CALIFORNIA STATE TRANSPORTATION AGENCY

TRANSPORTATION AGENCY
ISSUE MEMORANDUM

FROM: Brian Annis
Secretary
California State Transportation Agency

Joe Hedges
Chief Operating Officer
California High-Speed Rail Authority

DATE: December 7, 2108

SUBJECT: **GREENHOUSE GAS REDUCTION FUND:**
California High-Speed Rail Authority

EXPENDITURE RECORD FOR
High-Speed Rail Program

This Attestation Memorandum documents that *the High-Speed Rail Authority* completed the attached Expenditure Record on *December 7, 2018,* for *the High-Speed Rail System.* The Expenditure Record is consistent with the statutory requirements of Government Code Section 16428.9 and with the California Air Resources Board (CARB)'s 2018 *Funding Guidelines for Agencies Administering California Climate Investments* to support expenditures from the Greenhouse Gas Reduction Fund. This Attestation Memorandum and Expenditure Record will be submitted to CARB for public posting on the CARB website at: www.arb.ca.gov/caclimateinvestments.

Questions on this Attestation Memorandum or Expenditure Record may be directed to James Andrew, California High-Speed Rail Authority, James.Andrew@hsr.ca.gov, (916) 669-6547.

APPROVED:

Brian C. Annis, Secretary
California State Transportation Agency

3/8/2019
Date

Joe Hedges, Chief Operating Officer
California High Speed Rail Authority

1/22/2019
Date

Attachment: Greenhouse Gas Reduction Fund: Expenditure Record

Greenhouse Gas Reduction Fund: Expenditure Record

California High-Speed Rail Authority
California High-Speed Rail

Authorizing legislation: Senate Bill (SB) 852 (Leno, Chapter 25, Statutes of 2014), SB 862 (Committee on Budget and Fiscal Review, Chapter 36, Statutes of 2014)

Element (1) A description of each expenditure proposed to be made by the administering agency pursuant to the appropriation.

❑ Agency that will administer funding	▪ The California High-Speed Rail Authority (Authority or HSRA).
❑ Amount of proposed expenditure and appropriation reference	▪ Per SB 862, 25 percent of the annual proceeds in the Greenhouse Gas Reduction Fund (GGRF) are continuously appropriated to HSRA for high-speed rail, beginning in Fiscal Year (FY) 2015-16. The exact amount of available funds will not be determined until after all auctions during a given FY have occurred.
❑ Estimated amount of expenditures for administering agency administrative costs	▪ The Authority does not propose to use any GGRF funds for administrative costs.
❑ If applicable, identify laws or regulations that govern how funds will be used	▪ Assembly Bill (AB) 1532 (Pérez, Chapter 807, Statutes of 2012), SB 535 (de León, Chapter 830, Statutes of 2012), SB 1018 (Budget and Fiscal Review Committee, Chapter 39, Statutes of 2012), AB 1550 (Gomez, Chapter 369, Statutes of 2016), AB 398 (Ch. 135, Statutes 2017) and SB 862 provide the general framework for how the auction proceeds will be administered to further the regulatory purposes of Division 25.5 of the Health and Safety Code. ▪ Safe, Reliable High-Speed Passenger Train Bond Act for the 21st Century – Proposition 1A (Streets and Highways Code §2704-2704.01; §2704.4-2705.095) defines the high-speed rail system, and Public Utilities Code §185033 details the purpose and content of the Authority's biennial Business Plan.
❑ Continuation of existing Expenditure Record	▪ This fiscal year's, and subsequent fiscal years', appropriation will support a continuing program that will fund the same types of projects that have already been funded under an existing Expenditure Record.

