CALIFORNIA High-Speed Rail Authority

2021 SUSTAINABILITY REPORT

Building an Equitable Future

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Brian P. Kelly
Chief Executive Officer

California High-Speed Rail Authority

770 L Street, Suite 620
Sacramento, CA 95814

(916) 324-1541

info@hsr.ca.gov

www.hsr.ca.gov

The California High-Speed Rail Authority (Authority) is responsible for planning, designing, building and operating the first high-speed rail in the nation. California high-speed rail will connect the megaregions of the state, contribute to economic development and a cleaner environment, create jobs and preserve agricultural and protected lands. When it is completed, it will run from San Francisco to the Los Angeles basin in under three hours at speeds capable of exceeding 200 miles per hour. The system will eventually extend to Sacramento and San Diego, totaling 800 miles with up to 24 stations. In addition, we are working with regional partners to implement a statewide rail modernization plan that will invest billions of dollars in local and regional rail lines to meet the state's 21st century transportation needs.

Cover Image: The San Joaquin River Viaduct will carry high-speed rail trains over the San Joaquin River.

TABLE OF CONTENTS

MESSAGE **FROM THE CEO**

This project is challenging, so why do we persist in our pursuit to build the nation's first high-speed rail system?

We are building this train because we believe in a future where Californians are connected with the highest quality, fastest and cleanest technology. Because that is what the people of California voted for, more than a decade ago. And in that decade we have completed the environmental clearance for the first operable segment and have more than 119 miles of construction underway.

Californians voted for electrified high-speed rail as a means to achieve our state's mobility goals and to address our essential climate goals. We are delivering a modern, proven next-generation high-speed rail system that will connect California's communities, enhance economic opportunity, protect our environment and create a more sustainable future for generations to come.

We know how critical is to be investing now and acting decisively to accomplish the transformation necessary to sustain our quality of life and restore our environment. According to the Environmental Protection Agency, almost a third of the greenhouse gas (GHG) emissions generated in the United States come from the transportation sector, primarily from burning fossil fuel for cars, trucks, ships, trains and planes. California's zero emission high-speed trains, powered by 100% renewable energy, will carry travelers to and from our urban centers at speeds of up to 220 miles per hour. The potential of this system, with the travel times it offers, is enormous. Slashing trip times will motivate people to shift from gas-powered cars and planes, saving 2 million metric tons of carbon each year, equivalent to taking 432,000 cars off the road annually.

California is pushing multiple industries to underpin the decarbonization of transportation. Aviation has made critical progress, but there is still significant technological change required to achieve complete transformation of the aviation sector. The transition to electric cars is more imminent but even when they become widely used, they won't reduce congestion or improve highways speeds. Electrified high-speed rail is in service across the world and is a proven transportation option for addressing climate change.

Electric high-speed rail will serve as the backbone for a modern, integrated statewide passenger rail network that will connect California's urban, suburban and rural communities with fast, frequent service. This is the vision set forth in the 2018 California State Rail Plan and it is central to the state's climate policies.

High-speed and regional rail systems will connect at key multimodal hubs, like San José, Merced, Palmdale and Los Angeles, speeding travelers to their destinations with little to no environmental impact. Rail connections to airports will facilitate transnational and international travel. Seamless transit connections within an integrated network will ensure that people living in historically disadvantaged communities have wider access to employment, educational, recreational, travel and other opportunities.

As the Biden Administration era emerges, California's efforts to build transportation infrastructure that reduces GHG and shifts passenger rail from fossil fuels to clean, renewable energy could not be better timed. Sustainability has always been, and always will be, at the core of our mission, and our goal is to create the greenest infrastructure project in the nation, both in its construction and its operations. Shifting travelers from traditional forms of travel to clean, green high-speed rail will deliver more than 100 million metric tons in GHG reductions in its first 50 years of operations.

Where We Are

Despite the COVID-19 pandemic, we continued to make progress in 2020. We maintained progress in building 119 miles of high-speed rail infrastructure in the Central Valley. As of August 2021, we have environmentally cleared 291 miles of the 500-mile statewide system and are on pace to clear the full system by the end of 2022 or early 2023. We are funding important regional investments in the Bay Area and the Los Angeles regions.

The Authority is playing a key role in helping California achieve its social equity, economic development and environmental objectives. To date, we have created 6,200 well-paying jobs statewide and provided work for more than 600 small businesses, generating more than $4.4 billion in labor income and $11.4 billion in economic output. High-speed rail has been a consistent stimulus to the Central Valley economy, generating $350 million in labor income in FY 19-20 alone. These jobs support numerous families, many of whom live in the most economically disadvantaged part of the state.

In 2020, our progress was marked by a significant milestone:

» In December 2020, the Authority received the highest sustainability rating possible for our program. The Envision Platinum rating was awarded by the Institute for Sustainable Infrastructure.

This award reflects policy commitments, a dedicated focus, and implementation of ambitious strategies since the inception of the program.

Other milestones include:

» Preserving or restoring more than 2,320 acres of habitat;
» Planting more than 7,100 trees and;
» Avoiding 180,000 pounds of criteria air pollutants during construction

Sustainability Drives Us

As Greta Thunberg rallied us, "I want you to act as if the house is on fire."

And we are. We take our mission seriously to deliver a transformational project in a way that transforms industry and starts restoring our communities, our economy and our environment. Not eventually, but right now.

This is a project that is lifting up Californians now, with jobs, and will sustain communities for the next century through economic connections. High-speed rail will provide future generations with the most energy-efficient mobility available on the planet. Our Sustainability Policy continues to reinforce our fundamental commitment to Californians who established our mission, and the goals expressed in the high-speed rail enabling legislation.

The past year has been brutal, testing all of us to adjust to changing conditions daily, but it has taught us that together we can accomplish the type of change we need.

This system is for all of us. I am excited to get it done.

EXHIBIT 0.1: THIS MAP SHOWS THE PHASED IMPLEMENTATION PLAN AS DESCRIBED IN THE 2020 BUSINESS PLAN.

ABOUT **THIS REPORT**

This report has been prepared in accordance with the Global Reporting Initiative (GRI) Standards: Core option—the world's leading and most widely adopted sustainability reporting framework that addresses environmental, social and governance issues.

It covers the California High-Speed Rail Authority (Authority) and its activities from January 1, 2020, to December 31, 2020, except where indicated. The Authority is the only entity included in its consolidated financial documents. This report is updated on an annual basis; our previous report was published in October 2020 and covered the 2019 calendar year.

There have been no significant changes in the reporting scope or boundaries. The scope and boundaries of all material topics are summarized in the Materiality Assessment section of this report. No restatements of information published in previous reports have been made.

The intended audience for this report includes members of the California State Legislature, station cities and other stakeholders. The contents of this report have not been externally assured, unless otherwise noted.

This report looks backward when highlighting the progress we made in 2020 toward advancing our sustainability policies and commitments. This report looks forward when discussing how our policies and practices will affect California into the future.

Acknowledgments

Thanks to all our federal, state, regional and local partners and to our environmental and community non-profit and advocacy partners who contributed to this report and with whom we are delivering California's high-speed rail system.

Who We Are

The Authority is responsible for planning, designing, building and operating the first high-speed rail system in the nation.

California high-speed rail will connect the megaregions of the state, contribute to economic development and a cleaner environment, by connecting regions, creating jobs, and preserving agricultural and protected lands. When complete, trains will run from San Francisco to the Los Angeles basin in under three hours at speeds capable of exceeding 200 miles per hour. The system will eventually extend to Sacramento and San Diego, totaling 800 miles and up to 24 stations. In addition, under the direction of the California State Transportation Agency, the Authority is working with other state and regional partners to implement a statewide rail modernization plan that will invest billions of dollars in local and regional rail lines to meet the state's 21st century transportation needs.

The Authority is headquartered in Sacramento, California, and operates in the United States of America. The Authority is a California state department established pursuant to the California High-Speed Rail Act (SB 1420, Chapter 796 of the California Statutes of 1996) to develop and implement high-speed intercity passenger rail service. It is located under the California State Transportation Agency under the direction of Transportation Secretary David Kim. In September 2020, the Board voted Tom Richards as Chair of the Board of Directors. No other significant changes occurred in the Authority's structure or ownership during the reporting period.

Our Governance Structure

The Authority's Board of Directors was established in 2003 by California Public Utilities Code 185020 to oversee the planning, construction and operation of the high-speed rail system. The Board of Directors consists of nine members: five members appointed by the governor, two members appointed by the Senate Committee on Rules and two members appointed by the speaker of the Assembly.

Each Board member represents the entire state and serves a four-year term. There is a Board Chair (currently, Tom Richards) and a Vice-Chair (currently, Nancy Miller). During 2020, the Board included six men and three women[1]. In 2016, Governor Jerry Brown signed AB 1813, which added two nonvoting, ex officio members (one member of the California Senate and one member of the California Assembly) to the Board. Both positions were filled in 2017.

The Board of Directors is responsible for setting policy directives, and for developing and approving the Authority's key policy documents. These policy documents include business plans, financial plans and strategic plans, such as those related to sustainability, and environmental, social and governance issues. The Authority's Chief Executive Officer (CEO) and Authority staff designated by the CEO report directly to the Board of Directors on ongoing program issues.

The Board of Directors also maintains several sub-committees dedicated to overseeing specific aspects of the high-speed rail program, including the:

- Executive/Administrative Committee;
- Finance and Audit Committee;
- Operations Committee; and the
- Transit and Land Use Committee.

The California State Legislature provides oversight and monitoring of the program through the annual budget cycle and through committees specifically tasked with reviewing and monitoring the Authority and progress on the project. The Authority produces two statutorily mandated reports to the Legislature; a Business Plan (submitted in even years) and a Project Update Report (submitted in odd years).

The legislative oversight committees are the:

- Senate Committee on Transportation;
- Assembly Committee on Transportation;
- Senate Committee on Budget and Fiscal Review; and the
- Assembly Committee on Budget.

In addition, state law established an independent Peer Review Group (PRG), which is responsible for reviewing the planning, engineering, financing and other elements of the Authority's plans. The PRG analyzes the appropriateness and accuracy of the Authority's assumptions, as well as the viability of the Authority's financing plan, including the funding plan for each corridor required by California law. The PRG reports its findings and conclusions to the Legislature.

Our Values

We are committed to delivering high-speed rail and achieving our mission in a way that reflects our highest values:

- Safety: The safety and security of our workers, employees and customers is first and always our top priority.
- Stewardship: Protect and conserve public and environmental resources dedicated to this project.
- Performance: Use specific performance measures to track progress and support the development of a robust culture of program delivery and accountability.
- Transparency and Engagement: Engage and consider input from the public and our stakeholders in an authentic, two-way dialogue to provide information about program achievements, milestones and challenges.
- Diversity: Develop and support a diverse workforce fully capable of delivering this transformative project.
- Sustainability: Deliver a system that maximizes benefits to priority communities, protects resources and serves in the transition to a low-carbon economy.

Our Team

As of December 31, 2020, the Authority had 280 state employees on staff in several regions of the state, including full-time employees, retired annuitants, part-time employees, student assistants and employees on loan from other state agencies, as shown in Exhibits 0.2 and 0.3. During the reporting period, the only significant variation in staff numbers was due to the addition of new staff and turnover.

In 2020, the Authority hired 87 new employees, for a new hire rate of 31%[2]. There was a turnover rate of 15% for 2020. The Authority also includes a significant number of private-sector consultants integrated with state employees.

We provide state employees with training opportunities designed to increase job proficiency and career advancement with the goal of promoting a capable, efficient and service-oriented workforce. This is done by developing employees' skills and abilities through training programs that meet Government Code Section 19995 and the Authority's Policy Directive POLI-HR-21, entitled Employee Training Policy, and signed in June 2014.[3]

Our policies are consistent with the California Department of Human Resources policies and laws.

EXHIBIT 0.2: 2020 STATE EMPLOYEE BREAKDOWN BY GENDER AND EMPLOYEE CATEGORY

EMPLOYEE CATEGORY	MALE	FEMALE
Rank and file	70	67
Managerial	29	29
Supervisory	20	33
Exempt	19	13
Confidential	0	0
Total	138	142
Employees – Total (Including Board Members)	280	

EXHIBIT 0.3: 2020 STATE EMPLOYEE BREAKDOWN BY LOCATION*

REGION	EMPLOYEES
Sacramento	228
Central Valley	42
Southern California	4
Northern California	6

*Employee diversity is not reported by age or minority group

Our Supply Chain

We are responsible for procuring services, contractors and materials, as well as coordinating the delivery of the high-speed rail program. Our supply chain includes suppliers providing materials, as well as consultants and contractors providing design and construction services to build the high-speed rail system, with many of these businesses being locally based in California.

Details of supply chain expenditures are available online via the Finance and Audit Committee materials web page (see ***https://www.hsr.ca.gov/about/board/finance.aspx)***. The outputs of this work include the physical infrastructure (e.g., rail, trains and stations), as well as outcomes of cleaner air, transit-oriented development and a highly connected California.

Contact

We value all feedback. Please send comments and questions to ***info@hsr.ca.gov.***

PHOTO: Work continues on Peterson Avenue viaduct construction in Kern County.

CHAPTER 1: OUR SUSTAINABILITY APPROACH

Sustainability is at the core of our mission. It is one of the six overarching goals that guide our holistic, integrated approach to delivering high-speed rail to California. Our aspiration is to deliver the greenest infrastructure project in the nation in the greenest possible way.

We take actions in system delivery that play a critical role in helping the state achieve its forward-looking policies to address climate change, develop clean energy, create healthy communities centered around equitable transit, protect the environment, and spur economic prosperity and opportunity while transitioning to a low carbon economy. To that end, we constantly assess our efforts while building the high-speed rail system to make sure that our actions will enable current and future generations to lead healthy and rewarding lives.

Our Sustainability Policy

The Authority's Board of Directors, legislators, stakeholders and regulatory bodies have stressed that the project should exemplify sustainability in its planning, siting, design, construction, mitigation, operation, maintenance and management.

The Authority's Sustainability Policy, signed in September 2013, honors several industry sustainability and stakeholder commitments. An updated Sustainability Policy was adopted by the Authority's Board of Directors in March 2016. Since then, the Authority has continuously implemented a range of sustainability actions, including an update in 2018 to its materiality assessment. This led to an updated Sustainability Policy adopted by the Board of Directors in April 2019, which included refinements to priorities, objectives and commitments, and a clear delineation by program phase.

Our Sustainability Policy summarizes our sustainability objectives, identifies specific sustainability commitments and serves as a framework for strategically identifying directed, cost-effective approaches. It applies across all aspects of the design, construction, operations and governance of the high-speed rail program.

The objectives of the policy are to minimize impacts to the natural and built environment, maximize safety and reliability, encourage walkable land development around transit stations, increase ridership and revenue, and help California reduce resource consumption, traffic and airport congestion, and energy dependency in a cost-effective manner over its entire life cycle.

POLICY STATEMENT

> The Authority will deliver a sustainable high-speed rail system for California that serves as a model for sustainable rail infrastructure. The Authority has developed and will continue to implement sustainability practices that inform and affect the planning, siting, designing, construction, mitigation, operation, and maintenance of the high-speed rail system.

To read our Sustainability Policy, see our website at ***https://hsr.ca.gov/wp-content/uploads/2021/04/Sustainability_signed_policy.pdf***

Our Sustainability Priorities and Commitments

The Authority's mission is to deliver an electrified high-speed rail system, which provides critical mobility and serves as a foundation for California's sustainable development. Our commitment is also to employ leading methods during construction to make the country's largest infrastructure program a model for sustainable delivery. A project at the scale of the California high-speed rail system, more than 500 miles connecting more than 20 million people, provides opportunities to move industries and set new public-policy precedents.

We understand how important it is that stakeholders for the system, as well as the general public, be clearly aware of the sustainability priorities for the system, how these priorities help implement wider public policy goals, and how these priorities will be achieved by the Authority and its delivery teams. In 2012, Authority staff and stakeholders identified five sustainability priorities. The Authority periodically confirms the relevance of and refines these five priorities, most recently in 2018-19.

Economic Development and Governance

Refers to responsible leadership and management, transparency practices and sound business planning.

Energy and Emissions

Refers to the conservation and type of energy resources used to construct and operate the rail systems, and to the tracking and minimization of emissions (both greenhouse gas and criteria air pollutant emissions) associated with both construction and operation.

Natural Resources

Refers to the environment and its resources, addressed in and within ecological systems.

Sustainable Infrastructure

Refers to the set of principles and actions in planning, siting, design, construction, mitigation, operation, maintenance and management of infrastructure that reflect a balance of social, environmental and economic concerns.

Station Communities and Ridership

Refers to collaborative planning activities that promote transit-oriented development and sustainable land use decisions that will help bring riders into the system, encourage and promote proximity co-location for education, health and business institutions, and ancillary consumer concession services.

As shown in Exhibits 1.0 through 1.4, each priority is broken down to its commitments, which correspond to specific actions the Authority will undertake itself or through work with partners. Together, these priorities and commitments are designed to act as a unified whole to advance the overall Sustainability Policy.

EXHIBIT 1.0: ECONOMIC DEVELOPMENT AND GOVERNANCE PRIORITY AND COMMITMENTS BY PHASE

Commitments	Phase
Improve the economic value to Californians from the system and maximize benefits to disadvantaged communities.	Construction
Implement 30% overall small business participation goal for Authority contracts, including 10% Disadvantage Business Enterprises (DBE) participation and 3% Disabled Veteran Business Enterprises (DVBE).	Construction
Maximize opportunity for private investment.	Construction
Govern transparently and accountably.	Construction
Continuously improve program delivery and management.	Construction
Maximize opportunity for private investment and private-sector operations.	Operation
Achieve a self-sustaining financial structure.	Operation

EXHIBIT 1.1: ENERGY AND EMISSIONS PRIORITY AND COMMITMENTS BY PHASE

Commitments	Phase
Achieve net-zero greenhouse gas and criteria air pollutant emissions in construction.	Construction
Net-zero energy/LEED® Platinum facilities.	Operation
Operate the system on 100% renewable energy.	Operation
Strengthen public health by improving air quality.	Operation
Reduce vehicle miles traveled.	Operation
Reduce operational energy costs.	Operation

EXHIBIT 1.2: NATURAL RESOURCES PRIORITY AND COMMITMENTS BY PHASE

Commitments	Phase
Conserve, maintain and restore habitat and wildlife corridors through landscape-scale mitigation.	Construction
Retain, protect and enhance the environmental quality and biodiversity of the high-speed rail program area.	Construction
Conserve agricultural land.	Construction
Reduce the demand for virgin natural resources by using recycled materials.	Construction
Practice on-site water conservation.	Construction
Work toward net-zero water operations.	Operation

EXHIBIT 1.3: SUSTAINABLE INFRASTRUCTURE PRIORITY AND COMMITMENTS BY PHASE

Commitments	Phase
Design and construct the system in conformance with the Authority's Principles for Sustainable Infrastructure.	Construction
Consider climate change risks and vulnerabilities, and proactively plan for them by incorporating climate adaptation measures into system design.	Construction
Protect the health and safety of workers and communities.	Construction
Operate the system in conformance with the Authority's Principles for Sustainable Infrastructure.	Operation
Protect the health and safety of workers, customers and communities.	Operation

EXHIBIT 1.4: STATION COMMUNITIES AND RIDERSHIP PRIORITY AND COMMITMENTS BY PHASE

Commitments	Phase
Design and construct stations and infrastructure that reinforce sustainable community strategies, as required by state law.	Planning, Construction and Operation
Implement livable development patterns in station areas and reinforce quality of life through design of the built environment.	Planning, Construction and Operation
Reinforce infill development and affordable housing through station area planning partnerships; identify a mechanism to fund two-to-one replacement of low- and moderate-income housing stock.	Planning, Construction and Operation
Provide convenient station access and appropriate station interfaces to all high-speed rail station areas.	Planning, Construction and Operation
Connect local and regional transit to-high speed rail stations.	Planning, Construction and Operation
Implement active transportation facilities for station access (walking and bicycling).	Planning, Construction and Operation

Implementation Plan

The Sustainability Implementation Plan guides us to organize how our sustainability priorities are matched with specific implementation actions. The Plan translates the broader aspects of the Sustainability Policy into itemized, actionable tasks with measurable performance indicators and metrics. For details, see our website at ***https://hsr.ca.gov/wp-content/uploads/docs/programs/green_practices/sustainability/Sustainability_implementation_plan_SUMMARY.pdf***

High-Speed Foundation for Climate and Energy Goals

California is racing toward an electric transportation future as a foundation for a carbon neutral economy. As Governor Newsom has noted, "In California, we're not asserting our leadership – we've proven it. We've set audacious goals and actually figured out the how, exceeding our targets on renewables ahead of schedule while outperforming the nation in GDP growth over a five-year period."

