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EXECUTIVE MANAGEMENT COMMITTEE
OCTOBER 20, 2016

SUBJECT: SUSTAINABILITY STRATEGIES

ACTION: RECEIVE AND FILE

RECOMMENDATION

RECEIVE AND FILE report back on **sustainability strategies, accomplishments and short and long-term plans related to green infrastructure, sustainability transportation and workforce development and resources** needs to implement Metro's sustainability program.

ISSUE

In February 2016, the Metro Board of Directors passed Motion #57 by Directors Garcetti, Kuehl, Ridley-Thomas, Fasana, Solis and Bonin to direct the CEO on a number of items related to Metro's environmental and sustainability efforts to further Metro's goals to reduce emissions, clean the air, and improve urban areas (Attachment A).

There are two reports required by the Motion. Staff reported back on May 31, 2016 on Item A of the Motion. This Receive and File document is the second report that is also required by the Motion. This report includes an outline of staff's response for each of the items pertaining to Water Conservation and Green Infrastructure, First and Last Mile Connections to Metro's transit system, and Strategies to better Deploy Technology and promote Green Jobs.

BACKGROUND

Central to Metro's mission of continually improving the effectiveness and efficiency of Los Angeles' transportation system is the process of ensuring the implementation of sustainability-related efforts and infrastructure. Transit systems by definition already form a sustainable air quality strategy as any agency that reduces vehicle miles travelled, congestion, and promotes land use co-benefits as a result of transit investments lead to a reduction in criteria air pollutants and greenhouse gas emissions.

Although Metro has been implementing sustainability strategies, specifically as part of its construction efforts since 2003, sustainability only became a formal part of Metro's priorities in 2007, with our

Board's adoption of the Sustainability and Energy Policy; and the formation of the Ad Hoc Sustainability and Climate Change Committee. In the summer of 2008, the Board adopted the Metro Sustainability Implementation Plan (MSIP), which outlined specific actions to reduce our contribution to climate change and to further increase our sustainability. The MSIP is the cornerstone of our sustainability activities and provides overall guidance in our effort to implement sustainability-related projects in the most cost-effective and efficient manner.

To allow a most systematic implementation of our sustainability programs, the Board adopted an Environmental Policy in 2009 which established an Environmental Management System (EMS) as the tool for reducing environmental liabilities and implementing a continual improvement process with environmental objectives and targets that are measurable, meaningful and understandable. Metro's internationally certified EMS is the common thread in the development, implementation, and operations and maintenance of all sustainability related infrastructure in our agency. It is also the means for us to implement a coordinated sustainability program within Metro.

Our agency has consistently been the international leader in the sustainability space. Metro has developed the following baseline documents to ensure that sustainability principles are implemented uniformly in all of our construction programs:

1. Update in 2010 (and revised in 2012) of the Metro Rail Design Criteria specifically in Section 2 to include the consideration of multi-mobility hubs with various first and last mile strategies, climate change adaptation principles and green infrastructure;

2. Update in 2012 of Metro's baseline specifications to require the development and implementation of a project-specific Sustainability Plan regardless of the size of projects. Each one of these plans outlines the environmental and sustainability commitments for each project. These commitments are consistent with statutory and regulatory requirements. The Sustainability Plan specifically adheres to the requirements of the California Green Building Code and the California Building Code. However, Metro's requirements (if more stringent) are followed, as feasible, when in conflict with those of the statute or regulations.

3. Requirement for annual reports in environmental and sustainability metrics that is reported as the following: Energy and Resource Report (formerly called Sustainability Report, since 2010), annual Energy and Renewable Energy program update (since 2012), Annual Green Construction Policy Implementation (since 2012). Attachments B, C, D provide specific details on the projects and the metrics that Metro is measuring itself against in sustainability, energy, and green construction, respectively.

The basis for these documents include a number of agency-wide policies such as:

- Green Construction Policy;
- Renewable Energy Policy;
- Energy and Sustainability Policy (to include the requirement for the use of Leadership in Energy and Environmental Design [LEED] as the standard rating system to document the implementation of green infrastructure for projects 10,000 square feet or larger);
- Environmental Policy;
- Environmental Liabilities Reduction Policy;
- Construction Demolition Debris Recycling and Reuse Policy;
- Water Use and Conservation Policy; and
- Complete Streets Policy.

A complete inventory of all policies, plans, description of projects, metrics, and other relevant information could be found at www.metro.net/sustainability <http://www.metro.net/sustainability>.

DISCUSSION

In the context of the items in the preceding section, Motion #57 provides a framework and opportunity for Metro to strengthen and expand its sustainability policies, plans, and implementation efforts for the benefit of our metropolitan region and to foster a greater level of coordination with peer agencies trying to address overlapping sustainability mandates. Based on our staff-initiated consultation process, staff concurs with our stakeholders that Metro will need to adapt its sustainability implementation strategy to reflect rapidly evolving technology, increasing impacts of extreme weather events, more stringent federal, state, and local requirements, advancements in best management practices for active transportation infrastructure, as well as the need for closer coordination among agencies. We want to stay on the forefront of sustainability, and also recognize that we are not alone in this space. Continuing our leadership in sustainability implementation is necessary to carry out the co-related and cooperative green infrastructure goals to efficiently converge transportation, open space, air and water resource, and biodiversity protection into a shared vision of all our 88 cities and unincorporated areas of LA County and surrounding jurisdictions.

MSIP To Be Updated By March 2017

To holistically do so and to increase logistical efficiency, staff determined that updating the MSIP would be the most logical first step. While, on a project per project basis, a requirement is in place to develop a Sustainability Plan for all projects, regardless of size, the intent of the MSIP update is to make sure that we capture all of the gains we achieved in the last few years, summarize our lessons learned as well as draw from our experience and the input of diverse stakeholders to implement the most-effective strategies to mitigate the impacts from those challenges, and optimize our resources to optimally achieve environmental and sustainability goals. Developing an updated plan to be completed within the next six months is key to ensuring the continued implementation of existing sustainability efforts as well as opportunities for increased sustainability while maintaining a state of good repair and to be able to operate our expanding system in the most cost-effective and resilient

manner.

To better address the request of the Motion and to set the stage for developing an updated MSIP, our response to each element of the Motion for this report is characterized by its current stage of development:

- Bench - Research & Development stage;
- Pilot - Advanced from Bench stage and Metro is in the process of scaling up;
- Fully Implemented - Policy is applied to all eligible assets and projects; and
- Process Improvement - Continual improvement and innovation to meet targets.

The responses below for each of the elements of the Motion are developed in close coordination with Metro Operations, the Metro Highways Group and the Metro Countywide Planning Department. The Countywide Planning Department coordination specifically focused on the development and implementation of responses related to First and Last Mile Connections to Metro's transit system, Parking Management as well as Goods Movement initiatives.

Water Conservation & Green Infrastructure

Goal: *All Metro future construction projects (that are currently not out to bid) implement methods to capture and treat storm water and apply reclaimed water best practices.*

Current Status: Process Improvement status for Storm Water; Pilot status for Reclaimed Water practices.

Summary: Since 2003, Metro has implemented a best practice to capture and treat storm water. The requirement is reflected in the agency Design Criteria for all major capital projects. Section 2 of the Design Criteria describes Metro's commitment to develop a Construction Storm Water Control Plan for all above ground fixed facilities. These would include the implementation of applicable Standard Urban Stormwater Mitigation Plan (SUSMP) guidelines for permanent management of storm water. Where treatment is within Metro jurisdiction and if feasible to achieve the highest and best transportation use of the property, treatment would include the establishment of minimum buffers from riparian corridors and wetlands, where water quality is of particular importance. Engineering strategies are required to be constructed for the permanent control of water runoff during the operation phase of the project.

Throughout the County, Metro follows the City or County of Los Angeles' Low Impact Development (LID) protocols in addition to regulations from state and other local regulatory agencies that govern the treatment and re-use of storm water. Major capital transit projects where these strategies were

implemented include the Orange Line, Central Maintenance Facility, Division 13, Santa Monica Yard, and Monrovia Yard. For future projects, Metro will coordinate with Countywide stormwater managers and land use planners to determine the overlap of potential LID treatment sites with Metro properties and locate optimal sites of implementation within Metro parcels based on drainage corridors and critical water sources. Metro will work with other jurisdictions to integrate their LID strategies with those of Metro at the time of Metro implementation.

Our Board has mandated the reduction of potable water use agency-wide by as much as 20% by 2017 using 2015 baseline levels. Current efforts continue for process improvements to meet the target. Since mid-2000, our bus washes have supplemented potable water use with reused treated washwater in all of our bus and rail car washing activities. We have implemented the use of recycled water in some segments of the Orange Line for landscaping, specifically where we are able to connect to recycled water main pipelines installed by the Los Angeles Department of Water and Power. The use of dewatering water can pose some challenges, especially if the water quality is impacted by chemical contamination (natural [e.g., in the case of stations adjacent to the La Brea Tar Pits area] or anthropogenic [e.g., due to industrial activities adjacent to the dewatering site]).

Full scale reclaimed water implementation at Metro (specifically for landscaping) faces significant impediments for consistent implementation on construction projects. In most cases, the local jurisdiction or utility companies are currently in the planning stages or have constrained resources to align with the schedule and proximity of their projects to Metro's projects. Based upon Motion #57 and feedback from stakeholders, Metro will continue its close coordination specifically with the City of LA's Bureau of Sanitation, Department of Water and Power, Los Angeles County Department of Public Works, County Sanitations District of Los Angeles County, and One Water LA Working group in aligning placement of reclaimed water throughout Metro projects, in addition to Orange Line.

Besides these potable water conservation efforts, as part of our efforts to determine feasible numerical sustainability goals, Metro staff will work to develop minimum targets for LID strategies. To this end, Metro will establish best practice strategies (including consideration of voluntary goals such as those provided in the California Green Building Code, where feasible) to achieve those targets and track progress including monitoring, reporting, and maintenance towards the greening of our new and existing infrastructure.

Metro is working with the County of LA in bringing these strategies to the rest of the cities in the County. We have identified a potential new funding source to assist local jurisdictions regarding expansion of storm water capture and reuse and other low impact development strategies. If passed by the voters, Measure M will allow local jurisdictions to use up to one-third of their annual Local Return funds (or $7.5 billion over 40 years) for "Green Streets" initiatives. Per the Ordinance, "Green Streets" are defined as "urban transportation rights-of-way integrated with storm water treatment techniques that use natural processes and landscaping and that quantitatively demonstrate that they

capture and treat storm water runoff from their tributary watershed through infiltration or other means that are included within the respective Enhanced Watershed Management Plan."

Goal: *All future design and construction projects ($5 million and over) use Storm Water & Discharge Runoff Capture and Cleaning Devices.*

Current Status: Pilot Status

Summary: This goal relates to the treatment of storm water that is in excess of what could be infiltrated or captured and reused on site. Since 2003, Metro has incorporated and implemented additional low impact development and engineering controls for this purpose, where feasible. The Orange Line is an example where we have installed an extensive network of detention basins and treatment devices at or preceding storm water inlets.

Challenges exist in reaching full implementation based upon three key issues:

- Feasibility in terms of physical area of capture;
- Development of performance metrics and targets to push progress; and
- Agreement on inter-jurisdictional Operations & Maintenance.

Metro will work with all stakeholders in developing strategies to overcome these challenges.

Not all project sites have sufficient right-of-way or drainage area to allow for efficient capture & installation of mitigation strategies or installation of treatment devices. Further, it can be a challenge for jurisdictions to fully implement long-term operations and maintenance after Metro's typical initial five year establishment period, specifically in areas where there may be confusion on limits of maintenance responsibilities. While we had limited opportunities to implement these strategies in recently-built stations and projects, we continually look for opportunities in newer projects like the Emergency Service and Operation Center, Rosa Parks Willowbrook Station, and Union Station projects. We have also recently worked with the Gold Line Foothill Authority to use the recently laid out ballast as a part of the system's storm water treatment strategy. Staff is working with the Crenshaw LRT, Regional Connector, and Purple Line Extension projects for opportunities as part of the implementation of the project-specific Sustainability Plans.

As stated above, based upon Motion 57 and feedback from stakeholders, if approved by voters, Measure M provides a potential new funding source for local jurisdictions by making "Green Streets" an eligible expense under Local Return. We are also working with other jurisdictions on defining how maintenance can be implemented using community partnerships.

Goal: *All future design and construction projects ($5 million and over) use Permeable Pavement &*

Surfaces.

Current Status: Bench (Research & Development) status.

Summary: Metro received a grant in 2014 and has a permeable pavement pilot planned for installation at the Central Maintenance Facility (CMF) in 2017. This two-year pilot will allow for evaluation of the technology until 2019. Retrofit projects are being planned in other Divisions. The goal is to complete the pilot effort at CMF, determine the benefits and costs for full implementation, and begin full-scale implementation across all applicable assets is 2018. This study makes use of the results of existing research that have identified parking lots, alleys, service roads, and low-traffic suburban neighborhood roads as best-suited for permeable pavement. Where applicable, these results provide insight on possible ways to accelerate more widespread deployment. It is also worth taking into consideration that at present permeable pavement is quite costly, and so other best management practices may be more appropriate when budget constraints are a major limiting factor. Metro's current study incorporates bioswales and trees/vegetation. Other strategies such as rain grading, infiltration trenches, and curb inlets can be considered for other applications.