	▪ This is an update to an existing Expenditure Record. The Expenditure Record elements being updated include the following: o Updates to benefits information; and o Percentage of total funding that will be expended for projects that are located in and benefit priority populations, per CARB's Guidance.
❑ Project type(s)	▪ Sustainable Communities and Clean Transportation o High-Speed Rail
❑ Describe the projects and/or measures that will be eligible for funding	▪ Phase 1, referred to in SB 862 as Phase 1 Blended System, will connect San Francisco and the Los Angeles basin, via the Central Valley, by 2033 with high-speed rail service. Components of the Phase 1 System include planning, environmental review, design, right of way acquisition, repayment of any loans made or to be made by the Authority to fund the project, and construction and other capital costs (such as environmental mitigation). ▪ Phase 1 includes an initial line for high-speed rail service, typically referred to as the initial operating segment, or IOS. The initial operating segment is also referenced in SB 862. The 2018 Business Plan identified the Silicon Valley to Central Valley line as the feasible initial operating segment that could begin full service in 2029, with interim service options to be explored for 2026. ▪ Phase 1 also includes investments in bookend and connectivity projects that are essential for high-speed rail service but also generate benefits for regional and local rail systems. Examples of bookend projects include the electrification of the Caltrain corridor and the Rosecrans/Marquardt Grade Separation in the Los Angeles to Anaheim Corridor. The Authority does not include the greenhouse gas emissions reductions that those services will accrue in any greenhouse-gas-reduction reporting to CARB. Only the estimates of the emissions reductions from high-speed rail service itself are included. ▪ The appropriated GGRF funds could be used to leverage federal funding and will be combined with other funds (e.g., from the state's Proposition 1A (Prop 1A) bonds) for expenditure on components of the Phase I System.

❑ Intended recipients	▪ The Authority, to fund implementation of its project through contracts with public and private entities, including, but not limited to, contractors, land owners, air districts, local governments and/or non-profit organizations.
❑ Program structure and process for selecting projects for funding	▪ Direct funding of defined state capital improvements. The Authority is currently implementing planning, design and construction of the high-speed rail system. The Authority issues design-build and other service contracts periodically and as detailed on its website: http://www.hsr.ca.gov/About/Doing_Business_with_HSR/index.html. Projects for funding are selected based on construction phasing for the Phase 1 System and their contribution to a commercially viable system.

Element (2) A description of how a proposed expenditure will further the regulatory purposes of Division 25.5 (commencing with Section 38500) of the Health and Safety Code, including, but not limited to, the limit established under Part 3 (commencing with Section 38550) and other applicable requirements of law.

❑ How the expenditure is consistent with the Investment Plan and the Scoping Plan	▪ AB 1532 (Pérez, Chapter 807, Statutes of 2012) requires the development of a three-year Investment Plan, which identifies priority investments that facilitate greenhouse gas (GHG) emission reductions. This legislation also requires that GGRF moneys be appropriated in a manner that is consistent with the Investment Plan. The Second Investment Plan[1] calls for California to improve mobility options to allow all residents to drive less and reduce household costs while reducing GHG emissions and realizing better air quality. Figure 12 of the Second Investment Plan describes potential concepts for transportation and sustainable communities (i.e., expansion of public transit and active transportation infrastructure). Therefore, the high-speed rail expenditures covered by this record will be consistent with the three-year Investment Plan. ▪ High-speed rail expenditures will reduce GHG emissions and further the regulatory purposes of Division 25.5 of the Health and Safety Code when people shift from cars, planes and other more-GHG-intensive forms of transportation to high-speed rail and its Phase I System components. Ultimately, the system will provide high-quality, high-speed passenger rail service connecting California's major population centers. The Second Investment Plan, 2008 AB 32

[1] Cap-and-Trade Auction Proceeds Second Investment Plan: Fiscal Years 2016-17 through 2018-19; https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/16-17-final-second-investment-planii.pdf

Scoping Plan,[2] 2014 Scoping Plan Update, and 2017 Scoping Plan[3] recommend investments in high-speed rail and rail modernization to help achieve AB 32 goals.

Element (3) A description of how a proposed expenditure will contribute to achieving and maintaining greenhouse gas emission reductions pursuant to Division 25.5 (commencing with Section 38500) of the Health and Safety Code.