California has invested strategically toward achieving its audacious goals and will continue to do so. The state invests proceeds from its signature Cap-and-Trade program into projects and programs that deliver on the requirements of Assembly Bill 32 (Núñez, 2006; the Global Warming Solutions Act) and Senate Bill 32 (Pavley, 2016; the California Global Warming Solutions Act and an update to the Act to include greenhouse gas (GHG) reduction targets), respectively. Recent federal budgets have also pointed to significantly greater investment in zero-emissions transportation infrastructure, including both rail and automobile infrastructure.

High-speed rail's alternatives, such as expanding airports or adding more lanes to the existing interstate and highway system, are not just costlier but also create significant negative impacts to the environment from their construction and operations. High-speed rail is a significant investment that delivers positive returns for current and future communities.

High-speed rail is a valuable investment not just for the vehicle miles traveled (VMT) and GHG reductions it will deliver, but also the extensive co-benefits that return to Californians, as shown in Exhibit 1.5, including those in the state who are most vulnerable. These benefits have already been accomplished or will come through system operations. No mode of transportation delivers the speed and quality of trip at the same energy efficiency as high-speed rail. California high-speed rail is currently projected to capture 30%, minimum, of the intrastate air market and, given international experience, it is likely the system could entirely replace intrastate air markets in some corridors. For California to achieve its carbon neutral future, the state will rely on high-speed rail to provide intraregional travel with zero total air quality and greenhouse gas emissions.

The high-speed rail system is integral to achieving carbon neutral objectives because the system will directly deliver crucial GHG emissions reductions in the transportation sector, as well as extensive co-benefits. The potential for exponential GHG reductions through reduced VMT is discussed in more detail in Chapter 6, Station Communities and Ridership. The project's positive impact on employing targeted and disadvantaged workers, a core priority of projects funded by the Greenhouse Gas Reduction Fund, is also highlighted in Chapter 2, Economic Development and Governance.

High-Speed Rail Provides Increased Capacity at Lower Costs

The state of California is facing a transportation infrastructure capacity issue. The state's transportation infrastructure has not expanded at a rate that matches the increase in population, tourism and economic growth in the state. Most current highways, airports and rail networks are already operating at or over capacity. California estimates that the population will grow to a total of 50 million people by 2050. In this context of significant population growth, many of the state's highways and airports that are already stretched to the limits of their capacity will struggle to accommodate the new demand.

The capacity of California's existing transportation infrastructure is gravely overwhelmed. Simply expanding highway and airport capacity does not create the same transportation utility as that of high-speed rail. To understand the competitive advantage of high-speed rail, the Authority's 2019 Capacity Analysis Update compared the capital cost of building the high-speed rail system to the capital cost of adding highway lanes and airport runways that could supply equivalent people-moving capacity to that of high-speed rail.

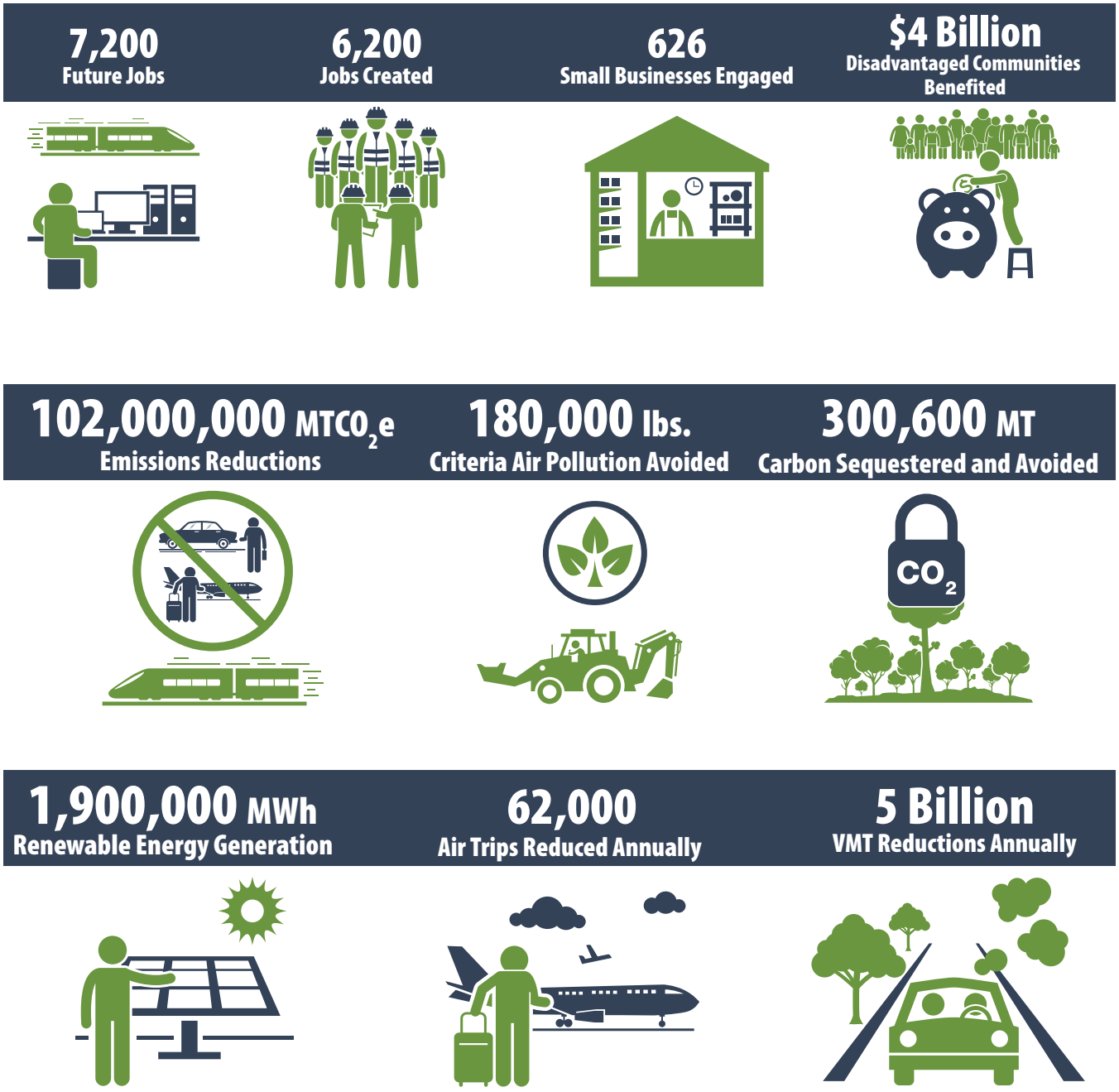
The 2019 Capacity Analysis Update found that it would cost between $122 billion to $199 billion to provide the equivalent people-moving capacity through highway and airport expansion. That result is twice as much as the estimated range of $63 billion to $98 billion for the high-speed rail network. These highway and airport capital expenditures would also require substantially more land, extensive environmental analysis and clearances, and result in significant negative impacts on communities.

In addition to being lower cost and condensing development, diverting intrastate travel from highways and airports to high-speed rail provides other important benefits, including:

- Relieving congestion on the state's highways;
- Adding transit connectivity and linkages at high-speed rail stations;
- Allowing major airports to focus additional resources to support growing demand for international travel, a major catalyst for ongoing economic development; and
- Advancing the state's environmental goals, such as GHG emissions reduction, improving air quality and transitioning to a sustainable, low-carbon future.

In summary, the results of the 2019 Capacity Analysis Update indicate that high-speed rail provides a great deal of intrastate people-carrying capacity at a lower cost, and also provides social, environmental and economic benefits.

EXHIBIT 1.5: HIGH-SPEED RAIL IS A VALUABLE INVESTMENT



External Frameworks and Assessments

We consistently look to external frameworks to benchmark our performance. Third-party sustainable rating systems, such as Envision and LEED®, help us understand our project's performance relative to objective standards and peer infrastructure projects and, more importantly, show us areas where we can improve. We currently align the high-speed rail project with the following frameworks.

GRESB Infrastructure Assessment

The GRESB Infrastructure Assessment is a globally consistent, voluntary framework that benchmarks the environmental, social and governance performance of infrastructure assets and funds. It ranks us in relation to our peers and provides useful insight into the integrity of our sustainability policies, practices and performance. It provides third-party validation of our program and leadership at an international scale.

The Authority began participating in 2015 (the inaugural year of this assessment), demonstrating our broader commitment to setting a new standard in sustainable high-speed rail infrastructure. We participated for the sixth time in 2021, maintaining our standing among leading infrastructure projects in North America.

Our participation in the GRESB Infrastructure Assessment supports our focus on attracting private investment. Anticipating the information that major investors find important aligns our reporting efforts with what is critical.

Envision

Envision provides a consistent, consensus-based framework for assessing sustainability and resilience in infrastructure. The Envision framework:

- Sets a standard for what constitutes sustainable infrastructure;
- Creates incentives for higher performance goals beyond minimum requirements;
- Gives recognition to projects that make significant contributions to sustainability; and
- Provides a common language for collaboration and clear communication both internally and externally.

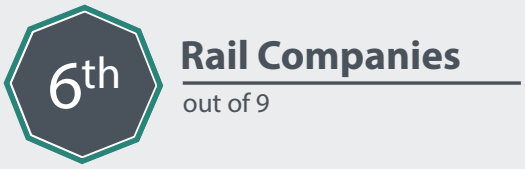
The Envision framework provides a flexible system of criteria and performance objectives to aid decision makers and help project teams identify sustainable approaches during planning, design and construction that will continue throughout the project's operations and maintenance and end-of-life phases.

In December 2020, the California High-Speed Rail Program earned the Envision Platinum rating, making it the largest transportation infrastructure project both in terms of capital investment and geographic area to earn an Envision award for sustainable infrastructure to date. Envision Platinum is the highest award level possible, according to the Institute for Sustainable Infrastructure.

Consistent High Marks

The California High-Speed Rail program was awarded four stars and ranked as one of the top infrastructure projects in North America. The program improved its rating from 68 to 79 and placed sixth among similar projects in the 2020 GRESB Infrastructure Assessment.

Peer Comparison



This achievement provides third-party validation of our leading position in terms of environmental, social and governance measures at North American and international scales.

LEED®

LEED® (Leadership in Energy and Environmental Design) is the most widely used green building rating system in the world. Available for virtually all building types, LEED® provides a framework for healthy, highly efficient and cost-saving green buildings.

Green building is the planning, design, construction and operations of buildings with several central, foremost considerations; energy use, water use, indoor environmental quality, material selection and the building's effects on its site.

LEED® acts as a framework for decision-making for project teams in all of these areas, rewarding best practices and innovation and recognizing exemplary building projects with different levels of LEED® certification.

Through its procurement practices, the Authority will require all occupied facilities to achieve LEED® Platinum Certification.

Working With Industry Partners

We continue to work with established industry partners to demonstrate our commitment to sustainability. These partners include the:

- American Public Transportation Association (APTA): This international organization represents the transit industry. By becoming a signatory of APTA's Sustainability Commitment, we committed to a core set of actions that enhance sustainability.
- International Union of Railways (UIC): This world-wide professional association represents the railway sector and promotes rail transport. We signed the UIC's Railway Climate Responsibility Pledge in 2015, committing to taking action to prevent climate change, reduce our carbon footprint and to support a more sustainable balance of transport modes.
- Transportation Decarbonization Alliance (TDA): This organization launched in 2018 to accelerate the worldwide transformation of the transportation sector toward a net-zero emission mobility system before 2050. California became the 19th member of the TDA and the first in North America, joining countries, cities and companies to encourage decarbonization in the transportation sector.
- California Climate Safe Infrastructure Working Group: Participation in this group enabled us to directly detail how infrastructure projects include climate change impacts in infrastructure planning, design and implementation processes.
- The Sustainable Purchasing Leadership Council (SPLC): This nonprofit organization supports and recognizes purchasing leadership that accelerates the transition to a prosperous and sustainable future. The Authority participated in a State of California benchmarking exercise with the SPLC.

In addition, we look across global best practices and align our work on the high-speed rail project with those practices. One example is the United Nations' Sustainable Development Goals (SDGs), a collection of 17 global goals that the United Nations General Assembly set in 2015 for the year 2030.

The UN describes the SDGs as the "blueprint to achieve a better and more sustainable future for all". The SDGs address global challenges, including climate, environmental degradation, poverty, inequality, prosperity, and peace and justice. Worldwide, 193 governments, including the United States, ratified the SDGs in 2015, and worldwide implementation started in 2016.

In 2018, as part of our work to refresh our materiality assessment, we discussed the SDGs with each of our stakeholders to determine the importance of referencing these broader global goals and how high-speed rail actions affect positive outcomes in relation to the goals. Our stakeholders expressed favorable reactions to the idea, because it is important to understand how our actions relate to broader global issues.

Materiality Assessment

Listening to stakeholders is vital. A materiality assessment is a process of stakeholder engagement and analysis undertaken to quantify the relative significance of different environmental, social and governance issues to the organization or project in question.

We conducted the materiality assessment update in 2018 via questionnaires and individual conversations with selected stakeholders. These stakeholders were identified based on the extent to which the groups are interested in, affected by or potentially affected by our activities. We examined the groups' ability to influence the program's outcomes and the extent to which the groups are invested in the high-speed rail program's success or failure. External stakeholders comprised local non-governmental organization representatives, as well as representatives from six state agencies: the California State Transportation Agency (CalSTA), the California Department of Transportation (Caltrans), the California Environmental Protection Agency, the California Natural Resources Agency, the California Energy Commission and the California Strategic Growth Council.

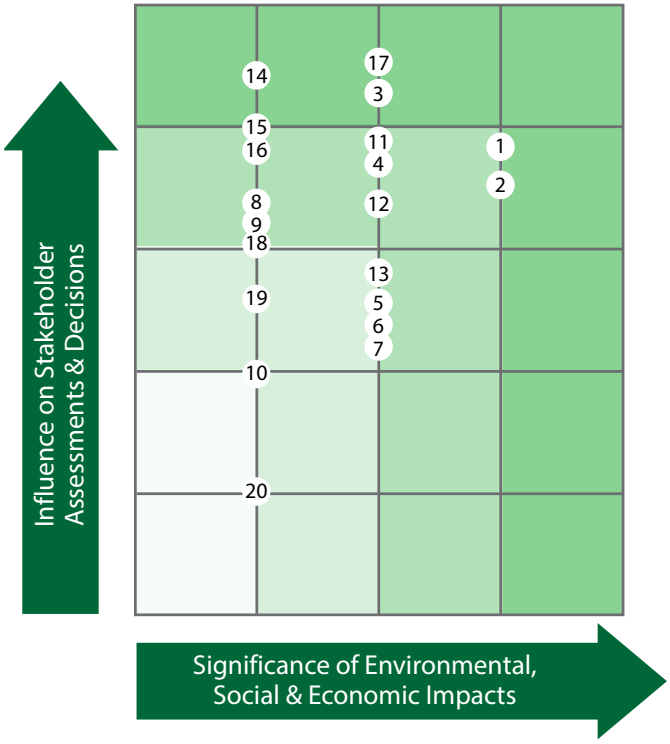
Our internal stakeholders included nine Board members and executives and six key external-facing staff, as well as the Early Train Operator (ETO), DB Engineering & Consulting USA.

Materiality Assessment Results

The materiality assessment provided clarity on how to respond to increasing requests for information related to our sustainability activities, in addition to our traditional reporting. This extensive review revealed the sustainability impacts (shown in Exhibit 1.6) that matter most to our stakeholders.

Some of these impacts occur internally (e.g., our office energy use), but many (e.g., running the system on renewable energy) have far-reaching effects external to our own operations. Boundaries for each material topic for the Authority and the project are shown on pages 14 through 17. For more information on the materiality assessment completed in 2018, the methodology used and detailed descriptions of the topics and boundaries covered, see our Sustainability Report from 2020 at ***https://hsr.ca.gov/programs/green-practices-sustainability/sustainability/***.

EXHIBIT 1.6: CALIFORNIA HIGH-SPEED RAIL AUTHORITY MATERIAL TOPICS



Environmental Material Topics	
1	Energy conservation and efficiency
2	Air, land and water pollution
3	Greenhouse gas (GHG) emissions
4	Renewed energy
5	Biodiversity and Ecosystem preservation/enhancement
6	Water use and management
7	Waste management
8	Resilience and adaptation, incl. extreme weather
9	Life cycle approach
10	Noise and Vibration
Social Material Topics and Aspect Boundaries	
11	Transportation hub activation and mass/active transportation
12	Economic development, skills and employment
13	Enhancing public space and amenities
14	Socio-economic equity
15	Health and safety
16	Community consultation, engagement and participation
Governance and Material Topics and Aspect Boundaries	
17	Transparency and accountability
18	Sustainable and local procurement
19	Emergency and disaster recovery planning
20	Third-party assessment

Environment Material Topics and Aspect Boundaries

Energy Conservation and Efficiency

Energy, including electricity and fuels, consumed in offices and project sites, and behaviors and/or technologies that reduce the amount of energy consumed.

Boundary: The efficiency with which we use resources impacts the environment.

Air, Land and Water Pollution

Substances associated with potentially harmful human health and environmental impacts. Criteria air pollutants include particulate matter, ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides and lead, while land and water pollution may result from leaks or spills of gases, chemicals, oils, fuels or wastes.

Boundary: Our approach to air, land and water pollution impacts the environment, as well as State commitments and requirements, such as those made with the California Air Resources Board (CARB).

Greenhouse Gas (GHG) Emissions

Greenhouse gases trap energy in the atmosphere and are the primary driver of climate change and global warming. The United Nations Intergovernmental Panel on Climate Change (IPCC) defines seven gases under this category: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs – a family of gases), fluorocarbons (PFCs – another family of gases), nitrogen trifluoride (NF_3) and sulfur hexafluoride (SF_6).

Boundary: The efficiency with which we use resources impacts the environment. Our approach to managing GHG emissions impacts State emissions-reduction commitments.

Renewable Energy

Resources, such as wind power or solar energy, that can be produced indefinitely without being depleted.

Boundary: Our use of renewable energy impacts the environment.

Biodiversity and Ecosystem Preservation Enhancement

Protecting biological diversity of ecosystems, plant and animal species. Conserving, maintaining, and restoring habitats and wildlife corridors.

Boundary: Our approach to ecosystem preservation and enhancement impacts local biodiversity.

Water Use and Management

Quantities of water withdrawn, used and discharged; practices to conserve water; consideration of water sources that could be impacted by withdrawal or discharge, and potential water quality concerns.

Boundary: The efficiency with which we use and manage water resources impacts the environment, both through our direct operations as well as via contractors' construction activities.

Waste Management

How materials are used and disposed, including wastes diverted from landfill via reuse, recycling or composting.

Boundary: The efficiency with which we use resources impacts the environment, both through our direct operations as well as via contractors' construction activities.

Life Cycle Approach

Considers upstream and downstream impacts of a product or activity over its lifetime. This includes the environmental or social impacts from extraction, manufacturing, transport, installation, use/operation, decommissioning and disposal.

Boundary: Taking a life cycle approach impacts the environment and people upstream and downstream of our direct operations.

Resilience and Adaptation, Including Extreme Weather

The ability of an individual, organization or community to adapt to and recover from hazards, shocks or stresses. This includes climate-change impacts, such as extreme weather events (droughts, floods, etc.).

Boundary: Our approach to this topic impacts our employees, contractors, consultants and the public, as well as the resilience of the high-speed rail system.

Noise and Vibration

The propagation of unwanted or excessive sound and/or physical oscillations with the potential to negatively impact human health and activity, or animal life.

Boundary: This topic impacts communities located near the high-speed rail system.

PHOTO: The high-speed rail project continues to employ thousands of workers.

Social Material Topics and Aspect Boundaries

Transportation Hub Activation and Mass/ Active Transportation

Access to multiple modes of transportation and opportunities to transition between modes, such as from transit to active transportation (e.g., walking, cycling, non-motorized wheel-chair use, etc.).

Boundary: Our approach to these topics impacts communities located near the high-speed rail system.

Economic Development Skills and Employment

Provision and access to training, development, employment and/or business opportunities, including programs targeting specific groups, such as small businesses, minorities and veterans.

Boundary: Our approach to skills and training impacts our employees, contractors, consultants and the public.

Enhancing Public Space and Amenities

Physical features benefiting neighborhoods and communities, such as public plazas, parks, recreation facilities, public art and historical/heritage features.

Boundary: Our approach to this topic impacts communities located near the high-speed rail system.

Socioeconomic Equity

Benefits delivered to all community members regardless of socioeconomic status, such as benefits created by station configurations, development practices, accessibility and environmental justice considerations.

Boundary: Our approach to this topic impacts communities located near the high-speed rail system.

Health and Safety

Harm prevention and promotion of physical health and mental/emotional well-being of employees, contractors, consultants and the public. This includes reporting on injury rates and work-related fatalities.

Boundary: Our approach to health and safety impacts our employees, contractors, consultants and the public.