In addition to these, the Exposition Light Rail Authority had recently completed a porous pavement project on Metro property around the Expo/Bundy station. This acts like a natural on-site stormwater retention system, reducing the storm water runoff onto city streets. LA Metro staff is currently working to understand the long-term operations and maintenance constraints of this new permeable pavement system.

Goal: *All future design and construction projects ($5 million and over) use Low Carbon-Intensity Materials.*

Current Status: Bench (Research & Development) Status.

Summary: Due to Motion #57, staff has begun to explore how to add this requirement in all projects for implementation. After the last few months of research, staff has determined that the availability of these materials in the supply chain that can fulfill Metro usage requirements is the critical path for full implementation. There are limited materials and volume to fulfill Metro needs. Therefore, Metro commits to implement this goal towards full implementation through a phased approach as follows:

a. Identify the availability of all such type of materials for use in all projects;
b. Educate suppliers on Metro's commitment to the use of these materials in all of its projects;
c. Encourage the use of low carbon-intensity materials through the revision of our procurement documents.

In addition, staff has determined that most contractors are not familiar with the use of these materials

(and their impact on warranties and durability) nor have the awareness of how to procure for these products. Concurrent with the update of procurement documents to include low carbon-intensity materials as a possible alternative, Metro will work with contractors to implement the strategy in all Metro projects and encourage their use in Metro funded projects.

Goal: *All future design and construction projects ($5 million and over) use Recycled and Local Materials.*

Current Status: Fully Implemented for Recycled Materials; Bench (Research & Development) Status for Local Materials

Summary: In 2007, Metro approved a policy to give preference to recyclable and recycled products in the selection of construction materials to the maximum extent feasible. The recycled material requirement is fully implemented on both construction and for the most part in operations. Examples of the extensive use of recycled materials, particularly recycled concrete sub-base, are the Metro Orange Line and the I-405 HOV lanes.

Similar to the implementation of low carbon-intensity materials, local materials implementation remains to be in the bench stage. Supply chain challenges remain an obstacle for scaling up. Further, the practical issue that not all materials are available locally (specifically at the scale we are projecting for these materials to be used in major capital projects) can eventually limit the full implementation. Metro commits to implement this goal towards full implementation through the same phased approach as low carbon-intensity materials.

Goal: *All future design and construction projects ($5 million and over) use Light Colored Pavement and Native Shade Trees*

Current Status: Light Colored Pavement is in the Bench stage; California Native Plants is Fully Implemented, Native Shade Trees is in Bench stage

Summary: Light colored pavement has been implemented in limited situations in Metro parking lots and maintenance yards, most recently at the Monrovia Rail Maintenance Facility. Due to Motion 57, Metro will continue to determine the feasibility of widespread use in all projects. There are life cycle cost concerns as it relates to the durability of light colored pavements as well the availability and full-scale implementation as compared to conventional pavement. High reflectance top coats are also an option that Metro will look into as a possible alternative method for combating the urban heat island effect.

Metro's best management requirements are to plant California native and drought tolerant vegetation at all existing Metro facilities. However, the requirement for Native Shade Trees is in Bench stage.

The implementation of this strategy is limited to areas where the trees would not interfere with the safe operation of the transit system (e.g., away from overhead catenary systems) or at locations where the presence of the tree would not impede safety of patrons and/or at intersections. Metro will incorporate urban heat island studies to determine opportunities on where shade trees may be critical especially when placement opportunity arises from new construction or retrofit of existing Metro assets.

While every project is unique; consideration of the inclusion of Native Shade Trees will be given priority, as opposed to the alternative of not including Native Shade Trees, given the direction of this motion. The correlation between a high urban heat island effect and lower-resource, disadvantaged communities makes apparent that offering technical assistance in this area where needed would be highly beneficial. Establishing targets and tracking relevant metrics towards achieving reductions in the urban heat island effect is a crucial initial step towards guiding progress in this area.

Goal: *All future highway and transit projects include a project-specific Sustainability Coordinator to oversee all resiliency and long-term sustainability-related requirements for the project realizing that proper maintenance is essential to realizing the full life-cycle benefit of sustainable infrastructure and to assist the agency's Sustainability Officer in achieving Metro's sustainability metrics.*

Current Status: Pilot status

Summary: A project specific Sustainability Coordinator is a requirement for all Metro construction projects per the Sustainability Plan. Currently, the project level Sustainability Coordinator role is met through Metro consultants. The Executive Officer, Environmental Compliance and Sustainability currently provides oversight in the overall implementation of all Sustainability Plans for all projects; acts as the EMS Administrator; and provides review and approval in all projects of any scale for the inclusion of sustainability strategies in any stage of a project or maintenance of an asset.

In terms of all of our existing facilities, as a result of Motion 57, staff has met with Metro Operations to improve coordination, specifically, with the Environmental Compliance and Sustainability Department. This coordination is focused on ensuring that operations and maintenance of sustainability elements of a project are properly vetted out, implemented, and environmental benefits optimized with Operations and Facilities Maintenance staff at the concept development stage rather than waiting until the project/installation is complete.

If passed by the voters, Measure M will provide a new funding source which could provide a resource for additional full time staffing to operate and maintain current and future sustainability-related projects. A formal Program Management Plan for Measure M will be presented to the Metro Board in October 2016 to include these potential additional resources, including the consideration of a Sustainability Officer.

Specifically on Metro's role in implementing green infrastructure projects in Metro's Highway programs, the State highway system in California is owned and operated by the California Department of Transportation (Caltrans). As a result, collaboration with Caltrans is the most effective way to assist with their sustainability efforts to the fullest extent possible. Caltrans' Sustainability Program follows established State and federal programs, policies, and guidelines throughout the project development, implementation, and maintenance and operation phases of highway projects. Regardless, Metro, as a major partner in implementing sustainable highway projects in Los Angeles County, continues to work with Caltrans in identifying and incorporating practical and feasible sustainability measures in projects.

Goal: *Significantly increase the number, size, and scope of projects in Metro's Urban Greening Implementation Action Plan.*

Current Status: Bench (Research and Development) stage.

Summary: Metro's Urban Greening Toolkit provides resources to cities and communities to implement transit-supportive green infrastructure at Metro-owned property. This is a critical first step because most jurisdictions do not have the technical knowledge of implementing an urban greening program. In January 2016, the Metro Board approved an Implementation Action Plan for the Urban Greening Plan and Toolkit. The action plan included, among other items, a small set of demonstration projects intended to showcase the benefits of green infrastructure and place-making. Subsequently, at the June 2016 meeting, the Board approved proposed criteria for the demonstration program. At this time, there is $200,000 budgeted in FY 17 for the small scale demonstration programs.

As a way to expand the program, staff recommends proceeding with an application process as described in the recently approved criteria, then reporting back to the board to request additional resources based on demonstrated demand for qualifying projects. The smaller scale demonstration projects will then inform the development of a larger scale program to be developed by staff for FY18. The application process referenced above is highly suitable for Metro technical assistance to lower-resource local jurisdictions - an initiative described in greater length later on in this document.

Improve Connectivity & Enhance First-and-Last Mile Connections to the Transit System

Subsequent to Motion #57, the Metro Board approved Motion #14 in May 2016 which directed a comprehensive set of activities to implement first/last mile improvements, with a required report-back to the Board by the Countywide Planning Department in October 2016. The report back will address all of the specific first/last mile items of Motion #57, including expanding the car-share program to more than the 15 current locations; and incorporating active transportation accessibility into transit

stations' design.

The report back will also propose development of guidelines that will delineate how to include first/last mile components in future capital projects. This will cover the shared responsibility of Metro and municipalities as well as how funding needs will be addressed. It will also describe a comprehensive planning effort that will include a set of metrics that can be used to evaluate successes and shortcomings of these design elements and associated strategies going forward. Such metrics could include utilization rates of bike facilities (as well as unmet demand like bike locker wait lists) provided at transit stations, changes in vehicular traffic or car parking utilization, transportation mode used to get to/from transit stations, as well as qualitative data on barriers to and enablers of mode shift. Metrics will also cover broader sustainability goals around VMT and emission reduction. Additionally, Metro will consider the value of integrating stations, particularly those services by Greenways, with automated bike/pedestrian counters as part of station design in order to measure changes in use of active transportation infrastructure over time.

Furthermore, in addition to First-and-Last Mile strategies, Motion #57 calls on Metro to play a leadership role in coordinating the establishment of a Regional Active Transportation Network, a coherent one which utilizes existing right of ways (utility corridors, flood channels, etc.) and connects existing fragmented segments. It is noted that the Active Transportation Strategic Plan and subsequent implementation actions lay out a broad set of activities to this end. To facilitate this aim, the Motion directs Metro staff to make recommendations on establishing a matching funding program (also covered in Motion #14) to support the delivery of multi-jurisdictional projects. Some other possible roles that Metro could play are to:

- Set County-wide benchmarks for active transportation use and regional network implementation, and report back to the public on an annual basis;
- Host an annual LA County Active Transportation summit to build regional capacity, provide technical assistance, and foster collaboration across the region; and
- Provide active transportation proposal development assistance for city-level projects with regional significance (e.g. regional Greenway expansion), especially for disadvantaged communities (DACs).

Deploy Technology and Promote Green Jobs

Goal: *Complete an assessment of any necessary positions focused on technological efficiencies and improvements that would be critical to supporting Metro's sustainability efforts.*

Current Status: Pilot Stage

Summary: There are three components to the assessment. The first component is the life-cycle

analysis to establish the benchmark for performance metrics. This process is complete. The next component, which is also complete, is to identify revenues to fund the life cycle strategies. The final component is to work with the Operations Department to determine the resource needs, including full -time staff, training, tools, software, etc. This third and final component is underway and anticipated to be completed by Spring 2017.

Goal: *Alternative renewable energy generation technology that could be used for future bus, vehicle, rail and maintenance structures.*

Current Status: Pilot stage.

Summary: Metro is in the forefront of piloting new forms of low-impact transport (e.g., EV buses, car share, taxis). For example the agency has received five of the 20 electric buses it has put on order and has piloted their use in selected routes. Results of the pilot are being evaluated. Metro is also in the process of procuring for biomethane (renewable natural gas) to replace fossil natural gas use in its CNG fleet. Once fully implemented, it is expected that it will reduce our bus fleet carbon emissions by more than 78% and agency emissions by more than 45%. The current timeline for the implementation of the biomethane pilot is Spring 2017 with full implementation anticipated in Spring 2018. The agency is also looking at other near zero or zero emissions technologies in combination with low NOx/biomethane fuel combination as viable alternatives.

In partnership with the California Energy Commission, our agency has installed electric vehicle chargers at five park and ride locations, and is in the process of increasing electric vehicle charger offerings for the rest of the system (including workplace charging). To date, Metro has installed approximately 4 megawatts of solar panels. In July 2016, the White House recognized Metro's commitment to the deployment of a Community Solar Program for our line-up of capital projects. This trailblazing new program will bring solar energy to communities throughout the LA region and will represent a significant investment in communities and renewable energy over the near and long term. Metro is the first public transportation agency to pursue a community solar program, which builds on our success of deploying approximately 7 megawatts of renewable energy by the end of fiscal year 2017, with a goal of 66 percent renewable energy use by 2022. Metro is currently working with the County of Los Angeles in developing a strategy for Community Choice Aggregation to further enhance the delivery of renewable energy specifically in underserved communities.

Goal: *Partnership and funding opportunities, including an incentive program, to maximize the use of zero or near zero emission technologies in future transit and goods movement corridors.*

Current Status: Pilot stage.

Summary: Metro is partnering with the Ports to identify strategies to reduce emissions along the I-

710 and SR-710 corridors. Metro is also in the process of identifying goods movement strategies in the high desert corridor to increase energy resiliency as well as a potential by-pass in lieu of the LA Basin for diesel emitting trucks.

Metro has been actively engaged in regional discussions to pursue opportunities to test and demonstrate connected vehicle technologies to reduce emissions and improve commercial vehicle operational efficiency. These technologies include eco-driving, freight signal priority, truck platooning, and freight drayage optimization applications. In addition, Metro is actively engaged with SCAQMD, Caltrans, Ports of Long Beach and Los Angeles, and SCAG, to advance the development of zero and near-zero emission truck technology (as mentioned above). Our agency has hired a full-time staff to coordinate these efforts and is currently reviewing the California Sustainable Freight Action Plan.

Metro is part of the Zero-Emission Truck Collaborative, which includes representatives from Caltrans, Port of Los Angeles, Port of Long Beach, SCAQMD, and SCAG. The collaborative was formed to promote demonstration projects. SCAQMD, with support from the Metro and the Zero-Emission Truck Collaborative, has recently been selected to receive funding from CARB to demonstrate zero and near-zero emission drayage truck technologies in and around the Ports, as well as connected vehicle technologies.

Metro realizes that the changeover to zero emission technologies in freight entails significant upfront costs and that both incentives and fines have a role to play in driving this transition. Many truck drivers are employed by small “mom-and-pop” establishments that lease their fleets. An economic system that impacts the lessors of the trucks, not the lessees, is an important environmental justice strategy to improve compliance. Metro will work with our stakeholders, for example the Los Angeles Alliance for a New Economy and the Coalition for Environmental Health and Justice to explore the development of sound, equitable compliance instruments going forward.

