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We thank The Ralph and Goldy Lewis Center for Regional Policy Studies at UCLA for financial and research support.

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<th>Definition</th>
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<tr>
<td>APTA</td>
<td>American Public Transportation Association</td>
</tr>
<tr>
<td>Boarding</td>
<td>A passenger boarding a Metro revenue vehicle</td>
</tr>
<tr>
<td>Criteria Pollutants</td>
<td>Six pollutants designated by the EPA as indicators of air quality</td>
</tr>
<tr>
<td>CO</td>
<td>Carbon Monoxide</td>
</tr>
<tr>
<td>CO2</td>
<td>Carbon Dioxide</td>
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<tr>
<td>CO2e</td>
<td>Carbon Dioxide Equivalent</td>
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<tr>
<td>CNG</td>
<td>Compressed Natural Gas</td>
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<td>GHG</td>
<td>Greenhouse Gas</td>
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<tr>
<td>GHGe</td>
<td>Greenhouse Gas Emissions</td>
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<tr>
<td>GWP</td>
<td>Global Warming Potential</td>
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<tr>
<td>HC</td>
<td>Hydrocarbons</td>
</tr>
<tr>
<td>HFC</td>
<td>Hydrofluorocarbons</td>
</tr>
<tr>
<td>KWH</td>
<td>Kilowatt hours</td>
</tr>
<tr>
<td>LADWP</td>
<td>Los Angeles Department of Water and Power</td>
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<tr>
<td>LEED</td>
<td>Leadership in Energy and Environmental Design</td>
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<tr>
<td>MSIP</td>
<td>Metro Sustainability Implementation Plan</td>
</tr>
<tr>
<td>MT</td>
<td>Metric Ton</td>
</tr>
<tr>
<td>NTD</td>
<td>National Transit Database</td>
</tr>
<tr>
<td>NOx</td>
<td>Nitrous Oxide</td>
</tr>
<tr>
<td>PFC</td>
<td>Perfluorocarbons</td>
</tr>
<tr>
<td>PM</td>
<td>Particulate Matter</td>
</tr>
<tr>
<td>Purchased Transportation</td>
<td>Metro transit service provided through contract service</td>
</tr>
<tr>
<td>ROG</td>
<td>Reactive Organic Gas</td>
</tr>
<tr>
<td>SCE</td>
<td>Southern California Edison</td>
</tr>
<tr>
<td>VMT</td>
<td>Vehicle Miles Traveled</td>
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Executive Summary

As the County transportation planner, designer, builder and operator, the Los Angeles County Metropolitan Transportation Agency (Metro) contributes to the economic, social, and environmental sustainability of the Los Angeles region by reducing congestion, improving air quality, and providing mobility. Due to the nature of our operations we also create significant environmental impacts. Reducing these impacts is essential to meeting our core mission of continuously improving an efficient and effective transportation system for Los Angeles County. Tackling the serious environmental problems that face Los Angeles, however, requires the work of many. While Metro is but one partner in a regional collaborative effort, it is our intent to complement the work of others in our collective journey towards a sustainable future.

We must understand Metro’s current performance in order to reduce our future impacts. This report analyzes our environmental performance and the economic costs of core activities. It compares changes in our environmental impacts to changes in our key service, public transit. We also measure changes in our environmental performance against changes in our transit service [based on number of boardings and revenue hours]. The analysis can be used to set targets, direct resources, and improve performance in a cost effective way.
Executive Summary

Key Findings
The key findings identified below pave a path towards sustainable operations for Metro. The information we used was accurate as of March 2009 and our findings were generated from data available to us at that time.

Sustainability Strategy
Metro is a leader among transit agencies in clean fuels and renewable energy generation. We operate the largest clean air bus fleet in the nation and generate more solar electric power than any other U.S. transit agency. It is our goal to achieve Leadership in Energy and Environmental Design (LEED) Silver certification for any new building construction. We are collaborating with our partners in implementing sustainability design strategies in our linear projects, and completing resource conservation upgrades on a regular basis as part of our operations and maintenance program. We have also begun to develop sustainable procurement methodologies, reduce our dependence on non-renewable resources, and engage in economic and joint development partnerships to reduce our carbon footprint.

In order to increase effectiveness of our sustainability efforts and following the lead of successful sustainability programs, the preceding efforts should be integrated into a comprehensive sustainability organizational structure and strategy, guided by Board-mandated targets. The recently adopted Metro Environmental Policy provides the overall framework to lead us down this path. As a next step, staff will develop an overall strategy [for Board consideration] that 1) explores the most cost effective way of implementing our sustainability efforts, 2) adopts a set of sustainability targets, 3) develops a plan to meet these targets, and 4) initiates monitoring to track progress with appropriate sustainability indicators.

The Agency should work to reduce greenhouse gas emissions from operations while increasing the regional benefits of transit.
Ridership

In order to understand the efficiency of our operations, we must understand the effectiveness of our key service, transit ridership. This report analyzes transit ridership as a means to improve the environmental performance of our operations. We measure transit service using ridership boardings and revenue hours.

Metro ridership outpaced population growth by 14 percentage points between 1997 and 2008. During that time, boardings grew by 23%, while County population grew approximately 9%.1

In 2008, bus boardings remained the majority of Metro boardings. More than four times as many trips were taken by bus in 2008 than by rail, largely due to the fact that there is a much larger bus service area. However, of all modes, rail has seen the fastest ridership growth. Increasing transit ridership can reduce regional vehicle miles traveled (VMT) and the associated greenhouse gas emissions (GHGe).

Cost effectively increasing ridership should be a key component of our Agency’s climate change efforts. An Agency-wide metric should be developed to measure the GHGe reductions created by Metro’s transit system. Life cycle costs of new transit projects should be analyzed, encompassing the planning stages through operations, as a key component of continued environmental sustainability.

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1 California Department of Finance (www.dof.ca.gov/research/demographic/reports/).
Fuel Use

We use three types of fuel to power our vehicles: Compressed Natural Gas (CNG), diesel, and gasoline. Total fuel use, measured in gasoline gallon equivalents (GGE), rose 3% annually since 2002. However, the use of diesel and gasoline (higher criteria pollution emitting fuels), is decreasing as we finish our conversion to CNG. While fuel costs have been rising, CNG is still the lowest priced fuel per GGE. After adjusting for inflation, however, even the price of CNG has more than doubled since 2002. Diesel prices have more than tripled in that time.

Therefore, to cut costs and reduce Metro’s environmental impact, we should target our efforts at increasing fuel efficiency and reducing the carbon intensity of our fuels.

Rail Propulsion Power

In 2008, 72% of the electricity used by Metro was to power the Metro rail system (Blue, Green, Gold, and Red lines). Since rail ridership is growing at a faster rate than rail electricity use, the amount of power used per boarding is becoming more efficient overtime. The efficiency of the rail line when measured in kilowatt hours (KWH) per rail boarding improved 11% between 2005 and 2008.

We should continually improve our efforts to increase rail ridership as well as the operating efficiency of our trains. These efforts should be a fundamental part of our climate change strategy.

Facility Electricity Use

The amount of electricity used to power our facilities is steadily increasing, as is the cost of that electricity. In 2008, Metro spent $6.8 million on facility electricity, which was 21% more than the amount spent in 2005 (adjusted for inflation). The high increase in cost occurred despite the fact that only 13% more electricity was used in 2008 than in 2005.

Decreasing electricity use will decrease our operational costs and is essential to reducing our operational GHG emissions. Staff will develop electricity reduction targets and strategies to meet those targets as part of the comprehensive sustainability strategy that will be submitted to the Board for approval.

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2 Due to a lack of sub-meters, propulsion power figures encompass the electricity used at rails stations and connected facilities for lighting, not just powering the trains. This additional facility use is small percentage of propulsion power KWH.
Water Use

Metro’s water use records from the Los Angeles Department of Water’s (LADWP) was analyzed for this report. Data from the smaller providers was not available. Metro’s water use is growing at a faster rate than increases to transit service (revenue hours). This is a concern because water resources statewide are dwindling while water costs are simultaneously increasing.

In 2008, our Agency used 39% more water from LADWP than in 2002, but Metro revenue hours increased only 7% in that time. Moreover, water costs increased more than 10% (adjusted for inflation) from 2002–2008. We spent more than $1 million on LADWP water in 2008. Because average water costs are increasing, Metro must reduce water consumption in order to maintain this level of cost.

Due to increasing water costs and decreasing water resources, staff will develop for Board adoption an aggressive water reduction target that includes implementation of a plan to meet that target.

Greenhouse Gas Emissions

Metro emitted 478,000 metric tons of carbon dioxide equivalents (CO2e) in 2008, about the same amount as we did in 2007. Ninety per cent of our emissions are from our transit system that moves our passengers. While Metro’s operations create GHGe, our transit service helps to reduce regional emissions by reducing regional VMT, traffic congestion, and by creating transit friendly land use patterns.

It is clear that Metro should take a two-pronged approach to climate change. We should simultaneously work to reduce emissions from operations while increasing the regional benefits of transit. We will develop for Board adoption GHGe reduction targets and develop and implement a plan to meet those targets.
Executive Summary

Air Quality

Metro’s revenue fleet emitted 85% less smog-causing ozone precursors and more than 90% less carcinogenic particulate matter in 2008 than in 1990. These reductions are due to our Agency’s conversion from diesel to less polluting compressed natural gas (CNG).

