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## Alameda-Contra Costa Transit District 2010 Environmental Sustainability Report



Prepared by



Environmental Science Associates  
San Francisco, CA

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NOTE: THIS REPORT COVERS INFORMATION FROM FISCAL YEAR (FY) 2009/2010,  
AND WHEN AVAILABLE AND APPROPRIATE, DATA FROM CALENDAR YEARS (CY) 2010 AND 2011.



## A Message from the General Manager

Let me begin by saying what an honor it is to join AC Transit. I have worked in the public transit industry for over 25 years. And while virtually all transit agencies have suffered recently from cutbacks in the public funding on which they depend, few have maintained a reputation for caring for the health and well-being of the communities they serve as well as AC Transit has.

One might reasonably ask, especially in difficult economic times, why should a public transit agency care about environmental sustainability? AC Transit has consistently demonstrated the answer: **Environmental sustainability goes hand-in-hand with providing safe, efficient, public transit service.** Since AC Transit first began publicly reporting its environmental impact four years ago, we have successfully reached the “low-hanging fruit”: retrofitting lighting and HVAC, reducing waste and increasing recycling, conserving water and energy, installing over 5,700 solar panels across our facilities, and perhaps most importantly, reducing the emissions from our buses. All of this has been accomplished while replacing millions of private vehicle trips, which otherwise would have increased both congestion and pollution in the neighborhoods we serve.

- Ultimately, increasing ridership is crucial to reducing environmental impacts. Improving the passenger experience is a necessary first step. While it is always a challenge to do more with less, we must work to improve our service by:
- Reducing passenger waiting time with such technology as NextBus, which provides real-time arrival and departure information by telephone, text, internet, and cell phone app
- Getting passengers on the bus quickly with Clipper, the all-in-one regional transit card that stores cash value and special passes
- Increasing speed of trips with Bus Rapid Transit (BRT), a low cost, high-speed, high-quality bus transit that operates on separate rights-of-way, allowing for faster, more reliable travel
- Staying on the leading edge of technology, exemplified by our solar energy initiative and our HyRoad program – the largest, most advanced zero-emission fuel cell transportation program in the United States
- Educating the public about our environmental achievements, so that we maintain and increase community support for the agency as a whole

All of these efforts are well under way, as you will see in the following pages, and I look forward to working towards expanding and improving them. It is therefore with great pride that I present AC Transit's Fifth Annual Environmental Sustainability Report.

Sincerely,

A handwritten signature in black ink, appearing to read "D. Armijo". The signature is fluid and cursive.

David J. Armijo

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## CHAPTER 1.0

### AC Transit's Value and Role

As the third largest public bus system in California, the Alameda Contra-Costa Transit District (AC Transit or the District) has a responsibility to be an environmental leader not just among transit agencies, but among Bay Area organizations in general. Our core function is to provide affordable and accessible transportation to the public. This service alone meets a main tenant of environmental stewardship, by allowing people to use energy efficient group transit rather than single occupancy vehicles for their mobility needs. For a variety of reasons, demand for public transit is rising,<sup>1</sup> and AC Transit is poised and capable of meeting this demand by continuing to provide efficient and innovative transportation choices.

However, AC Transit's vision and value as an organization includes broader opportunities to affect positive change. At the regional scale, we are in a position to be a critical part of the transportation-system solution. SB 375 was enacted in California in 2008, directing the California Air Resources Board (CARB) to set regional targets for the reduction of greenhouse gas (GHG) emissions. Each of California's Metropolitan Planning Organizations (MPOs) is preparing a sustainable communities strategy that demonstrates how the region will meet its regional GHG reduction target through integrated land use, housing, and transportation planning. AC Transit staff is working with the Metropolitan Transportation Commission (MTC), the Bay Area's MPO, and we are directly involved with MTC's planning processes.

AC Transit's support for Transit-Oriented Development (TOD) goes well beyond our SB 375 efforts. TOD is a fundamental tenet of community planning. As discussed in more detail in Section 3 of this report, *Promoting Public Transportation*, we are in a position to influence and promote service design policies that reward higher-density urban development and have impacts that are economically progressive. In most cases, recommended improvements to the transportation network will have a direct and positive effect on neighborhoods with the highest concentrations of low-income households. Moreover, a well-planned community makes public transportation a more affordable option to fund and implement.



Seamlessly integrating environmental, social, and economic concerns is the essential goal of sustainability. AC Transit is in a position to develop and operate a transit system that not only alleviates traffic congestion and improves system reliability across the Bay Area, but also reduces regional GHG emissions and benefits low-income households. Our holistic approach to integrating sustainability concepts into the public transportation system will allow us to remain a leader among transit agencies, and enable us to continue implementing innovative and modern policies and services.

<sup>1</sup> American Public Transportation Association, *Third Quarter Public Transit Ridership Up*, December 8, 2011 ([http://www.apta.com/mediacenter/pressreleases/2011/Pages/111208\\_Ridership.aspx](http://www.apta.com/mediacenter/pressreleases/2011/Pages/111208_Ridership.aspx))

# CHAPTER 2.0

## Our Organization

In October 2010, AC Transit celebrated its 50th year of bus service. Since our inception, AC Transit has continually looked for better ways to move people. In the past half century we have expanded our service

### OUR VISION

*We strive to provide a truly world-class transit service, a service that is convenient, reliable, and safe; a service that increases mobility, enhances the quality of life, and improves the health of the environment throughout the communities we serve.*

area considerably, diversified the types of services we offer, and became a leader in the use of alternative fuels. As the third largest public bus system in California, AC Transit is responsible for providing primary public transportation for residents of 13 cities and portions of Alameda and Contra Costa Counties along the eastern shores of San Francisco Bay and San Pablo Bay. Our nearly 700 buses provide riders with 25.8 million miles and 41,000 hours of service annually, connecting to 9 other bus systems, 21 Bay Area Rapid Transit District (BART) stations, 6 Amtrak rail stations and 3 ferry terminals.

In addition, AC Transit and BART jointly administer an Americans with Disabilities Act (ADA) complementary paratransit service known as the East Bay Paratransit Consortium (EBPC). This service is for individuals who cannot, due to a physical or cognitive impairment, use the fixed-route bus or rail service. In Fiscal Year (FY) 2009/2010, the consortium operated over 200 vehicles, employed over 400 people, and provided approximately 750,000 trips.

## Governance

AC Transit is governed by a seven-member Board of Directors elected by East Bay voters to four-year terms. Five Directors represent geographic wards, while two are elected at large. Board responsibilities include full power to acquire, construct, own, operate, and control transit facilities; fix rates; and establish routes and levels of service. The Board also appoints three officers—the General Manager, General Counsel, and District Secretary, all of whom serve at the will of the Board.

Four executive staff members serve under the General Manager to manage and monitor all of AC Transit's essential functions—the Assistant General Manager, Chief Operations Officer, Chief Financial Officer and Chief Human Resources Officer.

### AC TRANSIT AT A GLANCE

*Daily ridership (weekday): 200,000*

*Annual ridership: 62.1 million*

*Bus lines: 111*

*Bus stops: 6,500*

*Annual service miles: 25.8 million*

*Service Area: 1.5 million people within 364 square miles*

The Board's four standing committees oversee various responsibilities as follows:

**Operations Committee.** Responsible for reviewing and following through on policies and activities associated with AC Transit services and programs (including administration and operation). The Operations Committee monitors the implementation of items that are developed by the Planning Committee and approved by the Board of Directors.

**External Affairs Committee.** Responsible for reviewing all activities associated with marketing, customer service, relations with AC Transit advisory committees, legislation, public information, and dealings with other governmental agencies and private sector partners (employers, community groups, etc.) to promote AC Transit's interest.

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**Planning Committee.** Responsible for reviewing all policies and activities associated with planning, including services AC Transit provides to its customers, budgetary issues, and development of human resources. The Planning Committee deals with the “big picture.” Once the Board approves items to be implemented, the Operations Committee is responsible for follow-through.

**Finance and Audit Committee.** Responsible for reviewing all issues involving AC Transit’s finances including, but not limited to, budget preparation, potential revenue sources, grants, and auditing services and activities (both internal and external), financial reporting, requests for proposals/awards of contracts/agreements (unless assigned to a “topic” committee), procurement of non-revenue service vehicles and buses, and service reductions and adjustments.

## Environmental Departments

Several departments manage AC Transit’s environmental activities. An illustration of AC Transit’s commitment to environmental challenges was the recent creation of a Safety and Environmental Engineering Department housing the new position of Manager of Safety and Environmental Engineering. Formed in April 2011, the department combines the environmental engineer and safety activities into one department. The department is responsible for safety and environmental compliance for all AC Transit operations, and reports to the General Counsel.

The Director of Environmental Technology in the Capital Projects Department manages numerous components of AC Transit’s environmental initiatives. The Director manages the activities and operations of AC Transit’s environmental technology projects and programs; provides consultation and technical expertise to the Maintenance and Transportation departments, and the Board of Directors; and promotes AC Transit’s programs, policies, and funding goals to federal, state, and local entities, regulatory agencies, and public affairs and community groups.

The Capital Planning, Legislation, and Grants Department monitors and disseminates information about regulatory and legislative issues on various areas of environmental compliance. Service Development departments (Long Range Planning and Service Planning) also manage the completion of federal and state environmental clearance on both capital and service projects. This includes conducting the necessary studies, public scoping, and environmental process to comply with both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

## Environmental Justice and Social Equity

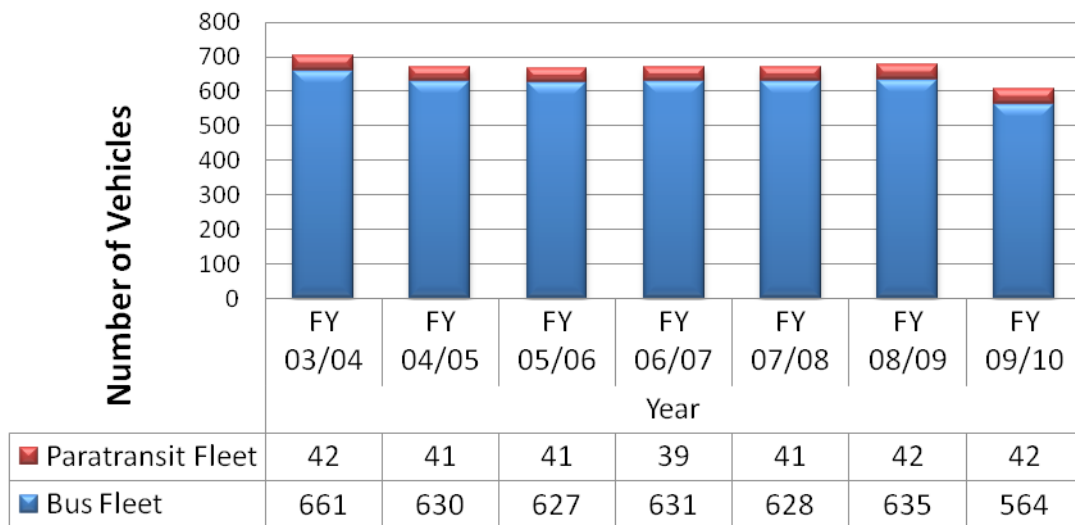
AC Transit has a long-standing commitment to environmental justice and social equity, ensuring that our policies do not discriminate against any one community. Resolution 2033, authorized by the Board of Directors in 2002, affirms our commitment to the civil rights and environmental justice principles and values covered by the Civil Rights Act of 1964. This resolution assures that the needs of our community are fully considered in decisions pertaining to service design, policy, and operations with meaningful community involvement regarding these decisions. In 2001, the Board adopted Policy 551, which created a blueprint for assessing impacts that service or fare changes may have on minority, low-income, and disabled communities.