Metro is in the forefront of piloting new forms of low-impact transport (e.g., EV buses, car share, taxis). As mentioned, Metro has received five of the 20 electric buses it has put on order and has piloted their use in selected routes. Results of the pilot are being evaluated. Metro is also in the process of procuring for biomethane (renewable natural gas) to replace fossil natural gas use in its CNG fleet. The agency is also looking at other near zero or zero emissions technologies in combination with biomethane use with Low NOx engines.

Metro has participated in Federal Notices of Funding Availability opportunities as well as working with our partners in all levels of government to secure mobility funds. LA Metro has developed a strategy to secure annual Cap and Trade funding. Metro has also voluntarily participated in the Low Carbon Fuel Standards market to generate revenue to construct/install, operate, and maintain sustainability-related infrastructures throughout Los Angeles County. Staff has been in discussions with the Department of Energy on community solar opportunities and the USEPA for alternative financing

mechanisms to convert brownfields to transportation supplementing facilities. Metro has a P3 program that is designed to attract private equity entities to assist Metro in fulfilling its agency sustainability objectives.

Goal: *An overview of the Environmental Compliance and Sustainability Department's agency-wide effort to ensure coordination in planning and implementing sustainability initiatives, including recommended metrics to measure challenges and successes. This includes partnering and soliciting input from non-profits and other stakeholders to ensure public participation.*

Current Status: Process Improvement.

Summary: The Environmental Compliance and Sustainability Department (ECSD) provides general support services to LA Metro's Planning, Construction, and Operations Business units. There are currently three distinct business functions provided by ECSD to include:

- Environmental Services;
- Sustainability Services (including Policy Implementation, Environmental Management System, and Carbon Credits Administration); and
- Project Management of Sustainability Related Projects/Infrastructure.

ECSD has implemented an award-winning, internationally certified EMS that provides environmental and sustainability support throughout the agency. With ECSD's very close partnership with Metro Planning, Construction, Operations, Procurement, Management and Budget, and Risk Management/Corporate Safety, ECSD has brought to light and implemented innovative environmental and sustainability strategies that are now standard in all of our construction methods and facilities operations. In addition, many of these projects have also generated cost avoidance, cost-savings, and to some extent revenue generating opportunities of which goes back to the Metro General Fund for reinvestment into sustainability projects. Many examples are provided in Attachment B and in www.metro.net/ecsd <http://www.metro.net/ecsd>.

Technological, regulatory, and increasing extreme weather event impacts provide an opportunity to do more than what we are currently doing. The FAST Act has also required that resiliency to extreme weather events as well as stormwater issues be incorporated into Federally funded projects. To this effect, in order to guide us in our MSIP update, staff proposes the use of the following Seven Pillars of Sustainability Planning that will form the principles for the development of our new Comprehensive Sustainability Implementation Plan (Plan). The Plan will involve collaboration among various Metro departments as well as our local and regional partners. The Plan will capitalize on Metro's efforts already underway to jumpstart a more robust regional effort that goes beyond pilot programs and aims for widespread implementation. These pillars will be used to come up with an updated plan in the next eight months. These include:

1. **Collaboration** - Metro will continue to work with the Chief Sustainability Officers of the various jurisdictions within the County to expand on the current collaboration efforts with these

jurisdictions as well as with other entities within the City and County of LA, AQMD, ARB, High Speed Rail Authority, and SCAG among others. Staff will convene in the next six months a collaboration summit to better understand the role that each of our agencies play in the overall sustainability of Los Angeles. We will initially focus our efforts in reducing the current gaps in our collaboration with local government representatives dealing with storm water, street services, parks and planning departments to facilitate implementation of projects. We will also explore with other agencies the benefits and costs on the use of various green rating systems other than LEED. The initial work products of this collaborative effort would focus on the regional issue of storm water management plans including the LA County Basin Plan, various Enhanced Watershed Management Plans, and the LADWP Stormwater Capture Master Plan and how those could interface with Metro's programs. Other areas of focus might include strategies for combating the urban heat island effect and encouraging mode shift towards more sustainable modes of transport. Lessons learned on the use of rating systems other than LEED would inform life-cycle costing analysis as described below.

2. **Leadership** -Similar to Metro's Technical Advisory Committee, Metro will promote and supports the formation of a "Sustainability Council" to advise Metro on its activities and projects. Metro staff envisions this Council to consist of members by nomination only and will leverage ideas from Metro's internal and external stakeholders. At a minimum, staff will look into a membership that may include the consideration of representatives from each of the following sectors: local government representatives in the Planning, Construction, and Operations and Maintenance space; environmental NGOs with a focus on water resources, water quality, and air quality (including the urban heat island effect); NGOs with a focus on social justice, environmental justice, and equity; the design profession (architect, engineer, etc.) who can provide expertise on implementation of sustainable solutions; landscape and infrastructure design; local labor unions; and public health. One of the initial tasks of the Council is to review the new Comprehensive Sustainability Implementation Plan prior to its endorsement by staff for Board approval. Future responsibilities could include providing input on the development of sustainability goals. Staff will include the results of action plans and proposals as to what their anticipated impact will be towards advancing the achievement of sustainability goals in the annual Energy and Resource Report (Attachment B). Staff will report back more frequently on progress on these items, if requested by the Metro Board. Metro staff will work to establish the formation of this Sustainability Council within 60 days of the Board receiving and filing this report.

3. **Strengthening Relationships** - Metro will leverage existing best practices and programs throughout the County to incorporate into its programs and explore opportunities of collaboration specifically to address the inter-jurisdictional challenges to fully implement Green Infrastructure strategies. These best practices will be used to facilitate a review of Metro's internal green infrastructure requirements and guidelines and determine correlation and inconsistencies with other jurisdiction's planning and general plan documents. We foresee using the results of such a review to facilitate continual improvement in Metro's requirements and how it addresses and coordinates those requirements with other jurisdictions. Maintenance of green infrastructure and the associated workforce skill development that is needed to do so are key issues to work through. While Metro's strategies are already best in class compared to other agencies throughout the nation, there remain opportunities for

improvement. Staff will explore the development, contractual implications, and implementation protocols for an incentive system that allows for the incorporation of best practice sustainability principles that are currently voluntary requirements (such as those in the CA Green Building Code) into major capital project proposals.

4. **Technical Assistance -** Staff will enhance LA Metro's training programs and include partnerships with non-profits in developing and implementing the program. For example, since our Board has required achievement of a LEED-Silver Certification for new construction that is 10,000 square feet or larger in area, it makes sense to partner up with the US Green Building Council (i.e., governing body that oversees LEED implementation) for Metro to conduct three types of training: Internal Metro Trades; Contractors; General Public. These series of trainings will result in three outcomes: 1) level the playing field and make all entities who would want to participate in the future on Metro projects to know and understand Metro's green infrastructure requirements; 2) ensure that green infrastructure is properly maintained to optimize benefits; and 3) ensure that a greater number of firms as well as individuals are equally competitive to implement or construct Metro green infrastructure projects/contracts. Metro will also look into developing additional aspects of a technical assistance program that aims to increase capacity in lower-resource, disadvantaged communities for them to advocate for in green infrastructure in their local streetscapes.

5. **Resiliency Policy** - Consistent with the requirements of the FAST Act to incorporate resiliency in all USDOT funded projects, Metro will develop and implement a comprehensive resiliency policy to make sure that our projects comply with the requirements of the statute. This proactive approach to formalizing resiliency in our agency is consistent with our current efforts to coordinate with the City of LA's efforts through their Chief Resiliency Officer to make sure that our current and future infrastructure and related services can immediately recover after a significant disruptor.

6. **Life Cycle Cost Analysis** - Within one year, staff will report back on its efforts to fully implement in all projects the 2014 authority on life cycle cost considerations in all sustainability -related infrastructure. Through this pillar, we also need to understand how the results of multiple pilot efforts can now be optimized into full scale operations. We will also consider the effects of incentives in accelerating the implementation of successful pilot strategies in capital projects, with a focus on making technical assistance available so as to create equitable opportunities for more widespread implementation of such sustainability-related infrastructure projects. The effect of standardizing sustainability implementation through rating systems other than LEED will also be explored.

7. **End User Collaboration** - The most challenging hurdle in the fulfillment of sustainability goals is the operations and maintenance of sustainability-related projects. Often, there is a dichotomy between construction and operations and maintenance. The Plan will address these challenges to ensure attainment of the sustainability benefits that drove the conceptualization, design, construction and operations and maintenance of the final work product. The Plan will also address the realization of an accelerated implementation of Green

Jobs and Technology in projects and any additional resource needs that Metro Operations needs to ensure that environmental and sustainability benefits are consistently realized throughout the life of the asset. In addition, the Plan will also identify strategies on how to manage the relationships and break down the barriers of operations and maintenance challenges between Metro and other end users including but not limited to cities, special jurisdictions, and joint developers.

Concurrent with Plan development, Metro will be reporting back to the Board (with specific reporting schedule) on the following items:

1. Financial quantification and determination of a blended Return on Investment for all of the sustainability investments already made; and to the fullest extent feasible (through a life cycle costing method) determine the benefits of implementing the new projects to achieve identified existing goals as presented: Winter 2017.

2. Determination of the cost impacts associated with new regulatory requirements as well as additional mandates dictated by the 2016 California Green Building Code; the planning, execution, and maintenance of capital projects related to the consideration and use of green rating systems other than LEED; any new updated or mandated inter-jurisdictional ordinances; and the associated operations and maintenance costs and requirements for Metro to operate its existing systems as well as the need for additional resources (manpower) needed; Spring 2017.

3. Determination of feasible numerical sustainability goals that Metro can adhere to and the identification of the parties responsible for ongoing operations and maintenance associated with maintaining that goal through a full life-cycle analysis. These goals will include those already approved by the Board, indicated in this report, and those that staff could recommend in the future. Goals will represent best practice with consideration of current voluntary requirements like those in the California Green Building Code and those that emanate from the implementation of LEED and other to be considered green rating systems. Staff will also provide a standardized process into where such goals will be commenced (i.e., either in the planning process, design, construction, or maintenance), metrics for measuring progress towards their achievement, and regular progress reports to the Metro Board on successes and challenges towards meeting these goals: Fall 2017.

Combining the information generated from the Seven Pillars of Sustainability Planning along with the information developed during the cost benefit analysis in the above three steps will provide the Board with a very objective result on when goals and new tools to achieve sustainability in our new current infrastructures can and should be achieved.

The above processes will be incorporated into the Agency's Measure M Program Management Plan (PMP). The PMP is currently being developed and will be presented to the Board for adoption during

the October 2016 Board meeting. The PMP will describe the organization, management controls systems, and processes that guide the full range of activities required to implement LA Metro's transformative expansion program. After PMP approval, staff will develop the specific timeline for development and implementation of the new Comprehensive Sustainability Program Implementation Plan.

NEXT STEPS

Staff will be working with stakeholders and executive management in developing the Comprehensive Sustainability Program Implementation Plan. Staff will report back within six months on its progress towards the implementation of the seven pillars of sustainability as well as the progress in the development of the Plan.

ATTACHMENTS

Attachment A: January 2016, Motion Item #57, Environmental & Sustainability Efforts to Further Metro's Goals to Reduce Emissions, Clean the Air & Improve Urban Areas

Attachment B: Metro's 2016 Energy and Resource Report (download from www.metro.net/ecsd <http://www.metro.net/ecsd>)

Attachment C: Energy and Renewable Energy Update

Attachment D: Green Construction Policy Update

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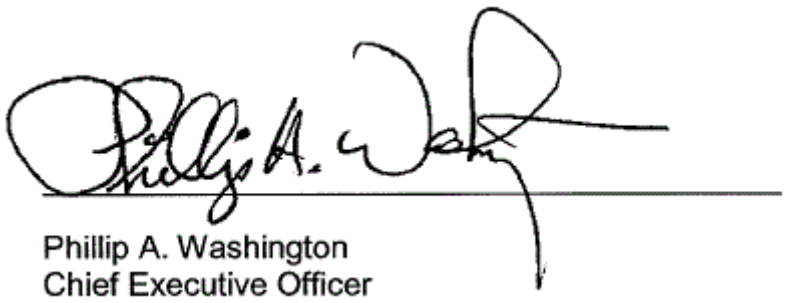


Phillip A. Washington
Chief Executive Officer

File #:	2016-0157	Name:	
Type:	Motion / Motion Response	Status:	Agenda Ready
File created:	2/12/2016	In control:	Board of Directors
On agenda:	2/18/2016	Final action:	
Title:	APPROVE Motion by Directors Garcetti, Kuehl, Ridley-Thomas, Fasana, Solis and Bonin that the Board of Directors direct the Chief Executive Officer to: A. INCLUDE the following elements in Metro's Annual Energy and Resource Report, related to Air Quality, Emission Reductions and Resiliency efforts: 1. Efforts to reduce nitrogen oxide (NOx) emissions since the approval of Measure R, with a goal of 80% NOx emissions reduction by 2025, using 2008 as a base year. 2. An update on the progress of the Metro June 2012 Climate Action and Adaptation Plan and recommendations on how to achieve carbon emission reductions by 2025, 2035 and 2050. 3. Efforts to reduce vehicle miles traveled ("VMT") per capita in Los Angeles County, including proposed reduction targets. 4. Methods and recommendations to increase agency infrastructure resiliency and reduce environmental liabilities, especially those related to hazardous waste, as well as increase fuel efficiency, and use of energy efficien...		
Sponsors:	Board of Directors		

EXECUTIVE MANAGEMENT COMMITTEE
FEBRUARY 18, 2016

Preamble

Motion by:

DIRECTORS GARCETTI, KUEHL, RIDLEY-THOMAS, FASANA, SOLIS AND BONIN

February 18, 2016

Environmental & Sustainability Efforts to Further Metro's Goals to Reduce Emissions, Clean the Air & Improve Urban Areas

Metro has been at the forefront of international sustainability efforts and can continue to be a model, sustainably-oriented transportation system.