Community Consultation, Engagement and Participation

Providing opportunities, such as public meetings, for community members to receive information and/or provide feedback on matters affecting them. This includes engaging communities with special concerns, such as disadvantaged communities.

Boundary: Our approach to this topic impacts communities located near the high-speed rail system.

Governance Material Topics and Aspect Boundaries

Transparency and Accountability

Reporting comprehensive, accurate and balanced information that stakeholders have a right to know. This includes information that supports stakeholders in holding an organization accountable regarding its commitments and legal responsibilities.

Boundary: Our approach to this topic impacts the reputation of the Authority and the high-speed rail system.

Emergency and Disaster Recovery Planning

Actively planning for actions to be taken before, during and after a disaster. This includes natural, environmental or human-caused disasters.

Boundary: Our approach to this topic impacts our employees, contractors, consultants and the public, as well as the resilience of the high-speed rail system.

Sustainable and Local Procurement

Selecting materials, goods, utilities and services with enhanced environmental or social benefits, such as goods produced from recycled materials or provided by disadvantaged businesses. Local procurement refers to selecting materials that have been sourced from within the same region or nation, enhancing local economic development and reducing transportation impacts.

Boundary: Selecting sustainable and local goods impacts community partners as well as the environment.

Third-Party Assessment

Aligning with third-party frameworks for sustainable infrastructure (e.g., the GRESB Infrastructure Assessment for benchmarking infrastructure asset sustainability policy and performance, and the Envision rating system for sustainable infrastructure projects).

Boundary: Our approach to this topic impacts the reputation of the Authority and high-speed rail system.

BOARD OF DIRECTORS

PHOTOS: The Board of Directors is responsible for setting policy directives for the Authority, and for the approval of the Authority's key policy documents, including the Authority's business plans and financial plans, as well as policies and plans related to sustainability.

PHOTO: Students at the Central Valley Training Center learn important skills in the construction trades.

CHAPTER 2: ECONOMIC DEVELOPMENT AND GOVERNANCE

Introduction

We understand that the environment and the economy are intertwined and that the ability to get to destinations reliably, cleanly and quickly is at the heart of economic vitality. The Authority's mission is to deliver a functional, certified and commercially viable high-speed rail system to California; a system that will link California's economic and population centers with reduced travel times to underpin continued economic resilience.

We also appreciate that access to the travel-time savings benefits and economic development associated with the system, both in delivery and operation, is not equal to all Californians, unless we focus on that as an objective. The Authority's commitment to equity has delivered positive results, but the commitment must be maintained. We continue to focus on job creation, economic benefits, continuous improvement, transparency, accountability and maximizing opportunities for private investment while delivering the system. These priorities, and a demonstrated focus on becoming a high-performance organization, are encoded into our structure through governing statute and agency policy.

Our Sustainability Policy identifies commitments relative to economic development and governance, pointing to how we and our consultants and contractors have and will continue to tailor the program to deliver economic value to all Californians.

We continue to make progress toward fulfilling our mission despite the challenges facing this project. Our 2020 Business Plan explained our progress in building an organization focused on performance and delivery. We continue to improve our governance processes, and we are committed to a continuous process to improve organizational capacity and maturity.

Highlights

- 6,243 construction jobs have been created at various construction sites along the Central Valley alignment; more than 3,700 were targeted workers.
- The number of small businesses put to work on the project increased by nearly 116% since 2015, and the number of those businesses located in disadvantaged communities grew by 91% in the same time frame.
- Participation by Certified Disadvantaged Business Enterprises (DBE) increased to 201, and Disabled Veteran Business Enterprises (DVBE) participation increased to 70 Certified DVBEs working on the program.
- As construction advanced over 119 miles in the Central Valley, so, too, have our investments into the system statewide. From 2006 to mid-2020, our investments generated approximately $10.5 to $11.4 billion in total economic activity in the state.
- We set a goal to achieve ISO 9001:2015 Quality Management System (QMS) certification before the end of 2020. From start to finish, this goal was accomplished in nine months, with certification awarded in December 2020. The Authority is only the second state agency to be ISO certified.
- The executive team created a Diversity and Inclusion Taskforce that examined all aspects of the organization and developed an action plan to address gaps. An Equity Impact Report is set to be published in 2021 that further refines an action plan and improving our approach and outcomes related to equity.

Effective Governance

2020 PROGRESS: The Authority's Program Delivery Committee (PDC), Business Oversight Committee (BOC), Enterprise Risk Committee, and Administrative Committee deliver internal decision-making rigor, accountability and transparency for major decisions for program delivery and organization. Proposed changes to the program or to projects go through the PDC and BOC for a comprehensive review of the full effects of a proposed change.

We enforce requirements on contractors, subcontractors and suppliers to ensure effective governance and transparency in everything we do. In 2020, we received no fines related to these regulations. Furthermore, we have identified no significant noncompliance with environmental laws and/or regulations.[4]

Our oversight philosophy emphasizes stewardship, transparency and accountability. Our internal governance is comprehensive and structured; it was designed to enhance interdepartmental interaction through a more streamlined process for identifying issues, resolving problems and making decisions. Under our governance system, we fully vet all implications and tradeoffs of a potential action to ensure fully informed decisions.

Governance Committees Structure

In 2020, we maintained a structure of five governance committees, each with its own purpose, roles, organization and operations. This structure will be analyzed in 2021 to streamline roles and responsibilities. The five governance committees—the Executive Committee, the Program Delivery Committee (PDC), the Business Oversight Committee (BOC), the Administrative Committee, and the new Enterprise Risk Committee—regularly interact with each other to address programmatic issues. The PDC, BOC and Administrative committees report directly to the Executive Committee.

The Executive Committee is the senior governance committee. Members of the committee advise the Chief Executive Officer, who chairs the committee, on key agency decisions and recommendations to the Board of Directors. The Executive Committee makes executive, enterprise-wide policy decisions, provides overarching Authority strategy and priorities, resolves escalated disputes, and ensures preparation of agenda items for upcoming board meetings.

The Program Delivery Committee (PDC) provides governance and oversight of the Authority's programmatic execution and performance. The PDC is accountable for all aspects of program development and delivery in accordance with the Program Baseline, including scope, schedule, and adherence to budget. The PDC advises the Board of Directors, the CEO and the Executive Committee regarding program execution and performance.

The Business Oversight Committee (BOC) provides programmatic acquisition strategy, procurement governance and commercial oversight. It acts as the Program Baseline configuration-management control board and approves all changes of scope, timeline, and budget to any program element within the Program Baseline. This committee ensures Program Baseline compliance with federal and state regulations and statutes.

The Administrative Committee provides governance and oversight of human resources, IT, communications, employee engagement, administrative functions and facilities outside of Program Delivery, and business oversight. The Administrative Committee ensures effective administration and support to the entire Authority.

Finally, the Enterprise Risk Committee—created in 2020—is an oversight body comprised of members including the Chief Executive Officer, the newly appointed Director of Risk Management and Project Controls, and other Authority executives. The Enterprise Risk Committee will evaluate and prioritize emerging risks, review management risk responses and provide transparent reporting.

Equity Compliance Office

Ensuring the Authority is a safe, equitable, and enjoyable place to work is a top priority. The Authority has put several measures in place to maintain a high-quality working atmosphere for its employees, including appointing an Equal Employment Opportunity Officer and establishing an Equity Compliance Office.

The Equal Employment Opportunity Officer reports directly to the Chief Executive Officer and ensures that no discrimination occurs based on race, age, culture, gender, ability, or any other socio-demographic factors.

Along with investigating complaints of discrimination, the Equal Employment Opportunity Officer oversees reasonable accommodation processes to ensure that the work offered is accessible to all, as well as provides monthly training to employees related to ethics and anti-discrimination.

The Equity Compliance Office for the Authority was established in November 2020. The main objective of this office is to implement an anonymous hotline for employees to come forward and voice their concerns, with the goal of ensuring that employees feel safe and secure in the workplace. If the Equity Compliance Office deems that an allegation is in violation of one of the Authority's policies or conduct, the office has the power to investigate. Working together, the Equal Employment Opportunity Office and the Equity Compliance Office ensure that Authority employees are protected against discrimination and feel empowered to voice their concerns should they believe there has been a violation in policy or conduct.

Risk Management Office

Risk is inherent to any large-scale capital program. Actively managing risk is critical to objectively frame and guide decision-making at all levels of the organization and to achieve the program's strategic objectives. The Authority has been engaged in the iterative process of identifying, defining and quantifying risk since its inception, gradually increasing its understanding of current and future program risks. However, the emergence of the COVID-19 pandemic in 2020 created a variety of new and unforeseen risks, neither anticipated nor planned for.

To manage new risks, the Authority created an independent Risk Management Office, which reports directly to the Board. The office is overseen by a newly created position, the Director of Risk Management and Project Controls. In September 2020, the director of Risk Management and Project Controls was appointed, and work began to enhance risk management oversight and develop the Authority Enterprise Risk Management Program.

The Enterprise Risk Management program integrates risk management into all significant activities and functions of the Authority, supplementing and augmenting every aspect of our organization to empower and support our people in continuously improving our understanding and management of risk.

The Authority also created an Enterprise Risk Committee, an oversight body composed of the Chief Executive Officer, the Director of Risk Management and Project Controls, and other Authority executives. The Enterprise Risk Committee will evaluate and prioritize emerging risks, review management risk responses, and provide transparent reporting.

Once the program is fully implemented, a standard risk report will be prepared for the Enterprise Risk Committee to stay informed and review management actions on key prioritized risks—the culmination of this work will then be reported to the Board of Directors on a regular basis.

Project Oversight With Stage Gate

Also in 2020, the Authority started to implement Stage Gate, a project oversight process, to monitor and manage our capital projects. For the purposes of managing through individual Stage Gate steps, capital projects are conceptualized as a series of stages. Stages represent coherent groups of activities and deliverables carried out within the confines of stages of the project. Stages represent key transition and/or decision points along the project's progression. Stages are marked by multidisciplinary project review meetings to determine organizational readiness, confirm financial affordability (updated cost, schedule and budget), and decide whether a project is ready to advance.

Since our Board of Directors' budget approval and contract awards are required to select project alternatives, the Stage Gate management approach provides the Board enhanced visibility into projects, increases transparency of decisions made, and increases control over key project decisions.

Governing Statutes and Regulations

As a public-sector entity, we are governed by regulations that ensure the development of a system that is safe, sustainable, and compliant with applicable laws and requirements.

Statutes
The Safe, Reliable High-Speed Passenger Train Bond Act for the 21st Century (Proposition 1A, 2008)
AB 32 (Núñez, 2006) Global Warming Solutions Act
SB 32 (Pavley, 2016) Global Warming Solutions Act, 2006: Emissions Limit
SB 375 (Steinberg, 2008) Sustainable Communities and Climate Protection Act
AB 75 (Strom-Martin, 1999) Waste Management for State Agencies
SB 1029 Budget Act of 2012
SB 852 Budget Act of 2014
SB 862 (2013-2014) Greenhouse Gases: Emissions Reduction
SB 535 (De León, 2012) Global Warming Solutions Act, 2006: Greenhouse Gas Reduction Fund
AB 1352 (Perez, 2012) Global Warming Solutions Act, 2006: Greenhouse Gas Reduction Fund
AB 262 (Bonata, 2017) Buy Clean California Act
SB 350 (De León, 2015) Clean Energy and Pollution Reduction Act
SB 100 (De León, 2018) California Renewables Portfolio Standard Program: emissions of greenhouse gases
SB 379 (Jackson, 2015) Land Use: General Plan: Safety Element: Climate Adaptation
AB 1550 (Gomez, 2016) Greenhouse Gases: Investment Plan: Disadvantaged Communities
AB 398 (Garcia, 2017) Update to Global Warming Solutions Act of 2006: market-based compliance mechanisms
Executive Orders
Executive Order B-18-12
Executive Order B-30-15
Executive Order N-79-20
Executive Order N-82-20
Regulations
2008 California Long-term Energy Efficiency Strategic Plan
2008 Air Resources Board Scoping Plan; 2013 Update
2016 California Green Building Standards Code (CalGreen Code Title 24 Part 11

Financial Responsibility

2020 PROGRESS: As of December 2020, the Authority had expended $7.7 billion of $20.6 billion to $23.1 billion of capital outlay funding currently identified for the program. Also, we continued regular financial reporting to the Federal Railroad Administration (FRA), as well as annual reporting to the California Air Resources Board in compliance with requirements for California Climate Investments.

The State of California and the federal government committed significant amounts of funding to implement this program. As of December 31, 2020:

- The Authority has received funding commitments of more than $3.5 billion from the federal government, $9.0 billion from Proposition 1A bonds ($8.5 billion for capital outlay and expenditures) and 25% of annual Cap-and-Trade proceeds on a continuous basis plus one-time appropriations, facilitated by California Air Resources Board programs.
- $13.8 billion in federal and state funding will be allocated to the construction of the Central Valley Segment Funding Plan scope, including $3.0 billion from the federal government, $6.7 billion from Proposition 1A bond proceeds and $4.1 billion in current and future Cap-and-Trade proceeds.

Through December 2020, approximately 98% of expenditures went to California-based firms and workers. Through a provision in our grant agreement with the Federal Railroad Administration (FRA), we were primarily expending federal funds from the American Recovery and Reinvestment Act (ARRA) grant to advance the program.[5]

As of the November 2020 Cap-and-Trade auction, the Authority received more than $3.6 billion in Cap-and-Trade proceeds for high-speed rail. This funding has allowed us to execute the contracts necessary to continue the Central Valley construction. It has also allowed us to complete environmental planning and other early work for the entire Phase 1 System, consistent with our federal grant agreements.

Risk Assessments

We still recommend that we remain on the path we set in 2018, refined in the 2019 Project Update Report and discussed further in the 2020 Business Plan. This path is to complete the commitments that have already been made to the Central Valley and other partners and strategically build on those investments incrementally as funding is available.

Because of the uncertainty presented by the COVID-19 pandemic, we updated our approach to delivering the Merced to Bakersfield line as an initial operating line. We initiated a cost and schedule risk review of the 119-mile Central Valley Segment in 2020 to identify the most prudent way to navigate through and beyond this uncertain time. The review's results provided a snapshot of our estimate to complete the Central Valley Segment at that point in time.

Overall, the net change would increase construction base costs by $330 million, which represents the known cost increases at that juncture. Because there are still considerable risks associated with completing construction, it is prudent to budget an additional $1.0 billion for contingency. This would require us to adjust our budget for the Central Valley Segment from $12.4 billion to $13.8 billion to accommodate identified costs and risks. This revised total incorporates proposed cost mitigations as well.

Our intent is to advance construction in the Central Valley and complete environmental reviews to fulfill our federal grant commitments; to keep Californians working on this transformative project; to steadily recalibrate where we are in the face of COVID-19 impacts; and to chart where we must go in light of those impacts.

We further enhanced our risk management and oversight program by creating a Risk Management Office and implementing an Enterprise Risk Management program, as discussed in Effective Governance, and began implementing a Stage Gate project development and delivery process. We took these steps to provide more rigor and focus on risk-informed decision-making.

Financial Decision-Making Statutes
Assembly Bill 115 (Com. on Budget, Chapter 38, Statutes of 2011): Budget Act of 2011
Senate Bill 1029 (Com. on Budget, Chapter 152, Statutes of 2012): Budget Act 2012
Senate Bill 852 (Leno, Chapter 25, Statues of 2014): Budget Act of 2014
Financial Responsibility Activities
Managing our Administrative Budget in conformance with State of California requirements
100% compliance with all existing financial obligations and tracking mechanisms
Preparing biannual Business Plans for submittal to the Legislature (even years)
Preparing biannual Project Update Reports for submittal to the Legislature (odd years)
Board of Director and Finance and Audit Committee public meetings and monthly reports
Annual reporting to the California Air Resources Board in compliance with requirements for California Climate Investments

LINKS

- Full details of program funding and financing are available in the 2020 Business Plan: ***https://hsr.ca.gov/about/high-speed-rail-business-plans/2020-business-plan/***
- Monthly Finance and Audit Committee updates to the Board can be found here: ***https://hsr.ca.gov/about/board-of-directors/finance-audit-committee/***
- Details of funding agreements can be viewed online here: ***https://hsr.ca.gov/about/capital-costs-funding/funding-agreements/***

Job Creation

2020 PROGRESS: Jobs supported by high-speed rail investment increased significantly as construction ramped up in the Central Valley over the past several years. Our investment in California's economy in Fiscal Year 2019-20 yielded between 9,600 and 9,900 direct, indirect and induced job-years.

The ongoing creation of jobs in designing, planning and constructing the system is one of the high-speed rail project's signature benefits. Focusing on jobs in disadvantaged communities is a direct result of our governance process and has bolstered local economic development. High-speed rail construction jobs go to the people who need them most.

Between July 2006 and June 2020, the Authority has invested more than $7.2 billion in planning and building high-speed rail infrastructure, generating significant economic impacts for California's economy:

- Job years of employment: 54,300 - 60,400
- Labor Income: $3.9 - $4.4 billion
- Economic Output: $10.5 - $11.4 billion

This investment creates jobs and generates economic activity in multiple ways. High-speed rail contractors hire workers throughout the state and pay other businesses for goods and services. Workers spend their earnings throughout the economy. These direct and indirect impacts induce statewide economic activity by pumping money back into local and regional economies.

PHOTO: The Central Valley Training Center creates job opportunities for graduates.

Jobs in the Central Valley

Ever since the Great Depression, investment in transportation infrastructure has been key to stimulating economic recovery. During this time of economic uncertainty with the COVID-19 pandemic, it's evident that investment in good-paying transportation infrastructure jobs is once again needed to help combat growing unemployment.

Since the beginning of the COVID-19 pandemic in March 2020, broad-based unemployment has increased in California by 3%. However, during that same period, high-speed rail construction in the Central Valley has continued to create jobs.

Exhibits 2.0 and 2.1 show the number of construction jobs dispatched in the Central Valley across the three construction packages (CP 1, CP 2-3 and CP 4) and construction hours worked.

EXHIBIT 2.0: JOBS DISPATCHED BY CONSTRUCTION PACKAGE SINCE INCEPTION (AS OF JUNE 30, 2021)

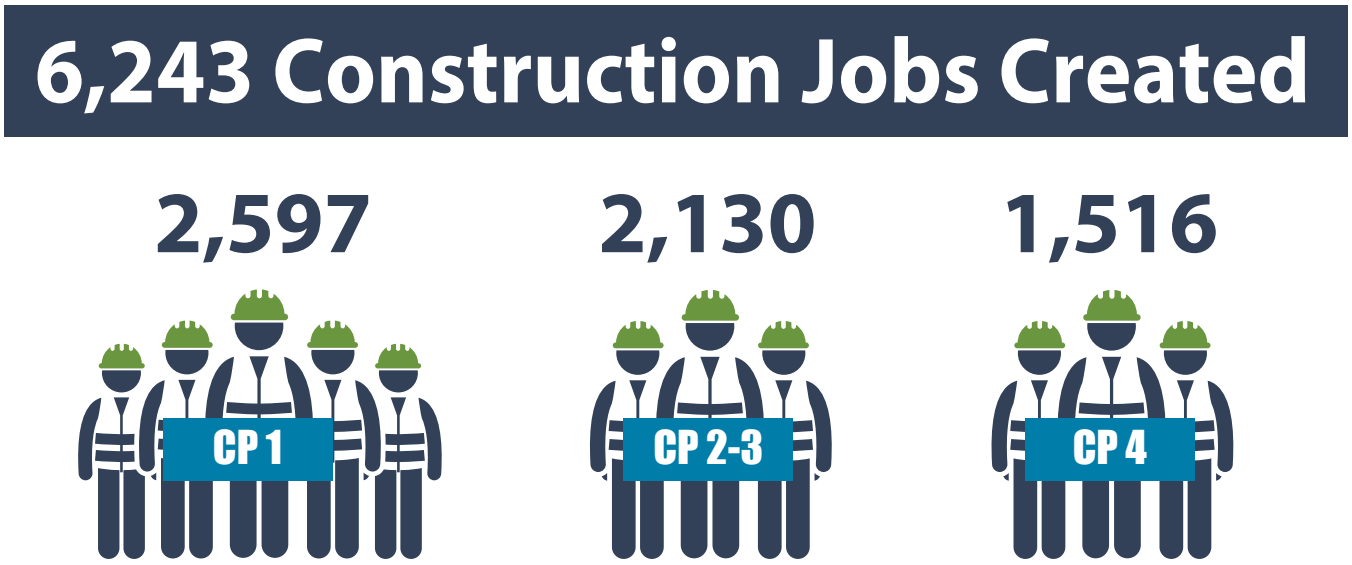


EXHIBIT 2.1: CONSTRUCTION HOURS BY CONSTRUCTION PACKAGE SINCE INCEPTION (AS OF MAY 31, 2021)

Jobs In Other Regions

Additionally, connectivity and bookend projects are providing jobs in Southern and Northern California, as shown in Exhibit 2.2. These projects, part of the California State Transportation Agency's (CalSTA) statewide rail modernization program, are designed to strengthen and improve existing rail networks and to connect them to the high-speed rail system. In time, permanent jobs will be created for train operators, maintenance yard workers, station managers and others to operate and maintain the system.