While criteria air pollutant reduction has been the cornerstone of our clean air success story, we understand these efforts to be intrinsically linked to our climate change efforts. The increased temperatures caused by climate change are likely to increase smog and related health effects. We continue to test new technologies to maintain our previous successes and to simultaneously address GHGe.

Emissions reduction targets will be developed by staff for Board adoption to further address the related issues of criteria air pollutant and GHGe reductions.

Waste

Metro’s operations generate several waste streams. Our Agency is actively working to reduce waste and has several programs to divert waste from landfills. Most significant of these programs include bus battery and tire recycling, construction recycling, small battery recycling, printer cartridge recycling, and office recycling.

We diverted 50% of our solid waste in 2008. We have recently adopted a Construction and Demolition Debris Recycling and Reuse Policy to cost effectively consider re-use, recycling, and recycled materials in all aspects of our planning, construction, operation, and procurement efforts. Recently implemented improvements to our recycling program at Gateway Headquarters are expected to further increase our diversion rate.

We will set waste reduction targets and improve waste reduction, material reuse, and recycling programs wherever possible.

Summary of Conclusions

The environmental impacts and the costs of core activities across our Agency are increasing. Metro’s sustainability projects offer an opportunity to demonstrate environmental leadership, improve economic efficiency, and most importantly create a safe and healthy environment for all of our employees, our clients, and our customers. In order to be effective, these efforts should be strategic and based on strong and comprehensive information. These data, analysis, and corresponding recommendations are documented in this report.
Key Recommendations

Recommendations for improving performance for each of the twelve indicators are discussed in detail in the body of this report. Shown below are seven recommendations for improving Metro’s overall sustainability strategy. If implemented these recommendations would improve sustainability performance across all indicators. Recommendations 1-7 are considered primary, while recommendations 8-10 are considered secondary.

1. Develop sustainability targets [for Board adoption], which should, at a minimum, include GHGe, waste, fuel use, and water use reduction targets.

2. Report sustainability performance to the Board on an annual basis using the indicators outlined in this report, updating the indicator metrics as needed every three years.

3. Establish a staff-level “Green Team” to inform, develop, and implement policies and procedures to meet the sustainability targets.

4. Develop a Climate Action Plan to reduce GHGe.

5. Develop a Water Action Plan to reduce water use.

6. Develop a metric to measure GHGe reductions and the congestion relief benefits of Metro’s transit system.

7. Improve data collection capabilities, by using the appropriate sub-metering and by aligning Metro’s address data with that of the utility companies.

8. Improve the flow of information.

9. Align incentives with goals.

10. Consider life-cycle costs.

Recommended Timeline

- **August 2009**
  Establish staff level Green Team

- **November 2009**
  The Green Team submits suggested reduction goals to the Board (including but not limited to goals on water and greenhouse gas emissions, with list of priority resources needed to meet goals)

- **March 2010**
  Metro Climate Action Plan submitted to the Board (includes actions already taken, cost-benefit of priority actions, and possible financing mechanisms)

- **March 2010**
  Metro Water Action Plan Submitted to the Board (includes actions already taken and cost benefit analysis of priority actions)

- **July 2010**
  Implementation of Metro Climate Action Plan

- **July 2010**
  Implementation of Metro Water Action Plan
Executive Summary

Summary Graphs

<table>
<thead>
<tr>
<th>Positive Trend</th>
<th>Negative Trend</th>
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</table>

Figure 1
Changes in Ridership (1997-2008)

- Revenue Hours
- Boardings

Percent Change

Figure 2
Changes in Fuel Use (2002-2008)

- Expenditures
- GGE per Boarding
- Gallons Gasoline Equivalent

Percent Change

Figure 3
Changes in Water Use (2002-2008)

- Expenditures
- Gallons per Revenue Hour
- Gallons Used

Percent Change

Figure 4
Changes in Facility Electricity Use (2005-2008)

- Expenditures
- KWH per Boarding
- KWH Used

Percent Change

Figure 5
Changes in Rail Propulsion Power (2005-2008)

- Expenditures
- KWH per Boarding
- KWH Used

Percent Change

Figure 6

- Metric Tons per Revenue Hour
- Metric Tons per Boarding
- Metric Tons

Percent Change
Summary Graphs

- Positive Trend
- Negative Trend

Figure 7
Changes in Air Quality (1990-2008)

Figure 10
Percentage of Waste Recycled (2008 Only)

Figure 8
Changes in Used Oil Waste (2002-2008)

Figure 11

Figure 9

Figure 12
Changes in Anti-Freeze Waste (2002-2008)
Introduction

The Metro Board adopted the Metro Sustainability Implementation Plan (MSIP) in June 2008. The MSIP contains short-term projects and general guidelines that serve as the basis for specific long-term sustainability project development. One short-term task is to report Metro’s environmental sustainability performance. This report meets that requirement by analyzing a seven-year trend in environmental performance across five key areas: ridership, energy, emissions, water use, and waste.

This report has two goals: 1) to provide information that decision-makers can use to improve Metro’s sustainability performance and 2) to inform the public on Metro’s sustainability performance. This report not only demonstrates our proactive approach to meeting the sustainability goals of this region, but more importantly demonstrates our sincere and serious commitment to meet our Agency’s social, financial, and environmental goals.

The three essential components of a sustainability program are performance goals, program implementation, and performance monitoring. This report strengthens Metro’s sustainability program in all three areas. By providing baseline information, it 1) enables our Board to adopt informed performance targets, 2) provides information necessary to implement plans to meet those targets, and 3) creates a structure that can be used to regularly monitor progress.
Sustainability at Metro

Sustainability has long been central to Metro’s mission of continuously improving the effectiveness and efficiency of Los Angeles’ transportation system. In 2007, sustainability became a formal part of Metro’s structure with the development of our Ad Hoc Sustainability and Climate Change Task Force. In the summer of 2008, our Board adopted the MSIP, which outlines specific actions necessary to reduce our greenhouse gas emissions and further increase our sustainability.

A brief summary of our sustainability efforts and accomplishments are outlined below.

Metro is Institutionalizing Sustainability

- We are working to make “green thinking” a part of our culture. In partnership with local educational institutions, we recently began a sustainability awareness training program for Metro staff. Key to the awareness training is the development of Personal Sustainability Initiatives (PSI) to develop, document, implement, and improve sustainability performance within the personal workspace.

- We are developing an Environmental Management System (EMS) with initial pilot programs for Divisions 10 and 20. These projects are designed to streamline the environmental process, reduce the impacts of our operations and ensure that environmental performance consistently goes beyond compliance. Metro plans to roll the system out to all the divisions after the pilots are complete.

- We will report on our GHGe and sustainability efforts annually. Our initial estimate of our GHGe was completed in 2008 using The Climate Registry Protocol. We are currently engaged in developing transit-specific inventory protocols with other transit properties through the American Public Transit Association (APTA) to include the three transit-specific elements of mode shift (VMT reductions), land use, and congestion reduction.

- Each year, we will host a Sustainability Summit to bring together regional stakeholders focused on sustainability issues. The second of these summits was held in May of 2009.
Metro is Conserving Energy and Installing Renewable Energy Projects

- We have installed solar panels at four facilities. These projects generate up to 1.85 megawatts of energy and reduce GHGe by 10,000 metric tons of carbon dioxide equivalents (CO2e) per year.

- We have recently applied for additional funding from various sources to further expand our solar panel installations at our other bus divisions, rail facilities, and our park and ride stations.

- An assessment of the Gateway Headquarters Building is underway to obtain LEED-EBOM (Leadership in Energy and Environmental Design-Existing Building Operation and Maintenance) certification.

- We have also conducted energy audits for Divisions 1, 8, and 15. These audits will be used to identify cost efficient energy reduction opportunities.

- We have incorporated energy efficiency measures to reduce our energy usage and installed an Energy Management System at our Metro Support Services Center (MSSC) to properly manage our energy consumption. These data will be used to strategize future energy initiatives within our agency.

Metro is Building Green

- Metro policy dictates that buildings greater than 10,000 square feet be built to meet the minimum LEED-NC (Leadership in Energy and Environmental Design-New Construction) Silver Certification standard.

- Metro’s new San Gabriel Valley Sector Office was recently certified as LEED-NC Gold. On average, LEED-NC Gold buildings use 50% less energy than a standard building of the same size, according to a recent survey completed for the US Green Building Council.

- We are incorporating sustainability design guidelines using LEED principles. The Metro Orange Line Extension is our first major capital project in which our Environmental Policy will be implemented. Metro has committed to building projects based on sustainable principles with funding generated under Measure R.

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3 Cost savings from these reductions are monitored on a continuing basis.
4 EPA GHG Equivalencies Calculator (http://www.epa.gov/solar/energy-resources/calculator.html).
Sustainability at Metro

Metro is leading in Clean Fleet Operations

• In 2000, it became Metro policy to purchase only alternative fuel vehicles for our bus fleet. We now operate the nation’s largest compressed natural gas (CNG) bus fleet. These buses generate less criteria air pollutants than traditional diesel buses. We continue to explore the potential of other advanced technologies, including hybrid, composite, mixed fuel, and fuel cell vehicles.

Metro is Expanding Mobility, Accessibility and Livability

• We are reducing the need to drive in Los Angeles by providing quality transit service. We are working to turn Los Angeles into a more transit-friendly region, thus improving the lives of all Angelenos. We met our 2025 rail ridership goals of 269,710 weekday boardings 17 years early. In 2008, we surpassed this goal by more than 30,000 rail riders.