Every day, Metro provides transit service to over 1.4 million riders - literally taking millions of vehicles and the associated greenhouse emissions off the road. In addition, the Board has adopted a series of policies that demonstrate our commitment to operating in an environmentally sensitive manner. For example, the Board has instituted a Green Construction Policy, a Renewable Energy Policy and multiple Sustainability Policies which have guided both our operations and construction protocols.

However, given Metro's extensive operations and ambitious capital program designed to further expand public transit service, there is an opportunity to strengthen and expand our policies to further benefit the environment.

Specifically, Metro should look for opportunities to further reduce environmental impacts associated with the development and operations of both our current and future system. Metro's investments in future construction projects should reflect the best sustainability practices to meet federal, state, and local objectives in order to develop vibrant neighborhoods, foster economic growth, and enhance social equity. These investments should also be designed in a manner that promotes resiliency by assessing potential extreme weather events and drought-related issues resulting from the continual effects of climate change.

To maximize these goals, greening strategies should also be considered, implemented, and maintained in future Metro investments and capital projects to reduce regional air quality impacts, properly manage/reuse/recycle water resources, increase community connectivity, and advance clean technology, while simultaneously creating jobs to ensure economic vitality.

Metro's Environmental Compliance & Sustainability Department currently oversees the agency's multiple initiatives to reduce environmental impacts and is responsible for assessing Metro's ongoing commitment to sustainability, as reflected in their annual Energy and Resource Report. While this report demonstrates that much progress has been made, there are notable opportunities to expand and better integrate sustainability

efforts into Metro's overall operations and capital program.

Title
APPROVE **Motion by Directors Garcetti, Kuehl, Ridley-Thomas, Fasana, Solis and Bonin** that the Board of Directors direct the Chief Executive Officer to:

A. INCLUDE the following elements in Metro's Annual Energy and Resource Report, related to **Air Quality, Emission Reductions and Resiliency efforts:**

1. Efforts to reduce nitrogen oxide (NOx) emissions since the approval of Measure R, with a goal of 80% NOx emissions reduction by 2025, using 2008 as a base year.

2. An update on the progress of the Metro June 2012 Climate Action and Adaptation Plan and recommendations on how to achieve carbon emission reductions by 2025, 2035 and 2050.

3. Efforts to reduce vehicle miles traveled ("VMT") per capita in Los Angeles County, including proposed reduction targets.

4. Methods and recommendations to increase agency infrastructure resiliency and reduce environmental liabilities, especially those related to hazardous waste, as well as increase fuel efficiency, and use of energy efficient lighting, propulsion and auxiliary systems.

5. Efforts and recommendations to reduce emissions on Metro's vanpool program fleet.

FURTHER MOVE that the Board of Directors direct the Chief Executive Officer to report back to the Metro Board with an interim report on the above in May 2016 and a full report in August 2016 on the following:

B. An expansion of Metro's Green Construction Policy to make the following improvements related to **Water Conservation & Green Infrastructure:**

1. A requirement that all Metro future construction projects (that are currently not out to bid) implement methods to capture and treat storm water and apply reclaimed water best practices.

2. A requirement that all future design and construction projects ($5 million and over) use sustainable building materials which includes, but not limited to, the following, where feasible:

   a. Storm water & discharge runoff capture and cleaning devices
   b. Permeable pavement and surfaces
   c. Low carbon-intensity materials

d. Recycled & local materials
e. Light colored pavement & native shade trees

3. A requirement that all future highway and transit projects include a project-specific Sustainability Coordinator to oversee all resiliency and long-term sustainability-related requirements for the project realizing that proper maintenance is essential to realizing the full life-cycle benefit of sustainable infrastructure and to assist the agency's Sustainability Officer in achieving Metro's sustainability metrics.
4. A plan to significantly increase the number, size, and scope of projects in Metro's Urban Greening Implementation Action Plan.

C. Strategies to improve connectivity & enhance **"First-and-Last Mile" connections to our transit system**, including:

1. A schedule for expanding the existing car-share pilot program to at least ten additional park and ride Metro-owned lots and/or major transit hubs in the system.

2. An inventory of potential Metro-owned parcels that could be used to expand opportunities for active transportation links and/or "First-and-Last Mile" applications (e.g. Mobility Hubs).

3. A requirement, when feasible, that all future Metro-owned transit stations consider, for connectivity and ridership purposes, incorporate the following elements into their designs:

a. Walking paths
b. Bike routes
c. Accessibility to local neighborhoods (i.e. half-mile radius).
d. River & bicycle waterways (where applicable)

4. As part of Metro's Active Transportation Strategic Plan, strive to create a Regional Active Transportation Network, in coordination with local municipalities. As an initial step, Metro should coordinate with local agencies to assess opportunities to include right of ways (utility corridors, flood channels and other corridors) in this Regional Active Transportation Network to allow for preservation and best use and outline next steps towards implementing this network. Metro should also make recommendations on establishing a matching funding program to support the delivery of local first-last mile capital projects that support countywide transit ridership, and regional Active Transportation network connections.

D. Report back on the following strategies to better **deploy technology and promote green jobs:**

1. An assessment of any necessary positions focused on technological efficiencies and improvements that would be critical to supporting Metro's sustainability efforts.

2. Alternative renewable energy generation technology that could be used for future bus, vehicle, rail and maintenance structures.

3. Partnership and funding opportunities, including an incentive program, to maximize the use of zero or near zero emission technologies in future transit and goods movement corridors.

E. An overview of the Environmental Compliance and Sustainability Department's agency-wide effort to ensure coordination in planning and implementing sustainability initiatives, including recommended metrics to measure challenges and successes. This includes partnering and soliciting input from non-profits and other stakeholders to ensure public participation.

Board Report

Los Angeles County
Metropolitan Transportation Authority

Metro's 2016 Energy and Resource Report

Metro®

APPENDIX C: ENERGY AND RENEWABLE ENERGY UPDATE

Metro staff provides annual update on its implementation of Metro's energy program. For the purposes of the report back regarding Item #57 of the February 2016 Board Meeting, staff is including the information as Attachment D, herein. The following summarizes FY16 Energy Program activities and accomplishments.

Energy Efficiency Project Update

- Implemented energy saving projects and identified new opportunities, including:
    - Completed lighting retrofits at fuel islands and steam bays at Divisions 5 and 9, which are expected to save the organization over $11,720/year in utility costs;
    - Completed the installation and commissioning of an advanced wireless lighting controls system and lighting retrofits at Division 22, resulting in measured annual energy savings of nearly 1,000,000 kWh and avoided utility costs of $113,000 annually;
    - An ASHRAE Level II energy audit was completed at the Gateway Building. The purpose of the audit was to identify and quantity energy savings from proposed lighting and mechanical measures. Implementation of the proposed energy efficiency measures will contribute to the overall goal of achieving an Energy Star Rating to allow the LEED re-certification process to commence;
    - Metro's Energy Management Program (EMP) staff completed the 30% design packages for Buildings 1-6 at Metro's Central Maintenance Facility (CMF) based on the $2.5M energy improvements that were identified during FY15. The energy improvements identified are expected to save nearly $120,000 annually;
    - As part of the agency's annual Capital Program, the following are approved energy efficiency capital projects:
        - Division 30, Building 5 Air Scrubber Project: Metro's ECSD staff was asked to support the design of a ventilation system for the body shop within Building 5 at Metro's CMF to improve the current conditions within the space. In addition to supporting a permanent system, Metro's EMP staff was asked to investigate and recommend low cost short term solutions to improve the ventilation system and indoor air quality. Compressed air portable dust collector units were specified as an effective short term solution and will be purchased for the facility's use. Metro's EMP staff completed a Basis of Design (BOD), which outlines the requirements of the new central vacuum system that will replace the existing Rotoclones. Replacement of the Rotoclones with a central vacuum system will result in increased operating efficiencies and reduced equipment energy operating costs. Based on the outlined requirements, the proposed central vacuum system is projected to

save over 5,000,000 gallons of water annually. The procurement is expected to be initiated by the end of the calendar year.

- As part of the FY14 capital program, Metro staff applied for and was awarded nearly $4.2M to implement comprehensive energy efficiency and renewable energy projects at multiple bus divisions. In addition, $1.5M was awarded to implement energy efficiency projects at two rail divisions. Metro's EMP staff completed the 30% design packages and is ready for procurement. The procurement is expected to be initiated by the end of the calendar year and will require board approval.

- Gateway Lighting Retrofit Project: Using the investment grade lighting audit that was previously performed in 2010 as a basis, Metro's EMP staff conducted an updated lighting audit to focus on spaces that have since undergone changes and any interior or exterior lighting that was not previously included. Proposed recommendations include the retrofit of existing fixtures with new LED fixtures or retrofit kits and the installation of advanced lighting controls such as daylighting controls, fixture tuning, and occupancy sensors. Based on preliminary energy savings calculations, this project is projected to save approximately 2,800,000 kWh and avoided utility costs of over $300,000 annually.

- Gateway DHW Heat Recovery Project: In response to analyzing the most efficient system to heat the domestic hot water (DHW) at the Gateway building, a proposal emerged to utilize waste heat from the elevator motors that is currently ejected using air conditioners to heat hot water used in the high rise. This opportunity is expected to cost $50,000 and result in annual savings of $10,000. Southern California Gas Company has committed $15,390 to Metro in incentives for this project. The project will nearly eliminate the use of existing cooling equipment by taking all waste heat and pumping it into the domestic hot water system. This creates a positive feedback loop wherein the more the elevators are used; the more natural gas is offset because it is no longer used to provide hot water for the building.

- Select CNG Fuel Stations implemented recommended lockouts and if implemented successfully at all divisions, the lockout can potentially save Metro nearly $260,000 in annual energy costs with no capital expenditure necessary.

LEED Program Update

- Continued the pursuit of Metro's goal to achieve LEED-Existing Building (EBOM) certification at all existing maintenance facilities. LEED-EBOM progress in FY16 included:

    - Division 7 campus achieved LEED-EBOM Silver Certification. This site represents Metro's second LEED-EBOM certified maintenance facility and one of only a few in the country.

- LEED requires verification of compliance with ASHRAE Standard 62.1, which details the specific ventilation requirements different space types, including auto repair and offices. Extensive analysis and outside air (OSA) testing completed at Divisions 9 and 15 identified units that were not in compliance with ASHRAE 62.1. In order to proceed with the LEED Certification process, a corrective action plan will be developed to implement the minor repairs and adjustments to these units.

Renewable Energy Update

- Metro continues its progress in meeting and exceeding the Renewable Energy Policy goal of 33% use of renewable power by 2020. Current estimates for calendar year 2015 total at least 24.03% use of renewable power.

    Metro's existing photovoltaic (PV) systems at Division 8, 15, and 18 have been experiencing technical difficulties as detailed below and as a result have underperformed. A contract has been awarded to Skybridge Renewables to repair all known problems at the sites to bring these units not only operational, but also to upgrade the systems to current technology and specifications. A contract modification is currently in progress to include additional recommendations as detailed below and it is expected that the repair work will be completed by the end of this calendar year.

    - Division 8
        - Current Status: While Skybridge Renewables was on-site to assess the current state of the system they found that the system was not operational. They were able to get at least three inverters operating and the system is now producing.

        - Repair Plan: The old inverters will be replaced with string inverters, which will make this system operational for years and improve the performance.

    - Division 15

        - Current Status: During Skybridge Renewal's inspection of the existing system, they discovered a few bad modules that were then isolated in order to bring the system operational.

        - Repair Plan: The old inverters will be replaced with string inverters, which will make this system operational for years and improve the performance. Additionally, 40 modules will be installed to return the system to its nameplate capacity of 500 kW.

    - Division 18
        - Current Status: During Skybridge Renewal's inspection of the existing system, they identified two bad strings. As a result of cleaning and rebooting, the system is operational and appears to be producing. However, they also found the monitoring gateway has been removed. Therefore, the system performance of this system is not known.

        - Repair Plan: Rooftop and Inverter repairs and tune-ups are recommended for Division18 to improve the performance.

- In reaction to the issues uncovered at Metro's existing PV stations, a comprehensive preventative maintenance process was developed and implemented. ECSD and facility maintenance staff are working together to implement protocols that will ensure all systems receive regular maintenance, produce as expected and system failures are communicated and addressed in a timely fashion. Detailed training sessions on the preventative maintenance procedures have been held with facility maintenance staff and will continue to be offered as refresher course and to new staff over time. During a training session at El Monte station (Terminal 19), it was observed that the 89 kW system was underperforming. Further investigation led to the discovery that several micro-inverters were inoperable. Corrective actions were deployed by the system installer to bring the inverters operational and the system performance has since improved.