For more information on the economic effects of the program, visit ***https://www.hsr.ca.gov/programs/economic_investment/***

EXHIBIT 2.2: ECONOMIC BENEFITS BY REGION $ IN MILLIONS (JULY 2006-JUNE 2020)[6]

Economic Impacts	Northern California (Sacramento and the Bay Area)	Central Valley	Southern California
Job-Years of Employment	16,900	24,600	6,800
Labor Income	$1,330	$1,360	$500
Economic Output	$3,000	$4,470	$1,270

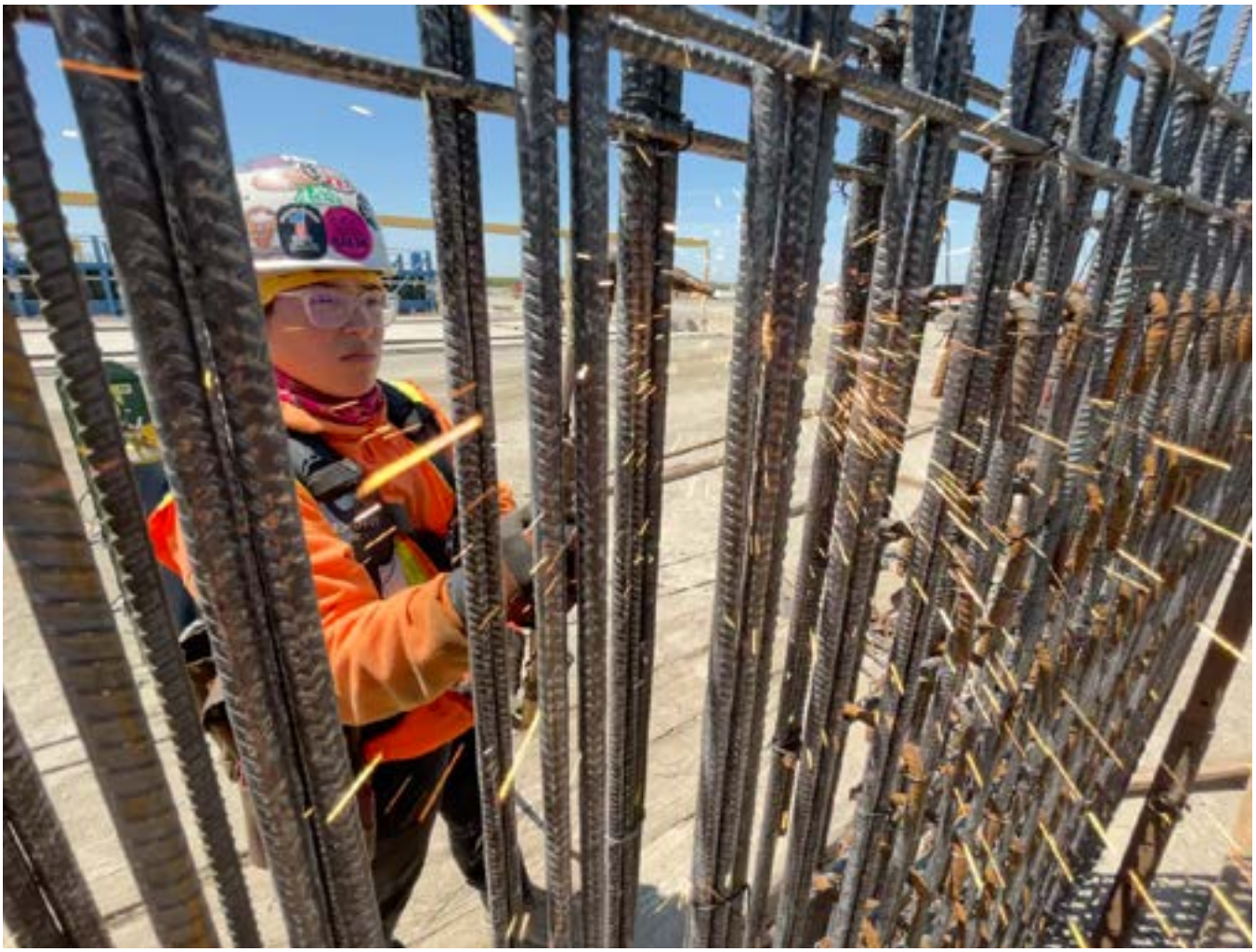


PHOTO: The high-speed rail project offers good-paying jobs and stability.

Future Jobs in Operations and Maintenance Facilities

In the future, more jobs will be created through continued design and buildout of the full system. For example, high-speed rail operations will require five different facility types: Maintenance of Way (MOW) facilities, an Operations Control Center, a Heavy Maintenance Facility (HMF) for trains, an operations management headquarters location and Light Maintenance Facilities (LMF).

Siting of the first facilities in the Central Valley is a critical consideration of multiple factors. As the system expands further and MOW and LMF sites are added, staffing will grow and be located strategically along the line for effective and efficient maintenance, operations and oversight.

The operations of the system will generate ongoing economic benefits to communities and businesses. According to an analysis conducted by the Authority in late 2019, a total economic output of $1.6 billion is anticipated, which includes the direct, indirect and induced effects that flow from these investments and staffing.

Exhibit 2.3 shows the estimated economic impacts of staffing the five maintenance facilities over a 10-year span of operation, starting at the end of the decade with facilities for initial testing of trains and continuing through operations.

EXHIBIT 2.3: HIGH-SPEED RAIL FACILITIES AND THEIR ECONOMIC IMPACTS ($ IN MILLIONS)

Facility Type	Labor Income	Output
Maintenance of Way Facilities	180	510
Operations Control Center	70	210
Heavy Maintenance Facility	110	340
Operations Headquarters	160	380
Light Maintenance Facilities	60	180
Total	580	1,600

Exhibit 2.4 shows the estimated job years created by staffing the five maintenance facilities over a 10-year span of operation.

EXHIBIT 2.4: HIGH-SPEED RAIL FACILITIES AND JOB YEARS

Facility Type	Job Years
Maintenance of Way Facilities	2,300
Operations Control Center	900
Heavy Maintenance Facility	1,500
Operations Headquarters	1,700
Light Maintenance Facilities	800
Total	7,200

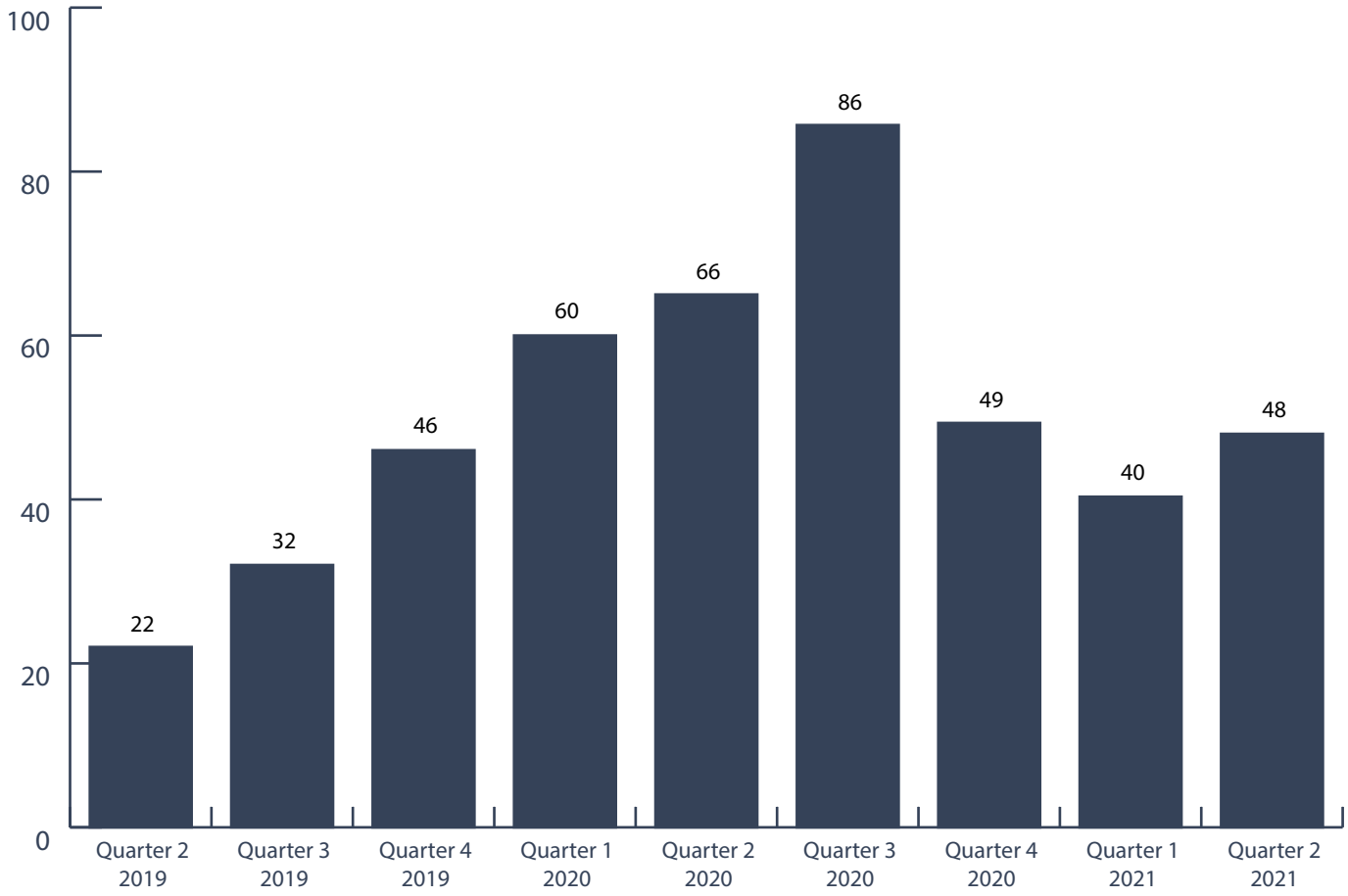
Fiscal Impacts for State and Local Governments

The Authority's average expenditures in the Central Valley construction packages continued to increase into the second quarter of 2020 compared to 2019, but decreased in the fourth quarter of 2020 and into 2021, as shown in Exhibit 2.5. The primary reasons for lower expenditures in the latter half of 2020 include third-party design approvals, utility relocations, delayed acquisitions of right-of-way parcels, environmental compliance issues and utilities-clearance conflicts.

In addition to jobs and economic output, the Authority's investment through 2020 also produced new net revenue for the state and local governments. As the Authority pays invoices for construction and other work on the project, those payments translate into higher incomes for small and large businesses working on the project, as well as wages for the workforce. When companies and individuals receive and spend this income, tax revenue is generated to support the services provided by state and local governments.

These fiscal impacts include state income tax and corporate taxes, state and local sales taxes, and local property taxes. According to an analysis conducted by the Authority in late 2019, $220 million in total net revenue was generated for California state and local governments over the 13-year period between fiscal year 2006-2007 and 2019-2020. The Authority has generated between $10.5 and $11.4 billion in economic output for California from July 2006 to July 2020.

EXHIBIT 2.5: MONTHLY AVERAGE EXPENDITURES IN CONSTRUCTION PACKAGES ($ IN MILLIONS), BY QUARTER



Catalyzing Regional Economic Development

The dramatic travel time savings through high-speed rail open regions of the state to new economic opportunities. The recovery from the economic crisis will depend upon rebuilding diverse economies, with a range of jobs and sectors that foster inclusive and sustainable economic growth. Regions have been looking at how they can develop collective approaches to development.

Building off the success of the Fresno DRIVE initiative in 2019 and the Governor's Office of Planning and Research/ GO-Biz Regions Rise Together initiative, state staff have been working in partnership with leaders in the City of Bakersfield and Kern County to launch "B3K" (A Better Bakersfield and Boundless Kern).

The Bakersfield-Kern region is at a turning point. Despite years of steady job creation based on energy, agriculture and population growth, the region faces serious challenges to its future vitality. It lags the nation and its peers on productivity, wages, new businesses and other measures of competitiveness. Access to quality jobs has impacted all demographic groups, with disparities creating a drag on the economy overall.

Fragmentation in the county undermines the economic competitiveness of the region. B3K is a collaboration among business, government and civic stakeholders to jointly create and deliver a shared strategy for economic growth and opportunity, as well as an investment plan for the Bakersfield-Kern region.

The initiative is answering key issues such as how to respond to economic disruptions and regional competitiveness challenges and how to improve job quality and access for broader prosperity. The B3K initiative aligns diverse efforts to maximize impact in advancing a common agenda for regional prosperity with quality job creation that is enduring and accessible to all residents.

This effort is funded, in part, with a $700,000 grant from the State's Employment Development Department. The local conveners are the Kern Community Foundation and the Bakersfield Chamber with a range of community groups and regional institutions, such as the City of Bakersfield, Kern County and CSU Bakersfield, as participants. That effort has stood up a steering committee and executive committee, hired a team from the Brookings Institution, and has begun a process of gathering data.

Connectivity through high-speed rail is a key to regional economic diversification and inclusive, sustainable growth.

B3K: Deep Prosperity for Bakersfield/Kern Region

"A Better Bakersfield and Boundless Kern (B3K)" is a long-term collaboration among business, government, and civic stakeholders driven to build a future where every person in the Bakersfield/Kern region can achieve self-sufficiency and reach their full potential.

Industries that have long fueled growth and economic mobility, from energy to aerospace, face significant headwinds as industries offering lower job quality have expanded. Employment rates have declined, and earnings have stagnated. The basics of what drive regional competitiveness in the modern economy—skilled workforce, innovation with commercial applications, dynamic young firms—have lagged. As a consequence, more than half of the region's residents now struggle to make ends meet, even though two-thirds of them belong to families with at least one working adult.

Launched in late spring 2020, B3K aims to create and deliver a joint strategy and operational/investment plan for regional economic growth and opportunity, centered on promoting quality job creation that is enduring and accessible to all residents. Over the past year, B3K has organized diverse stakeholders and produced an evidence-based market assessment which highlights the economic challenges for the region, presents findings for response, and identifies opportunities and areas where focused effort and investment are likely to yield results.

B3K has formed five work groups (Energy, Aerospace, Advanced Manufacturing, Business Services and Entrepreneurship and Business Ecosystem) that will take the findings from the market assessment and develop tangible strategies, tactics and operational plans. A Deep Prosperity Committee will help ensure that the work groups address challenges around access to economic opportunity, such as racial and gender disparities and geographic issues

To learn more about B3K, visit ***https://b3kprosperity.org/***

Opportunities For Disadvantaged Workers

2020 PROGRESS: Through 2021, the construction packages included 3,700 Targeted Workers, 60% of the total, which is twice the goal of 30%.

In FY 2019-2020, 64% of the investment in the system occurred in designated disadvantaged communities throughout California, spurring economic activity in these areas. Additionally, more than half (55%) of the total program investment from July 2006 to June 2020 occurred in designated disadvantaged communities.

We use two mechanisms to ensure that the jobs created by building and operating the high-speed rail system benefit communities most in need.

Community Benefits Policy

Under our Community Benefits Policy, we and our contractors adopt and implement programs designed to promote and advance construction employment and training opportunities for all individuals, especially those residing in extremely economically disadvantaged areas and veterans returning from military service.

Community Benefits Agreement

Our Community Benefits Agreement (CBA) focuses on engaging disadvantaged communities and achieving employment targets for individuals who reside in disadvantaged areas and those individuals designated as "Disadvantaged Workers," including veterans. The CBA, a cooperative partnership between the Authority, skilled craft unions and contractors, is designed to advance and promote training opportunities for all individuals. The job training that people receive through this policy will enable workers to be employed on other construction projects, delivering lifetime benefits.

The CBA's Targeted Worker Program ensures that 30% of all project work hours are performed by "National Targeted Workers" who come from disadvantaged communities where household income ranges from $32,000 to $40,000 annually. The program also requires that at least 10% of those work hours are performed by "Disadvantaged Workers."

As of June 30, 2021, 6,243 construction labor jobs have been dispatched to the three high-speed rail construction packages in the Central Valley, which includes 3,700 Targeted Workers. This is at a rate of more than twice the 30% goal (60%).

For more information on Targeted Workers and Disadvantaged Workers, see our Community Benefits Fact Sheet at ***https://hsr.ca.gov/wp-content/uploads/2021/05/CBA_Factsheet_051321.pdf.***

Workforce Development Center in Selma

In April 2020, the Authority partnered with the City of Selma to announce the launch of the Central Valley Training Center. The center welcomed its first group of 30 students in October 2020, and the first cohort of students graduated in January 2021.

The Authority, in coordination with the Federal Railroad Administration, established the training center to address impacts to environmental justice populations and maximize high-speed rail employment opportunities. The training center and its programs serve veterans, at-risk young adults, minority and low-income populations within Fresno, Kings, Tulare, Kern, Madera and Merced counties with a comprehensive and innovative look into careers in more than 10 different construction trades.

Students receive pre-apprenticeship and hands-on construction training from professional carpenters, cement masons, electricians and other specialists. Upon completion of the program, graduating students receive job-placement assistance from the high-speed rail program and its contractors.

Nearly 500 Central Valley residents have applied to take part in the Central Valley Training Center program since its opening last year. The training center is recruiting its second and third cohorts, and the second round of classes began on February 8, 2021.

To learn more and get involved, visit ***https://cvtcprogram.com/***

Fostering Diversity And Equal Opportunity

2020 PROGRESS: Despite most events taking place virtually in 2020, 12 outreach events took place in disadvantaged communities, and 449 disadvantaged workers have been dispatched to worksites since the project began. As of May 31, 2021, 201 Disadvantaged Business Enterprises (DBE) and 70 Disadvantaged Veteran Business Enterprises (DVBE) were working on the project. The Authority has surpassed its milestone of 500 certified small businesses (626 as of May 31, 2021) at work on the program.

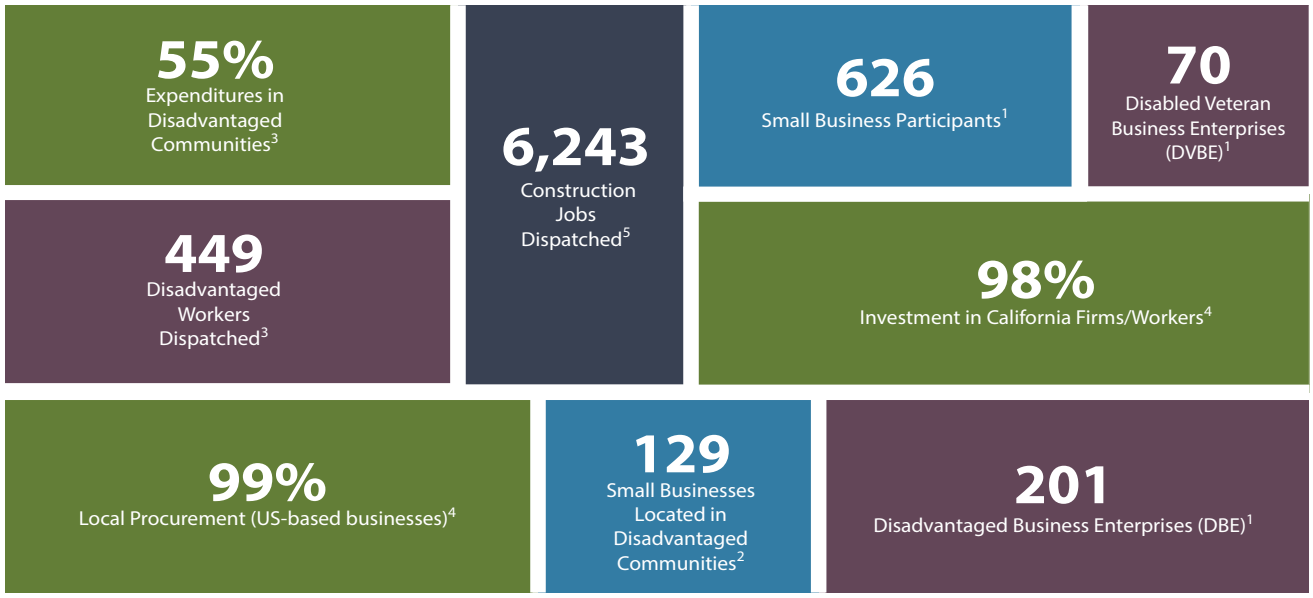
We believe strongly in equal opportunity for all and strength in diversity, as shown in Exhibit 2.6. We are committed to ensuring that no person is excluded from participating in any program or activity associated with the design, construction and operation of the high-speed rail system based on that person's race, color, national origin, sex, age or disability. We are committed to ensuring that no person is denied the benefits of participating in the high-speed rail program or is discriminated against under any program or activity of the high-speed rail system.

