introduction of clean, low-carbon hybrid and electric trucks and buses. The HVIP Program is designed to offset approximately one-half of the incremental additional cost of eligible hybrid and battery-electric medium- and heavy-duty vehicles and reduces this cost at the time of purchase. The HVIP base vouchers range from $8,000 to $45,000 on a first-come, first-served basis for the purchase of each eligible new hybrid or electric truck or bus. With the program's additional funding for qualified vehicles (the first three vehicles purchased), voucher levels can reach $65,000 per vehicle. As of March 29, 2013, over $12 million in vouchers are still available in the program.

Light-Duty Clean Vehicle Rebate Program. The Light-Duty Clean Vehicle Rebate Project is funded by the ARB and administered statewide by the California Center for Sustainable Energy. A total of $26.1 million has been appropriated for FY 2009–2012 to promote the production and use of zero-emission vehicles, including EVs, PHEVs, and FCVs. Rebates of up to $2,500 per light-duty vehicle are available for individuals and business owners who purchase or lease new eligible zero-emission EVs or PHEVs.

Regional Funding

Regional funding sources include Bay Area Air Quality Management District (BAAQMD) grants and incentives, Yolo-Solano Clean Air Funds, and Western Propane Gas Association's New Propane Vehicle Rebate Program.

Bay Area Air Quality Management District Funds. Part of Solano County is covered by the BAAQMD and can apply for BAAQMD grants and incentives. These grants and incentives include Climate Protection Grants, Lower-Emission School Bus funds, and the Transportation Fund for Clean Air. For example, the Transportation Fund for Clean Air can provide for a wide range of funding opportunities, including the purchase or lease of clean air vehicles.

Yolo-Solano Air Quality Management District Clean Air Funds. Yolo-Solano Air Quality Management District Clean Air Funds allow private businesses, non-profit organizations, and public agencies to apply for grants for projects designed to reduce emissions from motor vehicles. The funds can be used for vehicles or infrastructure. Projects awarded Clean Air Funds include replacing or retrofitting diesel trucks

and off-road equipment that do not qualify for other regional programs, new electric vehicles, construction of pedestrian and bicycle facilities, transit projects, and public information and education programs. Proposals can be made in one of three categories: clean technologies and low-emission vehicles; alternative transportation; transit; and public education.

Sacramento Metropolitan Air Quality Management District Regional Funding Program. Private business and public agencies that operate heavy-duty vehicles or mobile off-road equipment in the Sacramento Federal Non-Attainment Area (SFNA) which includes the eastern portion of Solano County, including Vacaville, Dixon, and Rio Vista, can receive funds to defray the costs of new lower emission technologies that meet cost effectiveness criteria. The program can help fleets pay for new lower emission engines, lower emission retrofits, and new equipment replacements under the district's Heavy-Duty Low-Emission Vehicle Program.

Western Propane Gas Association New Propane Vehicle Rebate Program. The Western Propane Gas Association funds a New Propane Vehicle Rebate Program. Up to $1,000 is available to California propane customers who purchase a new propane vehicle or convert an existing vehicle to a propane system. The program runs until August 31, 2013.

Regulatory Funding

Low Carbon Fuel Standard. In some cases, LCFS directly may apply to transit or municipal fleets, due to the definition of a "regulated party." Entities that produce (CNG) and consume (CNG, electricity) alternative fuels can voluntary opt-in to the LCFS and become a regulated party to generate credits. Requirements of a regulated party include quarterly and annual fuel consumption reports, which are done on-line through the state's LCFS tool and are used to calculate the credits generated. Opt-in parties are different than refiners and importers of gasoline and diesel, who are required to be regulated parties in the LCFS. For conventional natural gas fuel (as opposed to biogas), LCFS defines the regulated party as the entity that owns the natural gas fueling equipment. Also, if the transit or municipal fleets uses electricity in BEV or PHEVs in a fleet of three or more vehicles, the agency is eligible to opt-in to the LCFS and generate credits. These credits then can be sold to regulated parties for increased revenue and help offset incremental vehicle costs and infrastructure costs. Credits are currently being sold between $40-$65 per credit, which equates to approximately $0.09-$0.15 per GGE of CNG and $0.31-$0.50 per GGE of electricity.

5. Implementation Steps

Based on the assessment of the technologies, benefits, and costs of alternative fuel vehicles and infrastructure presented in the previous chapters, it appears that the three most promising areas of focus for Solano County public agencies interested in promoting alternative transportation fuels are:

- Biofuels
- Natural gas
- Electric vehicles

The most effective implementation steps for public agencies differ among these three fuel categories. This chapter discusses implementation steps, with an emphasis on near-term actions that can be led by Solano County public agencies interested in use of alternative fuels.

5.1. Biofuels

As discussed in Chapters 2 and 4, biofuels differ from most other alternative fuels in that they do not require large investments in new vehicle technologies. Many FFVs in municipal fleets are already capable of running on E85, and biodiesel blends up to B20 can be used in most HDVs without modification. Rather, the major barriers to increased use of biofuels are limited fueling infrastructure and limited understanding of biofuel options among the vehicle operators.

For agencies that are interested in increasing use of biofuels, the following implementation steps should be considered. These recommendations are based on a high-level assessment; a more detailed assessment that considers specific sites and operating environments would be needed to fully understand the benefits and drawbacks that any one alternative fuel type offers.

E85

E85 vehicles using corn-based ethanol produce modest reductions in GHG and air pollution emissions. In the future, by using E85 made from cellulosic ethanol (currently limited in supply), fleets can obtain much larger GHG emissions benefits.

One simple step to increase E85 use is simply to educate drivers or other staff about FFVs that may already be in their fleets. The fleet survey reported in Chapter 3 of this plan identified 133 FFVs currently in municipal fleets, but it is believed that this number is an undercount. Some city staff may not realize that they have FFVs, because the vehicles look identical to conventional gasoline vehicles and can operate solely on gasoline. For example, all Ford Crown Victorias model year 2006 and newer (a common police patrol vehicle) come flex-fuel capable from the factory. To reminder operators about their fueling options, fleets should apply a designator for E85 capability to all FFVs, new and existing, if the fleet does not already do so.

The limited E85 fueling infrastructure is clearly another barrier to increasing the use of biofuels. As discussed in Chapter 3, the County currently has only three E85 fueling facilities—two that are publicly available (in Fairfield and Vacaville) plus the fueling station at Solano County's corporate yard.

Both municipal fleets and private fleets can potentially modify fueling infrastructure at their operations and maintenance facilities to install E85 refueling infrastructure. This is a straightforward step to increase the amount of E85 consumed in fleets. There are two main pathways to install E85 infrastructure: (1) retrofit the existing storage tanks and dispenser to be E85 compatible; or (2) install new storage tanks and dispensers for E85. Generally, retrofits are cheaper; however, it is likely that a fleet may not have sufficient storage tank capacity to convert an existing tank to E85 storage and maintain sufficient on-site storage to continue dispensing gasoline and diesel to other vehicles in the fleet. If new storage tanks and dispensers are to be installed, fleets should consider an aboveground storage tank (AST) to reduce the installation costs associated with an underground storage tank (UST). For instance, the Solano County Corporation Yard installed an AST for E85 in 2009. Generally, due to space constraints and consumer convenience, retail fueling stations install USTs for E85.

ICF estimates the following costs to retrofit or install a new E85 fueling station–these estimates include the costs of tanks, dispensers, hanging hardware, and additional equipment:[61]

- In a retrofit scenario, costs range from $11,000 to $30,000.
- In a new installation, typical costs range from $50,000 to $125,000.

It is a significant challenge to provide more public E85 refueling opportunities because of the economics that retail fueling infrastructure providers face. First, the majority of retail fueling infrastructure providers are small business owners. A common misconception is that fueling stations are owned by large energy companies, but the larger companies started divesting from retail fueling stations due to lower profit margins in the 1990s. Consequently, most of the fueling station owners today have limited access to the capital that is required to invest in E85 infrastructure. Second, the return on the investment in E85 is often difficult to justify given weak demand for E85. Generally, the most cost-effective choice for E85 infrastructure is a retrofit or conversion of an existing tank and dispensers. In other words, the retail station owner needs to ensure that the demand for E85 will be sufficient to generate revenue to pay back the initial investment and offset the lost sales of the converted dispenser. This need often puts additional strain on the return-on-investment calculations performed by retail station owners.

Despite these barriers, there is an increasing interest in E85 refueling infrastructure, due in large part to regulatory drivers such as California's LCFS and EPA's RFS2. For instance, Propel is expanding the network of E85 infrastructure in nearby Sacramento significantly with the support of a grant from the CEC. Propel also has secured significant private investment, which is likely a positive indication of increased private interest in expanding E85 infrastructure. Moving forward, Solano County agencies should seek to engage local retail fueling station owners and E85 infrastructure providers such as Propel to determine the feasibility of expanding the availability of E85 to the general public and identifying grant opportunities to support this expansion.

Biodiesel

Like ethanol, use of biodiesel also results in lower GHG and most air pollution emissions; benefits increase with the percent of biodiesel blend (e.g., B20 has larger benefits than B5). All diesel vehicles can use low-level biodiesel blends (such as B5), and most can use blends up to B20 without vehicle modification or voiding of the vehicle warranty. Moreover, B5 and B20 cost only a few cents more per gallon than conventional diesel.

Use of biodiesel in California is increasing. As noted in Chapter 3, the Solano County fleet uses B5 for its HDVs. Aside from more frequent checking and cleaning of fuel filters during the transition period, Solano County reports no problems with the fuel and is now considering use of higher level blends. Caltrans uses B5 in most of its HDVs, and several transit agencies in California are already using B20.