- As part of the preventative maintenance program, a series of video clips were developed related to the most critical PV system maintenance procedures and safety to provide on demand training support. In an effort to provide technical assistance with addressing concerns/issues with the PV systems, a hotline was established to field calls from facilities maintenance staff. If warranted, the hotline will also be used to schedule an onsite visit to address the system concerns.

- Metro continues their efforts in fulfilling commitments in the Renewable Energy Policy to incorporate renewable energy into Metro facilities. During FY16 solar panels were installed at two Metro facilities (Divisions 13 and 24), which are

expected to avoid over 800,000 kilowatt hours per year from being purchased, reducing electric utility costs by approximately $100,000 annually.

- Procurement process has been initiated on a set of new photovoltaic (PV) systems that will leverage the recently authorized Alternative Financing Mechanism authority and expand Metro's system portfolio by more than 50%. Summary of the approach and systems are as follows:

    - Shaded and PV wired parking structures are specified for Division 9 and rooftop installations are proposed at Division 11, 22 and Expo Maintenance facility.
    - The entire project is expected to install 1.73MW in capacity and projected to avoid nearly 3,000,000 kWh from being purchased from SCE.
    - The proposed financing structure, known as a Power Purchase Agreement (PPA), will be funded through a Public-Private Partnership at no up-front capital cost to Metro.
    - Metro will agree to a price per unit of energy and purchase all the energy produced by the system for the life of the system.
    - This approach will constitute the 2nd renewable energy-related public private partnership at Metro following the system installed at Division 30 by Chevron Energy Services.
    - Roofing replacements will be included at Divisions 11 & 22 as part of the project; specifics of the cost and financing structure are currently being analyzed.

- Metro's maintenance divisions provide a large expanse of parking lots that provide an ideal opportunity for ground mounted PV systems, which represents the largest opportunity for large scale solar installation. The buses operate through these lots, requiring a modified carport to be constructed to raise the panels up and above the buses. Initial screenings were performed to assess viability from a physical, operational, and potential energy generation standpoint. Based on this assessment, three potential sites have been identified as the most favorable bus divisions for deployment of solar canopies.

- An area near the Metro Gold Line Highland Park Station was identified as a safety concern for Metro passengers and neighborhood residents. Metro ECSD staff, at the request of multiple parties, developed a sustainable, low cost solution for providing area lighting to address this safety concern. Solar powered lighting systems were installed to meet the need for outdoor lighting in this area.

NEXT STEPS

Metro staff will continue to implement the on-going programs as follows:

Energy Efficiency Projects

- Release large scale procurement across 6 divisions to implement all identified energy efficiency projects, which will save over $350,000 annually. Project details are provided in Table 1 below.

Table 1. List of Energy Efficiency Improvement Projects at Selected Divisions

	Net Capital Cost, Includes Incentives	Total Annual Cost Savings	Annual kWh Savings	Annual Therm Savings
Division 3	$580,880	$54,091	470,215	5,431
Division 11	$867,015	$95,111	614,874	29,435
Division 22	$208,712	$52,550	451,235	290
Division 7	$246,026	$48,226	329,701	8,141
Division 15	$368,480	$73,101	623,765	9,888
Division 9	$288,377	$55,115	563,226	15,721
TOTAL	**$2,559,490**	**$378,194**	**3,053,016**	**68,906**

- Release procurement for large scale lighting retrofit and advanced controls at the Gateway Building that is projected to save over $275,000 in utility costs annually.
- Establish a new capital project for the replacement of HVAC systems at the Central Maintenance Facility campus, which is expected to save nearly $120,000 annually. Replacement of these HVAC systems, which are beyond useful life, is necessary to improve indoor air quality and to achieve an Indoor Air Quality prerequisite for LEED Certification. Project details are provided in Table 2 below.

Table 2. List of Energy Efficiency Improvement Projects at CMF Buildings 1-6

	Net Capital Cost, Includes Incentives	Total Annual Cost Savings	Annual kWh Savings	Annual Therm Savings
Unit Shops #1 and #2	$841,582	$31,006	309,043	5,805
Unit Shops #3 and #4	$699,930	$18,988	182,611	5,825
Building 5	$687,087	$52,509	261,568	19,365
Building 6	$96,351	$16,745	129,218	1,101
TOTAL	**$2,324,950**	**$119,248**	**882,440**	**32,096**

- Completion of the following projects:
    - Install heat recovery project at the Gateway building;
    - Complete installation of LED lighting at Division 7;
    - Establish a new capital project for retrofitting the existing lighting fixtures in the Gateway Parking Garage.
- Complete expansion of the Energy Data Platform as the remaining sub-metering systems are installed and commissioned.
- Continue using the Energy Program Site Implementation Process as outlined in the Energy Management Action Plan to implement and measure results from energy efficiency measures at 4-6 more maintenance divisions;
- Continue managing utility incentives for any and all Metro projects. Outstanding incentives pre-approved total nearly $50,000.
- Implement remaining cost saving strategies related to the operation of CNG Fuel Stations. Successful implementation at all divisions is estimated to save nearly $260,000 annually.
- Continue utilizing the Master Energy Project Dashboard as the central reporting tool while expanding to include all Sustainability related projects/assets.
- Complete quantification of benefits from transferring Metro rail propulsion billing to a structure known as conjunctive billing and develop a strategy to support obtaining conjunctive billing treatment from all electricity providers.

LEED® Program

- In order to proceed with the LEED Certification process, a corrective action plan will be implemented at Division 9 and 15, which will include air testing, adjusting, and

balancing for all units that were identified as not meeting the minimum OSA requirements as per ASHRAE 62.1. At the completion of repairs and adjustments, these units will be retested for compliance.

- Initiate LEED Certification applications at Division 9 and 15.
- Implement four remaining sub-metering systems to meet LEED Certification requirements.
- Continue supporting the Gateway Building staff as it prepares to recertify to Platinum level LEED® Certification in 2018.
- Continue expanding the use of Disadvantaged Business Enterprises in the LEED Certification Process
- Continue managing installed sub-metering systems and continually manage energy data.

Renewable Energy Program

- Continue measuring the generation performance of installed systems and implementing the preventative maintenance program.
- The concept of Community Solar presents an opportunity for Metro to realize operational savings, enhance relationships with Business Interruption Funds recipients, and support renewable energy goals. To purse this opportunity, a proposed pilot program is under development. Disadvantaged Business Enterprises will be utilized for outreach in communities targeted for the pilot. The pilot programs will be designed based on communication with LADWP and SCE representatives to ensure that the pilot will best fit within LADWP and SCE's programs.
- Conceptual design studies will be developed for three bus division sites that were identified for deployment of solar canopies. Each site selected will undergo a financial analysis to evaluate various project financing options and alternative project delivery methods, including self-ownership, Power Purchase Agreements, and equipment leasing.

Energy Resiliency

- Explore applicable concepts of resiliency, business continuity, and emergency response as they relate to energy systems on or near Metro facilities, transit hubs, and right-of-ways. A white paper on this topic is being developed in conjunctive with Risk Management, Asset Management, and other departments.

Staff will report back to the Board periodically on accomplishments and challenges related to this Energy Program.

ATTACHMENT D: GREEN CONSTRUCTION POLICY UPDATE

Metro staff provides annual update on its implementation of the Green Construction Policy. For the purposes of the report back regarding Item #57 of the February 2016 Meeting, staff is including the same information as Attachment D, herein.

I. GREEN CONSTRUCTION POLICY OVERVIEW

The Metro Board approved the Green Construction Policy (GCP) in 2011 to reduce the air quality impacts of Metro's construction projects in surrounding communities. Staff is required to report back to the Board periodically regarding the implementation status of the policy. Staff is also reporting on the implementation status of Sustainability Plan Policy which was approved in 2012 to ensure compliance with Metro Facility Design Criteria for Sustainability and the California Green Building Standards Code.

II. BACKGROUND

By adopting this policy, Metro is committed to using greener, less polluting construction equipment and vehicles, and will implement best practices to reduce harmful emissions in all construction projects performed on Metro properties and rights-of-way. Metro's GCP applies only to Metro contractors and Metro construction projects. The information in this report reflects the measurement of emissions and data from the larger Metro capital projects, specifically the Purple Line Extension Section 1, Crenshaw/LAX, and Regional Connector.

The GCP provides requirements for (a) identifying and mitigating diesel exhaust emission impacts from on-road and off-road equipment used during Metro construction and development activities, on human health and the environment; and (b) implementing appropriate best management practices to complement equipment mitigations. The goal of the policy is to reduce harmful air emissions of Particulate Matter (PM_{10}, $PM_{2.5}$), Nitrogen Oxides (NOx), and Reactive Organic Gases (ROGs) during Metro construction projects while minimizing any significant impact to cost schedule.

III. DISCUSSION

OUTREACH ACTIVITIES

Metro continues to schedule and facilitate GCP outreach activities, across Los Angeles County, with the assistance from a California Air Resources Board (ARB) instructor who has led all of these workshops with the support of Metro staff and consultants. The purpose of the workshops is to educate and raise awareness of the potential health impacts from diesel emissions, the state of the Los Angeles basin air quality, ARB current strategies to reduce diesel emissions, ARB enforcement programs, engine standards and diesel emission control strategies, off-road and on-road vehicle regulation requirements, public agency fleet regulations ARB's portable equipment registration program fugitive dust regulations and

the requirements in Metro's GCP. The workshop participants have included interested stakeholders and contractors.

Metro has conducted two (2) training workshops over the past several months in an ongoing effort to ensure that the regulated community is aware of the ARB and South Coast Air Quality Management District (SCAQMD) requirements governing construction equipment: off-road, on-road, and portable equipment; and to assist Metro contractors with understanding and conforming with the GCP requirements. Workshops were conducted at the following locations:

- Metro Purple Line Extension Project Field Office, Los Angeles, March 9, 2016 **(Number of Attendees: 34)**
- Division 16 / Crenshaw & LAX, Los Angeles, March 8, 2016 **(Number of Attendees: 25)**

During the workshops with the contractors, Metro provided an overview of the following: purpose/goal of the GCP, GCP project specification requirements, best management practices, conformance reviews, available exceptions, submittal requirements and a link to Metro's Green Construction Equipment Initiative website.

Metro also provided a Construction Equipment Funding Resource Guide to workshop attendees. The guide includes a program description (SCAQMD, ARB, and EPA), key deadlines to apply for grant funds to repower, replace, or retrofit aged construction equipment, and program websites. Metro also provided specific information about funding workshops focused on the Carl Moyer Program and off-road and on-road funding sources provided directly by the SCAQMD and attended each workshop on **04/20/16** and **05/04/16** to acquire and assist in transmitting information to the contractors and sub-contractors.

PROJECT INSPECTION REVIEWS

Metro has continued to conduct project inspection reviews in Fiscal Year 2016 during the execution of the Purple Line Extension Section 1, Crenshaw/LAX, Regional Connector and Universal Pedestrian Bridge Projects. As a result of the reviews, Metro has documented the following GCP implementation challenges:

- Incomplete (but improved from Fiscal Year 2015) GCP specification submittals - includes equipment lists (on-road, off-road, portable generators), compliance certification, fuel use logs, and copies of ARB/SCAQMD permits and registrations;
- Fuel use logs are not submitted monthly as required in the specifications;
- Off-road equipment observed on site without ARB registration labels;
- Sub-contractors not documenting or providing a list of equipment or fuel use data;
- Off-road equipment with less than Tier 4 rated engines observed on-site, and through review of equipment lists;
- Methodology changes in emissions calculations and continually changing quantification tools;

- ARB EIN number required to verify the equipment was missing in 35% of equipment listed and reported on in fuel logs (Figure 1);

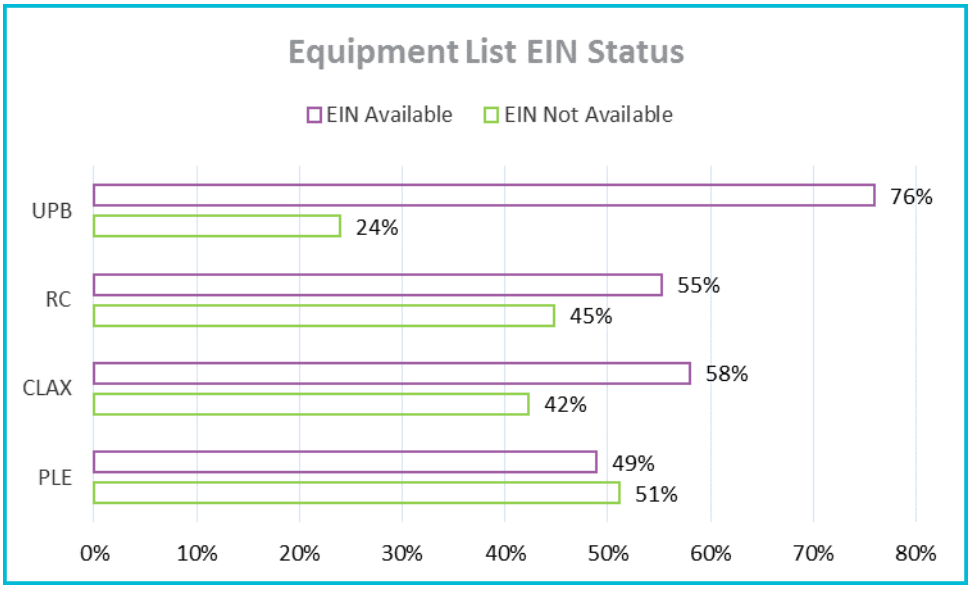


Figure 1 – Equipment EIN availability provided by contractor in equipment list

According to the Air Resources Board, "the In-Use Off-Road Diesel Vehicle Regulation (Off-Road Regulation) requires that all vehicles subject to the Off-Road Regulation be labeled with a unique EIN.[1]" In each non-conformance case, the contractor or subcontractors were issued corrective action requests to respond by either providing documentation of exceptions or to remove the equipment or vehicles from the site in order to be in conformance with the GCP. The contractors for each of the projects made a notable improvement in providing fuel logs in comparison to Fiscal Year 2015; data was reported for each month during the 2015 calendar year.