Title VI of the Civil Rights Act of 1964 prohibits discrimination on the basis of race, color or national origin in programs or activities receiving federal financial assistance. The rights of women, the elderly and the disabled are protected under related statutes.

We administer a Title VI Program in accordance with applicable non-discrimination laws and regulations. It is our policy and practice to provide free language assistance whenever individuals with Limited English Proficiency (LEP) request assistance. An individual with LEP is a person who does not speak English as their primary language and who has limited ability to read, write, speak or understand English. More about our Title VI program can be found on our website at ***https://www.hsr.ca.gov/programs/title_vi/***.

We are also committed to upholding Environmental Justice (EJ)—the fair treatment of people of all races, cultures and income levels, including minority and low-income populations, with respect to the development, adoption, implementation and enforcement of environmental laws and policies. We created an EJ program to ensure that our program, policies and activities incorporate EJ principles to mitigate disproportionate adverse impacts, particularly on minority LEP and low-income populations.

EXHIBIT 2.6: CREATING OPPORTUNITIES FOR DISADVANTAGED WORKERS AND FOSTERING DIVERSITY



1. As of May 31, 2021 2. As defined by CalEnviroScreen, as of December 2020 3. As defined in Title VI of the Civil Rights Act of 1964
4. Data covering July 2018 to 2020 and includes all construction activities across the Central Valley (significant location of operations)
5. As of June 30, 2021

Environmental Justice

Progress toward a clean, safe and healthy environment for all Americans has resulted in uneven and unequal distribution of environmental benefits. Members of minority and low-income communities disproportionately bear the burdens of a polluted environment.

California policy is to acknowledge, atone for and deconstruct the legacy of racism and oppression which has been a significant contributing factor for disproportionate burden by minority and low-income communities. Environmental Justice (EJ) addresses the unequal environmental burden often borne by minority and low-income populations.

The Authority is committed to upholding EJ principles—the fair treatment of people of all races, cultures and income levels, including minority and low-income populations, with respect to the development, adoption, implementation and enforcement of environmental laws and policies. In 2020, the Authority began a process of reviewing and updating its EJ policy and guidance.

As a federal project, we created an EJ program in compliance with Executive Order (EO) 12898 to ensure that our program, policies and activities incorporate EJ principles to address disproportionate adverse impacts, particularly on minority and low-income populations. Environmental justice is considered throughout the project life cycle but is analyzed in depth as part of the environmental clearance process in each project section.

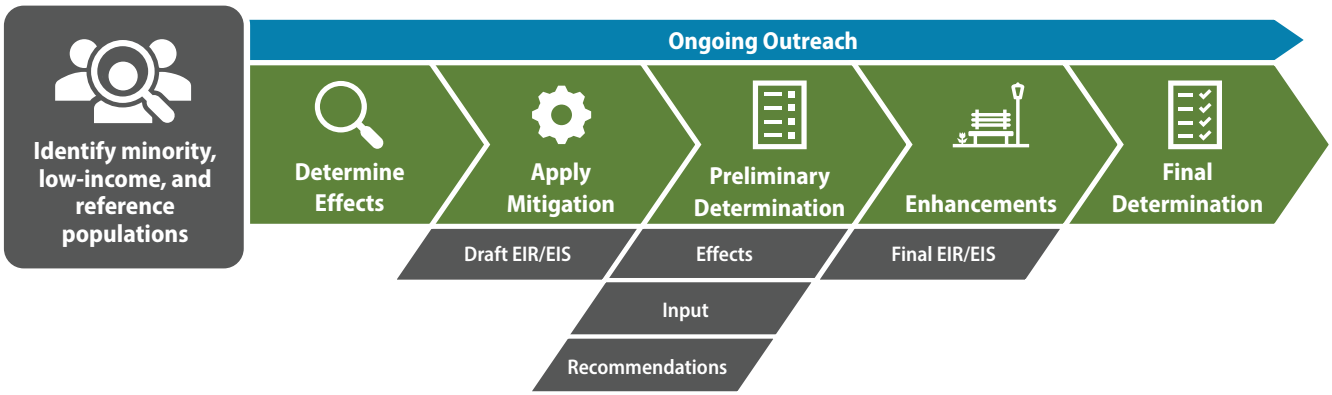
As we work to develop and analyze each project section, we identify reference populations and minority and low-income populations along the project section's routes, as shown in Exhibit 2.7. We identify effects to the reference population, compare them to the effects to low-income and minority populations and then determine if the effects are disproportionate for low-income and minority populations versus the reference population.

Where there may be disproportionate effects, we work with communities to identify appropriate enhancements that can provide direct benefit to communities to help offset the potential disproportionate effects.

We have been engaging with EJ populations along the potential route for the system throughout the project development process to gather feedback and inform the environmental analysis process. In 2019, our analyses of potential significant environmental and community impacts revealed disproportionately high and adverse impacts to low income or minority populations in eight communities in the San José to Central Valley Wye project section.

We then embarked on a process in late 2019 and into 2020 to identify potential measures to minimize the harm resulting from those disproportionate high and adverse effects. The measures will likely be enhancement actions that would be implemented as part of the high-speed rail project to provide benefits to EJ populations disproportionately affected by the project.

EXHIBIT 2.7: MITIGATION AND ENHANCEMENTS PROCESS



An improvement is defined as "any upgrading of an existing community facility, structure, function or action, or addition of a facility, structure, function or action that is made solely for the benefit of the local community, including an increase in the capacity, capability, efficiency, duration, function, or action over existing conditions."

Working directly with affected communities, the final environmental documents for this project section will lay out the steps that the Authority will take to offset disproportionately high and adverse effects on low income and minority populations.

Worker Protections

2020 PROGRESS: All Authority staff and consultants are covered by the Fair Labor Standards Act (FLSA) and/or union bargaining agreements that define labor conditions and wages. All construction workers follow a bargaining unit agreement or are protected by the FLSA.

The Fair Labor Standards Act (FLSA) and/or union bargaining agreements that define labor conditions and wages cover all Authority staff and consultants. All construction workers follow a bargaining unit agreement or are protected by the FLSA.

Safety During the Pandemic

We worked closely with our contractors to continue construction in 2020 during the coronavirus pandemic. Our goal is to ensure that California's workforce remains employed and contributing to the local economy, while also respecting local and state requirements related to COVID-19 and social distancing measures.

The construction teams continue to follow the Centers for Disease Control and Prevention (CDC) and Occupational Safety and Health Administration's (OSHA) increased safety protocols and guidelines.

Engaging Suppliers

2020 PROGRESS: The Authority continued coordination with other agencies focused on supply chain issues and established performance thresholds for embodied carbon for concrete and steel.

Our sustainable procurement approach is intended to scale to all sizes of suppliers to the high-speed rail program. The Small Business Program philosophy also applies to our supply chain. Initiatives within the supply chain extend the benefits of the program to local businesses and suppliers, and procurement policies and practices are designed to benefit local, small and disadvantaged businesses. The Authority also continued to convene a working group focused on sustainable procurement.

As we establish environmental, social, and governance targets and requirements for the supply chain, we identify how they can be scaled so that small businesses can participate. We also monitor the environmental impacts of the purchases we make, and we engage 100% of significant new suppliers through procedures, guideline specifications and contract documents to ensure that high-speed rail procurements meet our sustainability criteria.

Small Business Program

2020 PROGRESS: The small business program continued to grow in 2020, with additional small businesses joining and benefiting from the program. As of May 31, 2021, there were 626 small businesses working with the Authority on the high-speed rail program statewide.

We are committed to ensuring that small businesses play an active role in building the high-speed rail program, as shown in Exhibit 2.8. Our Small Business Advocate oversees our Small Business Program and guides our efforts to meet our aggressive 30% small business participation goal for small business participation, including Disadvantaged Business Enterprises (DBE), Disabled Veteran Business Enterprises (DVBE) and Micro-Businesses (MB). When applicable, this goal includes 10% participation for Disadvantaged Business Enterprises (DBE) and 3% for Disabled Veteran Business Enterprises (DVBE).

We continually seek new and innovative approaches to improve our policies and procedures to eliminate any barriers and increase small business utilization. Our Business Advisory Council is one way that we achieve these goals.

The council is representative of statewide construction and professional services business trade associations that serve as a forum to provide essential input and advisement to the Authority in implementing practices that effect and/or impact the small business community.

The council cultivates a partnership between the Authority and its small business and contracting community. The collaboration and insight will serve to advance the Authority's success in meeting its 30% participation goal for small businesses on this historic infrastructure project.

For more information, see the Small Business Program page on our website at ***https://hsr.ca.gov/business-opportunities/small-business-program/.***

PHOTO: Small businesses play an important role in the high-speed rail project (photo taken pre-COVID restrictions).

EXHIBIT 2.8: SMALL BUSINESS PARTICIPATION MAP

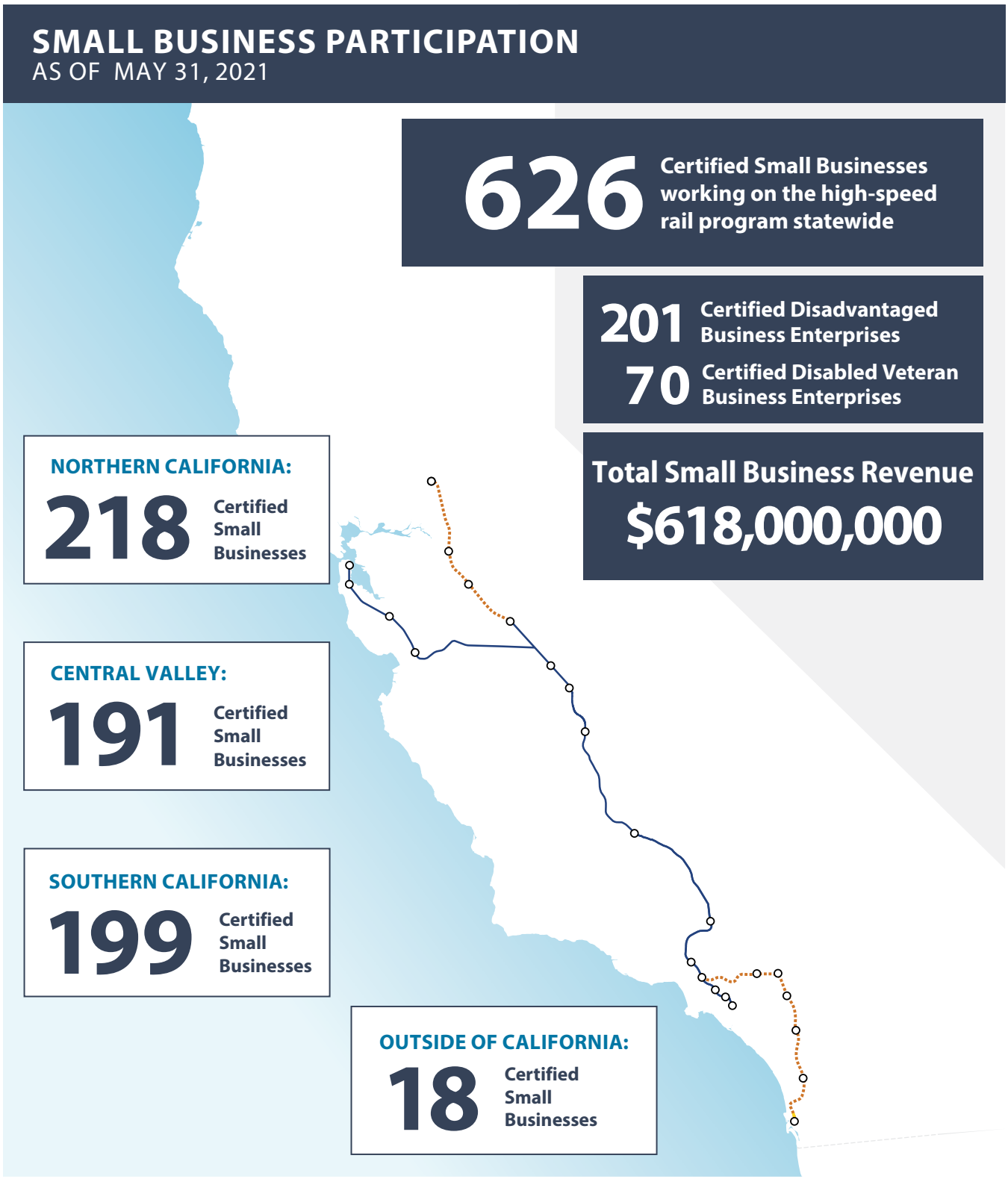


PHOTO: Tree-planting throughout the Central Valley will offset emissions produced during construction.

CHAPTER 3: ENERGY AND EMISSIONS

Introduction

The voters of California opted for the best of modern technology to underpin its economic future: electric high-speed rail, with speeds enabled by proven technology. These speeds have a dramatic side benefit—billions of vehicle miles off California roads and tens of thousands of flights reduced. In addition, overhead electrification has proven reliable, safe and cost effective for high-speed rail systems around the world. California must invest in projects that reduce pollution for communities and deliver short- and long-term greenhouse gas (GHG) emissions reductions. California has also clearly set itself on the path to carbon neutrality. Electrified high-speed rail, running on renewable energy, is the spine of clean, long-distance travel in California.

Energy and emissions are a primary focus for the program. Over 10 years ago, we committed to running the high-speed rail system's trains and facilities entirely on 100% renewable energy. This anticipated the more recent state commitment to carbon neutrality and electrification of transportation. This commitment also reflects the unique opportunity of operating in California, one of the best places in the world for renewable energy generation. Operating on renewable energy is an opportunity to reduce our operating costs and reduce system risks from climate change.

But we do not just rely on a clean supply; we have also focused design on efficiency. We will design high-speed rail stations and service facilities to be net-zero energy buildings, meaning they will produce at least as much energy on-site as they consume over the course of a year. Furthermore, we are committed to reducing GHG emissions through construction and operations, as well as protecting air quality by reducing the emissions associated with other criteria air pollutants.

Highlights

- The Authority demonstrated its contribution to reducing GHG and air quality emissions at a restorative level under the Envision rating system.
- The Program Delivery Committee approved a strategy for achieving the Authority's renewable energy commitment; on-site generation coupled with battery electric storage strategy. This strategy presents operating cost savings and resilience opportunities.
- We advanced other aspects of our net-zero energy and renewable energy goals through continued implementation, monitoring, planning and refinement of the Sustainability Implementation Plan action items.
- Contractors reported a 30% increase in electricity consumption, which corresponds to the 45% increase in construction activity.
- Electricity consumption in our offices remained similar to 2019 levels at 1954 MWh (a 2.4% increase above 2019 levels), as staffing levels remained stable.
- The Authority continued to track criteria air pollutants for nitrogen oxide, reactive organic gases (ROG), particulate matter (PM) and black carbon quarterly for each construction package. The quantitative results continued to be positive. The proportion of emissions avoided for ROG, PM, black carbon and nitrogen oxide ranged from 55% to 71% below a typical fleet.

Designing Net-Zero Energy Stations

2020 PROGRESS: The Authority used contract performance requirements to implement net energy-positive facilities for infrastructure maintenance facilities.

Our stations are future hubs of electrified transportation fueled with renewables. We will design all high-speed rail stations to function as high-performance buildings that provide low-cost operations by maximizing efficiency. High-speed rail stations and service facilities will be designed to be net-zero energy, meaning they will produce at least as much energy on-site as they consume over the course of a year. Energy could be supplied by building integrated elements, such as solar thermal or photovoltaics. Good passive solar and energy-efficient design will also reduce energy demand.

We have also begun developing plans for how excess energy produced at our facilities can spur more restorative development in station districts. Working toward net-positive energy facilities includes partnering with adjacent developments and helping our local partner communities reach important milestones for renewable energy and sustainability.

RENDERING: Photovoltaic panels will help stations generate power on-site (conceptual rendering of high-speed rail station).

Committing to Renewable Energy

2020 PROGRESS: We continued modeling and analysis of the rail system and operations schedule to refine a strategy for delivering renewable energy to the system that would enhance resilience, lower operating costs and meet our policy commitment. This activity clarified the sizing and scale of how renewable energy and battery storage could serve to reduce peak demand. We improved our understanding of energy costs and opportunities for streamlining solar opportunities.

The Authority continues to work with state partners, such as the California Energy Commission, to better understand the use and availability of renewable energy to supply the system's needs over the project's life. According to an Energy Commission analysis of state renewable energy data and trends, California's renewable energy resources provide more than enough capacity to meet the relatively small demands of the high-speed rail system.

Building Sustainable Power

Cost-efficiency and reliability are critical to successful operation. Our current strategy to operate on 100% renewable energy achieves operating cost reductions and mitigates risks to the system's power supply. The Authority has identified an effective strategy for 100% renewable energy: solar generation on Authority-owned land matched with battery storage.

Staff are further refining the steps for power generation and renewable power purchases. The current strategy is to use land that we already own for solar generation and battery storage resources. Over the next year, we will finalize and initiate procurement for the power needs of the system, aligned and scaled with the delivery of track and systems, and operating segments.

We already have an integrated team of renewable energy experts, along with right-of-way, environmental, contracting and legal staff, finalizing the strategy and approach. Staff have identified specific parcels to use in this strategy.

The Authority will continue refining energy specifications and requirements to inform future procurement documents for a solar and storage solution. This work will require close coordination with the Track and Systems contractor for power-connection points, as well as the train manufacturer for train energy requirements. Ultimately, this will lead to the construction and testing of energy generation and battery storage for power delivery systems and train needs.

This approach to power supply speaks to the importance of system resilience. The system, and its power supply, must operate under any number of future conditions. The current strategy:

- Reduces overall power demands, decreasing operating costs;
- Provides a source of back-up power should the grid unexpectedly shut off, enabling us to continue service for an extended period;
- Enables us to cost-effectively meet renewable energy commitments;
- Enables maximizing benefits from the low-carbon fuel standard program; and
- Enables us to test the battery storage system prior to commercial operation and to identify additional potential capital cost savings.

Energy Use in Construction

2020 PROGRESS: Construction activities occurred across 35 sites on more than 119 miles of the system throughout 2020. We continued monitoring fuel consumed by construction vehicles and equipment.

As construction continues in the Central Valley, the contractors engaged by the Authority use energy sources, such as fuel and electricity, to power construction and related equipment (front-loaders, bulldozers and graders, as well as pick-up trucks and other motor vehicles) and site/field offices.

Fuel Consumption

Diesel fuel consumption increased by 51% from 2019, attributable to increased construction activity, while gasoline fuel consumption decreased by 7%. In total, energy consumption of vehicle fuels increased 24% compared to 2019. Future construction packages, including the track and systems contract, include provisions that require the contractors to use zero-emissions vehicles for site travel, a requirement that should lead to reductions of fuel use in construction over time.

Electricity Consumption

Since 2015, construction of the system has consumed approximately 698,108 Gigajoules of energy. During 2020, approximately 28% of the total kWh that each contractor reported consuming was sourced from renewable energy.

Harnessing the Sun to Power High-Speed Rail

TerraVerde Energy, a Larkspur-based consulting firm, was founded to support California public agencies evaluating and deploying the distribution of solar photovoltaic projects, battery energy storage and energy resiliency (microgrid) projects.

The business got its start in the public-school sector, then expanded to other types of public agencies—cities, counties, water agencies, and then transit and community choice agencies. TerraVerde is a subcontractor and is helping the high-speed rail project develop its energy procurement strategy, focusing on four primary components—feasibility and design, procurement, project management and asset management.

The company is performing analytics to determine the appropriate scoping and design requirements for the most cost-effective way of implementing solar and battery storage. The company also created an electricity-usage model for the high-speed rail system.

Other transit agencies have tapped into the firm's expertise. Those clients include Bay Area Rapid Transit (BART), Caltrain and SamTrans. TerraVerde Energy is also supporting more than 60 public agencies in developing and managing solar management and storage. Working on high-speed rail has allowed TerraVerde to leverage its relationship with other transit agencies with similar strategic development work.

Energy Use in Authority Offices

2020 PROGRESS: As the number of personnel dedicated to the program remained stable in 2020, our energy consumption in offices also remained stable over the past year. In 2020, our electricity consumption for powering computers, lights, and heating and cooling systems increased by approximately 2.4% compared to 2019, which is proportionate to the increase in Authority and Rail Delivery Partner staff during that same period. We have implemented multiple initiatives to reduce demand, such as metered lighting, automatic shut-off of computer monitors, etc.

The Authority occupies office space in Sacramento in a building that is LEED® EB (LEED for Existing Buildings) Gold Certified and uses metered lighting and automatic shut-off of computer monitors to minimize energy use. The building features extensive glass throughout, which creates abundant, natural lighting. In addition, the Authority's Building Services Unit regularly corresponds with staff on energy-related issues, such as reminders on how to reduce energy loads or notices of "green" events, such as "bike to work month." Exhibit 3.0 shows the energy that's consumed in high-speed rail construction and in the Authority's offices.