## Trends in Service and Ridership

The number of vehicles placed into AC Transit’s fixed route service fluctuates throughout the year depending on route changes, vehicle maintenance (scheduled and unscheduled), training, and other needs. **Figure 1**, below, shows the number of vehicles in our fleet at the conclusion of fiscal years 2003/2004, and every year thereafter through 2009/2010.<sup>2</sup> This number includes AC Transit’s peak requirement as well as other vehicles needed to keep service operational. The Paratransit Fleet refers to those vehicles that AC Transit owned and operated as part of the EBPC.<sup>3</sup>

As shown in Figure 1, during FY 2009/2010, the number of vehicles in our active fleet decreased compared to previous years. To balance a fiscal shortfall, in March of 2010, AC Transit implemented a service adjustment plan that had an overall service reduction goal of approximately 140,000 hours of operation annually (approximately 7 percent). Staff conducted extensive public outreach and researched multiple alternatives in an effort to minimize the impacts to patrons from this reduction in service. Decreases in average daily ridership resulting from these service changes ranged from 1.0 percent (North County) to 8.8 percent (Central County), with an overall 3 percent reduction in patronage. AC Transit considers this to be a success, considering that service hours have been cut by 7 percent. Additional service cuts were implemented in FY 2010/2011.



AC Transit. 211564  
**Figure 1**  
**AC Transit Active Fleet**

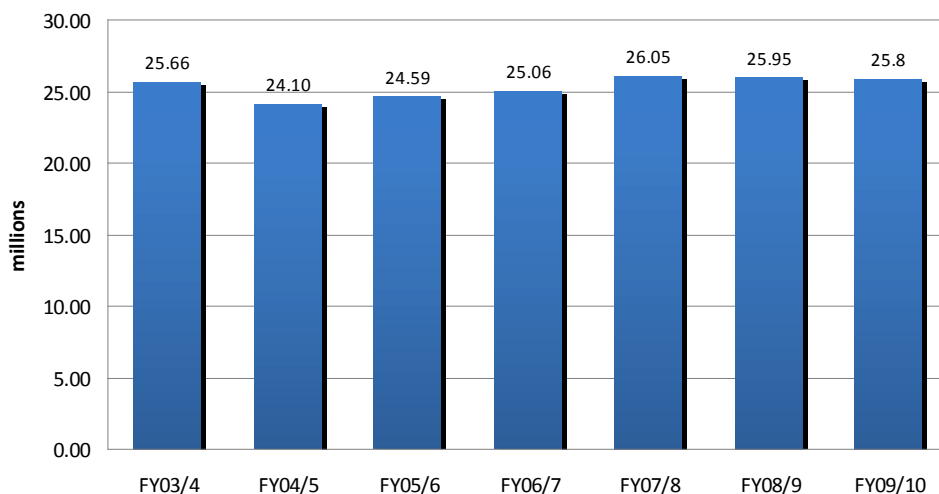
<sup>2</sup> Vehicle numbers represent a mid-year snapshot, at or near the end of the fiscal year ending in June, based on the maximum number of vehicles operated to provide service on an average weekday. Bus numbers fluctuate during each year (some buses are added/disposed/resurrected).

<sup>3</sup> AC Transit owned and operated Paratransit buses through CY 2010. In CY 2011, AC Transit closed its Division 8 Paratransit Unit.

On a per capita basis, AC Transit continues to have the highest bus ridership in California, after San Francisco’s Municipal Railway System. The following figures show ridership data<sup>4</sup> in terms of Total Vehicle Miles (**Figure 2**), Total Passenger Revenue Miles (**Figure 3**), and Average Passengers per Revenue Mile (**Figure 4**). As shown in Figure 2, Total Vehicle Miles, which includes all miles whether the bus is in service or not, have remained relatively stable over the past seven years; general fluctuations are attributable to shifts in the economy and the price of gas, and the slight decrease in FY 2009/2010 is attributable to the service cuts described above. Total Passenger Revenue Miles (Figure 3) have been decreasing since FY 2006/2007, likely due to widespread economic woes, high unemployment rates and housing foreclosures, lower gas prices during 2009, and the March 2010 cuts to AC Transit Services. Average Passengers per Revenue Mile (Figure 4) has also decreased steadily since FY 2006/2007.

In order to more accurately assess ridership, AC Transit has been installing Automatic Passenger Counters (APCs) on revenue fleet vehicles. To date, approximately 20 percent of AC Transit’s revenue fleet is equipped with APCs, but APCs are planned for all new fixed-route<sup>5</sup> revenue vehicles going forward. The main role of the APCs is to collect data related to service and operations planning on an individual route basis, such as boardings and alightings by stop location, maximum loads per one-way trip, and running times by segment. Staff has made extensive use of this information in refining existing service design and enhancing service productivity, as well as monitoring service effectiveness and efficiency.

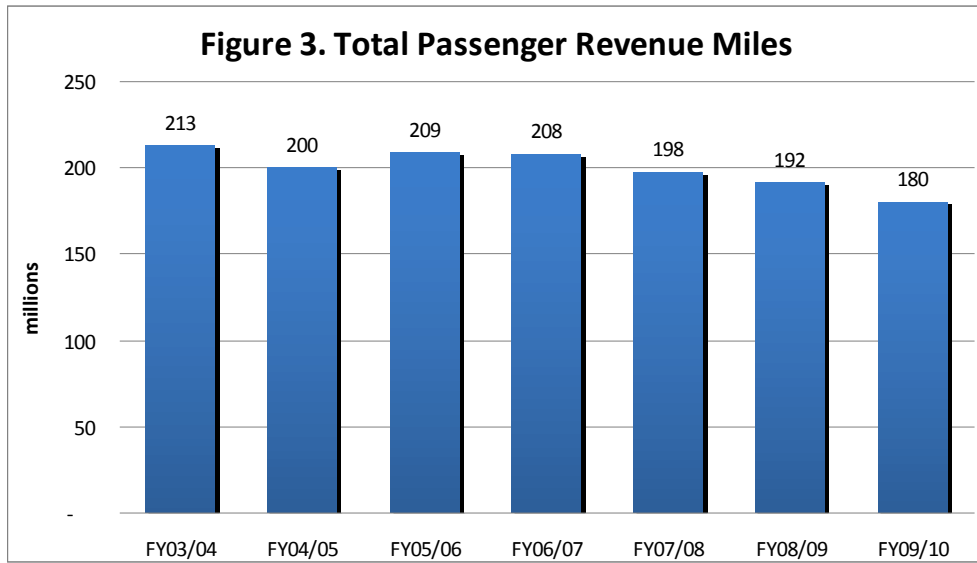
**Figure 2. Total Vehicle Miles**



AC Transit. 211564  
**Figure 2**  
**Total Vehicle Miles**

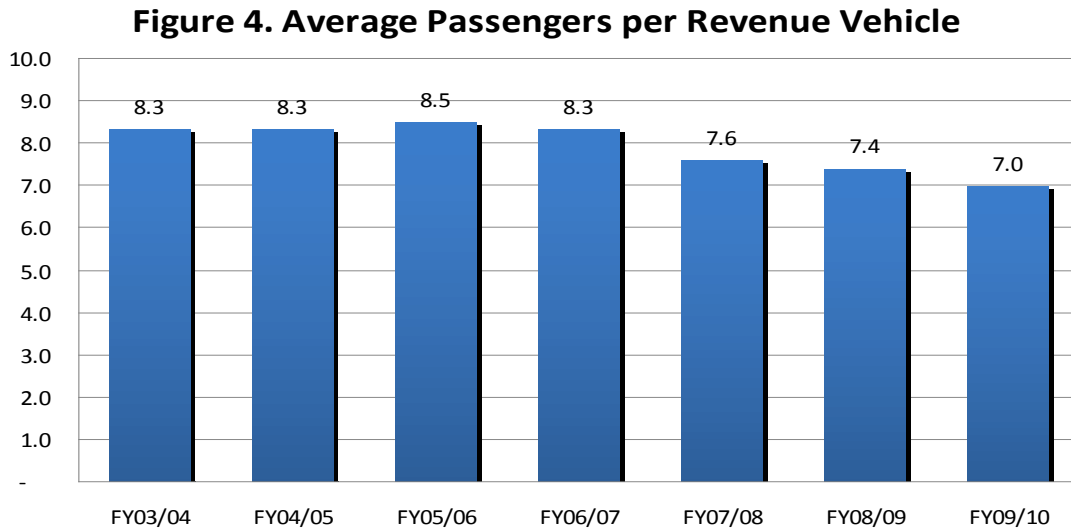
<sup>4</sup> In these figures, vehicle miles data are based on District records for all revenue vehicles in service, as reported in AC Transit’s Ellipse data management system, based on dispatched vehicles for scheduled and unscheduled service miles. Paratransit vehicle miles and day trippers are excluded. The 2006 Environmental Sustainability Report used revenue miles data obtained from the National Transit Database (NTDB) report, which only included scheduled revenue and service miles for revenue vehicles in the bus fleet.

<sup>5</sup> Fixed-route services operate along a pre-designated route on a fixed-time or headway-based schedule. In contrast, paratransit (or dial-a-ride) services operate along a non-defined route and a demand-based schedule.



AC Transit. 211564

**Figure 3**  
Total Passenger Revenue Miles<sup>6</sup>



AC Transit. 211564

**Figure 4**  
Average Passengers per Revenue Vehicle

<sup>6</sup> Passenger Revenue Miles are obtained from the annual NTDB report. Average Passengers per Revenue Vehicle = (total passenger revenue miles) / (total vehicle miles).

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## CHAPTER 3.0

### Increasing Ridership

AC Transit's primary value and role as an environmental leader is an ability to get members of the public out of single-occupancy cars and onto energy efficient group transit. To this end, AC Transit uses a variety of methods to increase ridership, from promoting large scale community planning that encourages high-density urban development, to improving the riding experience while maintaining low costs, to communicating with riders to ensure they are kept up-to-date with real-time access to bus schedules and arrival times. This chapter highlights our top strategies to increase our ridership by making it easier and more enjoyable for members of the community to use public transportation.

#### Supporting Transit-Oriented Developments

To maximize the efficiency and affordability of public transportation, communities must be designed with public transportation in mind. As such, supporting Transit-Oriented Development (TOD) continues to be a key part of AC Transit's approach to community planning.

##### **Sustainable Communities Strategy**

The most far-reaching of our TOD efforts is the Sustainable Communities Strategy now being developed by the MTC and the Association of Bay Area Governments (ABAG). As discussed in Chapter 1, SB 375 was enacted in California in 2008, directing CARB to set regional targets for the reduction of greenhouse gas (GHG) emissions associated with transportation. In the Bay Area, the MTC and ABAG are developing a Sustainable Communities Strategy that describes how the nine Bay Area counties will develop in a more sustainable, transit-friendly way to reduce vehicle miles traveled and emissions, through integrated land use, housing, and transportation planning. AC Transit is participating in the Regional Advisory Working Group (RAWG) for this groundbreaking document, and we are directly involved with MTC's planning processes.