❑ Describe how expenditures will facilitate the achievement of GHG emission reductions in the state

Reduce GHG Emissions by Shifting from Cars and Planes to High-Speed Rail

- Initiation of high-speed rail service and implementation of Phase I System components will reduce GHG emissions by shifting passengers from fossil-fuel-based forms of transportation to electric rail service and high-speed rail service powered by renewable energy.
- The Authority's 2018 Sustainability Report (CY2017),[4] in Exhibit 2, details the projected GHG emissions reductions (64.3 to 75.9 million metric tons (MMT) of carbon dioxide equivalent (CO_2e)) associated with operation of Phase 1. This estimate is also reported to CARB in the annual report to the Legislature on California Climate Investments. This estimate of 64.3 to 75.9 MMT CO_2e does not include GHG emissions reductions resulting from other investments associated with the high-speed rail program, such as bookend and connectivity investments. For context, these investments are presented in the Authority's Sustainability Report.
- The 2018 Sustainability Report (CY 2017) also presents a range of activities under the high-speed rail program that minimize GHG emissions, such as efficient construction practices, the use of clean equipment, recycling and mitigation efforts (such as the Voluntary Emissions Reduction Agreement[5]). The 2018 Sustainability Report (CY 2017) also presents parts of the program that will influence additional GHG emission reductions (such as station planning and transit connectivity).

[2] Air Resources Board; AB 32 Scoping Plan; http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm
[3] Air Resources Board; AB 32 Scoping Plan Update; http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm
[4] High-Speed Rail Authority; "Sustainability Report"; June 2018. http://www.hsr.ca.gov/docs/programs/green_practices/sustainability/Sustainability_Report_2018.pdf
[5] High-Speed Rail Authority; "GHG Timeline"; May 2014. https://www.hsr.ca.gov/Programs/Green_Practices/index.html

- The Authority updates the range of GHG emission reduction estimates for consistency with the latest approved Business Plan ridership forecasts. The current Business Plan was submitted to the Legislature in June 2018.[6]

Renewable Energy

- The Authority is committed to running high-speed rail service on 100-percent renewable energy. This approach furthers the purposes of AB 32, SB 32 (Pavley, Chapter 249, Statutes of 2016), SB 350 (de León, Chapter 457, Statutes of 2015), and SB 100 (de León, Chapter 312, Statutes of 2018). Net-zero energy operations can be achieved by procuring enough renewable energy to compensate for the amount of energy the system takes from the state's power grid to operate high-speed trains and facilities.[7]

Tree Planting Program

- The Authority has taken a range of actions, detailed in the 2018 Sustainability Report (CY 2017), that minimize emissions associated with construction. The Authority has also pledged to offset GHG emissions from construction site activities and has entered into an agreement with CalFIRE to fund urban and rural tree planting programs. To date, more than 450 trees have been planted in disadvantaged communities.
- The program could also include reforestation of burnt forest lands.

Other Activities That Mitigate GHG Emissions From Construction

- The Authority has taken steps to minimize the GHG and criteria air pollutant emissions from its construction through strict, binding requirements on its construction contractors.[8] These requirements include the use of new, fuel-efficient on- and off-road vehicles, the use of equipment meeting the cleanest engine standards for criteria pollutants, use of renewable diesel and electric vehicles, and recycling of all concrete and steel from

[6] High-Speed Rail Authority; "2018 Business Plan"; June 2018.
http://www.hsr.ca.gov/docs/about/business_plans/2018_BusinessPlan.pdf
[7] High-Speed Rail Authority; "Renewable Energy Feasibility Memo", April 2014;
https://www.hsr.ca.gov/Programs/Green_Practices/operations.html
[8] High-Speed Rail Authority; "Executed Agreement: Book 2, Part B: General Provisions. Section 44; RFP for Design-Build Services for Construction Packages 2-3: Book 1, Part B.2 – General Provisions. Section 44", July 2013 and May 2015.

	construction,[9] as well as at least 75 percent of all other non-hazardous construction waste. Collectively, these steps will result in minimizing GHG emissions from the Authority's construction activities.[10]
❑ Explain when GHG emission reductions and/or co-benefits are expected to occur and how they will be maintained	▪ The expenditures for the high-speed rail system will support a long-term project (construction of which is presently underway) that will help California maintain and continue GHG emission reductions through 2050 and beyond. The Authority estimates that GHG emission reductions from high-speed rail service will start to be achieved when the system starts operation. Ridership and GHG emission reductions are projected to grow annually, increasing as segments of the system are completed, and increasing over its 100-year expected life. ▪ High-speed rail service has been sustained and grown in countries such as Japan for the past 50 years; France for the past 33 years; and Germany and Spain for the past 22 years. Service in those countries grew and continues to grow based on initial and increasing demand, and operates at a profit. ▪ Similarly, HSRA analysis demonstrates that high-speed rail ridership will grow and that high-speed rail will continue to reduce GHG emissions for decades, as HSR operates over its 100-year expected life.