Among fuel providers, there is significant movement in California toward B5. For instance, Kinder Morgan is providing B5 at its Colton terminal (Southern California) and in Fresno, while Chevron is moving to B5 at its Montebello terminal. These shifts toward B5 are part of a response to the EPA's RFS2 and California's LCFS. Several terminals in Southern California and Central California provide B5; the availability of B5 in Northern California is expected to increase significantly in the near-term future.

In the near term, the fleets with central fueling should consider including a requirement in their bidding process that specifies the use of B5. As an example, SolTrans contracted in late 2011 with Pinnacle Petroleum to provide petroleum products—gasoline and diesel—to SolTrans facilities, including bus facilities and ferry facilities. This contract has a 2-year base with three 1-year options. In other words, it appears that, at the end of 2013, SolTrans could seek to modify the supply and delivery contract to include B5 as part of the specification. Pinnacle Petroleum's webpage indicates that they provide biodiesel products ranging from B5 to B100. The transition to B5 should not require any infrastructure modifications for the fuel supplier, nor should it require any refueling infrastructure or vehicle modifications on behalf of SolTrans or other fleets. While fleet managers should check engine warranties, it is highly unlikely that use of B5 will void any warranties.

Fleets that consider diesel as the best option for their bus or heavy-duty truck fleet in the near-term future should consider a transition to B20. It should be recognized, however, that the transition to B20 can be more challenging than a transition to B5, as it may necessitate a new storage tank and potential vehicle limitations. Fleets should consider the following before making a transition to B20:

- Fleet managers should update their procurement process to account for B20 (similar to the recommendations for B5 above). Most fuel providers should be capable of providing a biodiesel product.
- Fleet managers should confirm that engine warranties are covered by B20.
- Fleet managers will need to confirm that existing USTs are compatible with B20, assuming the fuel will be stored as B20 and not blended on site. Although a vast majority of USTs are compatible with B20, in is likely that a new storage tank would need to be installed, since most fleets would need to maintain conventional diesel fueling for equipment that cannot use

biodiesel. Existing USTs should be cleaned thoroughly prior to transition to B20 to remove any residuals in the tank. Fuel filters need to be cleaned more frequently with B20, particularly in the transition period, because biodiesel acts as a solvent and tends to dislodge contaminants in the fuel system. Fueling hoses likely also will need replacement.

- In the event that the diesel UST is not compatible with B20 (or higher blends), the agency should seek to update their tank as needed. This will require an investment on the order of $175,000, depending on the costs of digging up the tank.
- Fleet managers should confirm that any shelf-life issues with B20 or higher blends will not cause problems, particularly with equipment that is used only seasonally (e.g., chippers).

5.2. Natural Gas

As shown in Section 4.1, natural gas fueled vehicles have the potential for lower costs than conventional fueled vehicles. This is especially true with transit and fleet vehicles that refuel at private stations and enjoy lower fuel prices compared to public stations. This discount is usually due to long-term purchasing agreements between the fleet and the fuel provider. Natural gas vehicles also have lower air pollution and GHG emissions.

The most appropriate applications for natural gas as a transportation fuel tend to be those with high fuel use, which enables the higher purchase price of the vehicle to be offset through lower annual fuel costs. The higher the fuel consumption, the quicker the payback period and the more potential for fuel cost savings. Natural gas is not available or suitable for all vehicle types and uses, and should be analyzed on a fleet- and vehicle-specific basis. For example, the lower power of natural gas engines may preclude its use for some off-road applications.

Based on the large current fuel price differential, it appears that many Solano County fleets could reduce their costs by switching to natural gas. But several barriers prevent this from happening. The three main barriers are lack of fueling infrastructure; higher incremental vehicle costs; and lack of familiarity with the fuel, including new maintenance and operational practices. If a fleet is to perform its own fueling and maintenance, then a transition to natural gas requires a significant “all-in” commitment to guarantee the fleet can recoup any necessary infrastructure and vehicles costs. In other words, natural gas differs from most other alternative fuels in that fleets cannot simply “try out” the fuel with a few vehicles. A noted in Section 4.2, the cost of a new CNG fueling station can range from $600,000 to $5 million, and the fleet would also likely need to retrofit its maintenance facility.

For agencies that are interested in increasing use of natural gas as a transportation fuel, the following implementation steps should be considered. These recommendations are based on a high-level assessment; a more detailed assessment that considers specific sites and operating environments would be needed to fully understand the benefits and drawbacks that any one alternative fuel type offers.

Fueling Infrastructure

Solano County currently has three natural gas fueling stations, two located in Vacaville and one in Fairfield. These stations service the Vacaville City Coach and City of Vacaville transit bus and light-duty fleet vehicles and the Solano Garbage Company medium- and heavy-duty vehicle fleet. The limited refueling infrastructure in Solano County is likely a barrier to implementation, with some fleets possibly resisting conversion to natural gas due to limited fueling capacity. At the same time, there may be insufficient demand for private companies to invest in constructing publicly available natural gas refueling stations. This is a common barrier with many alternative fuels.

Fleets can be the fastest way to break through this "chicken-and-egg" problem as they can quickly, with large vehicle purchases, provide increased demand and justify the construction of new natural gas refueling infrastructure. These new stations can potentially serve a greater purpose of increasing demand outside of the fleet by providing both private and public access to the station. Increased public access will allow small fleets and individual vehicle purchasers an opportunity to take advantage of the fuel price differential between natural gas and gasoline or diesel.

Several potential locations in Solano County have been preliminarily identified for new natural gas refueling stations, as shown in Table 5-1.

Table 5-1. Possible Locations for New Natural Gas Fueling Facilities in Solano County

City	Location	Potential Users
Vallejo	SolTrans Bus Maintenance Facility 1850 Broadway	SolTrans buses, Vallejo public works, public
Vallejo	Vallejo Transit Center Park & Ride Curtola Parkway & Lemon Street	SolTrans buses, Vallejo public works, public
Benicia	Benicia Industrial Park	SolTrans buses, Benicia public works, public
Dixon	Dixon Public Works Maintenance Yard 285 East Chestnut Street	Dixon public works, public, trucks using I-80
Rio Vista	To be determined	Rio Vista public works, public, trucks using Highway 12

Ideally, these stations would have both public and private fleet access, but this type of access can increase station costs. The main variables affecting station cost are pipeline access (estimated cost of $1 million per mile for pipeline access), existing infrastructure, and the type of station (time-fill versus fast-fill). Existing infrastructure and site suitability affect the costs for site preparation.

The type of station depends on the main fuel users of the station, as described below.

- **Time-fill stations** are built for fleet vehicles that operate during the day and refuel overnight. These stations do not require compressed storage, because the large compressors refuel vehicles directly and multiple vehicles at a time. The main cost component for this type of station is the compressors.
- **Fast-fill stations** are built for public access where the refueling can happen within 5 minutes. These stations have high-pressure storage tanks that refuel the vehicle and compressors that refill the tanks between fueling events. The two main cost components for this type of station are compressors and storage tanks (either high pressure of liquefied).

Stations built to fulfill both private fleet and public access will need equipment to satisfy both types of refueling events.

An organization wishing to develop a new natural gas station typically has the option of financing the station on its own or securing a private developer to build and operate the station. To build the station on its own, the local agency would need to obtain the private capital necessary to build and operate the station. State and federal funding may be available for natural gas infrastructure. This approach was used by Solano Garbage, the local subsidiary of Republic Services, in Fairfield. The company built an LNG/CNG station, where the natural gas is stored as LNG and can be dispensed as either LNG or CNG. The main benefit of building your own station is lower fuel prices, because the station owner is paying only for the commodity price of the gas, amortized capital, and operations and maintenance costs. For comparison, privately developed stations incur all of these costs in addition to the mark-up and fee of the private developer and operator. The second benefit is the potential source of income from contracting with outside fleets and individual vehicle operators who would like to use the station. The DOE's Alternative Fuels Data Center has a link to the Clean Cities Vehicle and Infrastructure Cash-Flow Evaluation (VICE) Model, which can help in evaluating the return on investment and payback period for natural gas infrastructure.[62]

Building It Yourself – Solano Garbage

Solano Garbage Company built and operates an LNG/CNG fueling facility in Fairfield. Solano Garbage is a subsidiary of Republic Services, a national waste management services company. The company uses liquefied natural gas (LNG) in Class 8 refuse trucks as well as compressed natural gas (CNG) in several Ford E-450 vans. The original motivation behind natural gas vehicle (NGV) adoption in 2001 was the company's waste collection contract with the City of Fairfield, which specified vehicle emissions requirements. Republic Services chose to pursue LNG as a means to satisfy this mandate.

Solano Garbage used federal grants to help offset the costs of the natural gas station. By owning and operating the station, Solano Garbage can contract with other outside fleets, including Suisun City, who want to use the station for refueling.

When the station was constructed, the company planned ahead for future capacity expansion. Because all vehicles are dedicated NGVs, driver education was essential early on to ensure that the vehicles were sufficiently and properly fueled. The company has encountered no significant barriers related to vehicles or infrastructure.

The other approach is to contract with a private developer to build, own, and operate the natural gas station. Examples of private developers are Trillium CNG and Clean Energy. This option does not require capital expenditure for the station, but usually requires a long-term fueling agreement that guarantees a minimum fuel throughput for the operator. The fuel costs for this station option are usually higher than the build-it-yourself option to include cost recovery, mark-up, and fee. This option also allows for the potential of public refueling dispensers. Transit agencies in Elk Grove and Montebello, California have recently chosen this option with Clean Energy. The station built for the City of Elk Grove also has a public dispenser.