##### **Priority Development Areas**

Under the ABAG Priority Development Area (PDA) program, cities nominate locations where higher-density development should occur, with ABAG reviewing each area for eligibility. The goal is to focus planning resources and limited capital funding on areas that make up a small percentage of Bay Area land, but a much larger percentage of Bay Area development with TOD potential.

Jurisdictions within AC Transit's service area have designated 26 PDAs, more than in the service areas for San Francisco Muni, VTA, Golden Gate, or SamTrans. Every city in the AC Transit district, with the exception of Albany and Piedmont, has either designated its own PDA (or PDAs) and/or is included in the West County Transportation Advisory Committee (WCCTAC) multi-jurisdictional PDA along the Contra Costa County portion of San Pablo Avenue. There are also PDAs in the AC Transit-served portions of unincorporated Alameda and Contra Costa counties. This high level of participation highlights the magnitude of opportunity afforded to AC Transit. Under this program, AC Transit has actively participated in the development of a transit-supportive General Plan in Emeryville and a specific plan for the San Pablo Avenue transit corridor shared by El Cerrito and Richmond.

## Other Planning Activities

AC Transit continues to focus development efforts on the most productive corridors in our system, i.e., those with the highest level of use and the least reliance on external subsidy. These corridors tend to be located in areas with greater population density and a higher degree of dependence on public transit. Despite an extremely difficult climate for housing development, TOD continues to expand in the East Bay, particularly in Oakland, Berkeley, and Emeryville. In Berkeley, the “Fourth and U” project at 4th Street & University Avenue became the first project where each unit received an AC Transit bus pass, as a condition of the project being approved. This project can serve as a model for others in Berkeley and elsewhere. Construction also began at both the Union City intermodal BART station, where AC Transit played an important planning role, and the MacArthur BART (Oakland) transit village. Many communities—including Richmond, Berkeley, Oakland, San Leandro, Hayward, and Fremont—continue to plan for transit-oriented development, so that they will be prepared to act when economic conditions improve.

Other planning activities include participation in the refinement of San Leandro’s TOD strategy; the development of General Plans in Fremont and Richmond, and the development of two specific plans for the Lake Merritt and Upper Broadway areas of Oakland. Oakland has also launched the International Boulevard Transit Oriented Development Plan to support TOD along the planned route of AC Transit’s Bus Rapid Transit project. AC Transit is part of the Technical Advisory Group for the zoning update to Oakland’s commercial corridors that could facilitate significant TOD development.

## Increasing Customer Satisfaction

In many ways, increasing bus ridership is directly dependent on maintaining a transportation network that is easy and enjoyable to use. AC Transit maintains the following programs to ensure that riders enjoy the fastest, easiest-to-navigate transportation network available.

### Rapid Bus

AC Transit operates Rapid Bus service on our 1R and 72R lines. Our Rapid Bus lines use leading-edge technology and unique on-street improvements to reduce travel time, including wider-stop spacing, low-floor buses, and signal priority to improve speed and reliability. That means our riders spend less time on the bus and more time enjoying life. The Rapid buses run through the heart of the East Bay and provide convenient access to popular work, school, shopping, and health care locations. Plus, they connect to BART and other transit lines to get our riders anywhere they need to go. AC Transit’s survey of recent and planned development along the San Pablo corridor revealed that some 60 projects (most of which include housing) have been initiated since Rapid Bus line 72R was introduced in 2003. Furthermore, in a report published in January 2011, AC Transit found that the Line 1R Rapid Bus was able to accommodate the same number of passengers as the lines it replaced, using fewer buses.



## Bus Rapid Transit

The next step in the evolution of the Rapid Bus service is Bus Rapid Transit (BRT). BRT is essentially light rail without the tracks, combining the speed and capacity of light rail with the convenience and affordability of riding the bus. This low cost, high-quality form of bus transit operates on separate rights-of-way, such as dedicated lanes in a roadway or a separate busway, which allows for faster, more reliable travel. Like Rapid Bus, BRT spaces bus stops farther apart, uses transit-signal priority, and generally employs low-floor buses. BRT may also collect fares under a proof-of-payment system, and use multiple doors for entry and exit.

### **BUS RAPID TRANSIT**

*The East Bay Bus Rapid Transit Project has the following corridor-wide projections:*

- *Increased corridor ridership—From 24,000 to 49,000 patrons per day in 2025*
- *Faster travel speed*
- *39 percent compared to existing condition*
- *18 percent compared to Rapid Bus*

Over the past several years, the cities of Oakland, Berkeley, and San Leandro have been working to establish BRT to alleviate traffic congestion and improve system reliability. AC Transit recently completed an Environmental Impact Statement/Report on a proposed BRT system to serve the cities of Berkeley, Oakland, and San Leandro. BRT service—which will operate along Telegraph Avenue, International Boulevard, and the East 14th Street corridor—will include dedicated bus lanes, raised boarding platforms, attractive street furniture and sheltered waiting areas, pre-paid fare collection, and other amenities. Construction of the full BRT project is scheduled to begin in 2014, and be completed in 2016. When the BRT corridor is implemented, AC Transit anticipates significant growth in ridership, cost savings, and a reduction in environmental impacts.

## Clipper<sup>SM</sup>

Clipper<sup>SM</sup> (formerly Translink<sup>®</sup>) is the Bay Area's reloadable card for paying transit fares. Introduced as a pilot program in 2002 by the MTC to reduce the number of separate fare systems and help integrate transit systems in the Bay Area, Clipper is an all-in-one transit card that keeps track of any passes, discount tickets, ride books and cash value that our customers load onto it, while applying all applicable fares, discounts, and transfer rules. With a Clipper card, a rider can:

- Customize their card for their own transit needs;
- Stop carrying multiple forms of payment (exact change, tickets, or passes);
- Automatically add value when the card balance is low, with the Autoload feature;
- Replace registered cards and restore the card's balance for a small fee, if the card is lost, damaged, or stolen; and
- Get on the bus faster.

Between 2010 and 2011 AC Transit saw a large increase in usage of Clipper cards. The cards became more widely distributed and AC Transit transitioned to a paperless ticket system by replacing all paper fare media with Clipper cards.



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AC Transit studied the potential for a Clipper-like card to increase ridership in a pilot project in 2010. AC Transit participated extensively in a special MTC program known as “TransLink for TOD” or “T4T,” intended to introduce more people to transit while enabling us to learn more about TOD residents’ travel patterns. Under the program, residents in new/rebuilt developments in downtown Oakland, East Oakland, Emeryville, Berkeley, and elsewhere received TransLink cards (the predecessor to Clipper) that had a pre-paid AC Transit pass already loaded on the card. The special cards offered residents a year of unlimited free travel on our local and transbay buses. In June of 2010, the results of the pilot project were published and are summarized as follows:

- Almost half of the participants reported riding AC Transit buses more during the program than before.
- The number of market-rate participants who used AC Transit five or more times a week almost doubled.
- T4T reduced automobile trips by about one trip per week per participant.
- One-quarter of the participants in market rate housing added their own funds to their TransLink cards after the completion of the free period.
- Approximately 20 percent of participants reported using transit more after the program than before. The groups most likely to use transit more after the program were those aged 25-34 years old, in market-rate housing, with their own cars.
- T4T reduced GHG emissions by an estimated eight pounds per participant per week.

### **EasyPass**

The AC Transit EasyPass program offers qualified employers, residential communities, and colleges in the AC Transit service area with a discounted, unlimited-ride transit pass valid on all local and transbay buses.

AC Transit’s first “universal” discounted pass program began in 1999 with the UC Berkeley Class Pass. The next programs, the City of Berkeley Eco Pass and the UC Berkeley Bear Pass, began in 2001 and 2004, respectively. The program has since been standardized and branded as the AC Transit EasyPass and has Board-approved pricing matrices for employers, residential communities, and two- and four-year colleges. The EasyPass program currently has seven clients, consisting of: two employers (City of Berkeley and UC Berkeley faculty and staff); three colleges (UC Berkeley, Peralta Community Colleges [four campuses] and Mills College); and two residential communities (the 99-unit Ironhorse in West Oakland’s Central Station development and the 171-unit Fourth & U development in Berkeley). There are approximately 61,000 eligible participants with more than 47,000 active passes in the entire program. The EasyPass staff responds continually to interest from potential new prospects.

The program’s pricing and other programmatic elements are standardized to reduce time-to-market for new EasyPass clients. The EasyPass is loaded onto a Clipper® regional fare card with the participant’s photo ID to enable easy boarding and provide ridership data to the District and EasyPass clients.

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## NextBus and 511 Departures

AC Transit recognizes that maximizing ridership on our network of buses means potential riders must have access to real-time arrival information via a variety of media sources. The NextBus system has provided AC Transit riders with real-time bus arrival information for a number of years via the internet, electronic signs at selected bus shelters, e-mail, cell phones, and smart phones. This system helps our riders reduce their wait times. NextBus uses GPS satellite technology to track buses, and then, taking into account typical traffic conditions, predicts when buses should arrive at a bus stop. Arrival predictions are updated every few minutes to ensure a high level of accuracy.

More recently, the MTC coordinated the development and launch of “511 Departure Times,” a multi-format system of transit arrival predictions (also using NextBus data) for a number of agencies around the Bay Area, including AC Transit. The 511 Departures program is based on unique transit stop ID numbers. Riders key in the ID number on their computer or cell phone and get predictions for all buses arriving at that stop. Transit stop ID numbers are available online and eventually will be posted at each stop. Riders can also call 511, say “Departure Times” and then the stop ID, and hear the predicted arrival times for that stop.

Whether using NextBus directly, or using the regional 511 Departures system, having real-time bus arrival information available is a tremendous boon, a service that improves the public’s transit experience and encourages more people to ride.





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## CHAPTER 4.0

# Reducing Our Environmental Impact

AC Transit's approach to reducing environmental impacts ranges from short-term improvements to our fleet and buildings, to long-term planning both within our organization and in coordination with our partners throughout the greater Bay Area. For example, the AC Transit Climate Action Plan (CAP) unveils our long-term plan for reducing GHG emissions while improving the quality of our service. The plan further highlights short-term internal actions to reduce GHG emissions by increasing bus ridership and facilitating multi-modal travel, including better integration of our bus stops into the urban environment by providing easy on-off access, and providing real-time tracking of bus arrival times.

Other endeavors are focused on reducing harmful emissions from AC Transit buses and facilities. AC Transit recently entered the second phase of a zero-emission fuel cell bus project, and we continue to evaluate ways to improve our facilities' energy use and waste generation. From solar panels on the roofs of facilities to recycling used motor oil, AC Transit is constantly looking for ways to mitigate environmental impacts.

## Planning

### Climate Action Plan

AC Transit published its CAP in February 2011 as a roadmap for reducing entity-wide GHG emissions in the coming years. The plan provides a summary of AC Transit's direct (Scope 1) and indirect (Scope 2) CO<sub>2</sub> emissions, describes performance metrics and CO<sub>2</sub> emissions reduction targets, and a combination of current and planned measures for reducing emissions. The CAP also provides a road map for monitoring our progress toward meeting our reduction targets.

While recognizing that AC Transit already reduces regional CO<sub>2</sub> emissions by providing public transit, we have gone one step further by voluntarily developing internal CO<sub>2</sub> emission reduction targets based on guidance from The Climate Registry (TCR) and state-wide emission reduction goals mandated by the California Global Warming Solutions Act of 2006 (Assembly Bill 32). Specifically, AC Transit has adopted a 15% reduction target by 2020 for entity-wide Scope 1 and 2 emissions as measured by emissions per total vehicles miles, revenue vehicle hours, and passenger miles traveled (PMT). These targets are intended to reduce the carbon intensity of our operations.