Element (4) A description of how the administering agency considered the applicability and feasibility of other non-greenhouse gas reduction objectives of Division 25.5 (commencing with Section 38500) of the Health and Safety Code.

❑ Expected co-benefits, particularly environmental, economic, public	In addition to reducing GHG emissions, the high-speed rail system is expected to provide a variety of co-benefits, as described below. The high-speed rail system will connect regions of the state, contribute to

[9] The Air Resources Board has developed GHG emission reduction factors for recycling in the following document: "Method for Estimating Greenhouse Gas Emission Reductions from Recycling", November 14, 2011;
http://www.arb.ca.gov/cc/protocols/localgov/pubs/recycling_method.pdf
[10] High-Speed Rail Authority; "GHG Timeline"; May 2014.
https://www.hsr.ca.gov/Programs/Green_Practices/index.html

health and safety, and climate resiliency	economic development and a cleaner environment, create jobs, and preserve agricultural and protected lands. **Environmental and Public Health Co-Benefits** ▪ High-speed rail service will reduce vehicle miles traveled (VMT) and air travel, thereby reducing criteria pollutants and improving air quality in the state. **Co-benefits from Other Project and Mitigation Activities** ▪ Early investments in the system will also minimize the criteria pollutants from its construction by requiring the use of Tier IV or retrofitted equivalent off-road construction equipment to the maximum extent feasible. Localized criteria pollutants, such as particulate matter, can be greater around freeways, which often lie adjacent to disadvantaged communities. Reducing vehicles (and related emissions) on these freeways due to diversion of trips from auto to high-speed rail will benefit disadvantaged communities near these freeways. The 2018 Sustainability Report (CY 2017) contains an estimate of the reduction of criteria pollutants on site through the use of clean equipment. ▪ Grade separations—at locations with at-grade rail crossings, associated with the project through the Central Valley, and Northern and Southern California—contribute to public safety, and also are estimated to result in reduced emissions of criteria pollutants and GHGs in disadvantaged communities. ▪ The tree planting program mentioned in item (2) is also designed to deliver shading for buildings, playgrounds and public spaces, reduced building energy use, air quality improvements and reduced urban heat island effects. The program can also provide soil stabilization, erosion control, and fish and wildlife habitat through reforestation of burnt lands. The Authority is also undertaking additional mitigation efforts that preserve agricultural land and maintain or restore habitat (in contiguous parcels or at a landscape level). These efforts will help achieve some of the non-GHG objectives of Division 25.5.
❑ How the project will support other objectives of AB 32 and related statutes	**Other AB 32 Objectives and Co-Benefits** ▪ Connecting California's population centers and providing new mobility and accessibility to residents of the Central Valley will catalyze compact, transit-oriented development and other development patterns that result in VMT reductions, as well as

less water and energy usage. The Authority is helping to stimulate such development and associated benefits through investments in updates to local land use plans and zoning codes, and promoting transit-oriented development around high-speed rail stations. As analyzed in the Vision California study, development scenarios that enable transit-oriented infill development achieve critical policy objectives of AB 32 and have the potential to reduce additional GHG emissions.[11] Locating high-speed rail stations in existing downtown cores will assist with infill development, stimulate the local economy, reinforce SB 375 (Steinberg, Chapter 728, Statutes of 2008) regional plans and reduce the pressure on agricultural land.