Regulatory Compliance (Energy)

2020 PROGRESS: The California high-speed rail program complied with all applicable policies, laws, standards and regulatory guidelines in 2020.

All California high-speed rail systems and facilities are or will be subject to the following energy-related policies, laws, standards and regulatory guidelines:

- California High-Speed Rail Authority Policy Directive Poli-Plan-03 on Sustainability;
- California 2013 Building Energy Efficiency Standards;
- 2010 California Green Building Standards Code (CalGreen Code) Title 24, Part 11;
- 2008 California Long-term Energy Efficiency Strategic Plan;
- Memorandum of Understanding between the Authority and the California Energy Commission; and
- SB 350 (De León) Clean Energy and Pollution Reduction Act.

EXHIBIT 3.0: ENERGY CONSUMPTION IN 2020

Consumption Type	Units	Quantity
Off-Road Diesel Consumption	Gallons	694,029
On-Road Diesel Consumption	Gallons	342,392
On-Road Gasoline Consumption	Gallons	556,952
Energy Content of Fuel Consumed	GJ	224,352
Construction Electricity Consumption	MWh	2,387,717
Authority Office Electricity Consumption[7]	MWh	1,954
Construction Renewable electricity	%	28%
Energy Content of Electricity Imported	Megajoules	8,602,815

Reducing GHG Emissions

2020 PROGRESS: We continue to apply innovative construction practices, such as the durable concrete mix designs in Construction Package 1 (CP 1) that use 25% fly ash for cement and 100% recycled steel with global warming potential scores below industry average.

In addition, our early investments in upgrading regional rail systems, referred to as "bookend" and "connectivity" projects, will reduce GHG emissions. For example, electrification of the Caltrain corridor, upgrades to sensor and signal systems, more energy-efficient equipment and processes, and additional grade separations will reduce emissions and air pollution from idling vehicles.

California continues to be at the national forefront in establishing targets for reducing GHG emissions and transitioning to a sustainable, low-carbon future by focusing on achieving carbon neutrality across all sectors by 2045. The high-speed rail system is crucial to shift travel away from automobiles and short-haul air travel and to play a key role in California's ambitious plan to reduce statewide GHG emissions to 40% below 1990 levels by 2030 (Executive Order B-30-15 and California Global Warming Solutions Act of 2006 (SB 32).

In the absence of high-speed passenger rail service, vehicle miles traveled for long-distance trips in California are projected to increase by approximately 11.7 billion miles—to 70 billion miles annually—between 2021 and 2040. Without high-speed rail, there is no alternative for intrastate air travel.

High-speed rail contributes to reducing GHG emissions in the state as soon as it starts operating. Every mile traveled on high-speed rail is a mile of avoided travel by automobile or airplane. The emissions associated with these less-energy efficient forms of travel will be significantly avoided by traveling on the high-speed rail. On average, annual GHG emissions reductions are projected to be 2 million metric tons of carbon dioxide equivalent ($MMTCO_2e$).[8]

Emissions Reduction Calculation

The cumulative reductions of direct emissions (tailpipe), over the first 50 years of operation, are projected to be between 65 and 79 million metric tons of carbon dioxide avoided. The GHG emissions reduction scenarios reflect the ridership range expressed in the 2020 Business Plan. Ridership is expressed as both a medium case and as a 75th percentile, which provides the medium and high emissions scenarios. This projection informs the baseline case in California's Scoping Plan.

Our methodology to calculate projected GHG emissions has remained consistent, relying on a quantification method developed with the California Air Resources Board. We use the forecast of mode shift to high-speed rail service in combination with emissions factors for gasoline, diesel and jet fuel that are limited to the tailpipe emissions. For more information, see ***https://ww2.arb.ca.gov/sites/default/files/classic//cc/capandtrade/auctionproceeds/chsra_hsr_finalqm.pdf?_ga=2.104465283.202750622.1624558526-834839993.1550000807.***

For this sustainability report, we analyze the avoided emissions by assigning an emissions factor that illustrates the full life cycle impacts of the fuels used for transportation: electricity, gas, diesel and jet fuel. Using this analytic technique enables all fuel types to be evaluated on equal terms.

In Exhibits 3.1 and 3.2, the "well-to-wheels" emissions factors were obtained from the Argonne Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation Model (GREET) and applied to the fossil fuel auto and air fleet. A life cycle emissions factor was also applied to the electricity required for system operation. As shown in Exhibit 3.1, the results illustrate the full set of life cycle emissions that can be avoided through mode shift to high-speed rail over the first 50 years—between 83.85 and 102.14 $MMTCO_2e$.

EXHIBIT 3.1: PROJECTED CUMULATIVE GHG EMISSIONS AVOIDED: WELL-TO-WHEELS

YEAR	Medium ($MMTCO_2e$)	HIGH ($MMTCO_2e$)
2030	.16	.16
2040	11	13
2050	27	33
2079	83	102

As shown in Exhibit 3.2, the results illustrate the full set of life cycle emissions that can be avoided annually through mode shift to high-speed rail for the Phase 1 system—between 2.20 and 2.68 $MMTCO_2e$.

EXHIBIT 3.2: PROJECTED ANNUAL GHG EMISSIONS AVOIDED FOR PHASE 1: WELL TO WHEELS

YEAR	Medium ($MMTCO_2e$)	HIGH ($MMTCO_2e$)
2030	.075	.075
2040	1.54	1.88
2050	1.69	2.06
2079	2.20	2.68

Projected avoided emissions reflect riders shifting from automobile and air travel to 100% renewable energy powered high-speed rail based on the ridership on ramped up models for the high-speed rail. The shift reflects our goal of delivering an interconnected, sustainably approached and well-designed system that attracts riders and provides safe, reliable and fast travel between California's population and employment centers.

Projections do not account for related direct and indirect benefits, such as the additive effect of compact, infill development in station areas that the system is expected to underpin. That effect can realize exponentially greater GHG emissions reductions, as illustrated by methodologies associated with California's Climate Investments for Affordable Housing and Community Development, and the American Public Transportation Association's Transit Emissions Quantification Tool. These quantification tools estimate the additional effect of transit on compact land use and the consequent vehicle miles traveled reductions and express that as GHG emissions savings.

Reporting Actual and Avoided Annual Emissions

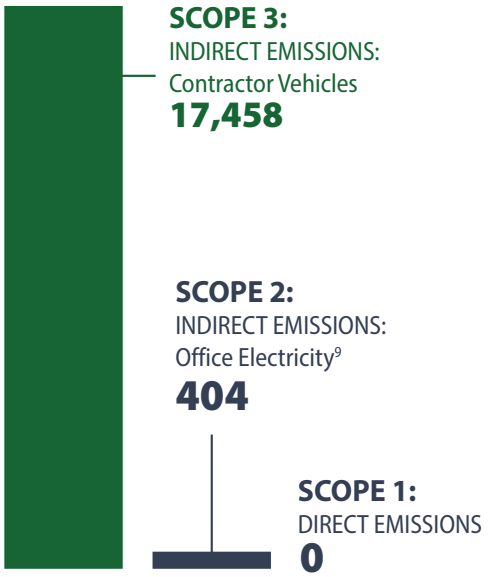
Building and operating the high-speed rail system does generate GHG emissions from several sources, including the production of materials used in constructing the system, fuel burned in construction vehicles and equipment, electricity consumed in offices, and waste treatment and recycling. Future GHG emissions also come from materials produced for use in rail system operations.

Using an operational control approach, the Authority tracks GHG emissions across emissions scopes, as shown in Exhibit 3.3, per the Greenhouse Gas Protocol and with reference to ISO 14064-2:

- Scope 1 emissions are direct emissions from sources owned by the Authority;
- Scope 2 are indirect emissions associated with electricity purchased for Authority activities; and
- Scope 3 are indirect emissions associated with contractor vehicles.

We continuously look for opportunities to reduce emissions, including fuel and energy conservation; recycling and reusing steel, concrete and other materials during construction; specifying use of materials with lower global warming potentials; and using renewable energy.

EXHIBIT 3.3: 2020 ANNUAL GHG EMISSIONS (IN $MTCO_2E$)



As shown in Exhibit 3.4, we also monitor, record and report avoided emissions from construction recycling. Construction recycling has decreased from previous years due to the construction phase transitioning from demolition of roadways and buildings to constructing.

EXHIBIT 3.4: 2020 AVOIDED EMISSIONS FROM RECYCLING

2,349 $MTCO_2e$ Emissions Avoided

Reducing and Managing GHG Emissions in Delivery

2020 PROGRESS: The Authority continued to govern construction contractors with binding contract provisions to minimize GHG emissions during construction. In construction, 1.17 metric tons of black carbon have been avoided.

The Authority has relied on industry- and public-policy leading practices to manage and reduce GHG emissions in construction. We require all contractors to abide by the signed contract and require contractors to monitor and report their material use, energy consumption, electricity purchase from the grid and renewable sources, water consumption, waste generation volumes by type, waste management streams by volume and type for each type of waste, types of on- and off-road equipment, and hours of miles of operation. The Authority uses this data to measure performance and for setting data-driven policy and strategies. These provisions are governed by our Sustainability Policy, updated in April 2019, which can be viewed on our website at ***https://hsr.ca.gov/wp-content/uploads/2021/04/Sustainability_signed_policy.pdf.***

Our policy details specific measures to decrease our indirect (Scope 3) emissions associated with construction contractors, materials and waste. These measures include:

- Minimizing GHG emissions through design requirements;
- Achieving net-zero tailpipe GHG emissions in construction through carbon sequestration projects;
- Requiring Environmental Product Declarations (EPD) for construction materials, including steel products and concrete mix designs, to improve disclosure of materials information and allowing for the selection of more sustainable products;
- Requiring performance thresholds for global warming potential for major materials while maintaining durability and quality requirements;
- Adapting existing structures and facilities for reuse whenever feasible; and
- Integrating climate adaptation and resilience principles into the design, construction and operation of the system.

Sequestering and Reducing Emissions Now

The Authority has partnered, for the past several years, with the California Department of Forestry and Fire Protection on a tree-planting program in urban and rural areas of California. This program will deliver carbon sequestration to balance, or offset, the remaining direct (tailpipe) GHG emissions associated with constructing the Central Valley Segment.

The Urban Forestry program focuses on communities that are near the rail system, with special emphasis on providing benefits to disadvantaged communities.

The first phase of urban tree planting at West Fresno Middle School kicked off on May 25, 2018, when nearly 200 trees were planted, and this effort was complemented with additional tree planting in the fall. Tree planting continued in 2020 throughout California.

The Authority anticipates planting hundreds of thousands of trees across California, with the goal of improving air quality and quality of life in priority communities, reducing energy use and stormwater runoff.

The rural tree planting program will also achieve important goals, such as preventing soil erosion and restoring habitats and natural ecosystems by planting native tree species on lands damaged by wildfires. For more information about the Urban Forestry program, see the Authority's Sustainability web page at ***https://hsr.ca.gov/programs/green-practices-sustainability/sustainability/***

PHOTO: Using Tier 4 equipment in construction helps minimize emissions from contractor fleets.

Extended Emission by Scope

The Authority recognizes the importance of telling the whole story of the energy it will take to deliver and operate the system. Given the critical attention to the issue of GHG emissions, the Authority discloses the energy it takes to construct and operate the system both in energy terms (see the Energy Use in Construction section) and in units of carbon dioxide equivalents. The calculation of those emissions always relies on the best available information at the time of reporting and is regularly refined to reflect new information.

Exhibit 3.5 shows information to date on emissions by scope across the project over the initial six decades. It is a combination of modeled and actual emissions and is based on the best available information. It is periodically updated.

Since 2016, 47,815 $MTCO_2e$ have been generated during construction. Positively, through more than 7,100 trees planted and more than 2,200 acres of rural projects, more than 143,000 $MTCO_2e$ will be sequestered over the trees' life cycle.

More than 151,000 $MTCO_2e$ have been sequestered or avoided through habitat and agricultural land conservation. Finally, more than 146,200 $MTCO_2e$ have been avoided through recycling since 2015.

EXHIBIT 3.5: GHG EMISSIONS BY SCOPE: 2015-2079

	Indirect - Upstream		Direct - System	Indirect - Downstream and Avoided Emissions	
Construction	**Scope 3** SUPPLY CHAIN Sustainable procurement requirements and baseline setting	**Scope 3** CONTRACTOR FLEET Mobile equipment emissions during rail construction: .52 $MMTCO_2e$* *to be revised with draft EIR data.	**Scope 1** AUTHORITY RAIL DEVELOPMENT Net-zero direct emissions from rail construction	**Scope 3** DISPOSAL/ RECYCLING 146,200 $MTCO_2e$ avoided emissions through recycling and reuse to date	**OFFSET/AVOIDED EMISSIONS** TREE PLANTING 143,000 $MTCO_2e$ program balancing fuel-based emissions from construction: .52 $MMTCO_2e$ target
Operations	**Scope 3** SUPPLY CHAIN Sustainable procurement of rolling stock and operations supply	**Scope 2** RENEWABLE POWER 100% renewable power for train operations	**Scope 1** AUTHORITY RAIL OPERATIONS Zero emissions generated from electric powered operations	**OFFSET/AVOIDED EMISSIONS** VMT + AIRTRIPS SAVED 83-102 $MMTCO_2e$ avoided from vehicle and shorthaul airtrips	**OFFSET/AVOIDED EMISSIONS** ADDITIONAL SAVINGS Savings from compact land use

PHOTO: The high-speed rail project continues to push the adoption of clean off-road diesel engines by using Tier 4 equipment.

Regulatory Compliance (Emissions)

Our role in reducing GHG emissions is detailed in and governed by the following policies and statutes:

Statutes
Assembly Bill 32 (Núñez, 2006), the California Global Warming Solutions Act of 2006
Senate Bill 32 (Pavley, 2016), requiring the California Air Resources Board, in adopting rules and regulations, to ensure that statewide GHG emissions are reduced to 40% below the 1990 levels by 2030
Senate Bill 862 (Committee on Budget and Fiscal Review, 2013-2014), Greenhouse gases: emissions reduction
Assembly Bill 1550 (Gomez, 2016), prescribing GHG reduction fund investment in disadvantaged communities
Assembly Bill 617 (Garcia, 2017), required the California Air Resources Board to establish a Community Air Protection Program to focus on reducing exposure in communities most affected by air pollution
Policies
California Air Resources Board 2008 Scoping Plan and 2013 Scoping Plan Update, which identify the high-speed rail system as a measure for GHG reduction
Greenhouse Gas Emissions Reduction Fund (Cap-and-Trade Auction Proceeds) Third Investment Plan: Fiscal Years 2019-20 through 2021-22, in which the system plays a key role

Protecting Air Quality During Construction

2020 PROGRESS: We use Tier 4 equipment in construction fleets to avoid significant quantities of criteria air pollutant emissions in 2020. We also required the next contractors to incorporate 25% zero-emissions vehicles (ZEVs) into their fleet.

The Authority minimizes air emissions from the fleets used by our contractors, as shown in Exhibits 3.6 and 3.7. All contractors are required to use fleets that comply with California vehicle standards. Contractors are also subject to contract terms which require the fleets to meet the U.S. Environmental Protection Agency standards for the cleanest off-road diesel engines (Tier 4 equipment, as available).

This requirement is unique among infrastructure projects and continues to push the adoption and use of cleaner off-road diesel engine technology in California in advance of regulatory requirements. The Authority has also continued to track the feasibility of using ZEVs for on-road hauling and electrified off-road equipment.

Between 2015 and 2020, on- and off-road vehicles emitted 100.55 tons of criteria pollutants, including, NOx, ROG, PM and black carbon. From 2015 to 2020, Tier 4 equipment reduced/avoided 135.71 tons of criteria pollutants, including NOx, ROG, PM and black carbon. The difference reflects the difference between emissions produced by using Tier 4 equipment and what would have been produced by a typical fleet. In that time, projects that will deliver 1,357.82 tons of offsets were carried out.

EXHIBIT 3.6: 2020 CRITERIA AIR POLLUTANTS EMITTED AND AVOIDED: TYPICAL CALIFORNIA FLEET COMPARISON

Criteria Air pollutant	High-Speed Rail Fleet	Typical Fleet	Percent Difference
Nitrogen Oxide (NOx)	50,043 lbs.	83,366 lbs.	-67%
Reactive Organic Gas (ROG)	3,982 lbs.	7,898 lbs.	-71%
Particulate Matter (PM)	3,775 lbs.	4,700 lbs.	-55%
Black Carbon	2,638 lbs.	3,796 lbs.	-58%

EXHIBIT 3.7: MINIMIZING CONSTRUCTION AIR QUALITY EMISSIONS

State Executive Order for Zero Emission Vehicles

In September of 2020, California Governor Gavin Newsom issued Executive Order (EO) N-79-20 establishing new, statewide goals for decarbonizing transportation and phasing out gasoline-powered cars and trucks. The order sets the following targets:

- 100% of in-state sales of new passenger cars and trucks will be zero-emission by 2035;
- 100% of medium- and heavy-duty vehicles in the state will be zero-emission by 2045 for all operations where feasible and by 2035 for drayage trucks; and
- 100% of off-road vehicles and equipment operations will be zero-emission by 2035, where feasible.

In addition to setting these targets, EO N-79-20 directs the California Air Resources Board, the Energy Commission, the Public Utilities Commission, and other relevant state agencies to take action within their existing authority toward accelerating progress. EO N-79-20 builds upon prior legislation and executive orders aimed at dramatically reducing greenhouse gas emissions from in-state sources, such as California's ambitious plan to reduce statewide GHG emissions to 40% below 1990 levels by 2030 (Executive Order B-30-15 and California Global Warming Solutions Act of 2006 (SB 32).

California continues to be at the national forefront in establishing targets for reducing GHG emissions and transitioning to a sustainable, low-carbon future by focusing on achieving carbon neutrality across all sectors by 2045. The high-speed rail system, which was planned to shift travel away from automobiles and short-haul air travel, will be a key contributing factor towards decarbonizing transportation and achieving carbon neutrality in California.

Following the EO N-79-20, we began a zero-emission vehicle (ZEV) study with the goal of identifying possible ZEV replacements for construction vehicles and equipment use by authority contractors. The results of this study will impact high speed rail policy moving forward. These policies changes will be announced and implemented in 2021.

We also continue to liaise with local constituencies and their representatives and sign agreements with local agencies to promote and achieve clean air in the jurisdictions. Through our Voluntary Emissions Reduction Agreements (VERA) program, we pledge to offset each ton of air pollutant emitted during construction within the local air quality district, as shown in Exhibit 3.8.

This tool is used within all parts of the system located in districts with poor air quality. The minimization and offsetting of criteria air pollutants is critically important.

The Central Valley and Southern California suffer from some of the worst air pollution in the nation, according to the American Lung Association's State of the Air 2020 Report:

- In the Central Valley, Bakersfield is ranked Number 1, Fresno-Madera-Hanford rank Number 2 and Visalia ranks Number 3 by year-round particle pollution; and
- In Southern California, Los Angeles-Long Beach ranks Number 4 by year-round particle pollution.

These are places where we must strive to deliver truly clean transportation.

The VERA program is designed to replace conventional polluting equipment with more efficient equipment. For our VERA offsets, the total lifetime reductions committed to were 1,358 tons with a total investment of $13 million, as shown in Exhibit 3.9.