### Regional Climate Action Planning

Over the past several years AC Transit worked closely with a number of local governments, including Oakland, Berkeley, and Alameda County, in the development of their CAPs, which identify and facilitate implementation of a broad range of measures to reduce local GHG emissions. With financial support from the Alameda County Transportation Commission (ACTC), every city in Alameda County prepared or is in the process of preparing a Climate Action Plan. Some jurisdictions in Contra Costa County are also preparing plans.

Increasing transit-oriented development (TOD) and improving public transit are key emissions-reducing strategies in all of these plans. To these ends, AC Transit consults with cities on implementation strategies, and provides background information, strategy review, and comments. AC Transit anticipates doing more of this work in the future, and continues to participate in the joint ACTC/CMA (Alameda County Congestion Management Agency) Climate Action Working Group, which is developing countywide approaches to address these issues.

AC Transit also reviews and comments on General Plan updates for the various cities we serve, and works with county and regional governments and local communities to promote and maximize public transit in land use developments. AC Transit has recently taken part in planning the following projects:

- Alameda Transit Study
- BART extension to Santa Clara
- Central Alameda County Transportation Study
- Downtown Oakland Transportation/Circulation Study
- Emeryville (Amtrak) Transit Center
- Fruitvale BART Transit Village
- MTC's Plan Bay Area
- Oakland Pedestrian Plan
- Richmond BART Transit Village
- Richmond Parkway Transit Center
- New Transbay Terminal
- Union City Intermodal Station

## Buses

The solution to moving more people more efficiently is not simply providing more buses. Rather, AC Transit's strategies for improving ridership and reducing environmental impacts focus on using *better* buses, and more effective operational plans that maximize transit service and minimize running times. To this end, AC Transit is using cutting edge technology that allows us to improve fleet and route efficiency.

Led by AC Transit's HyRoad Program, the Bay Area is home to the largest single fleet of fuel cell buses in the United States.

### HyRoad Program features:

- *Twelve 40-foot zero-emission hybrid-electric, hydrogen fuel cell buses*
- *On-site hydrogen production and fueling*
- *On-site fleet maintenance*
- *Ongoing, outside evaluation*
- *Public education and safety training*

### HyRoad/ZEBA

Led by AC Transit, a group of regional transit agencies (San Francisco Muni, SamTrans in the Peninsula, Golden Gate Transit in Marin, and Valley Transportation Authority in San Jose) called **Zero Emission Bay Area (ZEBA)** is operating zero-emission fuel cell buses in transit service throughout the region. Fuel cell buses are clean, quiet, electrically propelled vehicles that emit only water vapor from the tailpipe. We are working with the Bay Area's largest bus transit operators to establish a truly regional program, representing the interests of agencies with a combined fleet of more than 2,500 buses.

The ZEBA fuel cell bus demonstration project grew out of AC Transit's **HyRoad** program (begun in 1999), and the California Air Resources Board's (CARB) 2000 Fleet Rule for California's Public Transit Agencies. HyRoad represents the most comprehensive hydrogen fuel cell demonstration program in the United States. From March 2006 through mid-2010, AC Transit operated three fuel cell buses, logging over 270,000 miles and carrying over 700,000 passengers, while achieving significantly greater overall energy efficiency than diesel buses. During this time, AC Transit generated hydrogen fuel through steam methane reformation. Natural gas provided by the local utility (PG&E) was fed to a steam reformer that produced a hydrogen-rich gas that was compressed and purified for use in the fuel cell buses (as well as several leased hydrogen cars).

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In 2010 and 2011 AC Transit began operating twelve next-generation, zero emission fuel cell buses. As of December 2011 these buses had logged over 190,000 miles and carried more than 637,000 passengers. These buses feature a number of design improvements over the original three fuel cell buses, including a reduction of vehicle weight (by approximately 5,000 pounds) and improvements in overall rider comfort and vehicle performance. The new lithium-ion batteries are lighter, more energy-efficient, and more reliable. The buses themselves also have better weight distribution throughout to improve the on-road vehicle performance, ride, and handling. And just as important, all of these features are integrated during the vehicle manufacturing process, as opposed to being added on by a third party, resulting in components and networks that are more reliable, durable, and easier to maintain.

Our zero emission fuel cell buses are fueled by our new hydrogen fueling station in Emeryville, which opened in August 2011 and dispensed more than 14,000 kilograms of fuel. Hydrogen at the new fueling station comes from two different sources. We generate approximately a third of our hydrogen using an electrolyzer. Electricity produced by a new solar installation at our Central Maintenance facility offsets the energy used at Emeryville for the electrolyzer. The remainder of our supply is delivered by an outside vender that generates the hydrogen through steam methane reforming.

A second hydrogen station is scheduled to open in Oakland in 2013, which will use directed biogas from landfills or animal feedlots to fuel on-site stationary fuel cells, which in turn will power an electrolyzer to produce up to 65 kg of hydrogen daily.

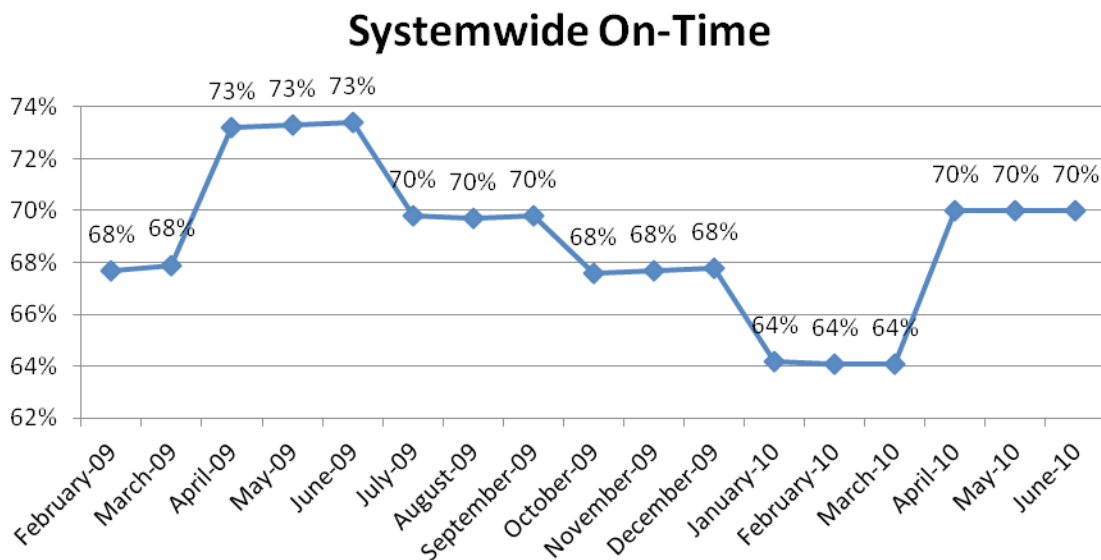
In addition to our continued participation in the ZEBA program, we will grow our own fleet of zero emission buses in the coming years, depending on a continuation of good performance and a reduction in capital and operating costs.



## On-Time Performance

AC Transit recognizes that to operate an efficient and reliable transit network, we must monitor the performance of the system as a whole, as well as by individual buses. Our On-Time Performance system allows staff to measure and record the percentage of buses that are operating *On-Time* (one minute before schedule to five minutes behind schedule), *Late* (six or more minutes behind schedule), or *Early* (two or more minutes ahead of schedule). AC Transit began publishing system-wide data in July 2010 and line-level data in September 2010 via [www.actransit.org](http://www.actransit.org). **Figure 5**, below, shows the percentage of buses running On-Time in FY 2009/2010

On-Time Performance data allows us to target lines that are not performing well, take action to remediate inefficiencies, and increase ridership by ensuring that our buses consistently operate on time.



AC Transit, 211564

**Figure 5**  
Monthly System-Wide Performance of Buses Operating On-Time

## Our Facilities

### Solar Power

AC Transit recently installed a new solar power system at our Central Maintenance facility (CMF) which more than doubled our previous solar-generating capacity. Completed on schedule and under budget in July of 2011, the 510 KW DC system will produce an estimated 695,000 kWh of electricity annually. This system, which is owned by AC Transit, indirectly offsets the energy AC Transit needs to generate hydrogen with its electrolyzer at its Emeryville division. The system uses solar panels to capture sunlight across a 360-degree photovoltaic surface capable of converting direct, diffuse, and reflected sunlight into electricity. It was constructed using grant funding from the Transit Investments for Greenhouse Gas and Energy Reduction (TIGGER) program. As of December 31, 2011, the CMF solar system had produced over 232,161 kW of electricity.

## CLEAN ELECTRICITY

*AC Transit's solar power systems combined are expected to produce approximately 1,475,000 kWh per year of clean electricity.*

*This is equivalent to the electrical energy needed to power more than 128 homes.*

*(Source: EIA, 2011)*

AC Transit also continues to operate two solar power systems consisting of 2,728 photovoltaic panels on seven rooftops at two of our facilities: the Hayward Yard (D-6) and the Seminary Yard in Oakland (D-4). In 2010, these systems, combined generated approximately 745,000 kWh of electricity. Specifically, electricity from our solar system represented approximately 40.4 percent of the total electricity used at D-6, and 14.1 percent of the total at D-4. Although AC Transit does not own the panels at D-6 and D-4 (and thus cannot take credit for GHG emission reductions), they nonetheless increase California's supply of renewable energy, reduce regional GHG emissions, and reduce demand on the local power utility. After the six-year power purchase agreement expires in 2013, AC Transit plans to purchase this system and lay claim to the renewable energy credits.

AC Transit is in the process of planning another solar power system (approximately 200kW in size) with remaining funds from the CMF facility TIGGER grant. It is anticipated that the additional system will be installed at AC Transit's Hayward facility on elevated platforms above the parking area.

## Lighting Retrofits

Since 2005, AC Transit has been conducting energy audits at many of our facilities to identify opportunities to reduce consumption and operating costs by replacement of inefficient lighting. In 2010, AC Transit purchased exterior lighting upgrades at multiple facilities, including energy-efficient Light Emitting Diodes (LEDs) and Compact Fluorescent Lights (CFL), as well as bi-level exterior lights. Currently, AC Transit is in the final phase of the Exterior LED Lighting Project, which involves purchasing PG&E approved bi-level LED lights to obtain higher than normal rebate amounts. The bi-level feature permits a 50% reduction in light output by using sensors to detect movement.

The energy savings from efficient LED technology, as well as 100,000 hour lamp life, and better quality light, result in many benefits to AC Transit. As shown in Section 5, Figure 8, total annual electricity usage decreased over 16 percent between 2009 and 2010, due in large part to lighting retrofit projects. Starting in September of 2011, we estimate a District-wide peak power reduction of 3.79 kW, and an annual electricity savings of 77,441 kWh/yr.<sup>7</sup>



<sup>7</sup> This projected decrease is also attributable to decommissioning of Richmond facilities in August 2011.

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In 2011, AC Transit completed installation of a new bus painting booth which has a number of energy-saving features. The lights utilize T-8 electronic ballasts (40 percent more efficient than the older T-12 lamps) and automatically shut off when the booth detects that there is no activity. During curing times, the lights also dim to the lowest feasible level. Beyond the energy-saving aspects, this booth is also equipped with modern features that reduce our impacts to air quality, such as gas fired heaters that are significantly more efficient than the 25-year old equipment that they replaced.