While we recognize the importance of these accomplishments, our sights are already set on the next steps in this effort. We are currently exploring the following projects to further improve sustainability performance.
• We began a pilot study to explore the feasibility of including hybrid buses in our fleet.

• We purchased 100 CNG composite buses that are lighter weight, more efficient, and will carry more passengers than existing buses. We will begin to deploy several of these buses over the next several months and monitor their performance.

• We are exploring the feasibility of running buses on a blend of hydrogen and natural gas as well as the feasibility of purchasing and operating fuel cell buses.

• We have laid out a plan to retrofit our existing buildings to LEED-Existing Buildings Operations and Maintenance (LEED-EBOM) standards. By meeting LEED-EBOM standards, our existing buildings will operate more efficiently; reducing costs and enhancing the welfare of our employees.

• We will continue to explore ways to generate clean energy with emerging technologies.

• We will conform to the intent of the Green Chemistry principles now in practice here in California. Green chemistry is a school of thought that encourages the design of products and processes that reduce or eliminate the use and generation of hazardous substances.

• We are considering a green procurement policy that will reduce the environmental impact of our purchases and will use our leverage as a large consumer to drive the economic markets in favor of sustainable products.

**Targets will also focus our efforts and complements the intent of our recently adopted Environmental Policy**

In addition to these technological advancements, we will continue our campaign to increased ridership and remove single occupant vehicles (SOV) from the road. The passing of Measure R by Los Angeles County voters on November 4, 2008, represents an important step forward in Metro’s efforts to increase regional service, ridership, and mobility while simultaneously reducing congestion, pollution and GHG emissions. Specific details of the Measure R projects are beyond the scope of this work but mimic Metro’s Draft 2008 Long Range Transportation Plan (LRTP).

If all the transit projects in Metro’s Draft 2008 LRTP are implemented, we estimate that by 2030 Metro’s system will eliminate an additional 584 million VMT and 265,000 metric tons of CO2e annually.

As technology and knowledge continue to improve, Metro will work to maintain its leadership status in sustainable transportation, while also maintaining our commitment to fiscal and social responsibility.
Recommendations to Further Advance Sustainability Program

Although Metro’s sustainability program began just over a year and half ago, we have already seen many achievements. This report offers ten recommendations to further improve the overall success of our sustainability program. We consider the first seven recommendations priorities. The final three are also important, but could be implemented after the first seven. These recommendations speak to the institutional challenges faced by all large organizations when advancing a sustainability program. Complete implementation will take time, but our sustainability program will benefit from thoughtful consideration of the following:

1. Establish Sustainability Targets
   Sustainability targets will create accountability and will ensure that we direct resources toward the most important priorities. These targets will help focus our efforts and complement the intent of our recently adopted Environmental Policy by pulling the various sustainability functions under one strategic organizational umbrella. This coordination will enable us to achieve results more efficiently.

2. Report Sustainability Performance Annually
   This report captures Metro’s current baseline sustainability performance. Metro should continue to track its progress towards sustainability targets and publish the results in an Annual Sustainability Report. Regular reporting will demonstrate the continued effectiveness of Agency programs, policies, and projects and will allow us to strategically align other operational elements that may not have been initially incorporated in this effort. These may include compliance with emerging statutes and regulations as well as continuing efforts that are now in pilot phases.

3. Establish a Staff Level Green Team
   A staff level Green Team will improve the flow of information and ensure that our sustainability plans and programs are well informed and feasible.

4. Develop a Climate Action Plan
   A Climate Action Plan will address the most efficient and effective ways we can reduce our carbon footprint.

5. Develop a Water Action Plan
   Water conservation is critical in the arid Los Angeles climate, where future water restrictions are likely. Water is also used throughout our operations. A Water Action Plan will address the most efficient and effective ways we can reduce our water use.

6. Develop a Metric to Measure GHGe Reductions From Our Transit System
   We are working with our APTA partners to develop an industry-accepted protocol to measure the climate change benefits created by public transit. This protocol will provide a means to leverage State and Federal dollars targeted at climate change mitigation efforts and will help measure the effectiveness of our GHGe reductions programs.
7. Improve Data Collection

Reliable and accurate data is needed to precisely track Metro’s progress towards sustainability. As a large organization, our data does not necessarily reside in a single location. Current data is sufficient to fulfill financial obligations, however, it needs to be further parsed, analyzed, and consolidated in order to determine specific cost-saving and utility conservation opportunities.

As such, it is imperative that Metro install sub-meters at all facilities to enable proper data collection. Additionally, we need to monitor the performance of all sustainability projects. Currently, there are several water and electricity efficiency programs in place, but there is no record kept of how well these projects are performing. Good data will allow our Agency to replicate successful projects and avoid potentially redundant efforts that would waste limited staff and financial resources.

Metro should consider participating in the American Public Transportation Association (APTA) Sustainability Pilot program. This program provides the basic structure needed for a comprehensive sustainability strategy: goals, action, evaluation, and reporting. Agencies that decide to participate must sign up by September 2009 and agree to meet a set of standards. Further details of the APTA program can be found in Appendix A-6.

8. Improve the Flow of Information

Data is only effective if it gets to the right people. For example Division Managers have first hand knowledge of how to reduce facility utility consumption, but without information on current consumption they cannot put this knowledge to use. Therefore, we should consider distributing monthly utility bills at the Division level. Other more sophisticated forms of data communication, such as energy management systems, should also be considered.

9. Align Incentives with Goals

The person who uses a resource (electricity, water, paper, etc.) is rarely the person who pays for it. For example, a department’s budget does not decrease if departmental staff leave their computers on all night. Similarly, as we implement sustainability principles during new construction, the capital project management team may often pay the higher building costs, but our operations group would benefit from the cost savings of the more efficient building. Within sustainability professions, this is called the dilemma of split-incentives.

Split-incentives lead to waste and deter creative thinking. Our Agency should consider ways to align incentives to improve sustainable behavior. These incentives could be as simple as departmental conservation innovation challenges or as in-depth as life-cycle budgeting.
10. Consider Life Cycle Costs

The life cycle cost of a product or project considers all the impacts from ‘cradle to the grave.’ This is important because many environmental and social costs occur during the manufacturing or disposal of a product, not just its period of use. Similarly, we identify and mitigate project impacts during our planning phase, but create additional environmental impacts during the construction stage, operation stage, and end of life stage. We should explore the feasibility of completing a life-cycle cost analysis of all of our activities. The calculation of life-cycle costs has become an integral tool for making decisions and setting policies.

The Importance of Indicators

What we measure and how we measure it directly affects policy outcomes. Environmental sustainability indicators provide integrated information that Metro decision-makers can use to improve the economic, social, and environmental integrity of Agency operations. For example, this report shows that Metro water use is rising. This is not surprising, as we expect use to rise as service increases and we wash more buses and rail cars. Water use, however, is rising faster than we would expect when compared to service increases. In addition, water costs are increasing; in 2008, Metro spent more than $1 million on water. Water prices are expected to continue to rise and many anticipate that water restrictions are imminent. This report provides policymakers with the tools to make effective decisions on how to reduce impacts before they reach unsustainable levels.
The purpose of this report is to provide decision-makers with information they can use to improve Metro’s sustainability performance. Accuracy is essential. We used the best available data as of March 2009 and the most reliable sustainability guidelines to develop this report. Any limitations to the data are explained below as well as within the discussions of specific indicators. Sustainability reporting is an evolving process. We hope and expect that as knowledge and data collection improves our reporting protocol will also improve.

We recommended that these indicators be used to report sustainability performance on an annual basis. Furthermore, we anticipate that the indicators will be reviewed and updated at least every three years to reflect new understandings.

Transit Ridership and Environmental Performance
Methodology

How the Indicators Were Chosen

The indicators used in this report were derived using The Global Reporting Initiative (GRI) sustainability reporting framework. GRI is considered to be the gold standard in sustainability reporting and is used by entities throughout the world to report environmental performance. The flexibility and comprehensive nature of GRI’s standard make it a good reporting tool for Metro.

The GRI framework is structured to include the inputs (energy, water, materials) and the outputs (emissions, effluents, and waste) that are common to most organizations as well as impacts on biodiversity. The framework was designed to be usable by any organization, which allows for intra-industry and inter-industry benchmarking. The GRI suggests a wide range of indicators. Reporters choose the indicators most relevant to their operations for which accurate data is available. Using this process we derived 12 indicators. They are: 1) Ridership, 2) Fuel Use, 3) Propulsion Power, 4) Facility Electricity Use, 5) Water Use, 6) Greenhouse Gas Emissions, 7) Air Quality, 8) Solid Waste and Recycling, 9) Used Oil Waste, 10) Liquid Hazardous Waste, 11) Liquid Non-Hazardous Waste, 12) Anti-Freeze Waste. We collectively call Indicators 8 to 12 as the “Waste” indicators.

Measuring Efficiency: Comparing Changes in Ridership to Changes in Environmental Impacts

One of Metro’s principal roles is to provide efficient and effective transit service to the Los Angeles region. Our transit service creates net sustainability benefits in the region through decreased congestion and VMT and increased mobility. As we increase our service capacity the environmental impacts of our operations will grow. Efficient expansion of Metro’s services will ensure that our environmental impacts do not out-pace the benefits to the region. By comparing our change in environmental impacts to the changes in service and ridership, we can estimate the efficiency of our growth. This is not a perfect science, but it does provide added depth of information to decision-makers.
Why We Measure Efficiency with Boardings and Revenue Hours

This report uses boardings and revenue hours to measure Metro’s transit ridership and transit service. These statistics are reported annually by all transit agencies to the National Transit Database (NTD) and thus enable cross-agency benchmarking.