- In addition to the benefits noted above, the benefit-cost analysis completed for the 2014 Business Plan forecasts a net benefit (in metric tons of carbon dioxide equivalents) to the state as a result of high-speed rail service. In particular, the benefits that accrue from the system accrue both to users of the system through travel time savings and improved reliability, and to non-users through reduced auto and air congestion, fewer emissions, and fewer car crashes. Providing equivalent capacity to high-speed rail through airport and road expansion would have significantly higher costs than building high-speed rail. In addition, the roadway and airport capacity that would be needed to provide mobility for California's projected population growth would result in higher GHG emissions when compared to high-speed rail.[12]

- The high-speed rail system will be a zero-emissions transportation alternative to both interregional car travel and in-state air travel. To adapt to changing climate conditions, design and management of the system are also informed by data on relevant climate stressors.

[11] Vision California; "Charting Our Future: Statewide Scenarios Report", May 2010. https://www.hsr.ca.gov/docs/programs/green_practices/sustainability/Vision%20California%20-%20Statewide%20Scenarios%20report.pdf

[12] High-Speed Rail Authority, "Comparison of Providing the Equivalent Capacity to High-Speed Rail through Other Modes", April 2012. http://www.hsr.ca.gov/docs/about/business_plans/BPlan_2012CompareEquivalentCapacity.pdf

Intergovernmental Panel on Climate Change (IPCC); 5th Assessment Report, "Climate Change 2014: Mitigation of Climate Change", Chapter 8: Transport; http://report.mitigation2014.org/drafts/final-draft-postplenary/ipcc_wg3_ar5_final-draft_postplenary_chapter8.pdf

❑ Percentage of total funding that will be expended for projects that are located in and benefit priority populations[13] per CARB guidance	▪ 100 percent of the funding will be expended on Phase 1, portions of which are located within and may provide benefits to disadvantaged communities based on the criteria in CARB guidance[14] (CARB Funding Guidelines).
❑ Describe the benefits to priority populations per CARB guidance	▪ Construction of the system should benefit disadvantaged communities (as identified by the California Environmental Protection Agency (CalEPA)) by providing career opportunities. This construction has already resulted in nearly 35,000 job-years.[15] The Authority has an aggressive Small Business program that requires 30 percent of all contracts to include small business participation, including Disadvantaged Business Enterprises (DBE) and Disabled Veteran Business Enterprises (DVBE). As of November 2018,[16] the Authority has 478 small businesses, 463 of which are in California, committed to working on the statewide program. The Authority will target outreach and information on its jobs training and Small Business programs to those communities identified as disadvantaged by CalEPA for California Climate Investments within proximity to the project. ▪ Building and operating the high-speed rail system will directly employ thousands of Californians, while indirectly generating tens of thousands more jobs throughout the larger economy. Construction on the first segment between the city of Madera and Kern County is projected to create thousands of jobs over the next five years. To ensure that these jobs benefit communities most in need, the Authority Board of Directors approved a Community Benefits Policy[17] in 2012 with the goal of promoting the hiring of California community businesses and residents during construction. The Policy also supports

[13] Priority populations include residents of: (1) census tracts identified as disadvantaged by California Environmental Protection Agency per SB 535; (2) census tracts identified as low-income per AB 1550; or (3) a low-income household per AB 1550. See Section VII.B for more information on the definitions of priority populations.
[14] Cap-and-Trade Auction Proceeds: Funding Guidelines for Agencies that Administer California Climate Investments, www.arb.ca.gov/cci-fundingguidelines
[15] High-Speed Rail Authority; "The Economic Impact of California High-Speed Rail"; July 2017; http://hsr.ca.gov/docs/newsroom/fact%20sheets/Economic_Impact.pdf
[16] High-Speed Rail Authority; "Small Business Factsheet"; November 2018. http://hsr.ca.gov/docs/programs/small_business/Small_Business_Factsheet.pdf
[17] High-Speed Rail Authority; "Community Benefits Policy", December 2012; https://www.hsr.ca.gov/docs/brdmeetings/2012/December/brdmtg1212_bot3.pdf