Private Developer – City of Elk Grove

The City of Elk Grove's transit bus system, *e-tran*, maintains a fleet of more than 50 vehicles, all of which are powered by compressed natural gas (CNG). Prior to 2011, *e-tran* buses were using a nearby Pacific Gas and Electric Company fueling station, but the time-fill capabilities were not ideal, and there was a possibility that the station would be unavailable during upgrades or relocated in the future. The City began to explore other options, including building a fueling facility of their own.

The City faced several challenges, primarily a lack of space to install a station at their corporate yard and no capital resources that could be diverted from vehicle investments to infrastructure. Working with Clean Energy, the City was able to overcome both hurdles. Clean Energy negotiated with the owner of an existing card lock fueling station and leased available property for the CNG infrastructure. Clean Energy also provided up-front capital in exchange for a 10-year fueling agreement with the City. The City was able to ensure a reduced CNG fuel rate for the long term as long as a minimum fuel consumption commitment was met. Federal grants also reduced the overall infrastructure costs.

Operated and maintained by Clean Energy, the station opened for business in March 2011 and is available to area fleets as well as the public. Additional dispensers were included at the station to ensure that *e-tran* vehicles are always able to fuel as needed.

When an agency is considering installation of a new station and weighing the options, it is important to contact cities and fleets to better understand the pros and cons of both approaches. Cities and transit operators can learn from and build off the experiences of others. Cities and transit operators may also be able to make use of another agency's resources, such as maintenance facility specifications and scopes of work for procurements and solicitations.

Incremental Vehicle Cost

As discussed in Section 4.1, NGVs carry a higher purchase price than their gasoline and diesel counterparts, mainly because of the cost of the fuel tanks. This higher up-front cost usually will be offset by lower fueling costs over the lifetime of the vehicle. The payback period depends primarily on the amount of fuel used per year and the price differential between natural gas and conventional fuel. Transit buses often have the shortest payback period, while light-duty trucks and sedans have a longer payback.

The incremental costs for NGVs can be reduced by state and federal funding, including AB 118, CMAQ, FTA, and DERA 2 programs. For more information on these funding sources, see Section 4.5. Reducing the incremental vehicle costs from state and federal funding will reduce the price differential necessary for a positive payback and increase the cost savings. It is recommended that fleets investigate these avenues of funding during the planning stages for NGV purchases to take advantage of all available funding sources.

Unfamiliar Maintenance and Operational Practices

Natural gas stations, infrastructure, and vehicle maintenance facilities require meeting more stringent safety guidelines than conventional fueling stations and vehicle maintenance facilities. The local fire marshal and utility can help with identifying these requirements. Additional investment may be needed to address these guidelines and needs. The City of Montebello, for example, required $50,000 in improvements to its maintenance facility when it switched to natural gas buses. It is recommended that agencies and fleets considering natural gas refueling contact their local fire marshal and other local agencies and fleets that have installed natural stations and maintain their own vehicles. This first-hand experience has immense value in identifying what upgrades and improvements could be required and what changes to maintenance practices could be required.

Another resource to assist transit agencies with the transition to natural gas is the Natural Gas Transit Users Group, operated through the Clean Vehicle Education Foundation and funded by the DOE.[63] This group helps stakeholders by sharing lessons learned and problem-solving techniques; providing a technical forum for fleet maintenance staff; and communicating safety issues, codes, and standards. It is recommended that agencies not only contact and visit local fleets (including Vacaville and Elk Grove) and transit agencies that have made the switch to natural gas, but also connect with Transit Users Group to address any potential questions and concerns.

5.3. Electric Vehicles

Electric vehicles have the potential to reduce GHG emissions, criteria air pollutant emissions, and displace petroleum. Although electric vehicles currently have only a small market shre, the long-term success of electrification depends on steps that are taken today. This is why local and regional agencies have prioritized EV readiness and planning. These near-term efforts are intended to pave the way for the long-term transition to electric vehicles consistent with California's regulatory initiatives such as AB 32, the Low Carbon Fuel Standard, and the ZEV Program. For instance, the ZEV Program requires that by 2025 about 15% of new light-duty vehicles be ZEVs, with ARB's most likely compliance scenario weighted towards EVs (rather than FCVs).

Electrification of transportation is part of California's long-term strategy to achieve significant GHG and criteria pollutant reductions, and near-term actions – such as EV deployment in municipal fleets –can help facilitate and accelerate that transition. The transition to electric vehicles, however, will face a number of barriers that should decrease over time. The sections below highlight the potential for electric vehicle deployment, while recognizing that there are considerable costs for consumers and fleets alike which will limit deployment until cost competitiveness improves.

The greatest barrier to increased use of EVs among Solano County residents in the near term is the high vehicle price. Because local governments are typically not in a position to provide incentives for consumer purchasing of vehicles, the ability for Solano County agencies to overcome this barrier is limited. Federal and state agencies have taken the lead in overcoming price barriers by offering incentives such as the federal tax credit (valued at up to $7,500 per vehicle) and the California Vehicle Rebate Project, administered by ARB (with rebates valued up to an additional $2,500 per vehicle). Despite the limited ability to influence car purchasing decisions, local agencies can help facilitate the deployment of EVs in several key areas, including: (1) targeted infrastructure deployment; (2) EV readiness through actions such as expedited permitting processes; and (3) deploying EVs in municipal fleets.

For agencies that are interested in increasing use of electric vehicles, the following implementation steps should be considered. These recommendations are based on a high-level assessment; a more detailed assessment that considers specific sites and operating environments would be needed to fully understand the benefits and drawbacks that any one alternative fuel type offers.

Infrastructure Deployment

Overview

Most EVs are likely to be charged at the owner's residence. However, the availability of public charging for personal vehicles and fleet vehicles likely will significantly benefit the transition to electric vehicles. Regional agencies such as BAAQMD and the Metropolitan Transportation Commission (MTC) have played a central role in coordinating the initial deployment of and planning for EVSE in the Bay Area. STA has played a key role in developing Solano County's charging station infrastructure to date using funding from the CMAQ program, BAAQMD Transportation Fund for Clean Air funds, and Yolo-Solano Clean Air Funds. The City of Vacaville has also been a leader in EVSE deployment. In 2011, Vacaville was voted runner-up for the "Most EV-Ready Community" award given by the Bay Area Climate Collaborative. In the next several years, it will be incumbent on local agencies to continue to play a central role in facilitating publicly available EVSE.

Several levels of EV charging are relevant to this discussion. EVSE is based on current standards established by the Society of Automotive Engineers (SAE) and differentiated by the maximum amount of power provided to an EV battery:

- **Level 1 AC** – These use standard 120-volt (V), single-phase service with a three-prong electrical outlet at 15–20 amperage (A).
- **Level 2 AC** – These are used specifically for EV charging and are rated at less than or equal to 240 V AC, and less than or equal to 80 A.
- **DC fast-charging units** – These provide power much faster than the AC counterparts, with a 480-V input. However, DC fast-charging equipment is more expensive to build and operate.

The times needed to replenish a battery halfway and fully for some common EVs—including the Toyota Prius Plug-in, Chevrolet Volt, Nissan LEAF, and Tesla Roadster—are shown in Table 5-2. Charging times

on Level 1 EVSE are primarily suitable for small battery vehicles, such as the Volt, which require more than 7 hours to fully charge. Estimated charge times using DC fast charging for the Volt, LEAF, and Roadster are included, despite not being equipped with the appropriate hardware, and are meant only for illustrative purposes. For DC fast charging, calculations assume that the battery is charged only to 80%, and the remaining 20% is completed by charging at a slower rate. If left connected at high power, the time to fully charge the battery will increase to over 1 hour because of the nature of DC fast charging.

Table 5-2. Estimated Charging Times Using Electric Vehicle Supply Equipment (hours: minutes)

Charger Type / Usable Power	Charge Level	Vehicle			
		Prius	Volt	LEAF	Roadster
Level 1 / 1.4 kW	Half	1:34	3:42	7:42	15:08
	Full	3:08	7:25	15:25	30:17
Level 2 / 7.5 kW	Half	0:40	1:34	3:16	2:49
	Full	1:20	3:09	6:32	5:39
DC fast / 50 kW	Half	0:02	0:06	0:12	0:25
	Full	0:05	0:47	1:39	1:08
DC fast / 150 kW	Half	0:01	0:02	0:04	0:08
	Full	0:02	0:41	1:25	0:41

The costs of EVSE depend on factors such as hardware, permitting, and installation. The following ranges of costs are typical:

- Single-family homes with dedicated parking: $900–$2,350
- Multiple-dwelling units (e.g., multi-family) and workplace installations
    - Level 1 EVSE: $3,800–$5,000
    - Level 2 EVSE: $5,600–$14,000
- Public installations (e.g., parking lots or on-street parking)
    - Level 1 and Level 2 EVSE: same as above for workplace installations
    - DC fast-charging EVSE: $17,000–$42,000

These ranges are based on each EVSE location installed and generally include two ports. It is also worth noting that the marginal cost of the next EVSE installation is a fraction of the total installed cost reported. The EVSE hardware is the only cost element that does not yield some benefit with increased number of installations. This is particularly relevant because the hardware represents a small fraction of the overall cost for both Level 1 and Level 2 EVSE. Even for DC fast-charging EVSE, multiple installations result in potentially significant savings, with approximately 25–60% of the installed cost represented by

the hardware. There is already some downward pressure on the hardware costs of DC fast-charging EVSE, as evidenced by Nissan's recent partnership with Sumitomo to market a charger for $9,900.[64]

Level 2 and DC fast-charging EVSE costs for multiple-dwelling units and workplaces will vary considerably depending on the siting characteristics. For instance, PG&E has estimated a range of $500–$30,000 for Level 2 charging EVSE. A number of factors could significantly increase the cost of DC fast charging, such as distribution upgrades and increased construction costs (e.g., increased trenching and repair or concrete work).