AC Transit continues to evaluate energy use, looking for additional improvements in operational efficiency.

### **General Office HVAC System**

In late 2010, AC Transit began a project to replace the 25-year old General Office building cooling equipment with new environmentally sustainable and energy efficient units. The project includes two chilled water plants, circulation pumps, a cooling tower, an air handler and associated duct work. The design conforms to current California regulations that maximize energy efficiency. Additional benefits include removal of the existing chillers in the penthouse mechanical room that used R-11 refrigerant, which has a very high ozone depleting potential. The new equipment uses refrigerants with a lower ozone depleting factor (R134a and HCFC 123), and all materials used on this project are high-quality and manufactured to last. For example, the cooling tower was upgraded and constructed of stainless steel materials that are resistant to corrosion.

By using high efficiency motors and variable frequency drives, and by automatically shutting down the chiller equipment when outside temperatures are 48 degrees Fahrenheit or less, this project is expected to reduce General Office annual electricity usage by 25 percent (126,000 kilowatt hours). The new control system platform is also designed so that future building and energy efficiency projects, such as the hot water boiler replacement or the floor fan-powered boxes, can be upgraded and programmed to operate on AC Transit's network. In addition, third party software packages can optimize the performance of the new system by analyzing building HVAC load trends and outdoor conditions to make adjustments to temperature, chilled water flow, and static pressure.

### **State of Good Repair**

In October of 2011, AC Transit received \$8.4 million in Federal Transit Administration (FTA) 5309 Bus State of Good Repair Initiative Funds to perform improvements at several facilities. AC Transit will use the funding for a weatherproofing project at the General Office Building and the attached parking garage, to reduce energy consumption and expand the useful life of the facility. This project will also help AC Transit minimize GHG emissions, and reduce overall operating expenses created by emergency repairs and extraordinary maintenance needs.

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## Minimizing Waste

AC Transit initiated recycling and waste reduction efforts over a decade ago, when a group of employees at the General Office in Oakland voluntarily formed a Recycling Committee. With the help of a grant from Alameda County's StopWaste program, the committee began to recycle office waste including paper, cardboard, bottles, cans, ink cartridges, e-waste (computer peripherals), and even eyeglasses. By 2007, the committee had expanded these programs to every AC Transit division office, recruiting point persons to ensure optimum implementation at each location. Other items recycled on an ongoing basis include oil filters, used motor oil, vehicle batteries, fluorescent tubes, used tires, graffiti shields, scrap metal, and wood pallets. Surplus electronic equipment and e-waste such as computers, printers, monitors, and telephones, are identified and tagged for optimal recycling or reuse. See Section 5, Waste Streams, for more information regarding recycled hazardous and non-hazardous material in 2010.

Education and communication continues to be a key part of the Recycling Committee's efforts. The committee meets semi-annually to discuss challenges, examine new recycling possibilities, and share best practices among operating divisions. Additionally, throughout the year, the committee sponsors community recycling days at Health and Safety Fairs hosted by each division.



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## CHAPTER 5.0

### Our Environmental Footprint

Over the past eight years, AC Transit has been tracking and reporting its environmental performance using metrics that include fuel and energy use, emissions of GHGs and other major air pollutants, water use, waste management, and regulatory compliance. This transparent accounting of environmental performance has allowed us to track the efficacy of the programs described in Section 4 of this report and foster awareness among facility and operations managers that results in better resource management.

#### Fuel and Energy Usage

In 2010 and 2011, AC Transit continued to rely on diesel as our primary fuel source. With plans to purchase diesel-electric hybrids and expand our hydrogen fuel cell bus fleet, AC Transit's reliance on diesel will diminish in future years. Gasoline and propane are used to a lesser degree for non-revenue vehicles, while natural gas and electricity meet the heating, cooling, lighting, and mechanical needs at office and bus yard locations.

#### Vehicles

Our FleetWatch management system became fully operational in mid-2010. This system uses hardware and software to provide real-time data on our revenue and non-revenue fleets. The FleetWatch system monitors fleet performance and helps improve overall efficiency by tracking vehicle mileage, fuel usage, and engine fluid usage. The system also schedules preventive maintenance and identifies possible leaks. Having all of this information readily available reduces the time and cost of environmental tracking and reporting. It also improves the accuracy of our GHG inventory by providing actual vehicle mileage and fuel usage data that can be used to quantify our CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O emissions associated with fuel consumption.

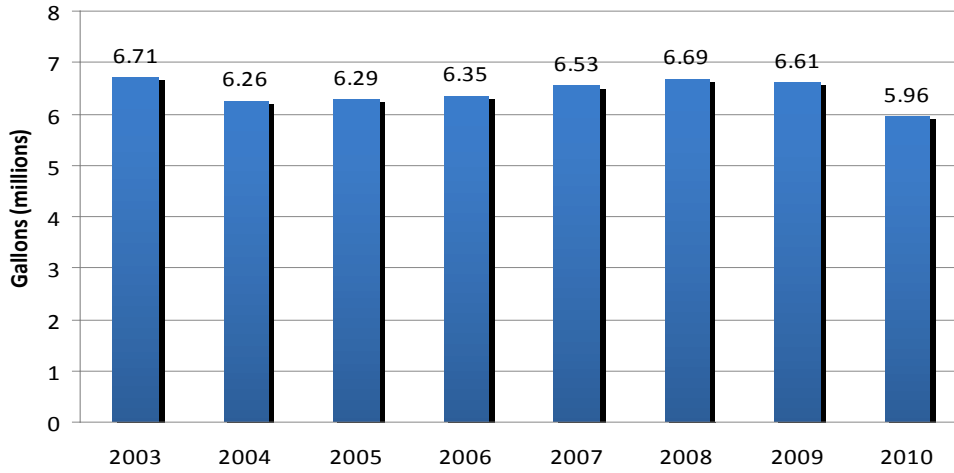
In addition to FleetWatch, AC Transit continues to track diesel and gasoline fuel usage with ELLIPSE, our inventory management system. Diesel is used by our revenue fleet (buses and paratransit) and by some non-revenue vehicles. Gasoline and propane fuel are used only by non-revenue vehicles, such as automobiles, service vehicles, forklifts, and store room trucks.

AC Transit experienced significant decreases in vehicle fuel consumption in 2010, due to service reductions, the use of more fuel efficient vehicles, and various operational efficiencies. In addition, following a needs assessment, many non-revenue vehicles were taken out of service in 2010 and 2011, and older models were sold at auction, improving overall fuel efficiency of the non-revenue fleet. As shown in **Figures 6** and **7**, total annual diesel consumption decreased by approximately 9.8 percent from 2009 to 2010, and total gasoline use decreased by 35 percent.

In June 2008, in an effort to reduce fuel consumption and reduce filter plugging, AC Transit initiated an automatic idle shut-off on the newer Van Hool buses (1200, 2000, 2100, 5100, and 5100 series), which automatically shuts buses down after five minutes when not in operation. During 2009 and 2010, this automatic shut down was expanded to include all buses for which the technology is viable. AC Transit has seen a significant improvement in fuel economy as a result.



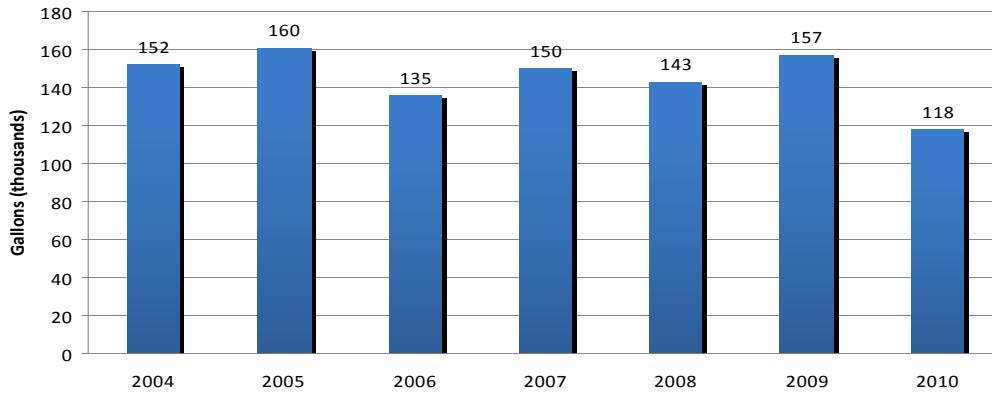
**Figure 6. Total Annual Diesel Consumption**



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**Figure 6**  
**Total Annual Diesel Consumption**

**Figure 7. Total Annual Gasoline Consumption**



AC Transit, 211564

**Figure 7**  
**Total Annual Gasoline Consumption**

## Facilities

AC Transit has taken significant steps over the past few years to reduce impacts associated with facility energy use. Since our facility energy needs consist primarily of electricity use and natural gas consumption, we have focused on increasing energy efficiency at facilities and offices and expanded installation of photovoltaic systems to provide GHG emissions-free solar power.

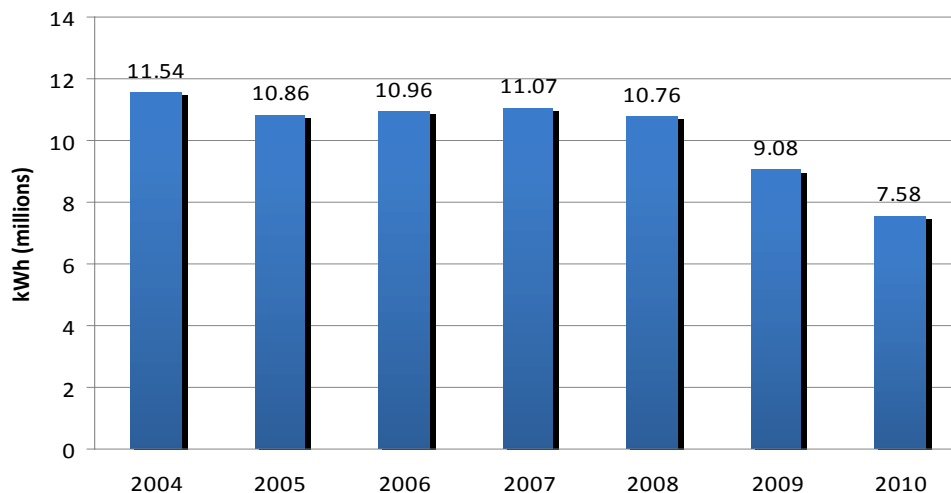
As shown in **Figure 8**, AC Transit's total annual electricity usage decreased by 16.6 percent from 2009 to 2010. In fact, our 2010 electricity usage was the smallest since 2004, when tracking began, representing an overall decrease of 34.4 percent since that year. This decrease is largely a result of AC Transit's lighting retrofit projects and facility improvements. With the installation of a new solar system at our Central Maintenance facility in Oakland in 2011, we expect to see energy consumption continue to drop in the future.

Electricity usage dropped at all but one AC Transit facility in 2010. Major decreases were observed the following facilities: D 2 (19.3 percent), D-4 (24.7 percent), D-6 (19.6 percent), RPTC (36.5 percent), and the Training Center (30.1 percent). The 66th Avenue facility saw a very large increase for the year because of tenants leasing from AC Transit.