	employment of individuals who reside in Disadvantaged Areas and those designated as Disadvantaged Workers, including veterans. As of September 2018, 335 disadvantaged workers had performed over 321,112 hours total. ▪ Under the Community Benefits Policy, design-build construction contracts are required to adhere to the National Targeted Hiring Initiative,[18] which requires that at least 30 percent of all project work hours must be performed by a National Targeted Worker and at least 10 percent of National Targeted Workers hours must be performed by a disadvantaged worker. The jobs training that workers will receive through this policy will later permit workers to be employed on other construction projects, delivering benefits for a lifetime. Also, permanent jobs—such as train operators, maintenance yard workers, stations managers—will be created to operate and maintain the system. ▪ The Authority is implementing outreach to disadvantaged communities, including communities that conform to the definition of low-income communities in AB 1550, through its jobs outreach, Title VI compliance, Small Business Advocate, and Small Business Compliance teams trainings and workshops. The Authority also provides information on GGRF funding opportunities through presentations throughout the state by its planning and integration teams. Priority communities are a specific focus in internal training, to increase understanding and awareness of unique community needs. ▪ Once completed and operational, the system will provide greater mobility by improving access to jobs, schools, and businesses for priority communities.
❑ Explain strategies the administering agency will use to maximize benefits to disadvantaged communities	▪ To help maximize benefits to disadvantaged communities, the Authority will coordinate with local and regional entities to target jobs, jobs training, and small business workshops in disadvantaged communities, and continue focusing outreach efforts in these communities.
❑ Explain how the administering agency will avoid	▪ The Authority follows procedures for identifying, avoiding and minimizing impacts to communities as required by the National Environmental Policy Act and California Environmental Quality Act.

[18] High-Speed Rail Authority; "National Targeted Hiring Initiative Plan"; https://www.hsr.ca.gov/docs/programs/construction/National_Targeted_Hiring_Initiative_Plan.pdf

potential substantial burdens to disadvantaged communities and low-income communities or, if unknown, explain the process for identifying and avoiding potential substantial burdens	Illustration of the analysis procedure and findings can be found in the Community Impact Assessment Report[19]. ▪ In addition, the Authority identified several practices as impact avoidance and minimization features[20] that are required in the delivery of the project: ○ **SOCIO-IAMF#1: Construction Management Plan.** Prior to construction, the Contractor must prepare a Construction Management Plan (CMP) providing measures that minimize impacts on low-income households and minority populations. The plan would include actions pertaining to communications, visual protection, air quality, safety controls, noise controls, and traffic controls to minimize impacts on low-income households and minority populations. The CMP would verify that property access is maintained for local businesses, residences, and emergency services. This plan would include maintaining customer and vendor access to local businesses throughout construction by using signs to instruct customers about access to businesses during construction. In addition, the plan would include efforts to consult with local transit providers to minimize impacts on local and regional bus routes in affected communities. ○ **SOCIO-IAMF#2: Compliance with Uniform Relocation Assistance and Real Property Acquisition Policies Act.** The Authority must comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended (Uniform Act). The provisions of the Uniform Act, a federally mandated program, would apply to all acquisitions of real property or displacements of persons resulting from this federally assisted project. It was created to provide for fair and equitable treatment of all affected persons. ○ **SOCIO-IAMF#3: Relocation Mitigation Plan.** Before any acquisitions occur, the Authority would develop a relocation mitigation plan, in consultation with affected cities and counties and property owners. In addition to establishing a program to minimize the economic disruption related to relocation, the relocation mitigation plan would be written in a style that also enables it to be used as a public-information document.

[19] http://www.hsr.ca.gov/docs/programs/fresno-baker-eir/FBLGA_Draft_EIRS_Community_Impact_Assessment_Technical_Report_August_2017.pdf

[20] https://www.hsr.ca.gov/docs/programs/fresno-baker-eir/FBLGA_Draft_EIRS_Vol_2_APPX2H_Function_of_Impact_Avoidance_and_Min_Measures.pdf

Element (5) A description of how the administering agency will document the result achieved from the expenditure to comply with Division 25.5 (commencing with Section 35800) of the Health and Safety Code.