Siting Analysis: Residential Charging, Workplace Charging, and Opportunity Charging

With respect to EV fueling or charging, vehicle architecture plays a significant role in determining both the frequency and amount of charging needed during any fueling session; this is because different types of EVs use electricity somewhat differently. For example, PHEVs use electricity to extend the range of the vehicle and to provide a dual-fuel option, while BEVs use electricity as their sole source of propulsion energy. With this in mind, siting of charging infrastructure is a key component of successful EV deployment and requires consideration of the following questions:

- **Location:** What are potential venues and areas to locate EVSE? Options are generally characterized as at home, at workplaces, and on public or private property.
- **Quantity:** How many EVSE are needed to support electric vehicle drivers?
- **Level of charging:** What voltage and power levels are necessary for useful EV charging at the various locations—Level 1, Level 2, or DC fast charging?
- **Investment:** Who pays for and maintains public and private infrastructure?
- **Payment:** How much should individuals pay for a "charge"?

BAAQMD recently commissioned a siting analysis as part of the *Bay Area Plug-In Electric Vehicle Readiness Plan* to start answering some of these questions.[65] The analysis focused on (1) residential charging; (2) workplace charging; and (3) publicly accessible charging (also referred to as *opportunity charging*). The results specific to Solano County have been extracted for the purposes of this report, as discussed below.

Overall, Solano County residents appear to be somewhat less likely to purchase EVs compared to other residents in the San Francisco Bay Area, based on data from the Clean Vehicle Rebate Project shown in Table 5-3. Solano County residents to date have received rebates for the purchase of 70 PHEVs and 51 BEVs, accounting for 2% of all Bay Area rebates. The ratio of EV rebates per 1,000 residents (0.29) is lower than ratios for the other eight Bay Area Counties.

Table 5-3. Rebates Issued in the Bay Area from the Clean Vehicle Rebate Project

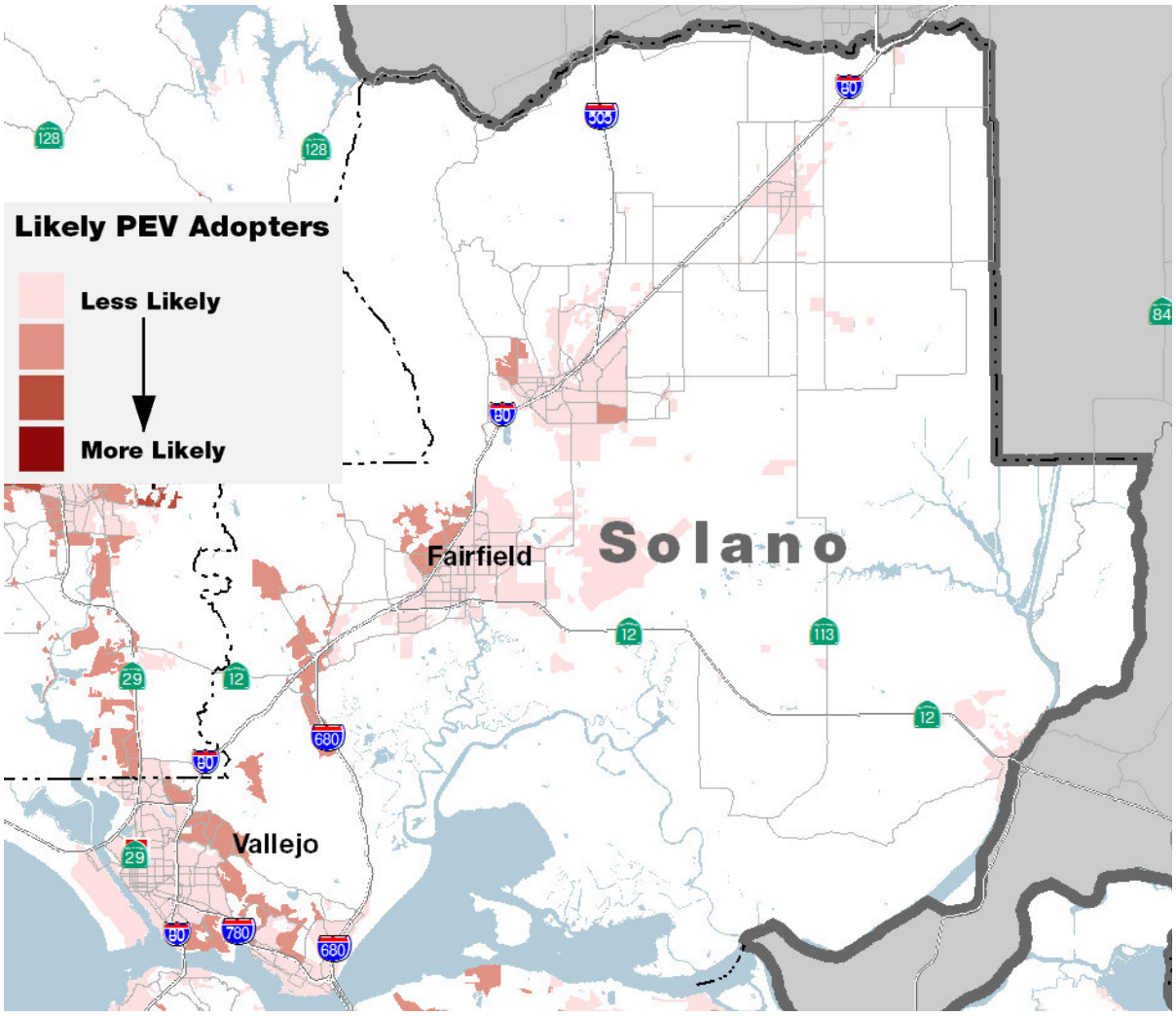
County	EV Rebates Issued through April 2013				Population (2011)	Rebates per 1,000 Residents
	PHEVs	BEVs	Total	Percent		
Alameda County	680	919	1,599	20%	1,530,000	1.05
Contra Costa County	369	420	789	10%	1,066,000	0.74
Marin County	151	222	373	5%	255,000	1.46
Napa County	28	31	59	1%	138,000	0.43
San Francisco County	151	318	469	6%	813,000	0.58
San Mateo County	300	660	960	12%	727,000	1.32
Santa Clara County	1,239	2,030	3,269	41%	1,809,000	1.81
Solano County	70	51	121	2%	416,000	0.29
Sonoma County	110	193	303	4%	488,000	0.62
Bay Area Total	**3,098**	**4,844**	**7,942**	**100%**	**7,242,000**	**1.10**

Source: http://energycenter.org/index.php/incentive-programs/clean-vehicle-rebate-project/cvrp-project-statistics ; accessed April 8, 2013

Residential Charging

As part of the *Bay Area Plug-In Electric Vehicle Readiness Plan* development, ICF identified the most likely adopters of EVs in the Bay Area based on household factors such as income, hybrid ownership, household type (e.g., single family vs. multi-family units), home ownership, and education. Figure 5-1 shows the home location of the most likely EV adopters.