Off-Road Equipment Summary

The majority of the off-road equipment used in the submitted equipment lists are comprised of excavators, backhoes, loaders, tractors and cranes. The Air Resources Board (ARB) applies engine "Tiers" to off-road equipment according to engine model year and horsepower. This higher Tier equipment has lower emissions rates, which are considered cleaner equipment. As of January 1, 2016 the ARB requires Tier 2 or higher for the fleet of equipment. Metro's GCP contains more stringent requirements than the ARB, requiring all equipment (not just the fleet) adhere to Tier 4 standards. An overview of ARB Engine Tiers is provided in the table below.

Equipment Engine Tiers	**ARB**	**Metro GCP**	**Notes**

[1] Air Resources Board, "Label Vendors for Off-Road Vehicles" http://www.arb.ca.gov/msprog/ordiesel/labelvendors.htm

Tier 0	Not Compliant	Not Compliant	ARB banned in fleets as of January 1, 2014
Tier 1	Not Compliant	Not Compliant	ARB banned in fleets as of January 1, 2016
Tier 2	Compliant	Not Compliant*	ARB minimum compliance through January 2018
Tier 3	Compliant	Not Compliant*	
Tier 4 – Interim (Tier 4i)	Compliant	Compliant	Tier 4i emissions standard that became effective on Jan. 1, 2011
Tier 4 – Final (Tier 4F)	Compliant	Compliant	Tier 4F represents the highest level of clean air regulations proposed to date

Table 1 - Tier requirements overview;
**Exceptions are defined with the GCP specification*

Through the fuel log submittals and equipment lists, we determined Tier 4 interim equipment or better comprised 70% of the equipment used on site across all projects. A project level breakdown is listed below. The "undetermined" category is assigned due to insufficient information in the equipment list (i.e. horsepower, model year, EIN number), which is information required to determine a tier for the piece of equipment. Subsequently, the emissions associated with these were not included in the reduction calculations. The off-road equipment for each of the four capital projects is listed in Figure 2.

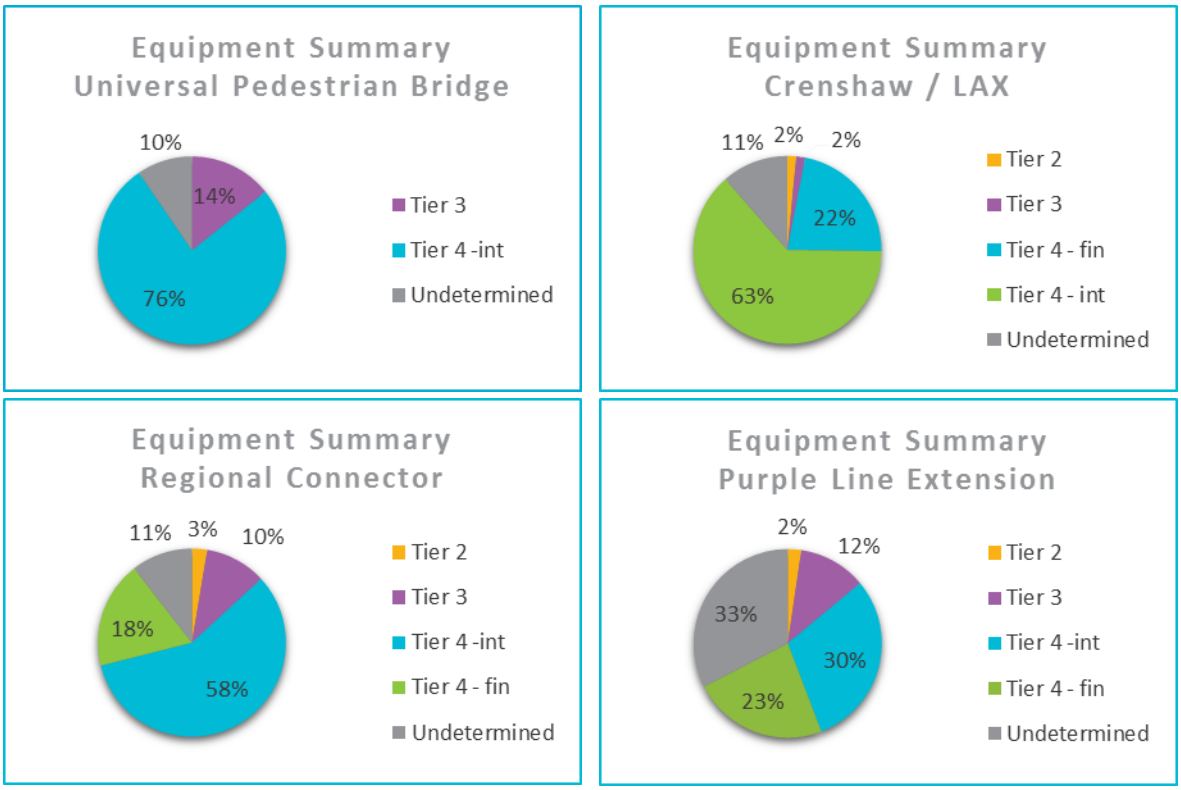


Figure 2 – Equipment Tier by project

IV. EMISSIONS REDUCTIONS

The emission reduction analysis analyzed the following criteria pollutants emitted by the construction equipment. EPA identifies these pollutants based on the human health-based and/or environmentally-based effects. These criteria pollutants included in the analysis are detailed in Table 2. The analysis primarily relies on the carbon dioxide equivalent converted into metric tons, using the Nitrogen Oxide emissions.

	Pollutant	**Definition**
NOx	Nitrogen Oxides	Nitrogen Oxides are a family of poisonous, highly reactive gases. NOx pollution is emitted by automobiles, trucks and various non-road vehicles (e.g., construction equipment)[2]
CO2e	Carbon Dioxide Equivalent	A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP).[3]
PM_{10}	Particulate Matter	10 micrometers or less in diameter, also known as inhalable coarse material by the EPA[4]
ROG	Reactive Organic Gases	Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate.

Table 2 – Criteria pollutants used in Green Construction Policy analysis

In Fiscal Year 2015, Metro calculated the emissions reductions (NO_x, PM_{10}, $PM_{2.5}$, and ROGs) for the Purple Line Extension Section 1, Crenshaw / LAX, Regional Connector and the Universal Pedestrian Bridge Projects for a worst case scenario. Each of these projects utilized off-road equipment, on-road vehicles or portable generators subject to the GCP. Project specifications required fuel log submittals for the off-road equipment and on-road vehicles for each project be reviewed and tabulated to determine the emissions reductions. The following summarize the CO2e reductions by pollutant across projects.

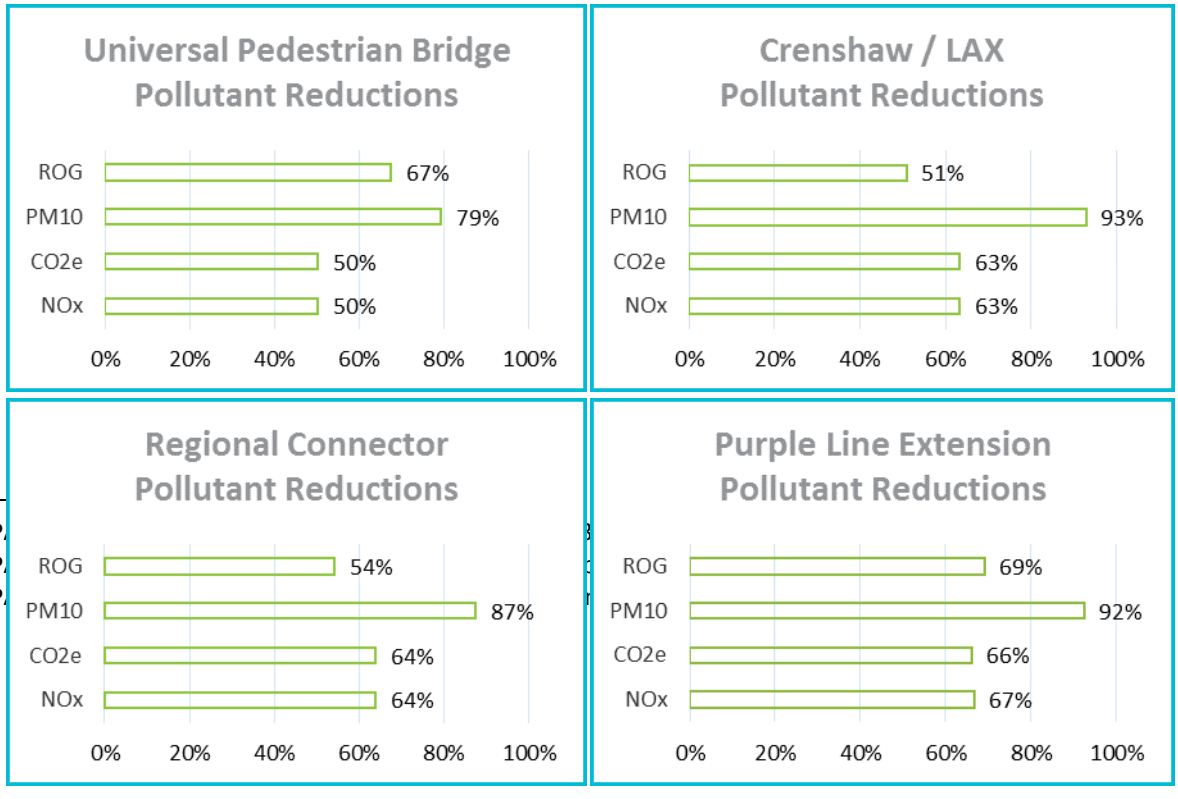


Figure 3 - Percent reduction in criteria pollutants and CO2e

[2] EP
[3] EP
[4] EP

As indicated in Figure 3, the most significant reductions from using Tier 4 Interim equipment, when compared to Tier 2 equipment, occur in PM_{10} with an average reduction of 87.5%. However, in terms of volume, Carbon-dioxide equivalents were reduced by 4,000.05 metric tons. According to the Environmental Protection Agency (EPA, 1999)[5] nitrogen oxides (NO_x) represent seven (7) compounds, including nitrous oxide (N_2O), which forms from tail pipe emissions (EPA, 2016)[6] and results in harmful ozone production, when combined with sunlight.

Currently, the emission factors for NO_x are available for multiple tiered off-road pieces of equipment. While nitrogen oxides are generally short-lived, nitrous oxides have long atmospheric lifetimes and the carbon dioxide equivalents were based on the global warming potentials of nitrous oxides to account for a worst possible case scenario. It should be noted that as EPA tools and methodologies continually develop for tail pipe emissions of multiple tiered off-road and on-road equipment and vehicles, emissions calculations will be further adjusted in Fiscal Year 2017. The percentage reduction in pollutants from off-road equipment emissions from the use of Tier 4 Interim equipment, when

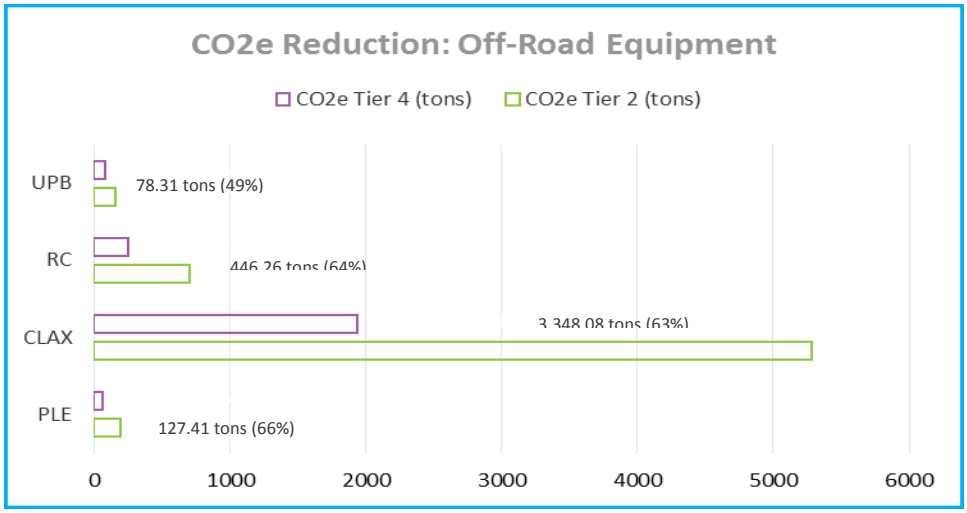


Figure 4 - Percent reduction CO2e and metric tonnage reductions.

compared to Tier 2 equipment reductions, are provided for each project in Figure 4.