EXHIBIT 3.8: VOLUNTARY EMISSIONS REDUCTION AGREEMENTS

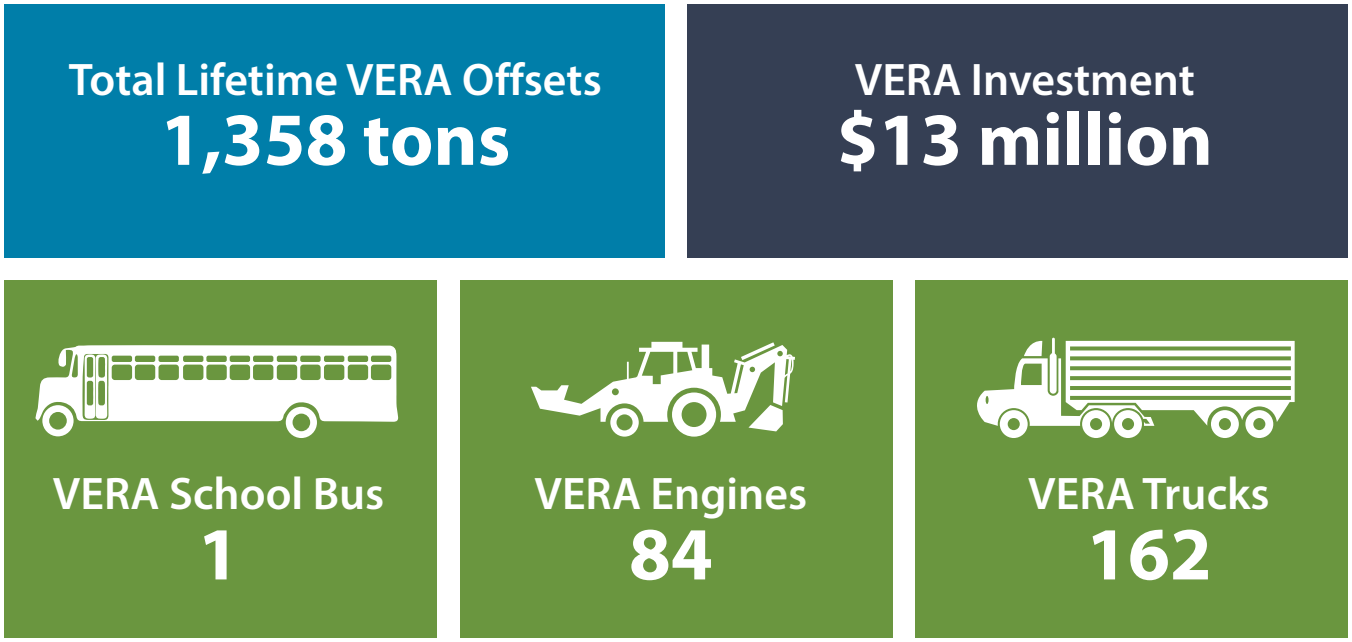


PHOTO: Flowers at the Salesforce Transit Center.

CHAPTER 4: NATURAL RESOURCES

Introduction

Natural resources must be honored, protected and enhanced. These actions are foundational for any sustainability program. Our policies and practices help ensure that future generations have the resources necessary to lead meaningful and productive lives. We preserve and enhance natural resources by tracking water use and preserving the California environment.

Natural resources are additionally critical as sinks for carbon emissions, sequestering carbon dioxide in plants, trees, roots and soil. Their restoration, care and maintenance are also crucial climate adaptation strategies that the Authority has prioritized in its climate adaptation approach.

Highlights

» Our Final Supplemental Environmental Impact Report/ Environmental Impact Statement (EIR/EIS) on the Central Valley Wye section was completed in 2020, and the Record of Decision was signed in September 2020. The EIR/EIS found that annual construction activities will use only 14% of the current water consumption along the corridor. Once construction finishes, this project section will use less than the current water consumption for the project footprint, because of existing agricultural land uses within the project footprint. This represents a net decrease in water use.

» To date, we have preserved and restored more than 2,320 acres of habitat and protected more than 3,096 acres of agricultural land.

Conserving Water Resources

2020 PROGRESS: The construction packages continued to comply with water-conservation measures initiated in compliance with state policy. Additionally, environmental review continued, which identified the water savings associated with project operation.

The Authority currently uses water in two ways, for use in its offices and on construction sites. As with energy, we account for water use by our staff in addition to, and separately from, water used in project construction. Tracking water use and applying water conservation guidance remains important because California faces inconsistent rainfall and snowfall and ever-increasing demands on water resources from residential and commercial users.

How Water Consumption is Governed

Federal, state and local regulations govern water consumption by the high-speed rail program. As construction extends into other parts of the state beyond the Central Valley, local regulations in Southern and Northern California will govern water consumption, though the Authority's water conservation policy and water conservation guidance will still apply. We must comply with several applicable federal and state statutes and regulations, as well as with regional and local requirements.

Federal

» Clean Water Act of the United States;

» Section 10: Rivers and Harbors Appropriation Act; and the

» Floodplain Management and Protection and Flood Disaster Protection Act.

State

- 2016 California Green Building Standards Code (CalGreen Code);
- Porter-Cologne Water Quality Act;
- Statewide Stormwater Permits; and the
- Streambed Alteration Agreement.

Regional and Local

- Fresno County General Plan and Ordinances;
- Kern County General Plan and Ordinances; and the
- Metropolitan Bakersfield General Plan/Update and Environmental Impact Report.

Executive Order to Fight Climate Change, Conserve Biodiversity and Boost Climate Resilience

California's vast network of natural and working lands—forests, rangelands, farms, wetlands, coast, deserts, and urban green spaces—are critical to the fight against climate change and biodiversity loss.

In October 2020, Governor Gavin Newsom issued Executive Order (EO) N-82-20 enlisting California's natural and working lands to store and remove carbon from the atmosphere.

The order establishes California as the first state in the nation to pledge to conserve 30% of land and coastal water by 2030 to fight species loss and ecosystem destruction, joining 38 other countries in a global commitment to conservation.

The order also directs state agencies to pursue innovative actions, strategies and partnerships that promote conservation and biodiversity through healthy soil management, wetland restoration, coastal protection, sustainable forest management and green infrastructure.

This ambitious executive order will encourage innovation, reduce the state's carbon footprint, and be a catalyst for economic growth.

Responding to Stakeholder Concerns

Several stakeholders expressed concerns that construction activities could compete with California farmers for water, an issue of significant importance in the Central Valley. We understand these concerns and are cognizant of water being a shared resource. Where applicable, we engage with local stakeholders and place high importance on water-conservation efforts and prioritize the use of non-potable water for construction purposes.

We updated our Water Conservation Policy to establish water conservation as a continuing practice through all phases of the project—including operations and maintenance. We established uniform, program-wide requirements for water conservation during design, construction, operations and maintenance of high-speed rail projects. Contractors must submit a Water Conservation Plan that clearly describes how they will comply with our requirements. These include requirements related to water conservation, rationing and drinking water shortage situations that are communicated by local and state agencies.

The water conservation requirements mitigate impacts within areas of water stress. The Authority did not set a limit on water consumption by contractors, due to the potential negative effects on construction timing, quality and worker health. Instead, the Authority requires contractors to follow water conservation practices.

Water Consumption

The Authority requires contractors to comply with water conservation practices, respecting the continual scarcity of water in California. Construction water use has increased year-over-year due to the expanding footprint of construction activities, as shown in Exhibit 4.0. The Authority more than doubled the pace of construction throughout 2020, expanding from 19 structures completed or in construction in 2018 to 56 in 2020. This increased activities such as concrete curing and dust suppression to maintain quality and safety. Additionally, one construction package revised its water reporting practices to more accurately reflect consumption. As a result, water use increased by 159% in 2020, compared to 2019.

Water drawn from high-stress areas accounted for 53% of total water withdrawals. Water is used on site to compact soil for overpasses, cure concrete, and suppress dust and particulate matter. Water stress can refer to the availability, quality or accessibility of water. Areas of high water stress are those areas where the ratio of total annual water withdrawal to total available annual renewable water supply is high (40% to 80%) or extremely high (>80%). Avoiding areas defined as high water stress is currently impossible, as the construction sites are all in such areas.

EXHIBIT 4.0: WATER CONSUMPTION (IN GALLONS)[10]

Water Consumption	Quantity (In Gallons)
Construction Water Use: Non-potable	211,509,340
Construction Water Use: Potable	88,075,850
Construction Water Withdrawn from High Water-Stress Areas	160,532,626
Office Water Use	2,000,160[11]

To identify and assess water-related impacts, the Authority prepares comprehensive Environmental Impact Reports (EIR) and Environmental Impact Statements (EIS) for each project section of the system to comply with the National Environmental Policy Act (NEPA) and California's Environmental Quality Act (CEQA). Each environmental analysis includes an assessment of water consumption and detailed projections of water required for construction. The Authority tracks water consumption by contractors every month and compares that consumption every quarter against the estimates developed as part of the environmental planning process. This helps us to understand overall trends in water consumption.

More information and context on the Authority's interaction with and management of water resources is available in the Environmental Planning documents: ***https://hsr.ca.gov/programs/environmental-planning/***

To manage water discharge-related impacts, the Authority complies with the National Pollutant Discharge Elimination System (NPDES) water quality order no. 2013-0001-dwq, the National Pollutant Discharge Elimination System (NPDES) general permit no. Cas000004 and follows the State Water Resources Control Board (SWRCB) construction general permit (order 2009-00009-dwq). More information on stormwater management is available on our website: ***https://hsr.ca.gov/programs/environmental-planning/stormwater-management/***

Water and Future Operation

We established criteria for our facilities to work toward net-zero potable water consumption through water-use reduction, recycling, capture and storage. To support these efforts, the issue of water consumption is a priority when siting future facility locations. In addition, our facilities will be designed and built using the CalGreen Code for planning, procurement, design, construction, operations and maintenance, including the Code's mandatory and voluntary sections.

In operation, the system will not require significant volumes of water or threaten water security for the region. The design requirements for Authority facilities, including maintenance facilities, require both water efficient fixtures as well as water reuse and use of gray water where available. Currently, at our offices, water use is minimized due to low-flow, automatic shut-off sink fixtures and low-flow toilets.

Furthermore, the comprehensive Environmental Impact Reports (EIR) and Environmental Impact Statements (EIS) completed for each project section include an assessment of water consumption and detailed projections of water required during operations. Because of the large scale of the project, the rail system will run through areas of the state with extremely different geographical, environmental and economic issues; thus, the project has been broken into 10 separate sections.

Managing Land Use

2020 PROGRESS: We developed regional mitigation strategies in 2017 to advance construction in a way that preserves biodiversity. These strategies prioritize the conservation and enhancement of larger, higher-value ecological areas and their linkages. By 2020, we have preserved and restored more than 2,320 acres of habitat and protected more than 3,096 acres of agricultural land.

We are committed to working with federal, state and local agencies and with local stakeholders to develop a high-speed rail system that preserves California's open spaces and environmental resources. Our Board of Directors created the Transit and Land Use (TLU) Committee to link transportation decisions with land use decisions through interactions with regional and local stakeholders.

The TLU Committee examines how system decision-making and potential land-management policies interact with local land use. Ideally, system stations should incentivize land use toward urban regeneration and important local planning changes, such as allowing mixed land uses, maximizing density and building height, and achieving highest and best land uses associated with a high-speed rail station.

In addition, we maintain mitigation activities associated with conservation and preservation of habitat and open space.

PHOTO: Environmental mitigation activities at the Kings River floodplain show tremendous success.

Preserving Habitat

As one way of mitigating its impacts on natural habitats in project sections, the high-speed rail project preserves habitats elsewhere. Through this approach, the Authority's mitigation efforts create a positive effect by preserving high-quality habitats occupied by special-status species; these high-quality habitats effectively replace a large portion of affected habitats of lesser-quality that special-status species make only limited use of.

The project's large scale and statewide reach provides the opportunity to implement regionally significant conservation efforts through preserving high-quality habitat. To date, the Authority has secured habitat that includes 2,320 acres at 13 sites, as shown in Exhibit 4.1. The acreage is considered regionally significant for several important reasons:

- Some of the sites are adjacent to other conserved areas;
- The acreage lies in wildlife movement corridors;
- The acreage contains distinctive, high-quality habitats for a diverse assemblage of plants and animals, including a variety of threatened and endangered species; and
- The acreage gives the Authority the opportunity to restore additional habitats.

In 2016, the Authority secured a conservation easement on 446 acres of the Lazy K Ranch, a working horse and cattle ranch in Chowchilla. This easement protects a distinctive landscape of vernal pools, an endemic type of seasonal wetland. The parcel borders a larger landscape of habitats, and the connection between the parcel and the adjacent land helps sustain the integrity of the preserved vernal pool landscape. Furthermore, the Authority secured another 866 acres of valuable habitat at Cottonwood Creek, Cross Creek East and CD Hill.

In 2017, the Authority, working through its contractor, Westervelt Ecological Services, secured the rights to establish a conservation easement of 829 acres along Cross Creek in Kings and Tulare counties. This conservation easement preserves some of the last larger, intact grasslands and wetlands in this important wildlife movement corridor used by California tiger salamanders, San Joaquin kit foxes and vernal-pool invertebrates. The Authority also secured an additional 527 acres at Kings River, Alkali Flats, and Poso Plains.

In 2019, the Authority purchased 978 acres of additional mitigation at multiple sites:

- Hog Flats (144 acres);
- Hog Hills (401 acres).
- CD Hilllman Expansion (77 acres); and
- Lost Hills (356 acres).

In 2020, the Authority purchased one additional mitigation site, Antelope Plains (705 acres).

EXHIBIT 4.1: HABITAT AND AGRICULTURAL LAND PRESERVATION

Preserving Native Wetland and Riparian Habitat in the Kings River Floodplain

The high-speed rail project is required to complete off-site compensatory mitigation to address unavoidable impacts caused by the project to waters of the U.S., waters of the state, and federally and state-listed species and their habitats.

Among these mitigation sites is Kings River, which is located within the northern portion of the Tulare-Buena Vista watershed in Fresno County and is situated along the western extent of the historic Kings River floodplain. The Kings River Mitigation Site (KRMS) provides an opportunity to preserve one of the last remaining parcels containing native wetlands and riparian habitat in the Kings River floodplain. Mitigation activities at the KRMS are intended to provide:

- Reestablishment, rehabilitation, and enhancement of freshwater wetlands and riparian wetland habitats;
- Preservation of riparian and upland habitats;
- Strategic grazing management to promote natural structural development of the wetland and riparian habitats; and
- Increased on-site retention of surface water for improved groundwater recharge and storage.

Monitoring of the restored habitats will take place over an initial 5-year period following restoration to evaluate the establishment of restored habitats. After the initial monitoring, a secondary monitoring schedule will be adopted to maintain the mitigation site in perpetuity.

Year two of monitoring and maintenance activities took place in 2020. To date, the results of the restoration activities at the KRMS site remain above average, and in some cases, far exceed the minimum requirements to meet final success criteria standards. Through two years of initial monitoring, the KRMS continues to show tremendous success and highlights the actions the Authority has taken to offset impacts to natural resources by construction of the high-speed rail project.

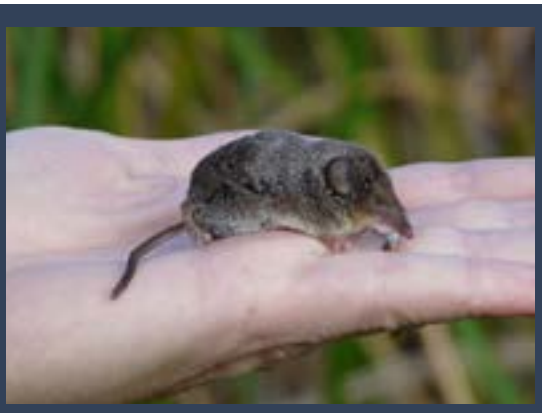
Protection for Riparian Systems at the Lazy K Mitigation Site

Located on a portion of the 1,555.75-acre Lazy K Ranch, approximately 5 miles east of the alignment of the Merced to Fresno Section, the Authority has established a mitigation site to ensure adequate protection of the riparian system located there. The site is at the northwestern edge of Madera County and the southern edge of Merced County, approximately 5 miles east of the city of Chowchilla.

The mitigation site provides construction of nearly 17 acres of vernal pools within the Wetland Restoration Area for aquatic impact mitigation, and 3 acres of riparian vegetation planting within the Riparian Restoration Area for the riparian impact mitigation.

Additionally, the Lazy K Mitigation Site provides important preservation of species habitat across the preservation area, including:

- 1.72 acres of San Joaquin Valley Orcutt grass designated critical habitat and suitable habitat;
- 1.72 acres of hairy Orcutt grass suitable habitat;
- 1.79 acres of succulent owl's clover suitable habitat;
- 6.76 acres of Conservancy fairy shrimp suitable habitat; and
- 12.03 acres of vernal pool fairy shrimp occupied habitat.



Protection for the Buena Vista Lake Ornate Shrew: Lone Tree Mitigation Site

The Lone Tree Mitigation Site is being established to provide off-site compensatory mitigation for impacts to the Buena Vista Lake Ornate Shrew, a federally listed species protected by the Endangered Species Act. The Lone Tree Mitigation Site will also replace a perpetual wetland conservation easement held by the U.S. Department of Agriculture - Natural Resources Conservation Service (NRCS), that is being unavoidably impacted by the high-speed rail project.

The Lone Tree Mitigation Site is located in Kern County within the historical extent of Tulare Lake, which was once the largest freshwater lake in the western half of the U.S.

Currently, the site consists of approximately 161 acres in total, 38 of which support a wetland complex that is managed for waterfowl, as well as supporting a robust population of Buena Vista Lake Ornate Shrews. The remaining 123 acres are predominantly fallow pastureland, which will be converted to a moist soil managed wetland as part of the restoration activities and will further increase the suitable habitat for the ornate shrews.

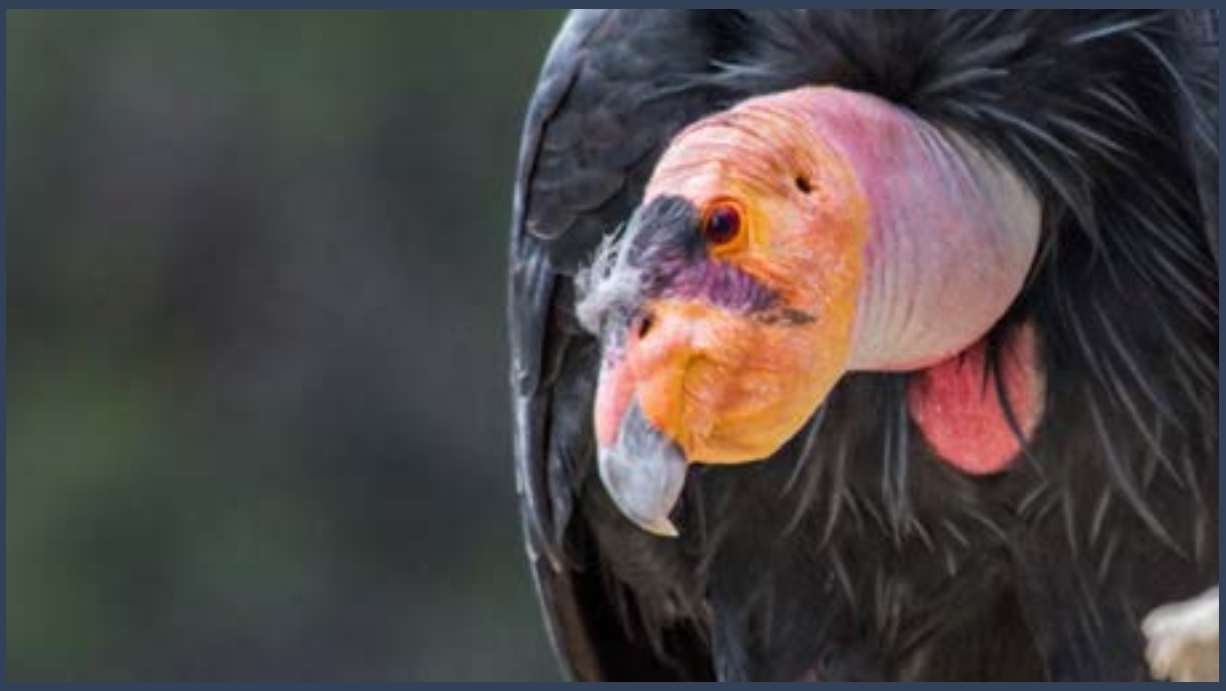
Documentation and approvals from the U.S. Fish and Wildlife Service and NRCS are currently underway to construct the restoration portion of the site and establish protection of the NRCS easement into perpetuity.

Once complete, the Lone Tree Mitigation Site will provide more than 150 acres of high-quality habitat to support the Buena Vista Lake Ornate Shrew and replace the acreage for the NRCS wetland conservation easement.

Raptor-Friendly Catenary

Engineers on the California high-speed rail project are designing electrification systems that won't harm California condors, golden eagles and other raptors.

The engineers realized that the standard overhead catenary systems (OCS) that power most high-speed rail trains would not be safe for California's federally- and state-protected bird species. Although birds like the California condor mainly favor a coastal habitat, their range — and that of other large raptors — extends into areas where the high-speed rail system will be built.



A standard OCS system consists of grounded poles spaced every 50 meters or so, with live wire strung between them. This setup, while harmless for small birds, would create a problem for California condors and other large raptors that may be tempted to perch. With wing spans up to 9.5 feet, the birds can potentially touch both the live wire and the grounded pole while perched, creating a lethal electric circuit.

During its research, the engineering team realized that the combination of large, fully protected bird species and OCS is unique to California.

The engineering team created a novel design concept, "live loop anti-perching," that would ensure big birds can perch in ways that keep them safe. The team created two prototypes that could be deployed depending on the habitat and size of the bird. By strategically blocking certain perching positions, the engineers have designed a cost-effective, practical, long-lasting alternative to standard OCS designs.

Preserving Agricultural Land

The Authority has worked with the Department of Conservation (DOC) since 2012 to preserve agricultural land. We participate in two DOC programs: The Agricultural Land Mitigation Program (ALMP) and the California Farmland Conservancy Program (CFCP).