Figure 5-1. Locations of Most Likely Electric Vehicle Adopters in Solano County



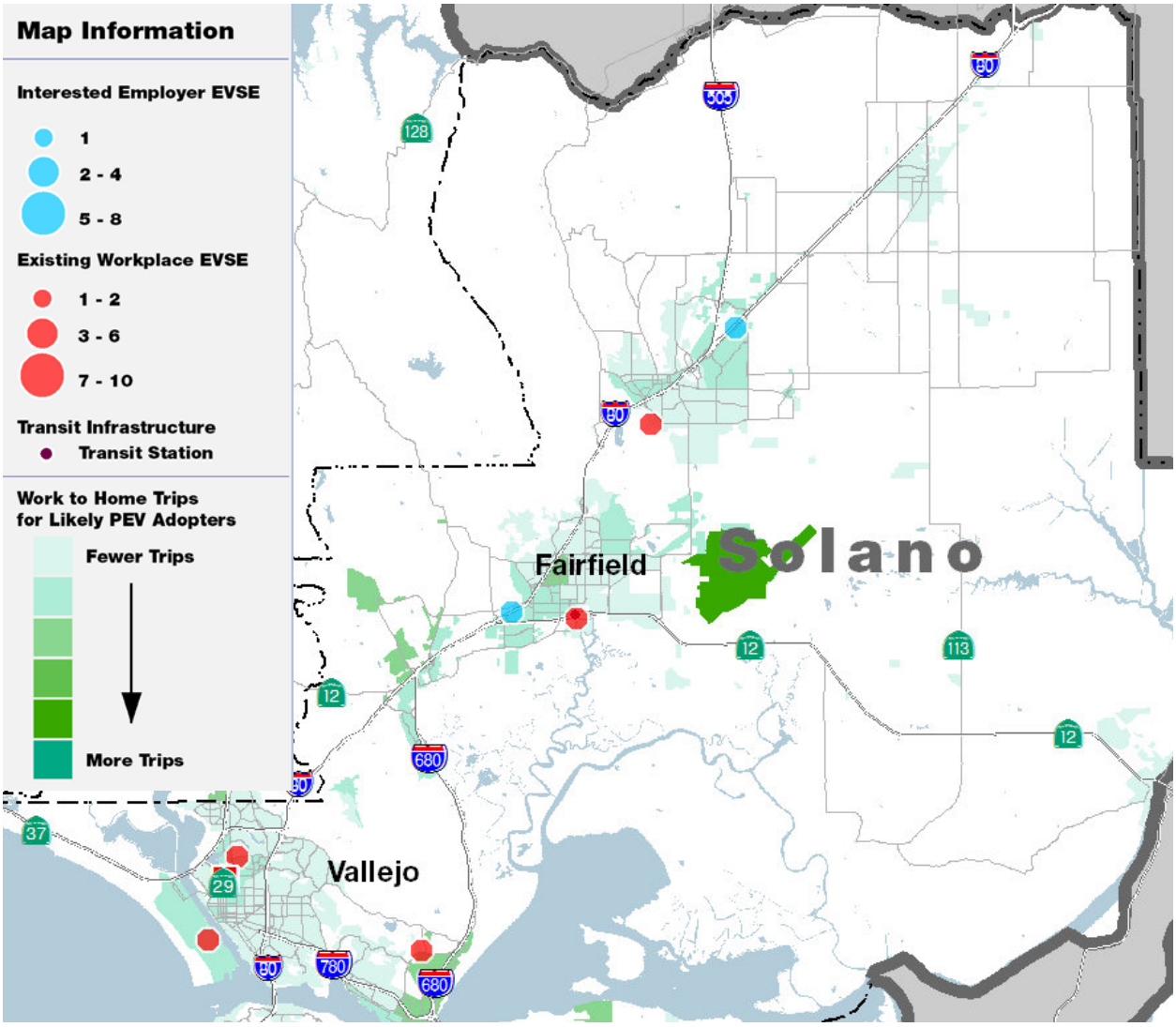
Workplace Charging

Workplace charging is significant because personal vehicles are likely to spend a considerable amount of time parked at work. According to MTC analyses, the average distance traveled to work for Bay Area commuters in 2010 was approximately 13 miles; these miles include only the distance between home and work and do not factor in any side trips, errands, or other trips that may extend the daily distance traveled. In other words, the average round-trip commute distance in the Bay Area is approximately 26 miles. In some cases (e.g., with the Chevrolet Volt) there may be sufficient range to make these trips entirely using electricity. However, with increases in the sales of PHEVs with less than 25 miles of range, and several more PHEV models with similar ranges hitting the market soon, there is significant potential to extend the all-electric miles traveled in places like Solano County.

Figure 5-2 shows an overlay of the following data: the most likely destination zones for workplace trips (different shades of green), areas with existing workplace Level 2 EVSE (red dots), and areas with

employers interested in deploying workplace EVSE for employee charging (blue dots). This map was created as part of the *Bay Area Plug-In Electric Vehicle Readiness Plan*.

Figure 5-2. Workplace Charging Siting Analysis for Solano County



As shown in Figure 5-2 (as red dots), there is already modest deployment of workplace EVSE today with some interest (light blue dots) in workplace EVSE. Moreover, several areas in Solano County have a significant number of work trips for what have been identified as likely PEV adopters, including at Travis Airforce Base (east of Fairfield), in Green Valley (west of Fairfield), around Vallejo, and around Benicia.

Opportunity Charging

Opportunity charging is distinguished from residential and workplace charging, and covers a wide range of situations in which an EV driver could potentially charge when away from home or work. This category of charging covers a wide variety of venue, such as retail shopping parking lots, on-street parking, airport long- and short-term parking, and cultural and recreational centers. Table 5-4 provides

general guidance regarding the type of EVSE for different venue types, mainly based on the duration of time that an EV driver may be parked at a specific location.

Table 5-4. Example of Charging Type Based on Trip Purpose

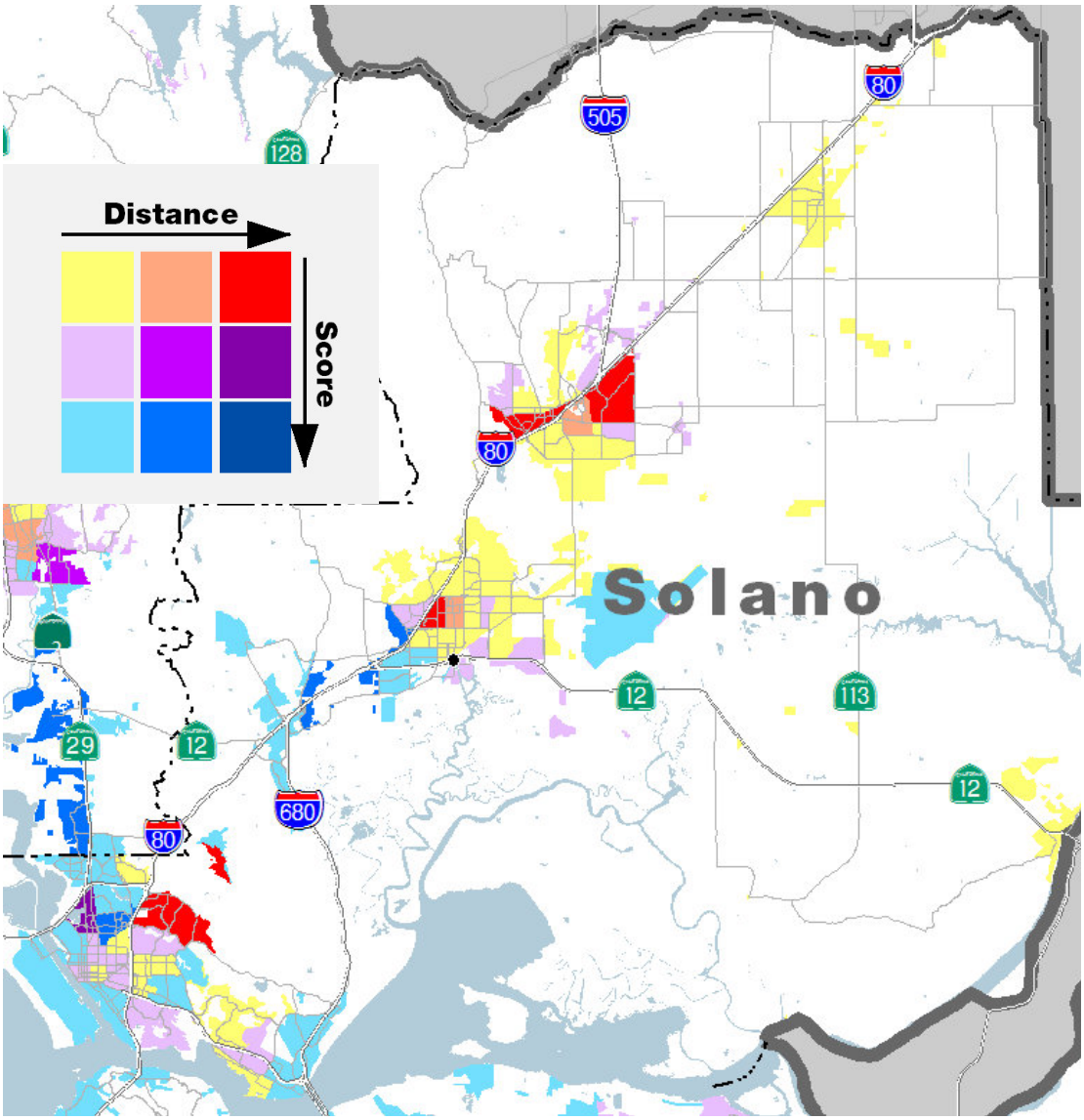
Category	Typical Venues	Available Charging Time	Charging Method (Primary/Secondary)
Opportunity and Destination	Shopping centers	0.5 – 2 hours	Level 2/DC fast
	Airports (short-term parking)	< 1 hour	Level 2/DC fast
	Streets/meters	1 – 2 hours	Level 1/Level 2
	Other	< 1 hour	Level 2/DC fast
	Parking garages	2 – 10 hours	Level 2/Level 1
	Cultural and sports centers	2 – 5 hours	Level 2/Level 1
	Airports (long-term parking)	8 – 72+ hours	Level 1/Level 2
	Hotels/recreation sites	8 – 72 hours	Level 2/Level 1
Corridor/Pathway	Interstate highways	< 0.5 hours	DC fast/Level 2
	Commuting/recreation roads	< 0.5 hours	DC fast/Level 2
Emergency	Fixed	< 0.1 hours	DC fast
	Mobile	< 1 hour	Level 2/DC fast

Figure 5-3 illustrates the locations with the highest potential for opportunity charging in Solano County. The legend in Figure 5-3 shows nine colors representing a matrix of scoring across three groups of distances and three groups based on the number of EV trips. Each block or color in the horizontal direction (left to right) represents the following trip distances: 0–5 miles, 6–10 miles, and 11+ miles. Each block or color in the vertical direction (top to bottom) represents the highest number of trips by likely PEV adopters to that zone. In other words, the blue shaded zones (light, medium, and dark blue) represent the most trips by likely EV adopters to that particular region. Thus:

- Dark blue zones are expected to have the highest number of long-distance EV trips that would use opportunity charging.
- Light blue zones are expected to have the highest number of short-distance EV trips that would use opportunity charging.
- Red zones are expected to have a moderate number of long-distance EV trips that would use opportunity charging.
- Yellow zones are expected to have a moderate number of short-distance EV trips that would use opportunity charging.

Retail locations (e.g., shopping malls or dining establishments) in the zones with shades of blue (represented in the bottom of the 3x3 matrix in the legend) should be considered the highest priority areas for Level 2 EVSE deployment for opportunity charging.