### AC TRANSIT FACILITIES LEGEND

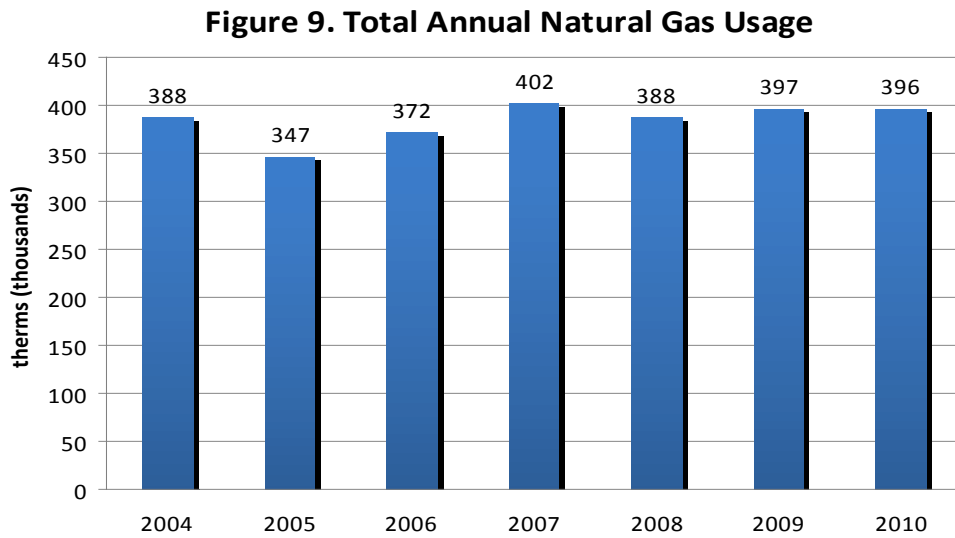
Ardenwood	Ardenwood Facility, Fremont
CMF	Central Maintenance Facility, Oakland
GO/Corporate	General/Corporate Office, Oakland
D-2	Emeryville Yard
D-3	Richmond Yard
D-4	Seminary Yard, Oakland
D-6	Hayward Yard
Training	Training Facility, Hayward
66th Avenue	Office Building
1400 Franklin Street	Office Space, Oakland
RPTC	Richmond Parkway Transit Center
RCT & ETC	Eastmont Transit Center and San Bruno Mt. Radio tower

**Figure 8. Total Annual Electricity Usage**



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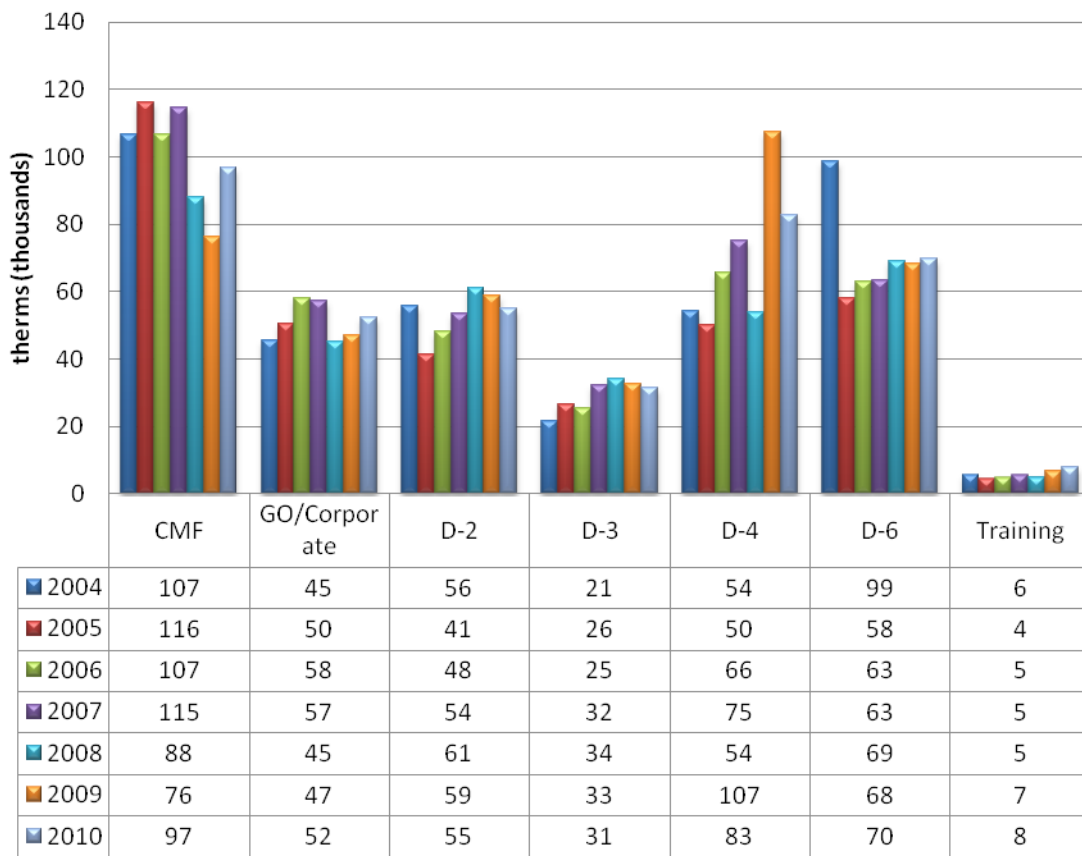
**Figure 8**  
Total Annual Electricity Usage



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**Figure 9**  
**Total Annual Natural Gas Usage**

As shown in **Figure 9**, total natural gas usage remained virtually unchanged between 2009 and 2010. **Figure 10** shows historical changes in natural gas consumption by facility. In 2010, the CMF, General/Corporate Office, D-6, and Training facilities increased their natural gas usage by 27, 11, 2, and 18 percent, respectively. These increases may have been the result of cooler weather, as natural gas is used for heating. The increase at the CMF is attributed in part to new steam bays in service in 2010, used for steam cleaning of engines. Our D-4 facility saw a 23 percent decrease in natural gas consumption, due to removal of the Chevron hydrogen station.



AC Transit, 211564  
**Figure 10**  
 Natural Gas Usage by Facility

## Greenhouse Gas Emissions

CO<sub>2</sub> is the primary GHG resulting from AC Transit’s operations, due largely to the burning of fossil fuels to power our vehicles. In 2011, AC Transit submitted its 2010 CO<sub>2</sub> emissions report to TCR, marking the fifth consecutive year of publically reporting. This report was recently independently verified. We began our public GHG reporting efforts with our CY2006 submittal to the California Climate Action Registry (California Registry), and in 2007 we joined TCR, a non-profit organization that encourages and supports early actions to reduce GHG emissions across North America.

**Table 1** shows emission categories (i.e., sources) of emissions included in AC Transit’s 2010 GHG inventory. In 2010, our annual CO<sub>2</sub> emissions decreased by more than 8 percent, due primarily to a drop in diesel consumption (largely from a reduced fleet and reductions in service), decreased consumption of unleaded gasoline, and a drop in electricity usage. GHG emissions decreased in 2010 for all but two categories: direct mobile emissions from emergency generators and direct stationary emissions from acetylene torches. The relative contribution from each major category to total CO<sub>2</sub> emissions has remained steady since data collection began in 2004.

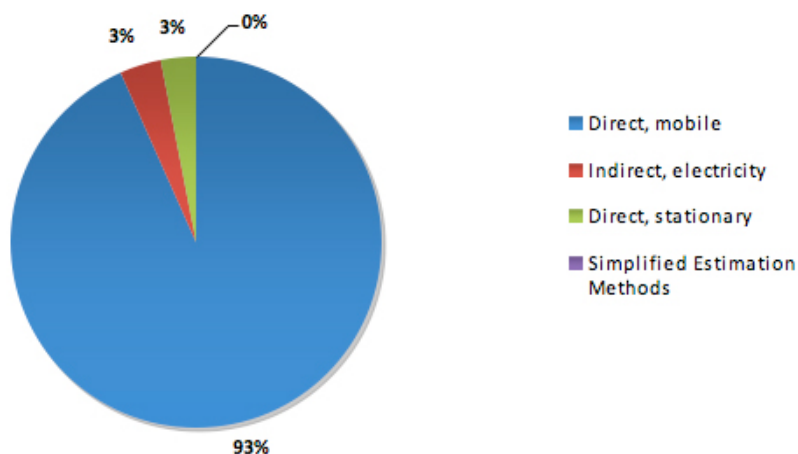
**Table 1**  
**AC Transit CY2010 CO<sub>2</sub> Emissions Summary by Category**

Emission Category (Source)	Total CO <sub>2</sub> (metric tons)					2009 to 2010
	2006	2007	2008	2009	2010	% change
Direct Mobile (combustion engines)	64,246	67,337	69,598	68,838	63,166	-8.24%
Imported electricity	2,438	2,289	3,074	2,613	2,351	-10.03%
Direct Stationary (Natural gas furnaces & water heaters)	1,965	2,131	2,060	2,104	2,070	-1.62%
Imported electricity (leased office space)	-	-	28.4	28.7	25.7	-10.45%
Direct Mobile (emergency generators)	134	54.1	29.7	29.7	29.9	0.67%
Direct Mobile (forklifts)	18	8	6.4	4.9	4.3	-12.24%
Direct Stationary (compressed gas-machining)	0.02	0.23	0.02	0.06	0.03	-50.00%
Direct Stationary (acetylene torches)	0.07	0.02	0.24	0.24	0.30	25.00%
<b>ALL SOURCES</b>	<b>68,801</b>	<b>71,819</b>	<b>74,797</b>	<b>73,619</b>	<b>67,647</b>	<b>-8.11%</b>

The pie chart shown in **Figure 11** summarizes the distribution of AC Transit emissions by source for 2010<sup>8</sup>. Mobile fuel use (diesel and gasoline) represent roughly 93 percent of the total emissions inventory. Electricity and stationary combustion (natural gas usage in buildings) each represent approximately 3 percent of the inventory. *De minimis* emissions, which make up less than 0.1 percent, are primarily from compressed gas used in maintenance equipment (such as propane used by forklifts) and a small amount of diesel to power stationary generators. Table 1 demonstrates that the distribution is consistent with previous years for all significant sources.

In contrast to past emissions inventories which reported only on CO<sub>2</sub>, AC Transit's CY2011 emissions inventory report to TCR will include GHG emissions from all six Kyoto gases: CO<sub>2</sub>, nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF<sub>6</sub>). We anticipate that our total GHG footprint may increase due to HFCs from refrigerants used in vehicle and office air conditioners.

**Table 11**  
**AC Transit CY2010 CO<sub>2</sub> Emissions Summary – Percentage of Total Emissions by Category**



AC Transit. 211564

**Figure 11**  
**AC Transit CY2010 CO<sub>2</sub> Emissions Summary – Percentage of Total Emissions by Category**

<sup>8</sup> Percentages do not add up to 100 because of rounding.

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## Fleet Emissions

Air quality is a top environmental concern in the heavily populated Bay Area. Motor vehicles are a major source of airborne particulates and smog-producing pollutants such as ozone and nitrogen oxides. Diesel engines in particular have long been a major source of emissions, including particulate matter (PM) and smog-forming oxides of nitrogen (NO<sub>x</sub>). AC Transit has dramatically reduced PM and NO<sub>x</sub> emissions over the past few years through the introduction of newer engines, improved exhaust-control technologies, and the availability of cleaner-burning diesel fuels.