Boardings
The purpose of transit is to move people from one place to another—in other words, to enable travel. This report measures ridership in boardings.

Revenue Hours
Revenue hours measure the number of hours all Metro revenue vehicles serve customers, but do not include the time that buses operate out of service. Measuring revenue hours enables us to see if increasing impacts are correlated to increased service. This is important because, as a transit agency we must both anticipate and induce travel demand. For this reason, the ridership benefits of transit projects might not be realized until several years after the projects are implemented. Measuring revenue hours can help us understand increased environmental impacts before they have translated into increased ridership.
Methodology

Weaknesses in the Data

Analyzing the environmental performance of an agency as large and complex as Metro involves large amounts of data from many sources. We used the best data available as of March 2009 for this report and determined that these provide an accurate analysis of Metro’s performance. There were a few shortcomings in the data, however, that should be addressed in future reports.

1. Lack of Sub-Meters: Because a few of our current utility meters monitor several buildings within a Division (for example), it is difficult to accurately identify the source of increasing or decreasing energy usage within a specific Division.

2. Lack of Water Utility Data: We were not able to obtain data from the small municipal water departments in a timely manner. This report thus analyzes LADWP accounts only. LADWP is the majority of Metro’s water use. In addition, based on utility bills we examined, it is apparent that LADWP does not always check meters on a monthly basis making it difficult to understand the causes for increases and decreases in water use.

3. Lack of Certain Years or Dollars: There were two instances (facility electricity and solid waste and recycling) where data was not available back to 2002. In these instances, we used all the data that was available to draw as accurate a picture as possible.
Indicator Analysis

In order to understand Metro’s operational efficiency we need to understand, our principal service as an Agency, public transit. This section of the report provides an overview of Metro’s 2008 transit service. It is likely that as our transit service expands, our environmental impacts will also grow. If this growth is efficient we will be providing economic, social, and environmental benefits to the region that outweigh our impacts.

As an example of this environmental efficiency, in 2008, Metro’s system emitted half as many greenhouse gas emissions (GHGe) per passenger mile as single occupant vehicles. In addition, the Metro system provides mobility to the transit-dependent including the elderly, disabled, and poor. Without Metro service, many people would not be able to access jobs, doctors, and other services. For all of these reasons, public transit is essential to the sustainability to the Los Angeles region.

Transforming Los Angeles’ transportation system will be no small feat. The effort, however, will be well worth it. If we work together, we can and will create a transportation system that increases prosperity, livability, and environmental integrity in Los Angeles.
Ridership

**Definition:** Measures annual Metro ridership.

**Units:** Boardings and revenue hours

**Relevance:** Transit ridership increases economic production, social equity, and environmental integrity in the region and is Metro’s main service as an Agency.

**Regulation:** None

**Linkages:** All

**Description of Linkages:** Increasing service is likely to increase our Agency’s environmental impacts. In order to be sustainable, our Agency should strive to not increase impacts faster than increasing service. Transit ridership can also reduce regional environmental impacts by reducing VMT.

**Information Source:** National Transit Database

In 2008, 474 million boardings were made on Metro’s transit system. While this is approximately 4% lower than 2007, over the last 12 years ridership has trended upward. Lower boarding totals in 2008 are likely due to the regional economic downturn and rising unemployment. The most boardings, 495 million, were made in 2007. The fewest, 385 million, were made in 1997. Overall, boardings increased 23% between 1997 and 2008, outpacing population growth by fourteen percentage points. In the peak year of 2007, ridership was 28% higher than in 1997.

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Recommendations

- Continue our efforts to increase ridership.
- Make increasing ridership a part of Metro's Climate Action Plan.
- Develop an Agency standard for calculating the GHGe reductions created from Metro's transit system.

The Majority of Transit Riders Take the Bus

Bus riders make up the mass majority of Metro ridership. In 2008, more than four times as many boardings were made on Metro bus than on Metro subway. From 1997–2008, our customers boarded Metro bus service 4.4 billion times and Metro subway only 749 million times. This is largely due to the fact that Metro’s bus service is far more extensive than its rail service.

Rail Ridership is the Fastest Growing Mode

Between 1997 and 2008, fifty-two million, or 59%, of all new transit boardings were rail boardings. In this same period, bus revenue hours increased by 1.3 million, while rail increased by only 357,000. For every increased rail revenue hour, rail gained 147 new boardings, while bus gained only 28 new boardings for each increased bus revenue hour.
**2 Fuel Use**

**Definition:** Measures fuel used to power Metro’s directly operated fleet (purchased transit not included).

**Units:** Gallons of Gas Equivalents (GGE)

**Relevance:** Fuel is made from limited natural resources and thus its use should be reduced whenever possible. In addition, fuel represents a significant cost to Metro.

**Regulation:** California Fuel Standards

**Linkages:** Ridership, Criteria Pollutants, Greenhouse Gas Emissions

**Description of Linkages:** Increasing Metro service and ridership is likely to increase the amount of fuel used. The type and amount of fuel used also directly impacts Metro’s criteria pollutants and greenhouse gas emissions.

**Limitations:** This indicator does not include fuel used for purchased transit services.

**Information Source:** Fuel Use Records and M3.

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In 2008, Metro’s fleet used 48 million GGE of fuel, 8 million more GGEs than was used in 2002. This equates to a 3% annual increase. Due to Metro’s conversion from diesel to CNG, Diesel consumption decreased in that period by 85%. Gasoline consumption decreased by 12%. Metro’s fleet used 13.8 million more GGEs of CNG in 2008 than in 2002, a 42% increase. The dip in fuel usage in 2003 is likely due to the strike that year.
**Recommendations**

- Create a plan to reduce idling.
- Develop a program to reduce the day use of Agency cars.
- Study feasibility of installing emissions control systems on appropriate Metro equipment and machinery.

GGE’s per system-wide boarding and per directly-operated-bus boarding were trending downward after 2004, but then increased again in 2008. This spike is at least partially due to the 2008 dip in ridership. Also, increases in traffic congestion and excessive idling decrease vehicle fuel efficiency, which may be reflected in this trend.
Metro spent $63.8 million on fuel in 2008. This is $37 million, or 139%, more than what was spent in 2002 (after adjusting for inflation). This is due both to increased consumption and rising fuel prices; the average cost of CNG and gasoline nearly doubled between 2002 and 2008. The average cost of diesel nearly tripled. Despite price increases, the cost of CNG remains significantly lower than the other fuels.
The Importance of Energy Efficiency

The use of inefficient and/or outdated fixtures and equipment equates to excess environmental impacts and excess costs. Further, as energy costs rise, the fiscal impacts of inefficiency increase. For these reasons energy efficiency has been the cornerstone of our sustainability efforts. We are committed to building LEED-Certified Silver buildings, we are upgrading existing buildings to be more energy efficient, and we are installing new renewable energy projects wherever feasible.

Metro operates dozens of properties and spent nearly $7 million on electricity in 2008. Implementing efficiency programs throughout our Agency will be no small task. It will require strategic thinking, employee education, data collection improvements, technological upgrades, and capital costs. If properly implemented, however, energy efficiency projects will pay for themselves. Furthermore, not increasing efficiency is likely to cost the Agency more money in the long run due to increasing energy costs.
3 Rail Propulsion Power

**Definition:** Measures electricity used to power Metro rail.

**Units:** Kilowatt Hours (KWH)

**Relevance:** Propulsion power is 18% of Metro’s carbon footprint and a significant cost to our Agency. At the same time rail has the potential to significantly reduce regional GHG.

**Regulation:** None

**Linkages:** Ridership, Criteria Pollutants, and Greenhouse Gas Emissions

**Description of Linkages:** Increasing Metro rail service and ridership will increase propulsion power. This directly impacts Metro’s criteria pollutants and greenhouse gas emissions. Increasing rail ridership increases the efficiency of the rail system per boarding.

**Limitations:** Propulsion power reports were not available before 2005, there was some trouble verifying the accuracy of Gold Line power consumption for 2004 and 2005.

**Information Source:** Agency Propulsion Power Records

Metro rail consumed 175 million KWH of electricity in 2008, 4% more than in 2005. The cost of powering the trains grew 5% in that period, from $19.3 million to $20.2 million. In every year the Red Line consumed more power than any other line.

7 Source: LADWP has plans to reduce the carbon intensity of their power generation in coming years.
**Recommendations**

- Increase the efficiency of rail service through advanced technology and improved operating procedures, as feasible.
- Continue to increase rail ridership.
- Incorporate rail ridership strategy into Climate Action Plan.

---

**Rail Rider Efficiency is Improving**

<table>
<thead>
<tr>
<th>Year</th>
<th>Kilowatt Hours per Boarding</th>
<th>Kilowatt Hours per Revenue Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>2.3</td>
<td>270</td>
</tr>
<tr>
<td>2006</td>
<td>2.2</td>
<td>272</td>
</tr>
<tr>
<td>2007</td>
<td>2.1</td>
<td>275</td>
</tr>
<tr>
<td>2008</td>
<td>2.0</td>
<td>277</td>
</tr>
</tbody>
</table>

Rail ridership (boardings) and rail service (revenue hours) are both increasing faster than consumption of propulsion power. In 2008, Metro used 2.02 KWH of electricity per rail boarding compared to 2.26 KWH in 2005. This is an 11% increase in efficiency.
**Facility Electricity Use**

**Definition:** Measures Metro’s annual agency-wide electricity use for facilities (does not include KWH used to power trains).