Figure 5-3. Opportunity Charging Siting Analysis for Solano County



The results of the opportunity charging siting analysis are similar to those for workplace EVSE, with some notable differences:

- There is significant potential for Level 1 and Level 2 EVSE around Travis Air Force Base, Green Valley, Vallejo, and Benicia.
- There is a higher concentration of opportunity trips around Fairfield (particularly southwest Fairfield) and a concentration of short-distance trips with a high rating (light blue) around

Vallejo, and the opportunity rating for Benicia is noticeably higher than the workplace rating in the previous map.

- Based on the analysis, likely EV adopters would be traveling longer distances to Vacaville (indicated by the red and orange markings along Interstate 80), where Level 2 EVSE would likely be a good candidate.
- There is good potential for Level 2 EVSE in Green Valley and the stretch of Interstate 80 between Green Valley and Fairfield, including around the Fairfield campus of Solano Community College.

Funding Opportunities

In the near-term future, there will be several funding opportunities for EVSE deployment in Solano County.

- The CEC continues to deploy EVSE through the Alternative and Renewable Fuel and Advanced Vehicle Technology Program (funded via AB 118).
- Last year, NRG Energy Inc. (NRG)—an EVSE infrastructure provider—reached a settlement agreement with the California Public Utilities Commission (CPUC) in the amount of $122.5 million to fund the installation of EVSE throughout California over a period of 4 years. More specifically:
    - 200 Freedom Stations to be deployed statewide, with 55 of these deployed in the Bay Area (including Solano County). Each Freedom Station will consist of at least one 50 kW DC fast charger and one Level 2 EVSE.[66]
    - 10,000 Make-Ready Stubs and 1,000 Make-Ready Arrays,[67] collectively referred to as *Make-Readies*, are to be deployed statewide at a cost of $40 million. An estimated 1,650 Make-Ready Stubs will be deployed in the Bay Area (including Solano County), with an additional 4,000 stubs to be deployed at NRG's discretion. The bulk of the $40 million will go toward wiring homes and preparing workplaces, multi-family dwelling units, hospitals, and schools for EVSE.
- As part of the development of the Bay Area's Sustainable Community Strategy (per Senate Bill 375), MTC and the Association of Bay Area Governments (ABAG) have developed a program referred to as a **Regional EVSE Network Program**. The program is designed to defray the installation costs of EVSE, with a focus on workplace charging. MTC will be coordinating with BAAQMD and other stakeholders as necessary to update the siting analysis that ICF performed and target the regions and employers that will maximize GHG reductions through targeted EVSE deployment.
- Solano County can also work closely with MTC to identify funding opportunities through the Federal Highway Administration (FHWA). Recent changes to some of FHWA's core programs could benefit Solano County. The Moving Ahead for Progress in the 21st Century (MAP-21) Act (Public Law 112-141) added several eligible project types to the Surface Transportation Program

(STP)—electric vehicle charging infrastructure that is added to existing or included in new fringe and corridor parking facilities is eligible for STP funding. This is a particularly interesting opportunity for Solano County: Even though the region only has modest EV penetration rates to date (as discussed briefly), it will likely be an important inter-regional corridor between the San Francisco Bay Area and the Sacramento region. It will be important to deploy DC fast charging along inter-regional corridors in places such as Solano County.

- A tax credit is available for entities installing EVSE, worth up to 30% of the total cost of the installation. This tax credit expires at the end of 2013. This is less of a funding opportunity for Solano County but could be an important factor in any public/private partnerships that Solano County pursues in the near-term future.

EV Readiness for Local and Regional Governments

The *Bay Area Plug-In Electric Vehicle Readiness Plan* prioritized actions for local governments in the areas of (1) building codes; (2) permitting and inspection practices; and (3) zoning, parking rules, and local ordinances. The objective of EV readiness planning is to outline the actions that local governments and affected stakeholder will need to take in order to be ready to meet the increased and unique demands by EVs and supporting charging infrastructure. The prioritized recommendations from the Readiness Plan are repeated in the Table 5-5, and include both the metrics that regional agencies will be using to track progress and the targets for readiness.

Table 5-5. Local Government Actions for Electric Vehicle Readiness

Recommendations	Metric	Regional Target
Adopt California Building Code standards for EVSE into local building codes	Percentage of agencies with standards for EVSE in building codes	100% of local governments by 2014
Create a permitting checklist for residents and contractors	Percentage of agencies that have created a permitting checklist for EVSE	100% of local governments by 2014
Train permitting and inspection officials in EVSE installation	Percentage of agencies that have trained permitting and inspection officials in EVSE installation	100% of local governments by 2014
Specify design guidelines for PEV parking spaces	Percentage of agencies that have adopted design guidelines for PEV parking	100% of local governments by 2014
Adopt requirements for pre-wiring EVSE into the building code and/or minimum requirements for PEV parking spaces	Percentage of agencies that have adopted requirements for pre-wiring EVSE into the building code and/or minimum requirements for EV parking spaces	100% of local governments by 2021

Recommendations	Metric	Regional Target
Work with local utilities to create a notification protocol for new EVSE through the permitting process	Percentage of agencies working with local utilities to create a notification protocol for new EVSE through the permitting process	100% of local governments in areas where MOUs [memoranda of understanding] provide electricity by 2021
Staff the permitting counter with electrical permitting experts	Percentage of agencies staffing the permitting counter with electrical permitting experts	100% of local governments by 2021
Adopt a climate action plan, general plan element, or stand-alone plan that encourages deployment of PEVs and EVSE	Percentage of agencies that have adopted a climate action plan, general plan element, or stand-alone plan that encourages deployment of PEVs and EVSE	100% of local governments by 2021
Allow PEV parking spaces to count toward minimum parking requirements	Percentage of agencies that allow PEV parking spaces to count toward minimum parking requirements	100% of local governments by 2021
Adopt regulations and enforcement policies for PEV parking spaces	Percentage of agencies with regulations and enforcement policies for PEV parking spaces	100% of local governments by 2021

More information is available about each one of these recommendations in the *Bay Area Plug-In Electric Vehicle Readiness Plan*. For the purposes of this plan, however, it is important to note that EV readiness will likely become an important determinant for funding opportunities. EV readiness has been prioritized by regional agencies (including BAAQMD, MTC, and ABAG) and state agencies such as the Office of Planning and Research and the CEC. To the extent that STA can expedite implementation of the recommendations of the *Bay Area Plug-In Electric Vehicle Readiness Plan*, it will likely be easier for regional and state agencies to prioritize funding to Solano County. Furthermore, NRG is working closely with readiness efforts to identify the areas where Freedom Stations and Make-Readies can be deployed; although they have numerical targets, the settlement with the CPUC is tied to expenditures. It is in NRG's best interest to deploy as much EVSE as possible, given the money available to spend; areas with higher levels of readiness are likely to have more cost-effective installations.

Municipal Fleets

Municipal fleets are often identified as an ideal application for EVs. Municipal fleets tend to have lower mileage than vehicles in the personal light-duty vehicle fleet. Although this increases the payback period for investment, some of this can be offset through innovative fleet financing programs. Municipal fleets have already shown leadership through increased deployment of HEVs. For instance, according to ICF estimates, government fleets have hybrid penetration rates from 25% to 95% greater than the personal light-duty vehicle fleet. One worry of municipal fleet, however, is that staff may not accept BEVs the way

they have accepted HEVs, since BEVs introduce new procedures for fueling and drivers may be concerned about range. These concerns can be alleviated through educational and training programs.

The main concern for fleets will be the expenditure associated with acquiring EVs—both the vehicles and the charging infrastructure. Despite the significantly lower costs of electricity as a transportation fuel compared to gasoline (or diesel) and the lower overall maintenance costs of EVs compared to conventional vehicles, the payback period for EVs in a fleet application will likely make it difficult to justify the higher cost of EVs. Furthermore, public fleets are often ineligible for the incentives available today for EV purchasing. For instance, the federal tax credit requires the purchaser to have a tax liability. On the other hand, local government agencies are eligible to receive a rebate through the Clean Vehicle Rebate Project, valued at up to $2,500 per vehicle (note: no entity can receive more than 20 rebates in a calendar year).

Although the costs of EV charging infrastructure are not as significant investment as the vehicles, the additional cost can be a barrier to EV deployment. There are a variety of factors that can increase the cost of EVSE installation. In the case of municipal fleets, older municipal buildings may require electrical upgrades. Most incentives available for EVSE deployment focus on the hardware and/or installation, and costs related to electrical service upgrades are not eligible. Furthermore, government agencies are not in a position to claim the federal tax credit for infrastructure deployment because they do not have a federal tax liability (as noted previously regarding the federal tax credit for vehicles).

Some municipal fleets have been making these upgrades as part of their plan to deploy EVs. For example, staff with Alameda County have noted that many municipalities made upgrades as part of the Local Government EV Fleet project funded by MTC (discussed in more detail below). MTC funding is helping Alameda County and its partners deploy 90 EVs in municipal fleets. Based on feedback from Alameda County staff, many of the municipal facilities did require upgrades; however, most municipalities paid for those upgrades themselves and did not use grant money. Despite being a barrier to EV deployment, there are ancillary benefits beyond EV charging to these upgrades that can help modernize municipal buildings.

Another factor that may affect the deployment of EVs in municipal fleets is the cost of electricity associated with EVs. Charging at off-peak times (e.g., overnight) in a residential application can be very inexpensive for EV drivers – around $0.10/kWh. However, municipal fleets charging during on-peak or partial-peak times may be subject to increased demand charges and increased electricity costs. The impact depends entirely on the rate schedule and can vary considerably. Fleets considering EV deployment should seek to understand the electricity cost impacts of on-peak and partial peak charging on a case-by-case basis to understand the lifecycle cost of EVs. For the sake of reference, the current pump price of gasoline – at about $4.00 per gallon in California – is equivalent to about $0.45/kWh. Even in a scenario in which a fleet exclusively charges during on-peak times (which is unlikely), the electricity costs will be less than that price-equivalent basis.