Off-Road Emission Reductions

The off-road equipment CO2e emissions reductions from the use of Tier 4 Interim equipment, when compared to Tier 2 equipment, are as follows:

[5] "Technical Bulletin, Nitrogen Oxides (NOx) Why and How They Are Controlled", 1999
https://www3.epa.gov/ttncatc1/dir1/fnoxdoc.pdf

[6] "Overview of Greenhouse Gases – Nitrous Oxide Emissions", 2016
https://www3.epa.gov/climatechange/ghgemissions/gases/n2o.html#Reducing

As indicated in Figure 4, the most significant reductions from using Tier 4 Interim equipment, when compared to Tier 2 equipment, occur in PM_{10} with an average reduction of 87.5%. However, in terms of volume, Carbon-dioxide equivalents were reduced by 4,000.05 metric tons. The percentage reduction in pollutants from off-road equipment emissions from the use of Tier 4 Interim equipment, when compared to Tier 2 equipment reductions, are provided for each project in Figure 4.

Off-Road Emission Reduction Comparisons

The reductions from using Tier 4 (Interim and Final), as required by the Metro GCP, result in greater emissions reductions than would otherwise occur under ARB regulations. The results of this more

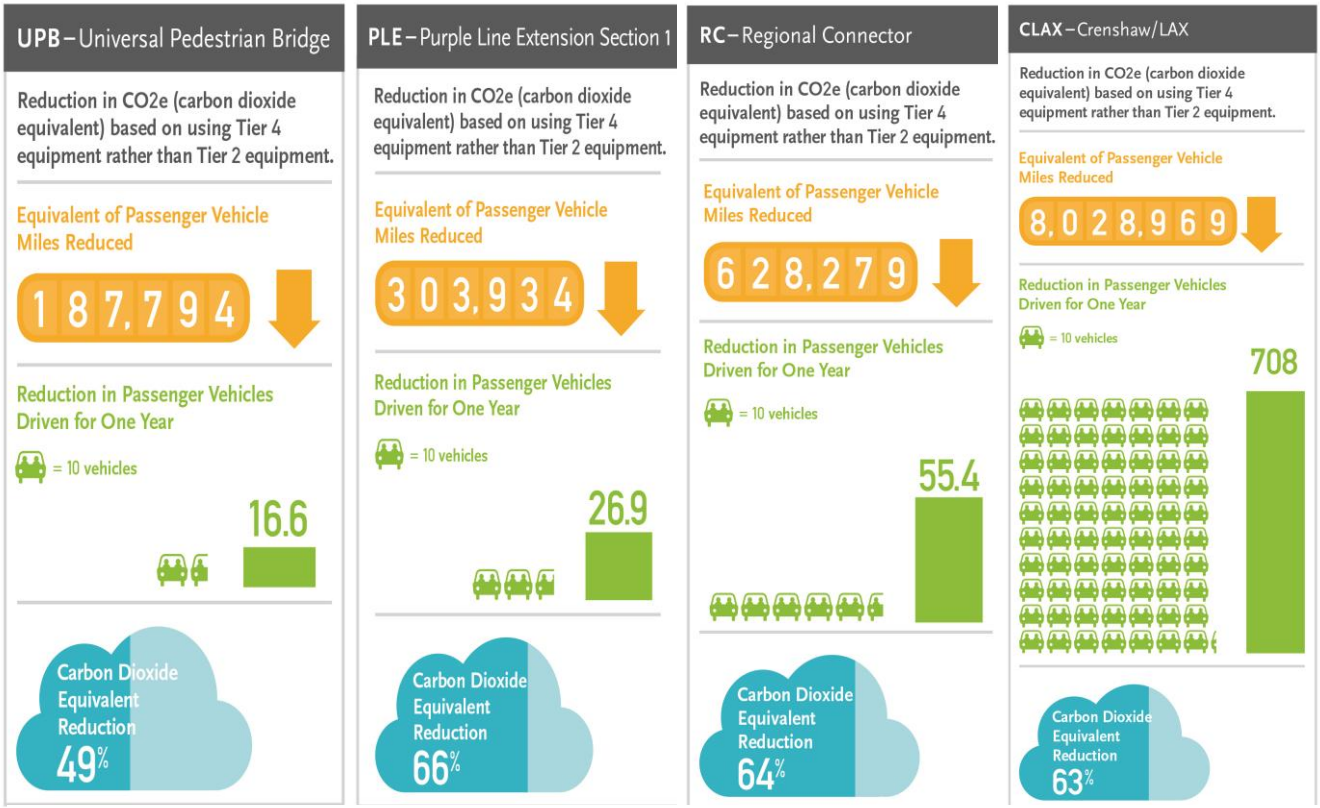


Figure 5 - Project summaries for emissions reductions (CO2e) based on Tier 4 equipment rather than Tier 2 equipment.

stringent Metro policy can be translated to greenhouse gas and carbon dioxide equivalent reductions. These emissions reductions per project based on using the cleaner Tier 4 equipment mandated by the GCP, rather than Tier 2 equipment required by the ARB, are as follows in Figure 5.[7]

On-Road Equipment Emissions

The Green Construction Policy requires on-road vehicles' engine model year (MY) to be 2007 or newer. Figure 6 shows the relationship between gallons of fuel dedicated by a range of model years and the associated CO2e emissions. 1998-2009 accounts for 6% of fuel usage, yet contributes to 44% of the

[7] "EPA Greenhouse Gas Equivalencies Calculator", 2014
https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

CO2e emissions. Conversely, 2010 and later model years consume 94% of fuel, and only contribute 56% of emission pollutants. The efficiency of newer model years indicate a nonlinear relationship between fuel usage and consequent pollutants, a relationship that highly favors using newer lower emitting construction equipment.

The on-road vehicle emissions reductions from the use of vehicles with engine model years of 2010 and newer, when compared to engine models of 1998 – 2009 are as follows:

Figure 6 –Projects summary for emissions reductions (CO2e) based on Tier 4 equipment rather than Tier 2 equipment.

III. NEXT STEPS

Metro Staff will continue to implement the GCP through the following tasks in Fiscal Year 2017:

1) Coordinate and schedule additional workshops jointly with the Air Resources Board (ARB).
2) Expand GCP implementation to other capital projects including Division 16, Purple Line Extension Section 2 and Building 61s.
3) Conduct construction project conformance reviews on a quarterly basis, and on a monthly basis where Metro deems necessary, based on the quality of contractor submittals.
4) Assist the contractors with meeting the GCP requirements through trainings and providing funding information.
5) Continue expanding quantification methodology and emissions reporting reductions using newly available tools in 2016.
6) Continue to provide Metro with infographics and visual tools for display on the Metro website.
7) Revise GCP specifications to include updated goals / timeframes through the year 2020 based on commercially available off-road, on-road, portable generators equipment and alternative fuel / electric equipment.

Staff will report back to the Board at the end of Fiscal Year 2017 to document additional progress of Green Construction Policy implementation.

IV. SUSTAINABILITY PLAN OVERVIEW

Starting in 2012, Metro began including the requirement for Sustainability Plans as part of specifications (Section 01 35 63) to be submitted for Metro's construction projects. The goal of the Sustainability Plan is for project contractors to address sustainable practices in the following categories:

- Planning and Design
- Energy Efficiency
- Water Efficiency and Conservation
- Material Conservation and Resource Efficiency
- Environmental Quality

The Sustainability Plan must include the project's mandatory and voluntary commitments to ensure compliance with Metro's sustainability policy and requirements and California Green Building Standards Code for Mandatory and Voluntary measures (CALGreen), Title 24. Additionally, the specification establishes that the contractor will provide a qualified Sustainability Coordinator that oversees the contractor's monthly submittals and annual Sustainability Plan updates. These reports provide the basis for the content that follows.

V. DISCUSSION

Sustainability Plans ("Plan") requirements are currently being implemented on the Crenshaw/LAX, Purple Line Extension, Regional Connector, Building 61s, and Universal Pedestrian Bridge Projects. The

Emergency Security Operations Center (ESOC) project will be kicking off its Plan in the near future and the new Division 16 rail yard project has yet to submit a Plan. The Universal Pedestrian Bridge project has been completed and we are awaiting their final annual report that will describe the project's sustainability performance in detail.

In December of 2015, Metro's sustainability team in ECSD kicked off tasks to elevate the level of compliance with the Sustainability Plan implementation. During the past 6 months, considerable effort has been spent to evaluate project compliance status, improve reporting on sustainability plan progress in monthly and annual reports, and identify gaps in sustainability plans where they do not adequately address mandatory requirements such as compliance with CALGreen Mandatory measures and applicable MRDC Energy Policy. The materials were also developed in 2016, including a Monthly Submittal, Monthly Review, Gap Analysis, CALGreen Report Card, and Annual Report templates. Furthermore, a *Sustainability Plan* template and implementation process document is under development for use by the contractor teams on current and future projects.

Compliance Summary

Key information provided in the contractor submitted 2015Sustainability Plan Project Annual Reports is summarized below. The following information highlights Sustainability Plan commitments of the Crenshaw/LAX, Purple Line Extension, Regional Connector projects. It should be noted that at this early-stage of Sustainability Plan implementation much of the project performance information is presented as "projections". This information will be refined annually as the program is implemented and more detailed performance information becomes available.

The following infographic includes the current reported status of the abovementioned projects along the path to required CALGreen State Mandatory Measure Compliance. All projects have committed to compliance with mandatory CALGreen measures in general as a primary objective of their sustainability plan as this is also the primary objective of the Sustainability Plan Specification. The projects, currently in design and early construction phases, have reported they are "on track" for all CALGreen State mandatory measures. Annually, and upon completion of construction, ESCD will assess and verify final compliance percentages.

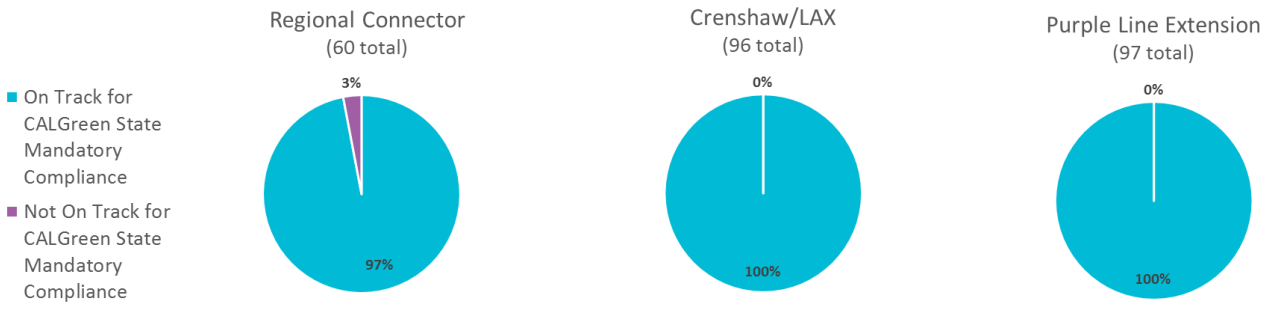


Figure 7 – CALGreen State Mandatory Compliance %

Sustainability Plan Practices

The following information highlights the sustainability practices reported by the Crenshaw/LAX (C/LAX), Purple Line Extension (PLE), Regional Connector (RC) projects for each of the Sustainability Plan specification required areas:

Planning and Design

Planning and Design

PLE – Purple Line Extension

Developing areas for a future bike sharing program that include bike storage units and multiple locations for bike racks. In order to promote the Metro Bike Sharing program, project designs do not include vehicle parking at stations.

Complying with Metro's new Vision Zero policy being implemented in Los Angeles.

We are focusing on improving our streets, during construction and for future use, for vulnerable roadway users to encourage walking and biking.