**Units:** Kilowatt Hours (KWH)

**Relevance:** Electricity costs our Agency millions of dollars every year and contributes to our Agency’s carbon footprint.

**Regulation:** None

**Linkages:** GHG Emissions, Air Quality

**Description of Linkages:** Approximately 8% of Metro’s carbon footprint is attributed to the electricity our facilities. Electricity use causes air pollution at the power generation site.

**Limitations:** Reports on electricity prior to 2005 combine rail propulsion and facility electricity use. Thus, we could only analyze facilities electricity for the years 2005–2008. A lack of sub-metering makes it difficult to understand usage and effectively target reduction projects.

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In 2008, Metro facilities used 69 million KWH hours of electricity, 11% more than in 2005. After a slight dip in electricity use between 2005 and 2006, electricity continued to increase into 2008. The increases were entirely in LADWP territory, where consumption increased 20% (9 million KWH) between 2002 and 2008.

Conversely, SCE purchases were 23% (3 million) lower in 2008 than in 2007. The growth in facility electricity use significantly outpaced the growth in Metro ridership (boardings). In 2008, Agency facilities used 5% more KWH/Boarding than in 2005.
Recommendations

- Staff will develop electricity reduction targets for Board approval.
- Complete energy retrofit of Gateway Headquarters Building.
- Provide adequate funding for energy retrofits.
- Provide sub-meters at each facility so funds can be properly directed and results accurately tracked.
- Invest in energy management systems to properly track energy usage.
- Provide division managers with monthly utility bills so they can monitor performance and prevent billing mistakes.
- Track energy efficiency upgrades and measure their success, so that the most successful projects can be repeated.
- Create an Agency-wide energy reduction plan, so that projects can benefit from economies of scale and bulk discounts, instead of project-by-project retrofits.
- Do a project life-cycle cost analysis at the beginning of every new construction or major renovation project so that the future savings of efficiency upgrades can be taken into account.
- Partner with LADWP and SCE to create a cost-effective Agency wide energy reduction plan.

Gateway Headquarters and the Metro Service Sector Center use the Most Electricity

In 2008, the largest users of electricity were Gateway Headquarters (16.0 million KWH) and the MSSC (10.6 million KWH). The combined electricity use at these facilities accounted for 39% of our Agency’s total facility use in 2008. An energy retrofit was recently implemented at MSSC, which included energy conservation measures and installation of 1 Megawatt of solar panels. These projects should significantly reduce use and cost.
4 Facility Electricity Use

Targeted Sustainability Efforts are Reducing Electricity Use

Although our Agency’s aggregate consumption is increasing, sustainability efforts have been successful in targeted areas. Solar installations at Divisions 8 and 15 provide an estimated 20% of electricity in those facilities. A solar project at Division 18 generates an additional 498 KW, and Metro’s fourth installation at our central maintenance facility (MSSC) generates 1 megawatt of electricity (1,000 KW).

Metro is also investing in energy and water efficiency. At Division 9, electricity use decreased by more than 1 million KWH (30%) between 2007 and 2008. This was in part due to the LEED Gold building that replaced the old Service Sector Center, one of four buildings on the site. Metro has done energy upgrades at several other facilities. There is no consolidated record of these upgrades and thus we cannot comprehensively estimate the energy and costs savings they generate. In addition, the lack of meters on individual buildings makes it impossible to accurately assess the success of efficiency programs.

Electricity is a Significant and Growing Cost

In 2008, Metro spent nearly $7 million in facility electricity cost, $1.2 million more than in 2005. Facility electricity expenditures increased by 21% in real dollars, while electricity use increased only 11% in the four year period. The average cost per LADWP KWH rose 9%. The Average cost per SCE facility KWH increased 24%. In 2008, SCE charged 66% more for electricity on average than LADWP. Efficiency projects in SCE territory will thus have a quicker payback and higher return on investment.
California is facing a water crisis. In June 2008, Governor Schwarzenegger declared a statewide drought. In August 2008, the Los Angeles County Board of Supervisors issued a countywide water supply and conservation alert and directed County departments to cut water by 15–20%. In February 2009, the Governor declared a State of Emergency due to the drought conditions. Climate change is predicted to further threaten the region’s water supply. For all of these reasons, it is likely that Los Angeles will face water restrictions in the near future. Metro should commit to significant reductions in water use. By aggressively cutting water use, Metro will show environmental responsibility and protect our Agency against future economic and operational hardship.
5 Water Use

Definition: Measures Metro’s annual agency-wide water use.
Units: Gallons
Relevance: Water is a critical issue in Los Angeles’ arid climate and future water restrictions are likely. Water is a large Agency expense.
Regulation: None
Linkages: Ridership, GHG Emissions
Description of Linkages: A large proportion of Metro’s water is used to wash buses and train cars, thus water use is directly related to vehicle revenue hours. Water conservation is a critical part of climate change adaptation.
Limitations: The small municipal water agencies were not able to provide data in time to be incorporated into this report, thus the analysis is of LADWP accounts only. These accounts make up the mass majority of Metro’s water use. LADWP does not always check meters regularly. Thus, water use is not necessarily recorded in the period it is used. This creates challenges in tracking the causes for changes in consumption and the benefits of efficiency upgrades.
Information Source: LADWP Water Bills

Water Use is Increasing Faster than Service

In 2008, our Agency purchased 253 million gallons of water from LADWP, 39% more than in 2002. A large portion of purchased water is used to wash buses and train cars. Thus, we expect Metro’s water use to increase as service increases. Between 2002 and 2008, however, water use increased 39%, while vehicle revenue hours increased only 7%. In 2002, Metro’s water efficiency was 24 gallons per revenue hour. In 2008, Metro was 30% less efficient and consumed 31 gallons per revenue hour.
**Recommendations**

- Because of California’s water crisis, water conservation should be a top Agency priority.
- Develop water reduction goals for Board adoption. Caltrans is working with the Metropolitan Water District of Southern California (MWD) to reduce their consumption by 20% in four-years; Metro might consider a similar target, as feasible.
- Create a Water Action Plan to meet reduction target.
- Establish a staff level Water Conservation Team to develop and implement the water-conservation action plan.
-Partner with MWD and LADWP to ensure that the reduction goals are met in a timely and cost effective manner.
- Where feasible, convert to recycled water for landscaping.
- Send monthly utility bills to division managers so they can monitor performance and prevent leaks and billing mistakes.
- Track and monitor the performance of conservation projects.
- Install water meters at bus/rail car washers, steam racks, and chassis jets.
- Establish and employee awareness program and solicit employee suggestions.
- Install timers on steam cleaners.

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**Water is a Significant and Rising Cost**

Between 2002 and 2008, water expenditures increased by 54% while water use increased by only 39%. Sewer expenditures increased 14% in that time. In 2002, Metro spent $692,000 on water and $523,000 on sewer (adjusted for inflation). In 2008, our Agency spent more than $1 million on water and $600,000 on sewer. This is a real dollar increase of $370,000 on water and $73,000 on sewer. This added cost is due both to Metro’s growing consumption and the increasing cost of water. After adjusting for inflation, the average cost of water grew 10% between 2002 and 2008 (does not include sewer costs). Water costs are expected to continue to increase.
5 Water Use

A policy to wash buses three times a week instead of everyday has recently been implemented and is expected to significantly decrease water use and cost. Metro has installed waterless urinals, low-flow toilets, and efficient faucets at several locations. Conservation features are currently added on a piecemeal basis as part of standard retrofits. Information is not formally kept on the location of efficient fixtures. So while these improvements will likely reduce water use at specific locations, we are not able to report the extent of these benefits in this report. The newly built San Gabriel Valley LEED Gold building is expected to reduce average water use by as much as 20%. Potable water is currently used in all Metro landscaping.

In 2008, daily division water use varied from a low of 1,200 gallons at division 21, to a high of 37,000 gallons at Division 15. Average daily water costs varied between $5 (Division 21) and $148 per day (Division 15).
Greenhouse Gas Emissions and Public Transit

Climate change is a global issue that has serious local impacts. In Los Angeles, climate change is expected to increase air pollution, heat related deaths, and affect the agriculture crop yields.\(^8\) Greenhouse gas emissions (GHGe) from passenger vehicles and light duty trucks are 30% of total California emissions.\(^9\) The American Public Transportation Association (APTA) Climate Change Working Group, points out four ways that public transit can reduce transportation related GHGe:

1. Reducing VMT
2. Reducing regional traffic congestion
3. Creating transit-friendlier landscapes
4. Improving operational efficiency.

Metro is working in all four of these areas. Our initial estimations show that VMT reductions are Metro’s most significant source for GHGe reductions. In 2008, Metro reduced its carbon footprint by approximately 86% through regional VMT reductions.\(^10\) This report recognizes the importance of regional efforts, but focuses on improving the environmental performance of in-house operations, such as building efficiency, fleet efficiency, and the carbon intensity of our fuel.

By actively addressing both internal operational efficiency and the regional benefits of transit, Metro is helping the Los Angeles region to reduce its carbon footprint and meet City, Regional, and State GHGe reduction goals.