There may be opportunities for STA to seek funding through regional initiatives such as MTC's Climate Initiatives Grant Program. The Local Government EV Fleet Project, which is administered by eight local governments (led by Alameda County) that are in the process of procuring 90 PEVs for municipal fleets

and 90 Level 2 chargers accessible to both the government fleets and, in some cases, the public. The local government agencies are deploying 78 light-duty PHEVs and BEVs and 12 vans or shuttles. The project received $2.8 million in Climate Initiative funding and additional funding from the BAAQMD and the CEC. The results of this project will help inform MTC's next round of funding.

Another way to offset the transition to EVs for municipal fleets is through credits under California's LCFS. There is potential to earn LCFS credits through the deployment of EVs in fleets. If municipal agencies own and operate more than three EVs and own the EVSE that is used to charge the vehicles, the municipal agency is eligible to receive LCFS credits. These credits can be used toward compliance with the LCFS, which requires a 10% reduction in the carbon intensity of gasoline and diesel by 2020. In principle, these LCFS credits can help fleets defray the higher costs of EV purchasing. The number of credits that can be earned is a function of how much electricity the EVs use, which is linked to vehicle miles traveled.

In addition to BEVs and PHEVs, the use of HEVs in light-duty, medium-duty, heavy-duty, and transit bus applications can reduce gasoline and diesel consumption without the requirement of additional refueling infrastructure. As discussed in Section 4, diesel hybrid transit buses have shown fuel savings on the order 20% - 40% and possibly higher, depending on the type of use. Hybrid-electric technologies can be applied to utility trucks and similar vehicles that require auxiliary power. Funding may be available to help offset the higher purchase price of hybrid buses and trucks, as discussed in Section 4.5.

5.4. Summary of Implementation Steps and Action Items

Fuel Category	Implementation Steps and Action Items
Biofuels	**E85** • Educate vehicle operators about FFVs already in fleets that can utilize E85 • Investigate modifying fueling infrastructure to install E85 by either retrofitting existing or installing new storage tanks and dispensers • Engage local retail fueling station owners and E85 infrastructure providers to determine the feasibility of expanding E85 to the general public • Identify grant opportunities to support public and private expansion of E85 **Biodiesel** • Check engine warranties to determine if any buses or heavy trucks are incompatible with low-level biodiesel blends (e.g., B5) • When renegotiating contracts with diesel suppliers, require B5 as part of the specification (assuming no engine warranty concerns) • To prepare for a future move to B20 for diesel fleets: (1) update procurement procedure to account for B20, (2) confirm engine warranties for current vehicles are covered with B20, (3) confirm existing USTs are B20 compatible and, if incompatible, (4) seek to update tanks for compatibility

Fuel Category	Implementation Steps and Action Items
Natural Gas	**Expanding Fueling Infrastructure** • Identify potential refueling station locations • Perform feasibility studies of these locations to determine station cost and proximity to current or future natural gas vehicle fleets • Investigate options for new natural gas station development (station built by local agency vs. private developer) **Overcoming Incremental Vehicle Costs** • Pursue federal, state and regional funding sources to reduce NGV incremental costs **Overcoming Unfamiliar Maintenance and Operation Procedures** • Contact the local fire marshal and utility to help identify safety guidelines • Contact other local fleets that have installed natural gas stations and maintain their own fleets to help identify any required upgrades or improvements and changes to maintenance practices • Participate in Natural Gas Transit Users Group, which shares lessons learned and problem-solving techniques; provides a technical forum for fleet maintenance staff; and communicates safety issues, codes, and standards
Electricity	**Expanding Infrastructure Deployment** • Utilize the Bay Area Plug-In Electric Vehicle Readiness Plan, including figures in Section 5.3, to identify new locations for potential public charging infrastructure • Pursue potential EVSE deployment funding sources identified in Section 5.3 **Ensuring EV Readiness for Local and Regional Governments** • Review the checklist of recommendations from the Bay Area Plug-In Electric Vehicle Readiness Plan that is prioritized in Table 5-5 • Identify steps to implement the prioritized items with an emphasis on (1) building codes, (2) permitting and inspection practices, and (3) zoning, parking rules and local ordinances **Deploying EVs in Municipal Fleets** • Identify potential fleets in the County interested in EVs • Perform feasibility studies for fleets, including vehicle and infrastructure costs, infrastructure and vehicle credits and rebates, and potential LCFS revenue from the sale of credits • Contact local fleets that invested in EVs and have taken advantage of federal, state, and regional credits, rebates and funding sources (such as Alameda County), to help in determine accurate costs for feasibility studies • Identify opportunities to deploy hybrid-electric vehicles for municipal fleets or transit.

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[43] http://www.cts.umn.edu/Publications/ResearchReports/pdfdownload.pl?id=1408

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[47] ARB On-Road New Vehicle & Engine Certification Program, http://www.arb.ca.gov/msprog/onroad/cert/cert.php

[48] California Air Resources Board Executive Orders: A-343-006, Westport Fuel Systems; A-021-0528-1 for Cummins Inc.; July 2010

[49] California Air Resources Board Executive Orders: A-021-518, Cummins Inc., A-021-0524, Cummins Inc.; December 2009

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[51] California Air Resources Board On-Road New Vehicle & Engine Certification Program, http://www.arb.ca.gov/msprog/onroad/cert/cert.php

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[53] http://www.granitestatecleancities.nh.gov/stakeholders/documents/20100618-low-carbon-fuel.pdf

[54] California Air Resources Board, "Staff Report: Initial Statement of Reasons for Proposed Rulemaking – Amendments to the Low Carbon Fuel Standard Regulation Carbon Intensity Lookup Tables," http://www.arb.ca.gov/regact/2011/lcfs11/lcfsisor.pdf

[55] California Air Resources Board, Low Carbon Fuel Standard Regulation Hydrogen GREET Analysis, http://www.arb.ca.gov/fuels/lcfs/012009lcfs_h2.pdf

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[57] California Air Resources Board, "Staff Report: Initial Statement of Reasons for Proposed Rulemaking – Amendments to the Low Carbon Fuel Standard Regulation Carbon Intensity Lookup Tables," Table ES-2 http://www.arb.ca.gov/regact/2011/lcfs11/lcfsisor.pdf

[58] See http://www.granitestatecleancities.nh.gov/stakeholders/documents/20100618-low-carbon-fuel.pdf

[59] California Air Resources Board, "Staff Report: Initial Statement of Reasons for Proposed Rulemaking – Amendments to the Low Carbon Fuel Standard Regulation Carbon Intensity Lookup Tables," http://www.arb.ca.gov/regact/2011/lcfs11/lcfsisor.pdf

[60] California Air Resources Board, Low Carbon Fuel Standard Regulation Hydrogen GREET Analysis, http://www.arb.ca.gov/fuels/lcfs/012009lcfs_h2.pdf

[61] U.S. Environmental Protection Agency, "Technical Analysis of the US Retail Infrastructure for Ethanol Fuel Blends," prepared by ICF International, March 2013.

[62] See http://www.afdc.energy.gov/fuels/natural_gas_infrastructure.html

[63] http://www.cleanvehicle.org/committee/gas-transit/

[64] Nissan, "DC Quick Charger," http://nissanqc.com/.

[65] Bay Area Air Quality Management District, *Bay Area and Monterey Bay Area Plug-In Electric Vehicle Readiness Plan*, Prepared by ICF International, December 2012, http://www.baaqmd.gov/Divisions/Strategic-Incentives/Bay-Area-EV-Ready.aspx

[66] Per the terms of the settlement, NRG Energy Inc. also has the option of deploying two DC fast chargers at Freedom Stations.

[67] Note that an array can have no more than 10 stubs, which means that there must be at least 1,000 unique locations across the state.

DATE: August 16, 2013
TO: SolanoExpress Intercity Transit Consortium
FROM: Sofia Recalde, Associate Planner
RE: Personal Care Attendant (PCA) on Fixed Route

Background:
The STA formed the Solano Seniors and People with Disabilities Transportation Advisory Committee (TAC) in 2009 to provide a countywide forum for coordination of and funding for transportation services for seniors and people with disabilities. The Committee makes recommendations to the STA Board. The Committee is chaired by Supervisor Spering and includes elected officials, community members, and representatives from Solano County transit agencies, County Health and Social Services, medical providers, non-profit and faith based organizations, the Paratransit Coordinating Council, the Senior Coalition and Solano Community College.

At the July 2013 Solano Seniors and People with Disabilities TAC meeting, a committee member initiated a conversation about whether or not the transit operators have a policy in place that requires certain ADA certified passengers who are frail and/or prone to falls to travel with a Personal Care Attendant. The committee member was concerned about the safety and liability of such passengers travelling alone on fixed route and paratransit, as well as the on-time performance of the service. It was requested for transit operators provide a response.

Discussion:
To address the question of when and/or if a PCA is or should be required on fixed route and paratransit at the next meeting (October), STA staff is proposing that either a transit operator volunteers to present to committee or arrange for a consultant to present. If a consultant is preferred, STA staff will provide the transit operators an opportunity to review the consultant's presentation on their findings before the meeting. Staff requested a discussion of how to respond to this request.

Recommendation:
Informational.

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DATE: August 15, 2013
TO: SolanoExpress Intercity Transit Consortium
FROM: Wayne Lewis, Fairfield and Suisun Transit
RE: Clipper Implementation Update

Background/Discussion:
Wayne Lewis of Fairfield and Suisun Transit has requested for Clipper to be put on the Consortium Agenda for discussion.