❑ How the administering agency will track/report progress to make sure projects are implemented per requirements in statute and CARB guidance	▪ In its Sustainability Policy[21] (October 2013; Update March 2016) the Authority discusses tracking of information to report against metrics (including, but not limited to, those referenced below, in accordance with industry standard and recognized GHG emissions reporting requirements). The Authority collects this data from technical reports, as discussed in this record, as well as through tracking and reporting required of all contractors. ▪ Over the life of SB 852 and SB 862 expenditures from the GGRF, the Authority will use its existing data collection processes to track progress and provide regular updates on expenditures, project status and benefits in reports prepared according to CARB's Funding Guidelines. At a minimum, the reports will include expenditure amounts, current estimates of achieved (as applicable) and projected GHG emission reductions, and quantification of other applicable co-benefits as detailed in the GGRF requirements. In addition, the Authority will report metrics in its annual sustainability report.
❑ Describe the approach that will be used to document GHG emission reductions and/or other benefits before and after	▪ In 2013, the Authority provided a report to the Legislature on the contribution of high-speed rail service to reducing the State's GHG emissions.[22] For this report, the Authority followed a methodology based on the *Climate Registry General Reporting Protocol*, Version 2.0,[23] as well as the best practice discussed in *Recommended Practice for Quantifying Greenhouse Gas Emissians from Transit,* APTA 2009.[24] The

[21] High-Speed Rail Authority; "Sustainability Policy", update March 2016;
http://www.hsr.ca.gov/docs/programs/green_practices/sustainability/Sustainability_signed_policy.pdf
[22] High-Speed Rail Authority; "Contribution of the High-Speed Rail Program to Reducing California's Greenhouse Gas Emission Levels", June 2013;
http://www.hsr.ca.gov/docs/programs/green_practices/HSR_Reducing_CA_GHG_Emissions_2013.pdf
[23] Climate Registry; "General Reporting Protocol, Version 2.0", March 2013;
http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf
[24] American Public Transportation Association, "Recommended Practice for Quantifying Greenhouse Gas Emissions from Transit", 2009.
http://www.apta.com/resources/hottopics/sustainability/Documents/Quantifying-Greenhouse-Gas-Emissions-APTA-Recommended-Practices.pdf

project completion	quantification method has been reviewed by CARB and is posted to the GGRF site.[25] The Authority will work closely with CARB to refine GHG emission reduction quantification methodologies and estimates, based on the best available data. ▪ Net GHG benefits result when the GHG emissions reductions from decreased VMT and air travel are greater than the GHG emissions from power production to run the high-speed rail system. To estimate GHG emission reductions when travelers shift from cars and airplanes, the Authority used emission factors from CARB.[26] ▪ For the emissions results presented in the 2018 Sustainability Report (CY2017), the Authority used the same methodologies and calculations as were used in the 2013 report to the Legislature. However, the Authority refined modeling of the system per suggestions from the Ridership Technical Advisory Panel and the Government Accountability Office. The 2018 ridership model resulted in an updated data set for VMT and air trip reductions. Enhancements in operations analysis resulted in an updated forecast for system energy use. GHG emissions results will be updated and reported in response to model outputs to develop the 2020 Business Plan, due to the Legislature in May 2020.
❑ Type of information that will be collected to document results, consistent with CARB guidance	▪ The Authority will collect the information needed to document GHG emission reductions, co-benefits, expenditures that benefit disadvantaged communities, and other items as described in CARB's Funding Guidelines, and will illustrate how use of funds for high-speed rail supports AB 32, SB 535 and AB 1550 objectives. ▪ In addition to tracking GHG emissions and reductions, the Authority will document the following environmental co-benefits from high-speed rail implementation: o Tons of reactive organic gases (ROG) reduced; o Tons of carbon monoxide (CO) reduced; o Tons of nitrogen oxides (NO_x) reduced; o Tons of sulfur oxides (SO_x) reduced;

[25] Air Resources Board, Greenhouse Gas Quantification Methodology for the California High-Speed Rail Program, February 2017. https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/hsra_hsr_finalqm_16-17.pdf.

[26] Air Resources Board, Emissions Factor (EMFAC) 2014; and Greenhouse Gas Emissions Inventory 2014.

	○ Tons of particulate matter with a diameter of 10 microns or smaller (PM10) reduced; and ○ Tons of particulate matter with a diameter of 2.5 microns or smaller (PM2.5) reduced.
❑ How the administering agency will report on program status	▪ The Authority will report on program status annually through CARB's reporting templates online, as well as through the Authority's annual sustainability report.