\(^8\) California Air Resources Board: 2008 “Reducing Greenhouse Gas Emissions from Motor Vehicles Fact Sheet” (www.arb.ca.gov/cc/cc.htm).
\(^10\) This figure was estimated by using a mode shift factor of .47 to estimate VMT displacement created by the Metro system. This mode shift factor is suggested in the APTA Climate Change Draft Standard (http://www.aptastandards.com).
**Greenhouse Gas Emissions**

**Definition:** Measures Agency-wide greenhouse gas emissions.

**Units:** Metric Tons (MT) CO2e

**Relevance:** Greenhouse gas emissions cause global climate change. Climate change will have severe environmental, economic, and social impacts in Los Angeles.

**Regulation:** California AB32 and SB375 (no current direct regulation over Metro)

**Linkages:** Electricity, Fuel, Ridership

**Description of Linkages:** Electricity and fuel use directly impact Metro’s level of GHG emissions. Ridership impacts our Agency’s carbon efficiency.

**Limitations:** HFC and PFC emissions from air-conditioning equipment are not included due to a lack of analysis tools.

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Greenhouse Gas Emissions Remain Steady

The year 2007 was the first year our Agency began documenting emissions.

There was no significant shift in our Agency’s level of GHGe between 2007 and 2008.

Most Emissions Come From Transit Used to Move Passengers

In 2008, ninety percent of Metro’s emissions were used to operate the transit system that moves Metro passengers.
**Recommendations**

- Develop emissions reductions targets for Board adoption.
- Develop a Climate Action Plan to meet those targets.
- Create a staff level Climate Action Team to develop suggested targets and Climate Action Plan.
- Develop an agency-wide methodology for measuring GHG reductions created through transit.
- Focus efforts on increasing ridership and increasing operational carbon efficiency.

**Directly Operated Buses Most Carbon Efficient per Boarding**

In 2008, Metro’s directly operated buses remained the most carbon efficient per boarding. Purchased transport buses were the least carbon efficient per boarding.

**APTA Efficiency Statistics Reveal Variety of Carbon Efficiency**

APTA’s draft climate change standard recommends the performance statistics outlined below. In 2008, Metro’s light rail system was the most carbon efficient per passenger mile, emitting just 0.28 pounds of CO2e per passenger mile. The light rail system, however, was the second least carbon efficient per revenue hour, emitting 231 pounds of CO2e per revenue hour. This variation underscores the fact that a variety of carbon efficiency measures are necessary to understand Metro’s climate change impacts.

**Table 1: APTA Suggested Statistics in Pounds**

<table>
<thead>
<tr>
<th>Mode</th>
<th>E/Veh Mile</th>
<th>E/Rev Hour</th>
<th>E/Pas. Mile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus DO</td>
<td>7.30</td>
<td>102.64</td>
<td>0.51</td>
</tr>
<tr>
<td>Bus PT</td>
<td>4.77</td>
<td>78.18</td>
<td>0.81</td>
</tr>
<tr>
<td>Light Rail</td>
<td>9.71</td>
<td>231.16</td>
<td>0.28</td>
</tr>
<tr>
<td>Heavy Rail</td>
<td>16.72</td>
<td>391.10</td>
<td>0.48</td>
</tr>
<tr>
<td>Total</td>
<td>8.61</td>
<td>128.62</td>
<td>0.53</td>
</tr>
</tbody>
</table>

*Average passenger car emits about 1.1 pound of CO2 per mile*
Air Quality

**Definition:** Measures Metro’s annual emissions of criteria air pollutants attributable to transit operations (does not include non-revenue or purchased transit vehicles).

**Units:** Tons of criteria pollutants per year

**Relevance:** The Los Angeles region suffers from the worst air quality in the nation, and has been designated as “extreme nonattainment” for ozone and “nonattainment” for particulate matter air pollution.

**Regulation:** Metro is obligated under rules adopted by both the California Air Resources Board (CARB) and the South Coast AQMD to purchase transit buses that use non-diesel alternative fuel.

**Linkages:** GHG emissions

**Description of the Linkages:** Many sources of air pollution are also sources of GHG emissions.

**Limitations:** Air pollutant emissions associated with the generation of electricity used to power Metro electric locomotives are variable and difficult to quantify. Metro staff applies default power generation factors based on data published by the US Department of Energy; these values are highly conservative and tend to overestimate emissions attributable to electric rail operation.

In order to measure the effectiveness of our Agency’s conversion from diesel to CNG buses, this indicator analyzes changes in Metro’s fleet between 1990 and 2008.

**Metro Decreased Total Fleet Criteria Pollution by 71%**

Metro reduced its emissions of criteria pollutants (HC, CO, NOx, and PM) by 71% between 1990 and 2008. Specifically, Metro’s 2008 fleet emitted 85% less ozone-precursor emissions and 91% less carcinogenic particulate matter than in 1990. By reducing these pollutants, Metro has significantly reduced its contribution to regional smog and pollution related health risks.

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11 Data analysis in this section completed by Ray Gorski and Lauren Dunlap of Better World Group Inc.
13 South Coast AQMD Rule 1192; Clean On-Road Transit Buses
Recommendations

- Continue to explore technological advancements in transit vehicles that decrease air pollution.

Improvements Must Continue

Compliance with National Air Quality Standards is mandated by the Environmental Protection Agency; the South Coast AQMD is obligated to demonstrate compliance with particulate matter emission levels by 2015, and the eight-hour ozone standard by 2024. Therefore, it is critical that Metro continue to demonstrate progress in reducing both oxides of nitrogen emission (NOx), an ozone precursor, and particulate matter emissions from transit and rail operations.

The switch from diesel to CNG and increased rail mileage (which has no “tail-pipe” emissions) means Metro was able to increase vehicle miles while simultaneously reducing total pollution emissions. In 2008, Metro emitted 74% less criteria pollutants per vehicle mile than in 1990.

The average bus in 2008 emitted 86% less NOx than in 1990 and 93% less PM than in 1990. Metro’s cleanest buses on average emitted 99% less NOx and 97% less PM than the average 1990 bus.
Metro’s activities generate a number of waste streams. We try to reduce, reuse, and recycle waste whenever possible. We analyzed the environmental performance of other waste stream in indicators 8-12. These streams are: Used Oil Waste, Solid Waste and Recycling, Liquid Hazardous, Liquid Non-Hazardous, and Anti-freeze. For several waste streams, which were not analyzed, we divert 100% of the waste from the landfill or have strident reduce-reuse-recycle policies; these policies are outlined below.

**Construction and Demolition Debris Recycling and Reuse Policy**

It is Metro policy to reuse or recycle as much construction debris or waste on site as possible. Any debris or waste that cannot be used on site must be transported to the most appropriate facility. In addition, all Metro and Metro funded construction projects give preference to recycled and recyclable products. Metro Orange Line is an example of such a practice in mass scale.
Bus Tire Recycling

Metro’s bus tires are leased from Michelin with the condition that all spent tires be recycled. Under this program, Metro returns the used tires to Michelin. The tires are then turned into ‘crum rubber.’ The ‘crum rubber’ is then made into mats, blended into asphalt, or burned in cement kilns outside the state. The steel is separated from the tire and sold for scrap metal.

Bus Battery Recycling

Metro’s bus batteries are responsibly recycled. Spent batteries are smelted for their lead content and reused to make new batteries. The polypropylene cases are melted down and reused for new battery cases through an injection molding process. The acid in the battery is neutralized and sent to the sanitary sewer.

Significant Discharges

Since 2002, there has been only one significant discharge. This occurred in December of 2007 when an antifreeze hose nozzle failed and released antifreeze onto the shop floor. Proper procedures were followed and none of the fluids entered the storm drain.
**Definition:** Measures Agency-wide garbage and recycling.

**Units:** Tons

**Relevance:** Waste represents excess cost and contributes to environmental degradation and should be minimized.

**Regulation:** California AB 939

**Limitations:** Only 2008 data was available. No cost information was available.

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**Metro Facilities Recycled Half of Solid Waste in 2008**

Due to changes in the way data is collected, 2008 is the only year for which data is available. Metro uses a contractor to separate landfill waste from recycling. Under this agreement, the contractor must separate out all materials (paper, cans, and bottles) that can be recycled. Forty-five per cent of this waste was recycled in 2008. When we add in the batteries, printer cartridges, pallets, cardboard, metal, and windshields that are recycled, Metro’s solid waste diversion rate is 50%.
Recycling Rates Fluctuated Slightly Throughout the Year

The rate of recycling varied between a low of 41.1% in February to a high of 47.5% in November. There is no clear seasonal trend in the rate of recycling.

Recommendations

- Use the best practices from the Gateway pilot to roll out desk side recycling at other facilities.
- Put clear instructions on the bins as to what should go in what bin.
- As feasible increase desk side recycling to include bottles and cans.

Recycling Program is Increasing

As of April 2009, we increased desk-side recycling at the Gateway building. This will likely reduce contamination rates and increase recycling rates. In addition, cardboard compactors at the Gateway building and the MSSC allow for cardboard box recycling. Division 10 will be getting a compactor in the next few months.
Metro produced 183,000 gallons of waste oil in 2008, 6% less than in 2002. Waste decreased despite a growth in revenue hours. This is likely due to a switch to synthetic oil, which has a longer life than standard oil.

The average amount of waste for the seven-year period varied from a low of 155 gallons at Division 12, which does not serve revenue vehicles, to a high of 23,000 gallons at Division 18. The variation is due at least in part to the differences in division fleet size.
Recommendations

- Decrease waste as much as possible through improved technology and operational procedures.
- Reduce hazardous chemical use wherever feasible.