### California Air Resources Board Compliance

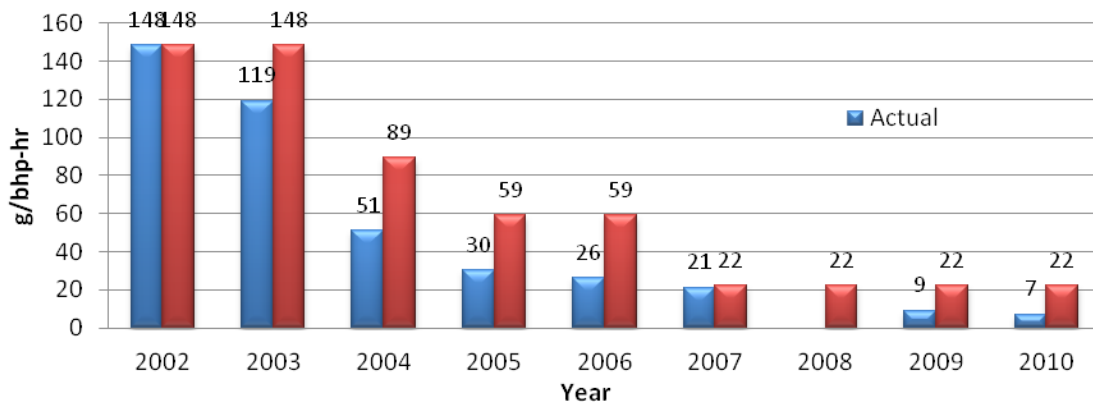
As a public transit agency, AC Transit must comply with CARB rules for exhaust emission standards. The two primary rules affecting AC Transit are the **Urban Bus Requirements** for new Urban Bus engines and vehicles (typically a heavy heavy-duty diesel engine 35 feet or longer and/or greater than 33,000 pounds gross vehicle weight rating [GVWR]) and the **Transit Fleet Vehicle (TFV) Requirements** for smaller vehicles (on-road vehicles less than 35-feet in length and 33,000 GVWR but greater than 8,500 GVWR, and powered by heavy-duty engines). Both rules require reductions in PM and NO<sub>x</sub> emissions.

To comply with CARB and federal Environmental Protection Agency (EPA) standards, AC Transit continues to replace older bus engines with advanced low-emissions engines. AC Transit retrofits existing buses with PM traps and NO<sub>x</sub>-reducing catalysts when required by CARB rules; however, retrofits are rare since, starting in 2008, all bus engines delivered to AC Transit come pre-equipped with exhaust after-treatment that meets CARB and EPA standards.

### Urban Bus Requirements

The CARB Urban Bus Requirements, which have been in effect since February 2000, enact stringent exhaust emission standards for new Urban Bus engines and vehicles, promote advanced technologies by providing for zero-emission bus demonstration projects, and require zero-emission bus acquisitions at transit agencies with greater than 200 buses.



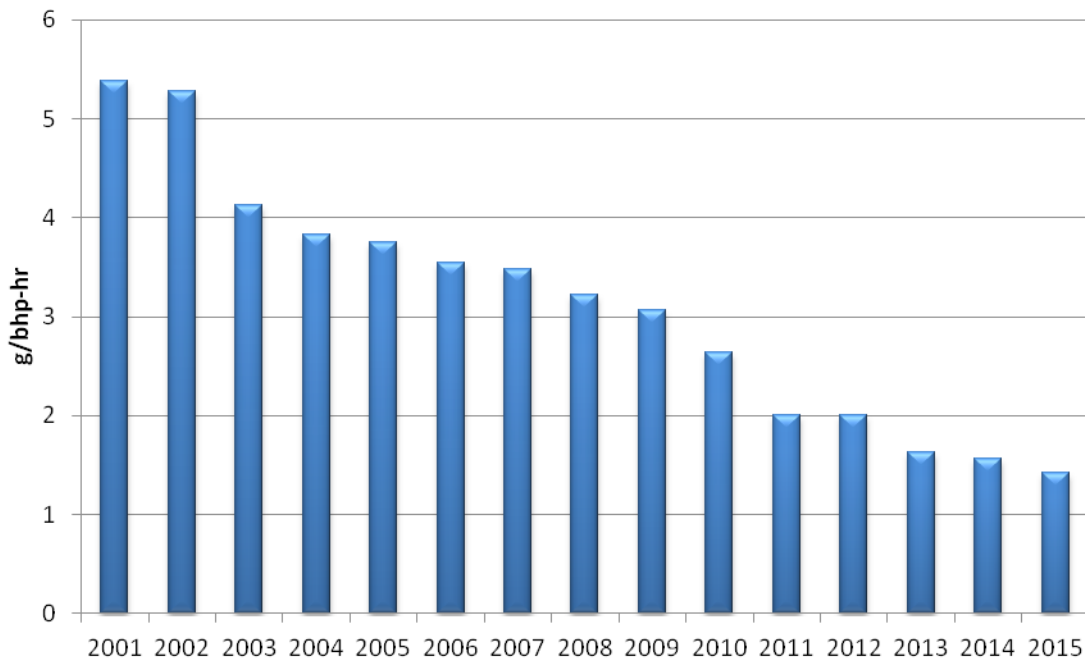


AC Transit. 211564

**Figure 12**  
Total PM Emissions of AC Transit Urban Bus Fleet

The requirements also require that transit operators choose a fuel path (diesel or alternative), which in turn affects bus purchases and dictates emission reduction deadlines. AC Transit is on the diesel fuel path, which requires California fleets to use Ultra-Low Sulfur Diesel (ULSD). AC Transit began using ULSD in January 2002, six months prior to the state requirement. ULSD contains 97 percent less sulfur than low-sulfur diesel, thus permitting the use of improved exhaust treatment devices to reduce PM and NO<sub>x</sub>.

Per the Urban Bus PM Reduction Requirement, AC Transit has been annually reducing total diesel PM emissions of our diesel Urban Bus fleet since 2002, with an ultimate goal of 85 percent reduction from 2002 baseline conditions, by January 2007. As shown in **Figure 12**, we successfully exceeded that requirement in 2007, and have continued to reduce our Urban Bus PM emissions every year since. Our 2010 PM emissions were at 7 grams per brake horsepower-hour (g/bhp-hr), a reduction of 22 percent from 2009, and an overall reduction of over 95 percent from our fleet's 2002 baseline emissions. AC Transit's most recent report to CARB (January 2012), shows a 96 percent reduction in PM emissions, from baseline conditions. The Urban Bus Requirement for NO<sub>x</sub> went into effect in October 2002, setting the fleet's average upper limit at 4.8 g/bhp-hr. AC Transit came into compliance with this requirement on May 1, 2003. Over time, the NO<sub>x</sub> rule sets standards for new engine purchases that are increasingly stringent. However, CARB-compliant engines have not been available from suppliers until recently, making compliance problematic. Engine manufacturers failed to meet the 2004 and 2007 NO<sub>x</sub> limits of 0.5 and 0.2 g/bhp-hr, respectively. In the absence of approved engines, CARB has allowed AC Transit and other Urban Bus fleets to pursue alternative means for reducing NO<sub>x</sub>. Our CARB-approved 15-year plan, shown in Figure 13, demonstrates how—through a mix of new bus purchases and installation of NO<sub>x</sub>-reducing catalyst devices on older buses—we will comply with the baseline requirement. As new engines become available, AC Transit's NO<sub>x</sub> reductions will continue to improve. A key element of our 15-year plan, all new buses purchased by AC Transit will meet or exceed the 0.2 g/bhp-hr emissions rate.



Note: Values for 2011 through 2015 are projections. Average NO<sub>x</sub> is calculated using manufacturer's data for engines and exhaust treatment devices.

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**Figure 13**  
**Urban Bus Fleet NO<sub>x</sub> Fleet Average over 15-year Period**

Under the Zero Emission Bus element of the Urban Bus Requirements, public transit providers operating 200 or more buses must participate in zero emission bus demonstration projects. As discussed in Section 4 under *HyRoad/ZEBA*, AC Transit is well under way with an advanced demonstration project that includes 12 next-generation zero emission buses.

### Transit Fleet Vehicle Requirements

The TFV Requirements took effect in February 2005, requiring emission reductions of PM and NO<sub>x</sub> via the use of alternative fuels, and retrofitting, repowering or replacing vehicles and engines. As of December 31, 2010, AC Transit operated a total of 98 TFV vehicles, including a 30-foot Van Hool gasoline hybrid bus.<sup>9</sup>

The TFV Regulation requires diesel PM reductions (using a January 2005 baseline) of 40 percent by December 2007 and 80 percent by December 2010. AC Transit's TFV 2005 PM baseline is 1.70 g/bhp-hr, and according to the most recent data submitted to CARB (January 2012), total PM emissions in 2011 were 5.59 g/bhp-hr, a 229 percent increase above baseline conditions. AC Transit is not in compliance with TFV Regulations because there currently no verified exhaust after-treatment device capable of reducing PM and NO<sub>x</sub> that can be retrofitted in AC Transit's fleet of Van Hool 5000 series buses. Each year, until a verified exhaust after-treatment device becomes available, AC Transit requests from CARB an annual extension. Until a verified after-treatment device is available, AC Transit is actively pursuing alternative approved devices for these buses.

<sup>9</sup> The Van Hool gasoline hybrid bus was removed from service in 2012.



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The TFV Rule sets a maximum NO<sub>x</sub> fleet average of 3.2 g/bhp-hr by December 2007 and 2.4 g/bhp-hr by December 2010. Transit's baseline was 4.3 g/bhp-hr in January 2006, and we met the December 2007 requirement with the addition of new 30-foot Van Hool buses. In 2008 and 2009 we took delivery of another 39 buses that fell into the TFV category. Our latest report to CARB shows a 2011 NO<sub>x</sub> fleet average of 1.91 g/bhp-hr.

### **U.C. Berkeley Fleet**

In 2010 AC Transit leased several buses to the University of California, Berkeley (U.C. Berkeley).<sup>10</sup> While AC Transit did not have operational control over the U.C. Berkeley Fleet, we owned the buses and therefore had to comply with a CARB rule for public agencies and utilities requiring the use of "best available control technology" (BACT) to reduce NO<sub>x</sub> and PM. AC Transit met the December 31, 2010 requirement that 60 percent of our fleet engines use BACT.<sup>11</sup>

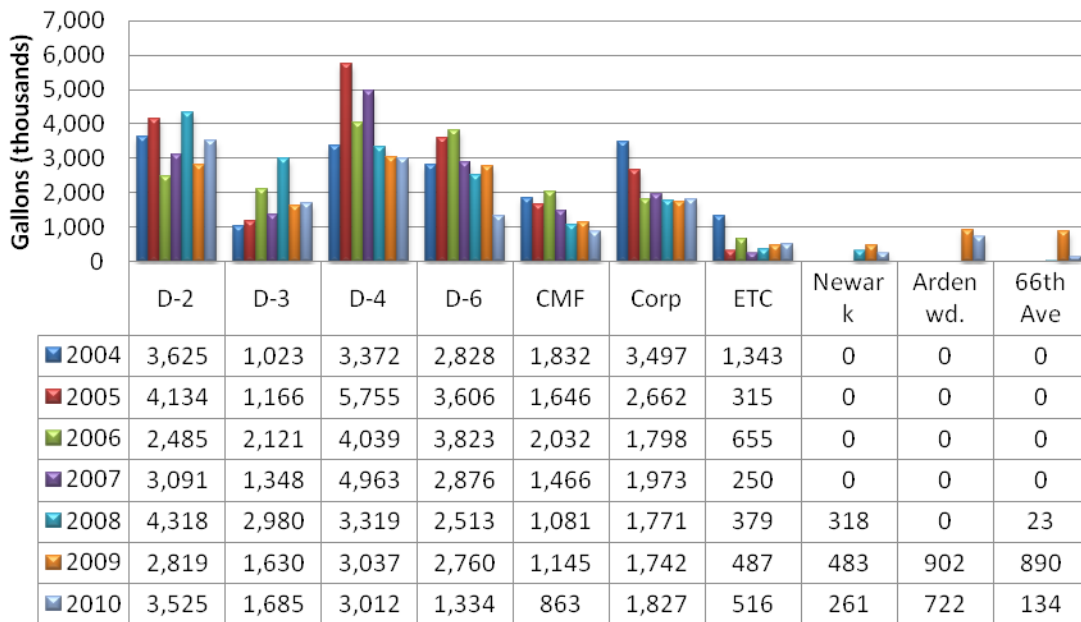
## **Water Use**

Bus washing continues to account for the largest portion of AC Transit water consumption. In 2010, total annual water usage was approximately 13.8 million gallons, the lowest since we began closely tracking consumption in 2004 (see **Figure 14**). AC Transit realized an overall 13 percent decrease between 2009 and 2010. Significant drops of 52 percent, 46 percent and 85 percent were noted at the D-6, Newark, and 66th Avenue facilities, respectively.