Energy Efficiency

Planning and Design

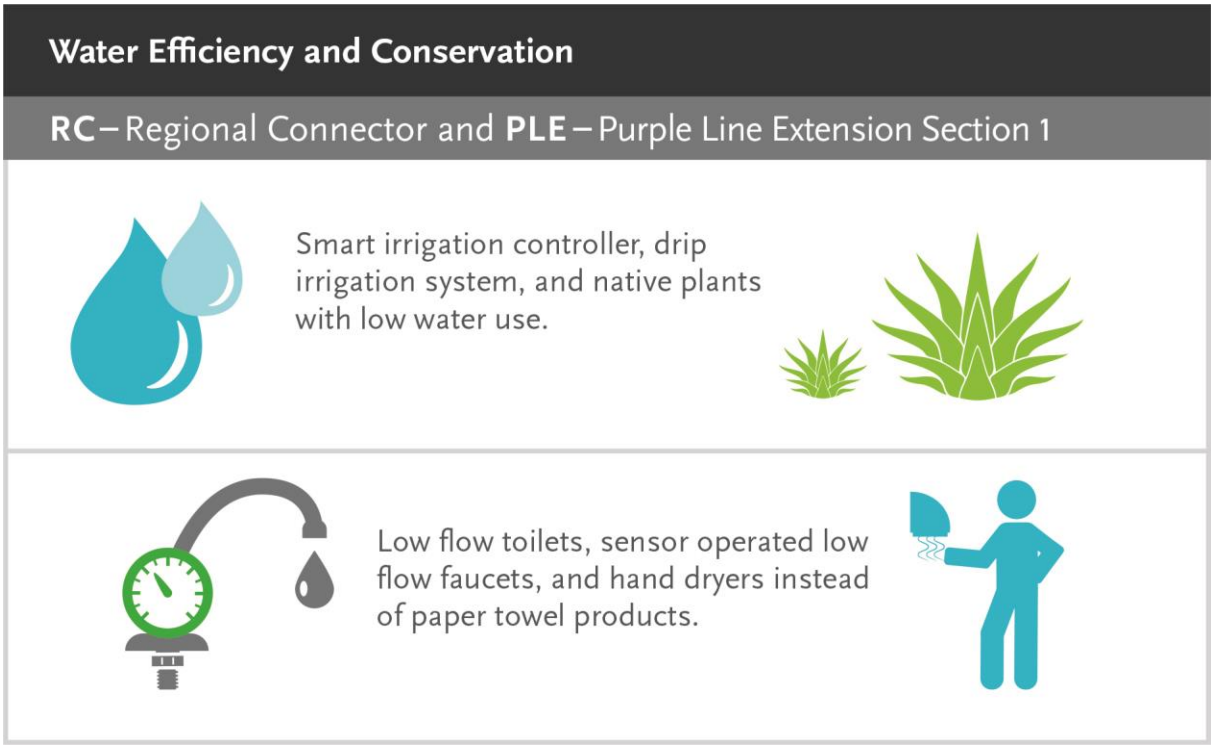
RC–Regional Connector and **PLE**–Purple Line Extension Section 1

Exceeds Metro Standards for LED Lighting, thus reducing cable sizes, losses in the cables and increasing available power on the feeders.

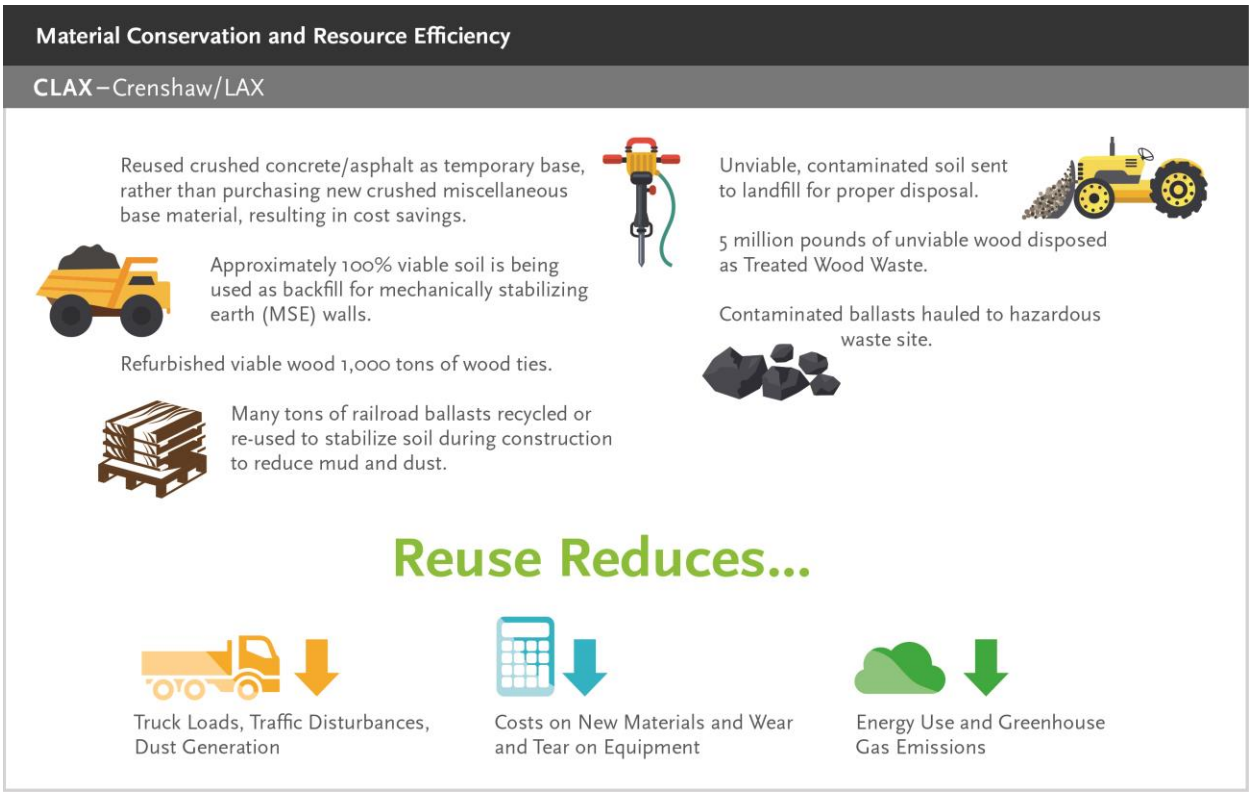
Improved overhead contact cable that minimizes wear and tear, reducing maintenance and materials costs.

Utilizes a single fan type for both emergency ventilation and normal operations instead of more traditional separate fan plant approach. This is a more economical design and lessens the station footprint and reduces the overall environmental impact.

Water Efficiency and Conservation



Material Conservation and Resource Efficiency



Environmental Quality

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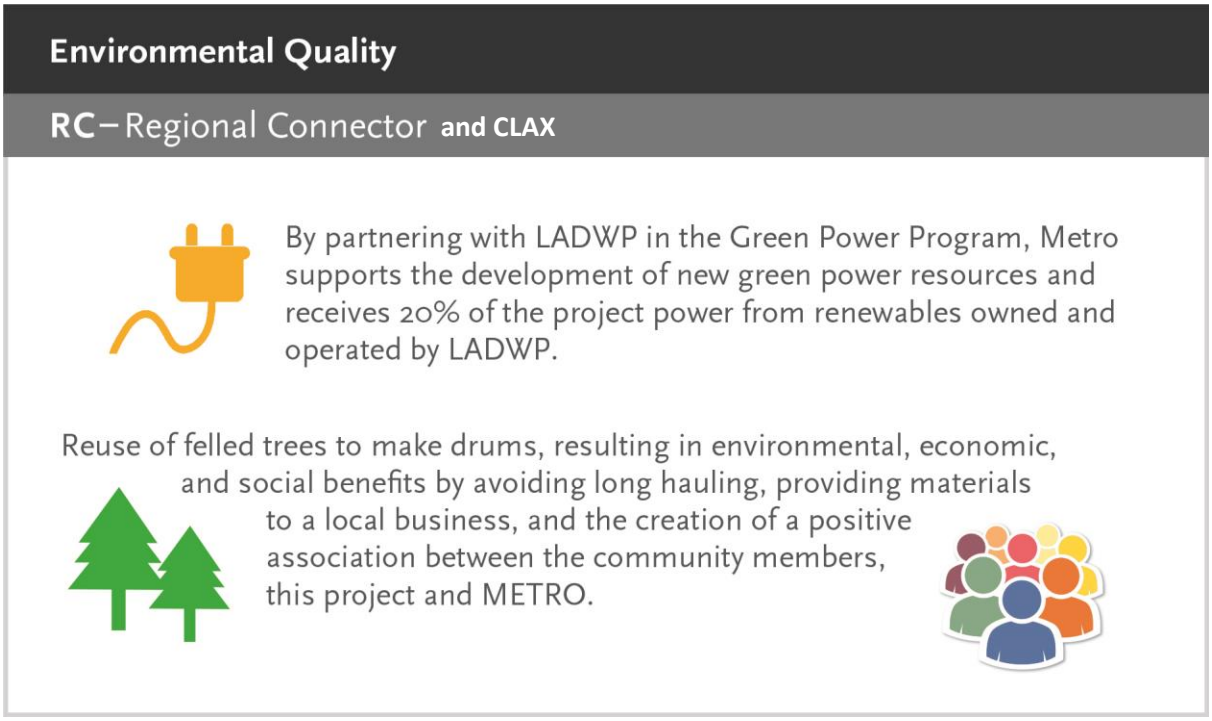

VI. Next Steps

Metro's Sustainability Team will continue to provide the Board the Sustainability Program Annual Review. Environmental and cost performance metrics will be refined annually as the project is implemented and more detailed performance information will be reported for the following:

- Updated Percent of CALGreen project compliance to State Mandatory Measures
- CO_2 Reduction Resulting from Bike Spaces
- Annual GHG benefits from Water, Energy, Bike/EV
- Savings from Water and Energy Reductions
- Reduction of Energy Demand in Kwh
- Renewable or Alternative Energy generation (kWh)
- Water Savings in G/Y for Indoor Potable, Wastewater, And Recycled Water
- Tons of Waste Diverted from Landfills
- Emissions Reduction from reduced Truck Trips per day and miles traveled per day

In addition, ECSD will conduct Sustainability Plan Workshops with project teams to ensure a clear understanding of reporting requirements, baseline data, and methodologies for the collection and reporting of annual report data.

VII. APPENDICES

I. Appendix A – Off-Road Annual Summaries

a) Universal Pedestrian Bridge

	Tier	NO_x	CO2e	PM_{10}	ROG
UPB	Tier 2 (lbs)	1,137.59	352,653.95	42.00	53.48
UPB	Tier 4 (lbs)	566.53	175,623.76	8.69	17.47

b) Regional Connector

	Tier	NO_x	CO2e	PM_{10}	ROG
RC	Tier 2 (lbs)	4,973.56	1,542,224.68	128.07	177.91
RC	Tier 4 (lbs)	1,800.04	558,228.67	16.26	81.59

c) Purple Line Extension

	Tier	NO_X	CO2e	PM_{10}	ROG
PLE	Tier 2 (lbs)	1,358.34	424,832.97	42.52	58.07
PLE	Tier 4 (lbs)	452.32	143,899.83	3.21	17.86

II. Appendix B – On-Road Annual Summaries

a) Universal Pedestrian Bridge

	Model Year	Gallons	NOx	CO2e	PM_{10}
UPB	1998 - 2009 (lbs)	202.70	26.47	8,204.99	0.61
UPB	2010 - later (lbs)	90.00	0.73	227.58	0.04

b) Regional Connector

	Model Year	Gallons	NOx	CO2e	PM_{10}
RC	1998 - 2009 (lbs)	1,868.37	179.94	55,782.83	3.61
RC	2010 - later (lbs)	7,734.03	63.09	18,690.24	3.15

c) Purple Line Extension

	Model Year	Gallons	NOx	CO2e	PM_{10}
PLE	1998 – 2009 (lbs)	387	55.94	5908.55	37.16
PLE	2010 – later (lbs)	262	20.64	681.01	18.61

d) CLAX

	Model Year	Gallons	NOx	CO2e	PM_{10}
CLAX	1998 – 2009 (lbs)	875	134.18	41596.45	3.26
CLAX	2010 – later (lbs)	47596.5	388.24	120355.3	8.96

III. Appendix C - < 50 HP

a) Universal Pedestrian Bridge

		NOx	CO2e	PM_{10}	ROG
UPB	Tier 4 (lbs)	82.14	25,464.23	4.97	5.15

b) Regional Connector – N/A

c) Purple Line Extension –

		NOx	CO2e	PM_{10}	ROG
PLE	Tier 2 (lbs)	26.25	11,883.31	2.32	2.40
PLE	Tier 4 (lbs)	24.69	11,336.61	0.99	0.99

d) CLAX

		NOx	CO2e	PM_{10}	ROG
CLAX	Tier 2 (lbs)	1.89	585.38	0.11	0.12

IV. Appendix D – Project Descriptions

Crenshaw/LAX	
Project Description	The Metro Crenshaw/LAX Line will extend from the existing Metro Exposition Line at Crenshaw and Exposition Boulevards. The Line will travel 8.5 miles to the Metro Green Line and will serve the cities of Los Angeles, Inglewood and El Segundo; and portions of unincorporated Los Angeles County.
Start Date	January 21, 2014
Proposed Completion Date	2019
Completion of Design Phase	90%
Completion of Construction Phase	30% of Tracks
Innovative Sustainable Elemement	The project collaborated with a local drum maker to resue tree trunks of felled trees within the community to create drums which avoided long hauling, providing materials to a local business (by-product synergy), and the creation of a positive association between the community members, this project, and Metro.
Notable Challenge/Lesson Learned	For a design-build project such as Crenshaw/LAX, there is no contingency budget to incorporate sustainable practices that have premium costs.

Purple Line Extension #1	
Project Description	The Metro Rail extension, which will be built in three phases, will continue from the current station at Wilshire/Western extending westward for about nine miles along Wilshire Boulevard into Westwood. Section #1 is 3.92 miles and extends the line to the Wilshire/La Cienega Station
Start Date	November 11, 2014
Proposed Completion Date	2023
Completion of Design Phase	90% and 60% for Wilshire/La Cienega
Completion of Construction Phase	5%
Innovative Sustainable Elemement	
Notable Challenge/Lesson Learned	