Recommendation:
Informational.

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DATE: August 15, 2013
TO: SolanoExpress Intercity Transit Consortium
FROM: Sara Woo, Associate Planner
RE: Summary of Other Funding Opportunities

Discussion:
Below is a list of funding opportunities that will be available to STA member agencies during the next few months, broken up by Federal, State, and Local. Attachment A provides further details for each program.

	FUND SOURCE	AMOUNT AVAILABLE (approximately)	APPLICATION DEADLINE
	Regional[1]		
1.	Carl Moyer Memorial Air Quality Standards Attainment Program (for San Francisco Bay Area)	Approximately **$20 million**	Due On First-Come, First Served Basis
2.	Carl Moyer Off-Road Equipment Replacement Program (for Sacramento Metropolitan Area)	Approximately **$10 million**	Due On First-Come, First-Served Basis
3.	Air Resources Board (ARB) Clean Vehicle Rebate Project (CVRP)	Up to **$5,000** rebate per light-duty vehicle	Due On First-Come, First-Served Basis
4.	Bay Area Air Quality Management District (BAAQMD) Hybrid Electric Vehicle Purchase Vouchers (HVIP)	Approximately **$10,000 to $45,000** per qualified request	Due On First-Come, First-Served Basis
	State		
5.	Safe Routes to Transit (SR2T)	**Approximately $4.3 million available**	Due September 30, 2013
	Federal		
6.	N/A	**N/A**	N/A

*New funding opportunity

Fiscal Impact:
None.

Recommendation:
Informational.

Attachment:
A. Detailed Funding Opportunities Summary

[1] Local includes programs administered by the Solano Transportation Authority and regionally in the San Francisco Bay Area and greater Sacramento.

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Attachment A

The following funding opportunities will be available to the STA member agencies during the next few months. Please distribute this information to the appropriate departments in your jurisdiction.

Fund Source	Application Contact**	Application Deadline/Eligibility	Amount Available	Program Description	Proposed Submittal	Additional Information
Local Grants[1]						
Carl Moyer Memorial Air Quality Standards Attainment Program (for San Francisco Bay Area)	Anthony Fournier Bay Area Air Quality Management District **(415) 749-4961** **afournier@baaqmd.gov**	Ongoing. Application Due On First-Come, First Served Basis Eligible Project Sponsors: private non-profit organizations, state or local governmental authorities, and operators of public transportation services	Approx. **$20 million**	Carl Moyer Memorial Air Quality Standards Attainment Program provides incentive grants for cleaner-than-required engines, equipment, and other sources of pollution providing early or extra emission reductions.	$12M Fairfield/ Vacaville Intermodal Train Station STA co-sponsor STA staff contact: Janet Adams	Eligible Projects: cleaner on-road, off-road, marine, locomotive and stationary agricultural pump engines **http://www.baaqmd.gov/Divisions/Strategic-Incentives/Funding-Sources/Carl-Moyer-Program.aspx**
Carl Moyer Off-Road Equipment Replacement Program (for Sacramento Metropolitan Area)	Gary A. Bailey Sacramento Metropolitan Air Quality Management District **(916) 874-4893** **gbailey@airquality.org**	Ongoing. Application Due On First-Come, First-Served Basis Eligible Project Sponsors: private non-profit organizations, state or local governmental authorities, and operators of public transportation services	Approx. **$10 million**, maximum per project is $4.5 million	The Off-Road Equipment Replacement Program (ERP), an extension of the Carl Moyer Program, provides grant funds to replace Tier 0, high-polluting off-road equipment with the cleanest available emission level equipment.	N/A	Eligible Projects: install particulate traps, replace older heavy-duty engines with newer and cleaner engines and add a particulate trap, purchase new vehicles or equipment, replace heavy-duty equipment with electric equipment, install electric idling-reduction equipment **http://www.airquality.org/mobile/moyererp/index.shtml**

[1] Local includes opportunities and programs administered by the Solano Transportation Authority and/or regionally in the San Francisco Bay Area and greater Sacramento

Fund Source	Application Contact**	Application Deadline/Eligibility	Amount Available	Program Description	Proposed Submittal	Additional Information
Local Grants[1]						
Air Resources Board (ARB) Clean Vehicle Rebate Project (CVRP)*	Meri Miles ARB **(916) 322-6370** **mmiles@arb.ca.gov**	Application Due On First-Come, First-Served Basis	Up to **$5,000** rebate per light-duty vehicle	The Zero-Emission and Plug-In Hybrid Light-Duty Vehicle (Clean Vehicle) Rebate Project is intended to encourage and accelerate zero-emission vehicle deployment and technology innovation. Rebates for clean vehicles are now available through the Clean Vehicle Rebate Project (CVRP) funded by the Air Resources Board (ARB) and implemented statewide by the California Center for Sustainable Energy (CCSE).	N/A	Eligible Projects: Purchase or lease of zero-emission and plug-in hybrid light-duty vehicles **http://www.arb.ca.gov/msprog/aqip/cvrp.htm**
Bay Area Air Quality Management District (BAAQMD) Hybrid Electric Vehicle Purchase Vouchers (HVIP)*	To learn more about how to request a voucher, contact: **info@californiahvip.org**	Application Due On First-Come, First-Served Basis	Approx. **$10,000 to $45,000** per qualified request	The California Air Resources Board (ARB) created the HVIP to speed the market introduction of low-emitting hybrid trucks and buses. It does this by reducing the cost of these vehicles for truck and bus fleets that purchase and operate the vehicles in the State of California. The HVIP voucher is intended to reduce about half the incremental costs of purchasing hybrid heavy-duty trucks and buses.	N/A	Eligible Projects: Purchase of low-emission hybrid trucks and buses **http://www.californiahvip.org/**
Transportation Fund for Clean Air (TFCA)	Robert Guerrero **(707) 424-6075** **rguerrero@sta-snci.com**	Due by May 10, 2013	Approx. **$59,000**	To fund the implementation of TCMs and MSMs, the State Legislature authorized the Air District to impose a $4 surcharge on motor vehicle registration fees paid within the nine county Bay Area. These revenues are allocated by the Air District through the Transportation Fund for Clean Air (TFCA). TFCA grants are awarded to public and private entities to implement eligible projects.	N/A	Eligible Projects: TFCA funded projects have many benefits, including the following: • Reducing air pollution, including air toxics such as benzene and diesel particulates • Conserving energy and helping to reduce greenhouse gas emissions • Improving water quality by decreasing contaminated runoff from roadways • Improving transportation options • Reducing traffic congestion

*New Funding Opportunity
**STA staff, Sara Woo, can be contacted directly at (707) 399-3214 or swoo@sta-snci.com for assistance with finding more information about any of the funding opportunities listed in this report

State Grants						
Safe Routes to Transit (SR2T)*	Clarrissa Cabansagan TransForm (510) 740-3150 x333 ccabansagan@TransFormCA.org	Application Due to Caltrans: September 30, 2013	Approx. **$4.3 M**	The purpose of the Safe Routes to Transit Program intends to reduce congestion on Bay Area bridge corridors by improving access and safety for bicyclists and pedestrians to and from regional transit stations. **http://www.transformca.org/programs/safe-routes-transit-2013-applications**	N/A	Eligible Projects: Capital and planning projects are eligible, but operations and maintenance projects are not. To be eligible, a project must facilitate walking or bicycling to existing transit services, hereby increasing ridership on a regional transit system. Please

						see the FAQs for a detailed statement about eligibility. http://www.transformca.org/campaign/sr2t
Federal Grants						
FTA Section 5311(f), Intercity Bus Program*	Ronaldo Hu Caltrans **(916) 657-3955** Ronaldo_Hu@dot.ca.gov	Application Due to Caltrans: April 30, 2013	Approx. **$3.6 Million**	The purpose of the Section 5311(f) funding is to provide supplemental financial support to transit operators and to facilitate the most efficient and effective use of available Federal funds in support of providing rural intercity transportation services. http://www.dot.ca.gov/hq/MassTrans/5311.html	Transit Operators	Eligible Projects: Intercity Bus service.
FTA Section 5316, Job Access Reverse Commute (JARC) Grant*	Scott Sauer, California Department of Transportation (Caltrans) **(916) 657-3863** scott_sauer@dot.ca.gov	Due April 19, 2013	Approx. **$1.88 Million**	To improve access to transportation services to employment-related activities for welfare recipients and eligible low-income individuals and to transport residents of urbanized areas and non-urbanized areas to suburban employment opportunities. http://www.dot.ca.gov/hq/MassTrans/5316.html	N/A	Eligible Projects: Funds from the JARC program are available for capital, planning, and operating expenses that support the development and maintenance of transportation services designed to transport low-income individuals to and from jobs and activities related to their employment, and to support reverse commute projects.
FTA Section 5317, New Freedom Grant*	Scott Sauer, California Department of Transportation (Caltrans) **(916) 657-3863** scott_sauer@dot.ca.gov	Due April 19, 2013	Approx. **$1.43 Million**	To provide additional tools to overcome existing barriers facing Americans with disabilities seeking integration into the work force and full participation in society. The New Freedom formula grant program seeks to reduce barriers to transportation services and expands the transportation mobility options available to people with disabilities beyond the requirements of the Americans with Disabilities Act (ADA) of 1990. http://www.dot.ca.gov/hq/MassTrans/5317.html	N/A	Eligible Projects: For the purpose for the New Freedom Program, "new" service is any service or activity that was not operational and did not have an identified funding source as of August 10, 2005, as evidenced by inclusion in the Transportation Improvement Plan (TIP) or the State Transportation Improvement Program (STIP).

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