During 2008 and 2009, AC Transit implemented a conservation plan that included monitoring monthly water use, reducing the bus washing frequency, and techniques to reduce the volume of water required during the process. In 2009, AC Transit also participated in EBMUD's voluntary water reduction program (due to the 2009 drought). These programs have contributed to an overall decrease in water usage.

<sup>10</sup> Four New Flyer buses (model 2400, 35-footers) and six Gillig buses (model 2800, 40-footers).

<sup>11</sup> In December of 2011 the U.C. Berkeley buses were removed from service and disposed of. Therefore, not all buses were retrofitted to meet the December 31, 2011 deadline of 100 percent retrofit.



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**Figure 14**  
Total Annual Water Usage by Facility

## Waste Streams

### Standard Municipal Waste

In 2010, AC Transit continued to recycle material from our standard municipal waste, including white paper, colored paper, cardboard, and aluminum cans. In addition, AC Transit donated 114 pieces of electronic equipment to Oakland Technology Exchange (OTX) West including computers, monitors, printers, fax machines, electric typewriters, and more. OTX West, which is dedicated to eliminating the digital divide in Oakland, California, teaches basic computer skills to adults and children, and provides ongoing technical support free of charge. The organization engages in environmentally sustainable re-use by refurbishing donated personal computers and other technological equipment for students who successfully complete the OTX West training class.

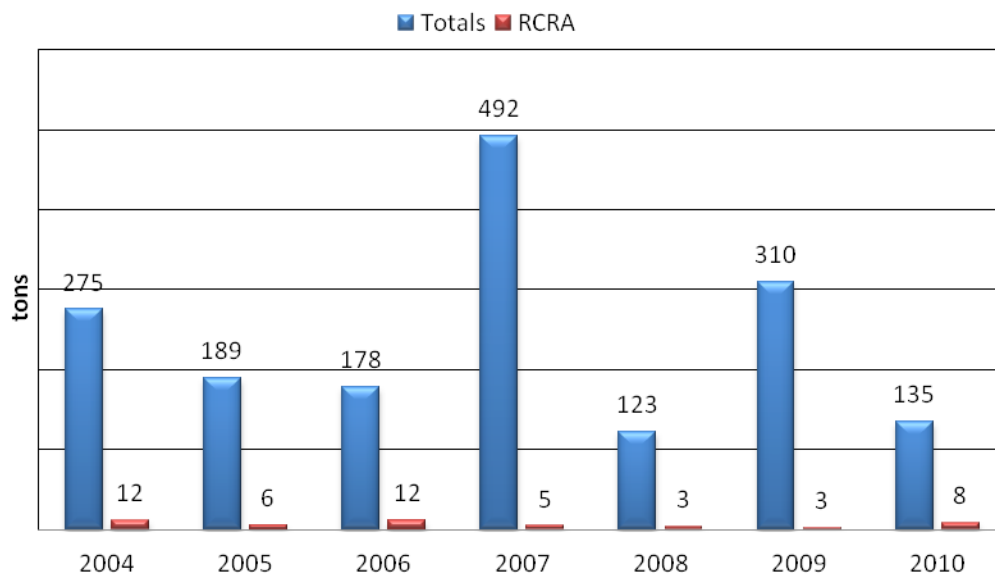
### Hazardous Waste

In addition to monitoring standard municipal waste, AC Transit separately tracks waste streams that are classified as "hazardous." As shown in **Figure 15**, in 2010 we experienced a decrease in the total amount of hazardous waste generated as compared to 2009, and generated less hazardous waste than in five of the six previous years. In general, our hazardous waste stream can fluctuate dramatically. Such fluctuations are attributable to variations in the amount of liquids that we must dispose of, as these materials tend to weigh more than most solid wastes and therefore introduce greater effects to overall reported tons of hazardous waste. These liquids are produced primarily from the cleaning of oil water separators and wastewater sumps in our maintenance facilities.

AC Transit's most hazardous wastes are regulated under the Resource Conservation and Recovery Act (RCRA), which gives the EPA the authority to control hazardous waste and also sets forth a framework for the management of California-regulated hazardous wastes. Examples of RCRA waste include waste paint, related materials, glass windows with lead-containing coating, and caustic alkali liquids (from our Print Shop). Only a small portion of the waste we generate is covered by RCRA. In 2010, this waste represented approximately 4 percent of our total hazardous waste generation. Our largest waste stream is used oil from bus maintenance that is recycled by a third party. Our RCRA waste, as a percentage of total manifested waste, has remained low since 1999, when we removed our solvent parts washer units in response to stricter regulation by the Bay Area Air Quality Management District (BAAQMD).

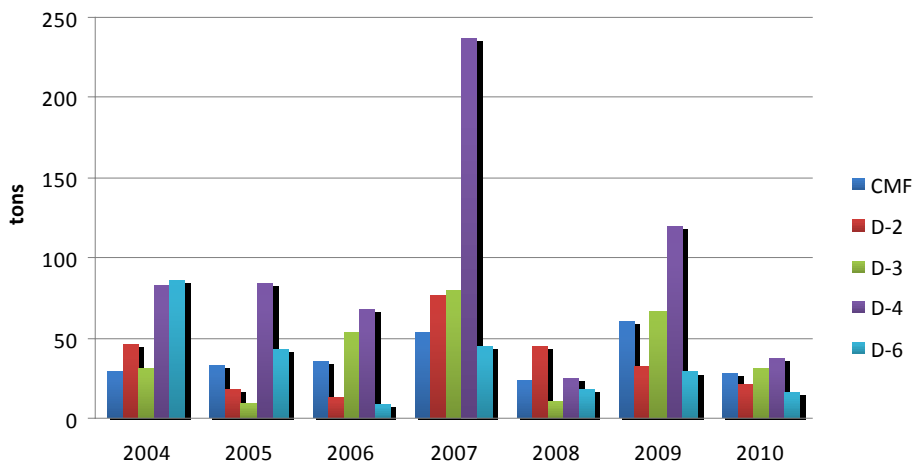
**Figure 16** shows that the overall reduction in total hazardous waste is reflected at the facility level, where in 2010 each facility saw a decrease in manifested hazardous waste. The largest decrease was observed at D-4, and is generally associated with decreased generation of liquids and sludge from maintenance of oil-water separators.

In addition to used motor oil, AC Transit recycles used oil filters, vehicle batteries, alkaline batteries, fluorescent tubes, used tires, electronic equipment, graffiti shields, scrap metal, and wood pallets (see Section 3 under *Minimizing Our Waste* for further details). Fluorescent tubes used in buses represent a significant universal waste stream due to the higher replacement rate in winter months. Since tracking began in 2004, AC Transit has recycled just over 25.3 tons of used fluorescent tubes.



AC Transit. 211564  
**Figure 15**  
**Annual Hazardous Waste Generation**

**Figure 18. Annual Hazardous Waste by Facility**



AC Transit. 211564

**Figure 16**  
Annual Hazardous Waste by Facility

## Regulatory Compliance

AC Transit operations are under the oversight of numerous regulatory agencies to ensure compliance with various environmental rules and regulations. In addition to the CARB regulations discussed earlier this chapter, in 2010 AC Transit continued to manage the following regulatory compliance activities:

**Underground storage tank (UST) inspections.** In order to meet UST certification requirements and training, inspectors verify all electronic monitoring components, review calibration records, and ensure that all record keeping and training procedures are implemented and maintained properly.

**Fuel pump inspections.** The Bay Area Air Quality Management District (BAAQMD) inspects each of our unleaded gasoline pump systems.

**Stormwater monitoring and reporting.** In accordance with California's General Industrial Stormwater Permit requirements, AC Transit regularly examines potential sources of pollutants in stormwater discharges during monthly yard walks and inspections. We continue to address challenges to reaching these benchmark levels through better training and education.

**Wastewater monitoring and reporting.** Our wastewater regulatory compliance activities are tracked and reported regularly as part of our suite of environmental compliance requirements. Wastewater samples from all facilities are collected and analyzed many times throughout the year.

**Air emissions permitting activities.** AC Transit maintains several air quality permits including those for five unleaded gasoline dispensers, two diesel fire pumps, one backup generator, seven diesel generators, and five paint booths.

## CHAPTER 6.0

### Index of Global Reporting Initiative Performance Indicators

The Global Reporting Initiative (GRI) provides a sustainability reporting frameworks for companies and organizations. GRI's most recent framework, GRI 3.1 launched in 2011, provides environmental performance indicators highlighting key components of a comprehensive sustainability report. **Table 2**, below, indicates GRI performance indicators that are discussed in AC Transit's 2010 Environmental Sustainability Report, and page number on which the corresponding discussion begins.

GRI Performance Indicator		Description	AC Transit Report Page
<b>Fuel and Energy</b>			
EN3	Core	Direct energy consumption by primary energy source.	5-1
EN4	Core	Indirect energy consumption by primary energy source.	5-1
EN5	Core	Energy saved due to conservation and efficiency improvements.	5-1
EN6	Additional	Initiatives to provide energy-efficient or renewable energy-based products and services, and reductions in energy requirements as a result of these initiatives.	4-2
EN7	Additional	Initiatives to reduce indirect energy consumption and reductions achieved.	4-2
<b>Water</b>			
EN8	Core	Total water withdrawal by source	5-10
<b>Emissions, Effluents, and Waste</b>			
EN16	Core	Total direct and indirect GHG emissions by weight.	5-5
EN18	Additional	Initiatives to reduce GHG emissions and reductions achieved.	4-1
EN24	Additional	Weight of transported, imported, exported, or treated waste deemed hazardous.	5-11
<b>Products and Services</b>			
EN26	Core	Initiatives to mitigate environmental impacts of products and services, and extent of impact mitigation.	4-1

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## We Want to Hear From You

AC Transit welcomes your comments. Feedback helps us understand the issues important to our stakeholders, so that we can continuously improve our environmental performance. Please direct your comments, concerns, and questions to the following address:

### **Environmental Report Department**

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