A no-fee service contract initiated in May of 2006 eliminated the cost of oil waste disposal.

In 2008, we created 0.022 gallons of used oil waste per revenue hour, 12% less than in 2002.
Hazardous Liquid Waste

Definition: Measures Metro’s Annual Liquid Waste 222.

Units: Gallons

Relevance: Waste classified as 222 is hazardous oil water separation sludge. This waste comes from the servicing of fuel station clarifiers, steam rack clarifiers, chassis equipment, part washers, oil/water separators, maintenance shop sumps, etc. Waste should in general be minimized. Non-hazardous liquid waste mostly comes from the bus and train car washes.

Regulation: County Wastewater Ordinance and LA Municipal Waste Control Ordinance

In 2008, our Agency produced 711,000 gallons of 222 waste, 39% less than the 1.2 million gallons produced in 2002. The largest decrease, between 2002 and 2003, is likely attributed to a change in how equipment was serviced. In 2003, Metro decreased service from 6 trucks per week (1 truck=5,500 gallons) to 5 trucks per week.

In 2008, Metro paid $518,000 in hazardous waste disposal fees, $92,000 less than 2002 (adjusted for inflation). Cost increased between 2007 and 2008 likely because under a contract awarded January 1 of that year the rate per gallon disposed increased.
Recommendations

- Decrease waste as much as possible through improved technology and operational procedures.
- Reduce hazardous chemical use wherever feasible.

Most Divisions Produced Lower than Average Waste in 2008

Between 2007 and 2008, all but four divisions (20, 18, 4, and 1) produced less waste than their division’s average for the seven years. Division 20 showed the largest decrease, producing 10,000 fewer gallons than in 2008 than the division’s seven-year average. Some of these changes may be due to changes in the division’s fleet size.

Efficiency per Revenue Hour is Improving

In 2002, 0.155 gallons of oil sludge waste were produced per vehicle revenue hour. By 2008, only 0.086 gallons were produced per revenue hour, a 43% increase in efficiency.
Definition: Measures Metro’s annual non-hazardous waste.

Units: Gallons

Relevance: Waste should in general be minimized. Non-hazardous liquid waste mostly comes from the bus, non-revenue and rail car washes. The exception to this is the Orange Line site where waste comes from stormceptors at the park and ride locations.

Regulation: County Wastewater Ordinance and LA Municipal Waste Control Ordinance

Linkages: Water use

Description of Linkages: The more water used to wash train and rail cars, the more non-hazardous liquid waste.

Limitations: No cost data available.

Due in part to a growth in the number of facilities the total non-hazardous liquid waste stream was 21% higher in 2008 than in 2002. Waste generated by number of divisions has fluctuated over time from a high of 32,000 in 2002 to a low of 20,000 in 2008. Waste has gone up and down in the years in between.

In 2008, Metro paid $167,000 in non-hazardous waste disposal fees, $8,700 less than 2002. Disposal fees dropped sharply in 2007, with the drop in use, but rebounded in 2008.
**Recommendations**

- Decrease waste as much as possible through improved technology and operational procedures.
- Reduce hazardous chemical use wherever feasible.

Between 2002 and 2008 the majority of divisions contributed about 5-6% of the total waste stream. Divisions 5, 9, and the Orange line each contributed close 9-10% of the total waste stream. Divisions 5 and 9 each have two bus washers, which could explain their higher contribution. In addition, at Division Nine, 7,000 gallons of 2008 waste are from evacuation of storm water. Divisions 7 and 10 also have two bus washers, but only contributed 6% of the seven year total.

In 2008, Metro generated 0.061 gallons of non-hazardous liquid waste per revenue hour, approximately 13% more than was used in 2002. Efficiency fluctuated in the years between.
Anti-Freeze Waste

**Definition:** Measures anti-freeze waste.

**Units:** Gallons

**Relevance:** Waste antifreeze may contain heavy metals such as lead, cadmium or chromium in high levels that make it a hazardous waste. Waste should be minimized.

**Regulation:** CCR 22

**Linkages:** None

Anti-freeze waste in 2008 was 57% higher than it was in 2002. Waste increased at all divisions expect for Division 14. Anti-freeze waste at Divisions 1 and 6 more than tripled. Some of these changes may be due to changes in the division’s fleet size. In addition, newer buses require more anti-freeze due to changes in technology.

Average anti-freeze waste for the seven-year period varied from a low of 49 at Division 34 to a high of 7,027 at Division 10. Divisions 3, 10, and 18 produced the most waste in that period. Each produced an average of more than 8,000 per year. Divisions 4, 14, 20, and 34 are non-revenue shops, which explains their low numbers.
Recommendations

- Decrease waste as much as possible through improved technology and operational procedures.
- Reduce hazardous chemical use wherever feasible.

In 2008, Metro spent 54% more on antifreeze waste disposal than in 2002.

In 2008, Metro generated 46% more waste per revenue hour than in 2002. This is at least partly due to the fact that newer buses require more antifreeze than older buses.
Appendix
**Recommendations Matrix**

**Sustainability Strategy**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Develop sustainability targets [for Board adoption], which should, at a minimum, include GHGe, waste, fuel use, and water use reduction targets.</td>
</tr>
<tr>
<td>2</td>
<td>Report sustainability performance to the Board on an annual basis using the indicators outlined in this report, updating the indicator metrics as needed every three years.</td>
</tr>
<tr>
<td>3</td>
<td>Establish a staff-level “Green Team” to inform, develop, and implement policies and procedures to meet the sustainability targets.</td>
</tr>
<tr>
<td>4</td>
<td>Develop a Climate Action Plan to reduce GHGe.</td>
</tr>
<tr>
<td>5</td>
<td>Develop a Water Action Plan to reduce water use.</td>
</tr>
<tr>
<td>6</td>
<td>Develop a metric to measure GHGe reductions and the congestion relief benefits of Metro’s transit system.</td>
</tr>
<tr>
<td>7</td>
<td>Improve data collection capabilities, by using the appropriate sub-metering and by aligning Metro’s address data with that of the utility companies.</td>
</tr>
<tr>
<td>8</td>
<td>Improve the flow of information.</td>
</tr>
<tr>
<td>9</td>
<td>Align incentives with goals.</td>
</tr>
<tr>
<td>10</td>
<td>Consider life-cycle costs.</td>
</tr>
</tbody>
</table>

**Ridership**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Continue our efforts to increase ridership.</td>
</tr>
<tr>
<td>12</td>
<td>Make increasing ridership a part of Metro’s Climate Action Plan.</td>
</tr>
<tr>
<td>13</td>
<td>Develop an Agency standard for calculating the GHG emissions reductions created from Metro’s transit system.</td>
</tr>
</tbody>
</table>

**Fuel Use**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Create a plan to reduce idling.</td>
</tr>
<tr>
<td>15</td>
<td>Develop a program to reduce the day use of Agency cars.</td>
</tr>
<tr>
<td>16</td>
<td>Study feasibility of installing emissions control systems on appropriate Metro equipment and machinery.</td>
</tr>
</tbody>
</table>

**Rail Propulsion Power**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>Increase the efficiency of rail service through advanced technology and improved operating procedures, as feasible.</td>
</tr>
<tr>
<td>18</td>
<td>Continue to increase rail ridership.</td>
</tr>
<tr>
<td>19</td>
<td>Incorporate rail ridership strategy into Climate Action Plan.</td>
</tr>
</tbody>
</table>
### Facility Electricity Use

<table>
<thead>
<tr>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>20. Staff will develop electricity reduction targets for Board approval.</td>
</tr>
<tr>
<td>22. Provide adequate funding for energy retrofits.</td>
</tr>
<tr>
<td>23. Provide sub-meters at each facility so funds can be properly directed and results accurately tracked.</td>
</tr>
<tr>
<td>24. Invest in energy management systems to properly track energy usage.</td>
</tr>
<tr>
<td>25. Provide division managers with monthly utility bills so they can monitor performance and prevent billing mistakes.</td>
</tr>
<tr>
<td>26. Track energy efficiency upgrades and measure their success, so that the most successful projects can be repeated.</td>
</tr>
<tr>
<td>27. Create an Agency-wide energy reduction plan, so that projects can benefit from economies of scale and bulk discounts, instead of project-by-project retrofits.</td>
</tr>
<tr>
<td>28. Do a project life-cycle cost at the beginning of every new construction or major renovation project so that the future savings overtime of efficiency upgrades can be taken into account.</td>
</tr>
<tr>
<td>29. Partner with LADWP and SCE to create a cost-effective Agency wide energy reduction plan.</td>
</tr>
</tbody>
</table>

### Water Use

<table>
<thead>
<tr>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>30. Because of California’s water crisis, water conservation should be a top Agency priority.</td>
</tr>
<tr>
<td>31. Develop water reduction goals for Board adoption. Caltrans is working with the Metropolitan Water District of Southern California (MWD) to reduce their consumption by 20% in four-years; Metro might consider a similar target, as feasible.</td>
</tr>
<tr>
<td>32. Create a Water Action Plan to meet reduction target.</td>
</tr>
<tr>
<td>33. Establish a staff level Water Conservation Team to develop and implement the water-conservation action plan.</td>
</tr>
<tr>
<td>34. Partner with MWD and LADWP to ensure that the reduction goals are met in a timely and cost effective manner.</td>
</tr>
<tr>
<td>35. Where feasible, convert to recycled water for landscaping.</td>
</tr>
<tr>
<td>36. Send monthly utility bills to division managers so they can monitor performance and prevent leaks and billing mistakes.</td>
</tr>
<tr>
<td>37. Track and monitor the performance of conservation projects.</td>
</tr>
<tr>
<td>38. Install water meters at bus/rail car washers, steam racks, and chassis jets.</td>
</tr>
<tr>
<td>39. Establish and employee awareness program and solicit employee suggestions</td>
</tr>
<tr>
<td>40. Install timers on steam cleaners.</td>
</tr>
</tbody>
</table>
# Recommendations Matrix

## Greenhouse Gas Emissions

<table>
<thead>
<tr>
<th></th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>41.</td>
<td>Develop emissions reductions targets for Board adoption.</td>
</tr>
<tr>
<td>42.</td>
<td>Develop a Climate Action Plan to meet those targets.</td>
</tr>
<tr>
<td>43.</td>
<td>Create a staff level Climate Action Team to develop suggested targets and Climate Action Plan.</td>
</tr>
<tr>
<td>44.</td>
<td>Develop an agency-wide methodology for measuring GHG reductions created through transit.</td>
</tr>
<tr>
<td>45.</td>
<td>Focus efforts on increasing ridership and increasing operational carbon efficiency.</td>
</tr>
</tbody>
</table>

## Air Quality

<table>
<thead>
<tr>
<th></th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>46.</td>
<td>Continue to explore technological advancements in transit vehicles that decrease air pollution.</td>
</tr>
</tbody>
</table>

## Solid Waste

<table>
<thead>
<tr>
<th></th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>47.</td>
<td>Use the best practices from the Gateway pilot to roll out desk side recycling at other facilities.</td>
</tr>
<tr>
<td>48.</td>
<td>Put clear instructions on the bins as to what should go in what bin.</td>
</tr>
<tr>
<td>49.</td>
<td>As feasible increase desk side recycling to include bottles and cans.</td>
</tr>
</tbody>
</table>

## Liquid Waste

<table>
<thead>
<tr>
<th></th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>50.</td>
<td>Decrease waste as much as possible through improved technology and operational procedures.</td>
</tr>
<tr>
<td>51.</td>
<td>Reduce hazardous chemical use wherever feasible.</td>
</tr>
</tbody>
</table>
### Indicator Results Matrix

#### 2008 Efficiency

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ridership</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>474 Million Boardings</td>
<td>23% (1997)</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Fuel Use</td>
<td>0.10 Gallons per Boarding</td>
<td>12%</td>
<td>48 Million GGE</td>
<td>19%</td>
<td>$64 Million</td>
<td>139%</td>
</tr>
<tr>
<td>Rail Propulsion Power</td>
<td>2.02 Kilowatt Hours per Rail Boarding</td>
<td>-11% (2005)</td>
<td>175 Million Kilowatt Hours</td>
<td>4% (2005)</td>
<td>$20.2 Million</td>
<td>5% (2005)</td>
</tr>
<tr>
<td>Facility Electricity Use</td>
<td>0.14 Kilowatt Hours per Boarding</td>
<td>5% (2005)</td>
<td>69 Million Kilowatt Hours</td>
<td>11% (2005)</td>
<td>$7 Million</td>
<td>21% (2005)</td>
</tr>
<tr>
<td>Water Use</td>
<td>31 Gallons per Revenue Hour</td>
<td>30%</td>
<td>253 Million Gallons</td>
<td>39%</td>
<td>$1 Million</td>
<td>54%</td>
</tr>
<tr>
<td>Greenhouse Gas Emissions</td>
<td>2 Pounds CO2e per Boarding</td>
<td>5%</td>
<td>478,000 Metric Tons CO2e</td>
<td>0%</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Air Quality</td>
<td>0.04 Pounds per Vehicle Mile</td>
<td>-74%</td>
<td>2,167 Tons</td>
<td>-71%</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Used Oil Waste</td>
<td>0.022 Gallons per Revenue Hour</td>
<td>-12%</td>
<td>183,000 Gallons</td>
<td>-6%</td>
<td>$0</td>
<td>-100%</td>
</tr>
<tr>
<td>Solid Waste and Recycling</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>7,000 Tons Trash, 5,600 Tons Recycling</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>Hazardous Liquid Waste</td>
<td>0.086 Gallons per Revenue Hour</td>
<td>-43%</td>
<td>711,000 Gallons</td>
<td>-39%</td>
<td>$518,000</td>
<td>-15%</td>
</tr>
<tr>
<td>Non-Hazardous Liquid Waste</td>
<td>0.061 Gallons per Revenue Hour</td>
<td>13%</td>
<td>502,000 Gallons</td>
<td>21%</td>
<td>$167,000</td>
<td>-5%</td>
</tr>
<tr>
<td>Anti-Freeze Waste</td>
<td>0.011 Gallons per Revenue Hour</td>
<td>46%</td>
<td>93,000 Gallons</td>
<td>57%</td>
<td>$27,400</td>
<td>54%</td>
</tr>
</tbody>
</table>

*Unless otherwise noted, base year is 2002*
APTA Sustainability Pilot

Overview

The American Public Transportation Association (APTA) has established a Sustainability Pilot program. The program provides the basic structure needed for sustainability strategy: goals, action, evaluation, and reporting. Agencies who decide to participate must sign up by September 2009 and agree to meet a set of standards. If we participate in the pilot, we would have the opportunity to shape industry-wide sustainability standards and to highlight our sustainability work nationally.

The pilot phase of APTA’s Sustainability Commitment will take place during 2009 in order to 1) refine the commitment elements; 2) test whether the base requirements and pre-requisites are appropriate; and 3) ensure the mechanisms for achieving commitment goals can be consistently applied. Founding signatories to the commitment, those signing on by September 30, 2009, will agree to 1) adhere to the base principles of the commitment and 2) actively participate in defining the higher levels of the commitment and assessing which level, i.e. the extent of action items, reduction targets and stretch goals, they are able to aspire to within the year of their signing. Founding signatories will be asked to make a progress report to the APTA Sustainability Task Force within five months of signing and will make a commitment to a higher status level by the end of the year of signing.

Figure 63
APTA Sustainability Pilot Standards

<table>
<thead>
<tr>
<th>Attainment Level</th>
<th>Base Principles</th>
<th>Short &amp; Medium-Term Action Items</th>
<th>Stretch Goals</th>
<th>Percent Reduction from Baseline</th>
<th>Time frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entry</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Within 1-year</td>
</tr>
<tr>
<td>Bronze</td>
<td>X</td>
<td>6</td>
<td>2</td>
<td>2%</td>
<td>Within 1-year</td>
</tr>
<tr>
<td>Sliver</td>
<td>X</td>
<td>18</td>
<td>2</td>
<td>5%</td>
<td>Within 3-years</td>
</tr>
<tr>
<td>Gold</td>
<td>X</td>
<td>36</td>
<td>6</td>
<td>10%</td>
<td>Within 3-years</td>
</tr>
<tr>
<td>Platinum</td>
<td>X</td>
<td>36</td>
<td>9</td>
<td>20%</td>
<td>Within 6-years</td>
</tr>
</tbody>
</table>

Notes
*Additional information is provided in Appendix 1.
**These are the number of elements that a Pilot Candidate would have to meet prior to Pilot Application.
APTA Sustainability Pilot
Commitment Elements

1. Base Principles – are minimum actions which signatories must take to demonstrate their commitment to sustainability and are applicable to all commitment signatories. They include:
   • Sustainability is identified as a strategic objective;
   • A sustainability champion is identified along with human and/or financial resources and mandates;
   • A sustainability outreach program (awareness-raising and education) is established for all staff within the organization;
   • A sustainability inventory, including but not limited to a carbon footprint, is undertaken and a list of indicators (water usage*, criteria air pollutants and water pollutant discharge*, carbon emissions*, energy use - fuel, electricity*, recycling levels/waste*, operating expense per unlinked passenger trip and passenger mile**, VMT per capita in community of operation***) have been established for the organization:
     * To be normalized in view of ridership and/or population growth
     ** Applicable to transit agencies only
     *** Applicable to transit agencies signing at gold and platinum levels only

2. Action Items – are quantifiable goals for the short- to medium-term (1-3 years) in operation, maintenance and capital, products and services, and in education and outreach and demonstrate a commitment to take concrete actions to achieve economic, environmental and social sustainability objectives.
   For example: Establish in-house “Green Teams” or put in place procurement methods that require (or favor) sustainable practices or use sustainable practices in the operations and maintenance of organizations and transit systems, etc.

3. Reduction Targets – are key environmental, social and economic indicators based on baseline measurements made as part of the minimum requirements for adhering to the APTA sustainability commitment.
   For example: By 20__, reduce your organization’s carbon footprint (in terms of emissions per passenger mile) by __ percent over baseline or reduce water pollutant discharge and water use per vehicle mile by __ percent over baseline, etc.
4. Stretch Goals – are longer-term programmatic and process goals (4-6 years) that challenge the organizations committed to make a very significant difference in the way they function in view of meeting sustainability criteria.

For example: Establish an organization-wide policy and action plan which covers economic, social and environmental sustainability, or ensure all new construction meets LEED-like principles and bring existing construction into line, or implement EMS, SMS and/or ISO 14001 standards, or put in place an sustainable-procurement policy which is based on comprehensive sustainability principles, etc.

For more information, visit http://www.apta.com/research/sustainability/pilot_08.cfm.