The ALMP is designed to mitigate impacts to farmland in California caused by infrastructure-related projects. The DOC contracts with the Authority to provide mitigation services for the loss of important farmland associated with developing the high-speed rail alignment. This service involves working with local nonprofit land trusts and other entities to identify and permanently protect important farmland through conservation easements funded by the Authority, occasionally supplemented with other funding sources.

Through the CFCP, the DOC funds the purchase of agricultural conservation easements from willing participants and secures the easements on the Authority's behalf. As shown in Exhibit 4.1 on page 55, a total of 3,096 deeded acres have been protected to date.

The DOC routinely reports on the benefits of conservation projects that protect land from development; specifically, the DOC quantifies the GHG emissions reductions that are created by these conservation projects. Typically, the DOC estimates three factors:

- Vehicle miles traveled (VMT) that are avoided by limiting development in a given area;
- Avoided energy use from buildings; and
- Avoided soil disturbance caused by housing construction.

The Authority asked the DOC to perform a similar assessment of the GHG emissions reduced through the conservation of farmlands made possible by the Authority's mitigation funds.

Project Results

Out of the 1,434 acres protected by the ALMP on behalf of the Authority in 2020, the DOC estimates that 1,338 acres would have been subject to development risk. The DOC estimates that 401 development rights were extinguished as a result of this conservation effort, resulting in an estimated 334,787,225 VMT being avoided, or 151,683 metric tons of CO_2e in GHG emissions being avoided.

PHOTO: Protecting natural resources is a key priority for the California High-Speed Rail Authority.

PHOTO: The San Joaquin River Viaduct's highly visible arches represent the northern gateway into the city of Fresno.

CHAPTER 5: SUSTAINABLE INFRASTRUCTURE

Introduction

Investments in infrastructure are a way to build the economy of the future. California has a rich history of using its infrastructure investments to advance sustainable development. It is impossible to consider California becoming the 5th largest economy in the world without the past investment in higher education, the state water project or its highways.

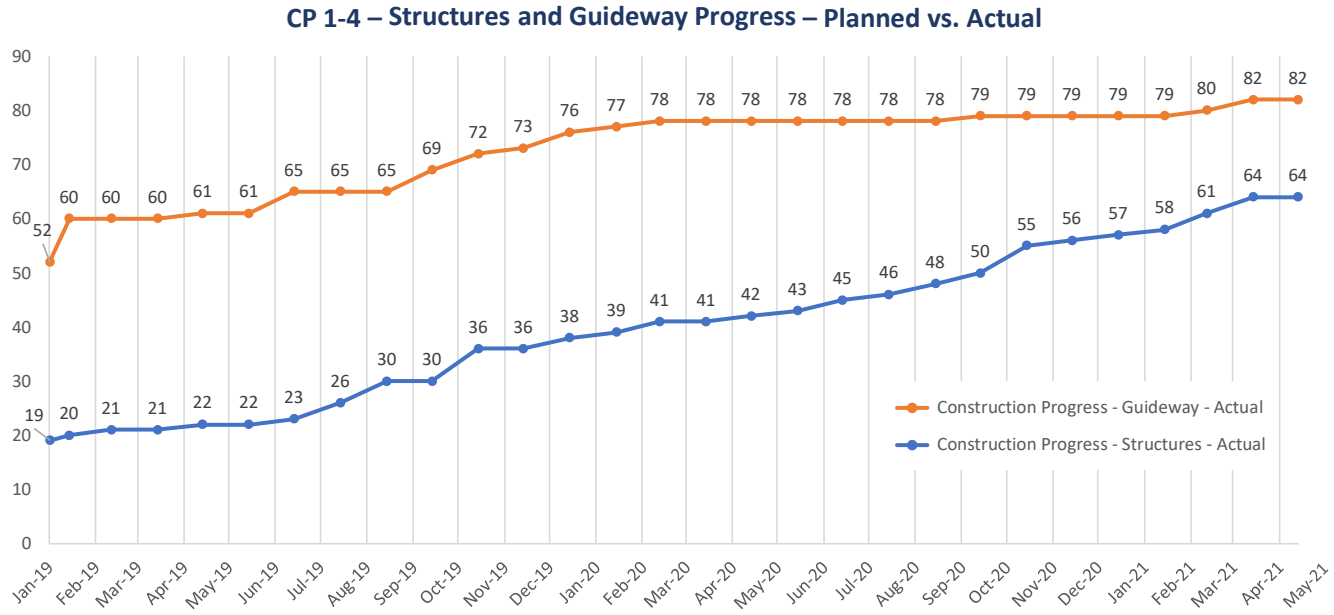
But the infrastructure built today must also include robust considerations of the way implementation can enhance the well-being of communities, economies and ecosystems across an array of context-specific metrics. The Authority has adopted that as a core of its mission. In practical terms, this means that we integrate sustainability actions into project development and operations as a strategy for managing risks, including climate risk, and identifying opportunities to benefit California's communities and economy.

During 2020, the pace of construction accelerated dramatically, as shown in Exhibit 5.0.

Highlights

- Continued the use of internationally regarded infrastructure sustainability benchmarks, such as the GRESB Infrastructure Assessment and Envision.
- Achieved Envision Platinum, the highest award level, for the program.
- Incorporated considerations of climate stressors into design requirements.
- Maintained progress against targets and objective requirements for sustainable construction even as the pace of construction quadrupled.
- Continued to customize our web-based tool, EMMA 2.0, to streamline and enhance data collection, review and analysis.
- Incorporated aggressive carbon targets into procurement, honoring the implementation steps identified through the Sustainable Purchasing Leadership Council (SPLC) Benchmark.

EXHIBIT 5.0: STRUCTURE AND GUIDEWAY PROGRESS IN 2019 AND 2020



Principles For Sustainable Infrastructure

2020 PROGRESS: We achieved the highest level of certification under the Institute for Sustainable Infrastructure's benchmarking system, Envision. The Envision submission received third-party verification to ensure the project's comprehensive sustainable commitments met the rigorous Envision evaluation criteria.

Our sustainable infrastructure principles reflect a balance of social, environmental and economic issues relevant throughout the design, construction and operations phases of the program. These principles were developed in consultation with leaders across functional areas of the Authority to represent and reflect California's priorities. They can be found here: ***http://www.hsr.ca.gov/docs/programs/green_practices/sustainability/Sustainability_signed_policy.pdf***

In addition to these principles, we adhere to other commitments and requirements, including:

- All Environmental Impact Reports/Environmental Impact Statements (EIR/EIS) include a Mitigation Monitoring and Reporting Program (MMRP) for implementation. Specifically, the:
  - *MMRP for the Statewide Program EIR/EIS has 250 mitigation commitments;*
  - *MMRP for the Bay Area to Central Valley Program EIR/EIS has 290 mitigation commitments; and the*
  - *MMRP for the Merced to Fresno Project EIR/EIS has 610 mitigation commitments.*
- Sustainability policy and periodic reporting, which provide overarching guidance and transparency;
- American Public Transportation Association (APTA) sustainability commitment; and the
- International Union of Railways (UIC) Railway Climate Responsibility Pledge.

Life Cycle Approach

Taking a life cycle approach is a key part of the Authority's sustainability program. In developing implementation strategies to improve sustainability performance, we consider both direct, annual impacts; impacts that are upstream or downstream from the system; and those that have occurred in the past or may occur in the future. Our updated Sustainability Policy and the construction package specific design criteria continue to include Sustainable Infrastructure Principles related to the life cycle approach, encompassing our commitment to sustainable infrastructure through these actions:

- Requiring optimized environmental product declarations (EPDs) for major materials, detailing the life cycle assessment of global warming potential, while maintaining competition, durability and quality;
- Requiring life cycle performance of components, systems and materials where practicable (including mandating specific embodied carbon thresholds for concrete and reinforcing steel);
- Adaptively reusing existing structures and facilities whenever feasible; and
- Carrying out constructability and other planning studies to minimize rework and future-proof facilities within a building block delivery method.

To support these principles, we continuously revise specifications and contract provisions to require improved materials life cycle scores for materials. In 2019, we set global warming potential performance thresholds for major system materials (concrete and steel), and in 2020, we required these thresholds in major procurements. We drew on a baseline of the materials currently being installed and preliminary design information for the system to analyze the materials' environmental characteristics.

As a next step, we will continue a range of analyses of supply chain impacts of major materials to clarify their relative influence on the project's life cycle footprint. We will regularly update our database with new EPDs as they become available. We will also draw on results from the current construction projects. The leading infrastructure life cycle assessment standard, outlined in a specific Envision credit, will be followed for the entire program, and will be supported by detailed best practices outlined by the United States Green Building Council's

Leadership in Energy and Environmental Design (LEED®)[12] benchmarking system for the life cycle assessment of facilities. By measuring and managing the impacts embodied in the materials we use to build the system, we can then demonstrate the benefits of lower life cycle impacts achieved through construction decisions.

After gathering and processing materials information, we will be able to provide important context as we compare the embodied impacts of construction against the much greater benefits of reducing vehicle miles traveled and lowering California's emissions footprint through providing an operational high-speed rail system. The intention of this work is to express the impacts and benefits—metrics—normalized at a range of scales: per mile, per alignment methodology, per construction segment and per operational segment.

Global Recognition for Excellence in Sustainable Infrastructure

In 2020, the Authority pursued third-party certification under the Institute for Sustainable Infrastructure's Envision framework. The Institute for Sustainable Infrastructure is a non-profit organization founded by the American Public Works Association, the American Society of Civil Engineers and the American Council of Engineering Companies. The Envision framework allows infrastructure projects to achieve four award-levels representing their sustainable initiatives amongst five categories: Quality of Life, Leadership, Resource Allocation, Natural World, and Climate and Resilience.

The Authority was awarded Envision Platinum for Phase 1 in December 2020. Not only is this the highest award level possible in the newest and most stringent version of the Envision framework (version 3), we significantly surpassed the minimum Platinum threshold by 15%, putting us among the highest scoring Envision-awarded projects to date.

Currently, the California high-speed rail program is the largest transportation infrastructure project, both in terms of capital investment and geographic area, to earn an Envision award for sustainable infrastructure. This achievement demonstrates that sustainability is achievable across large-scale and complex transportation systems.

Key sustainability achievements that helped earn the California high-speed rail program a Platinum Envision award include:

- Net reduction in air pollution emissions during system operations compared to the baseline, and eliminating pollutant sources in the design of the system;
- More than 100,000,000 $MTCO_2e$ greenhouse gas emissions reduced due to mode shift from automobiles and planes;
- Exceptional performance in achieving greenhouse gas emissions reductions and preparing for climate change;
- Leadership and commitment to sustainability and social equity and justice;
- Use of renewable energy for traction power, stations, and other facilities on the project site; and
- Stimulating economic prosperity and development across the state.

Reported data is also evaluated against supporting documentation provided by the contractor to demonstrate the accuracy and verifiability of the data. The reported data is compared with what is stated in the supporting documentation, ensuring that the figures align. Any reported estimates are grounded in sound methodologies and external databases or systems are used to ensure other key data can be properly verified. For instance, the Authority uses the California Air Resources Board's (CARB's) Diesel Off-Road Online Reporting System (DOORS) database to confirm the accuracy of off-road equipment specifications, helping ensure that the contractors are using the cleanest construction fleets possible.

Summaries of construction activities provided by the contractors help put data into context, helping clarify changes in data based upon season or schedule. The Authority also audits the contractors and Project and Construction Managers to verify their adherence to requirements or to identify any potential issues that appear in the data.

Reporting and Transparency

The high-speed rail system is a program of mega projects. Reporting, a priority, on billions of dollars of construction, across multiple contracts can quickly spiral into volumes of unmanageable data. The probity of the Authority led us to a robust database, the Environmental Mitigation and Management Application (EMMA), to streamline sustainability reporting and facilitate data quality assurance. EMMA provides sophisticated controls on key data fields that the Authority uses to verify accuracy of reported data, a built-in workflow to ensure multi-level review of data quality and built-in dashboards to track contractor performance against requirements.

EMMA complements field oversight of construction activity, and vice versa. Field staff review EMMA data submittals critically to evaluate the conformance of reported information with field observations. EMMA data can reveal trends or patterns that highlight issues that field staff may have missed in oversight. As a result, field staff use EMMA data to better inform oversight of construction activity.

Recycling Waste Responsibly

The Authority requires recycling 100% of the steel and concrete from construction and demolition and diverting at least 75% of all other construction and demolition waste from landfills, unless local regulations specify a higher diversion rate. To measure progress, the Authority tracks the amount of waste produced and diverted from landfills for each construction package. Every month, the Authority manages toward a critical metric: the percent of waste diverted from landfills by a given contractor.

Waste and recycling information is collected directly from contractors and reviewed every month for compliance with contract requirements. These recycling rates, as shown in Exhibit 5.1, meet the 50% minimum diversion rate recommended by the California Integrated Waste Management Board, demonstrating that the Authority is performing on par with leading international sustainable construction projects. However, due to issues that arose from COVID-19, we did not meet our goal of diverting at least 75% of other materials in 2020. As of report publication, these records are still in review and any adjustments to totals will be provided in both regular monthly reporting and in the next Sustainability Report.

All concrete and metal was recycled or stockpiled; curiously, only 51% of other demolition debris, including organic waste, was recycled. One reason for the increase in proportion of material landfilled is the much smaller universe of material handled in 2020. In 2020, we recycled or stockpiled 3,008 tons of materials, as shown in Exhibit 5.1, and we landfilled 2,698 tons. The recycling avoided the emission of 2,349 metric tons of carbon dioxide equivalent in 2020, and more than 146,200 metric tons of carbon dioxide equivalent to date.

Keeping materials such as concrete, asphalt, wood and organics out of landfills, either through reuse, recycling or source reduction, avoids the production of methane. It also incentivizes a circular economy, treating the outputs of construction activities as inputs and avoids the extraction of virgin materials.

Despite underperforming in waste diversion for the year, over the entire construction time frame, we have recycled more than 95% (196,906 tons) of all waste to date, as shown in Exhibit 5.2, and have sent less than 5% (9,651 tons) to landfills.

The Authority produced no un-remediated hazardous waste in 2020. A small amount of hazardous waste was remediated by the Authority's contractors and disposed of, according to proper procedures.

EXHIBIT 5.1: 2020 NON-HAZARDOUS MATERIALS MANAGEMENT (IN TONS)[13]

Disposal Method	Unit	Weight
Recycled Materials	Tons	3,008
Landfilled Materials	Tons	2,698

EXHIBIT 5.2: 2020 RECYCLING CONSTRUCTION WASTE (THROUGH 2020)

Ensuring Health, Safety and Security

2020 PROGRESS: We updated our Safety and Security Management Plan for the statewide program that includes the following elements. First, the safety-assurance portion of the RAMS (Reliability - Availability - Maintainability - Safety) program. Second, a hazard-management program that includes hazard identification and hazard assessment in the form of preliminary hazard analyses, as well as threat and vulnerability assessments. Third, coordination with fire and life safety agencies, such as the Office of the State Fire Marshal, the Federal Railroad Administration, the Department of Homeland Security and local emergency response agencies.

Safety and security are our highest priorities. Our Safety and Security Policy Statement captures our approach and continuous commitment to the safety and security of passengers, employees, consultants, contractors, emergency responders and the public. The operationalization of this policy is detailed in the Safety and Security Management Plan (SSMP), a comprehensive, systemwide framework for identifying risks and implementing mitigation measures to decrease the risk of incidents.

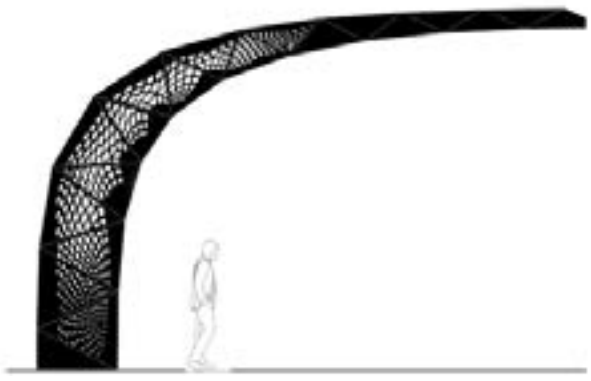
The hazard-assessment effort includes collaboration with the system disciplines (engineering, core systems, high-speed rail trains and operations) to develop safety and security design requirements that mitigate the risk to an acceptable level. The SSMP describes process requirements that demonstrate the achievement of Safety and Security Certification, and communication processes administered by the Safety and Security Team, including internal and external committee meetings and stakeholder outreach.

The SSMP was developed through consultation with Authority staff, local communities, law enforcement and first responders to manage the safety and security of all stakeholders. The SSMP adheres to all state and federal regulations, including requirements of the Federal Railroad Administration. At the heart of the plan is hazard and vulnerability identification, evaluation and an avoidance framework that is applied during all phases of the project for resolving safety hazards and security vulnerabilities. The SSMP encompasses all equipment, infrastructure, operation, and maintenance plans and procedures associated with the system and covers all Authority employees, contractors, first responders, transit riders and the public.

Risk-based, safety-hazard management addresses system hazards during the project's construction and operational phases based on the level of risk posed by the hazard. Safety-hazard analyses and security-risk assessments are developed through an iterative process. These analyses are created in close collaboration with employees and other project staff and are readily available to all. The Safety and Security Program Committee (SSPC) is responsible for reviewing and approving all hazard analyses and vulnerability assessments to ensure that significant safety hazards and security threats and vulnerabilities are identified and that the proposed countermeasures adequately resolve the issues.

Our comprehensive safety and security program also address operations and facilities and ensures that these measures enhance our passengers' experience. For example, we convened a Seismic Advisory Board that includes nationally and internationally recognized experts in seismic hazards evaluation and seismic design. This panel provides expert advice regarding seismic design of tunnels and reviews our design criteria. It also reviews and provides advice on special conditions that must be addressed in developing California's high-speed rail system, including high seismicity, near-source seismic response and active fault crossings.

EXHIBIT 5.3: STATION CANOPIES PROTECT PASSENGERS



Train Operations

The rail system we are designing and delivering has incorporated the best of current rail technology and practice. We are the first system to commit to running entirely on renewable energy. Bringing best-in-class technology is important to delivering a reliable, certifiable system. Some of the innovations incorporated in the project include:

» Tier III compliant trainsets that are in conformance with 100% Buy America requirements;

» Testing of the system, including trainsets, at speeds up to 242 mph, the fastest trains in the U.S.;

» Automatic train and traffic control coupled with an autonomous early earthquake detection system as well as a hazard warning (intrusion, high wind, high temperature, high water); and

» Regenerative breaking.

These practices use existing technology in new ways as well as new technology. As discussed elsewhere in this chapter, climate change resiliency and adaptive practices have already been incorporated into the design and operations and asset management systems.

In addition, we take a holistic, layered and risk-based approach for securing the rail system, including:

» Positive Train Control, which is a state-of-the-art system that monitors speeds and regulates the distances between trains and can automatically slow down or even stop trains to prevent collisions;

» Using an early earthquake warning system that detects earthquakes before they happen to stop the trains so that safety measures can be taken;

» Installing quad gates at grade crossings; and

» Building intrusion protection barriers at certain locations on the system.

Facilities

Similar to safeguarding train operations, we will take a comprehensive approach to securing rail system facilities, including:

» Early engagement with federal, state and local intelligence and policing agencies during design and construction;

» Ongoing engagement with the same agencies to review current and evolving criminal and terrorist threats, and applying mitigations to minimize vulnerabilities;

» Applying technology, fencing, intrusion protection, surveillance capabilities and other system-hardening techniques; and

» Development of security plans, procedures, protocols and a professional security force to monitor, patrol and respond to incidents.

Seismic Advisory Board Provides Added Assurance in Planning for Natural Disasters

California residents are no strangers to natural disasters. As we look to develop the infrastructure of the future, it is important to actively plan for and mitigate the impacts of natural disasters on the high-speed rail system.

Following the 1989 Loma Prieta earthquake, the California Department of Transportation (Caltrans) established the Seismic Advisory Board (SAB) to provide advice on seismic safety policy as it applies to the design of transportation structures in California. In 2017, the role of the SAB was then expanded to provide similar services to the California High-Speed Rail Authority.

Authorized by Executive Order D-86-90, the SAB is an independent body whose role is to advise Caltrans and the Authority on seismic policy and technical practices to enhance the seismic safety and functionality of California's transportation structures. The SAB is comprised of nationally renowned experts with decades of knowledge, including long-standing members who have significantly contributed to Caltrans and the Authority's seismic design practices. The Board's expertise includes deep knowledge of structural, civil, geotechnical, tunnel, high-speed rail, and earthquake engineering, which enables them to provide technical expertise and guidance to the Authority on matters that involve seismic safety, resiliency and reliability for design elements such as bridges, tunnels and more.

The SAB provides an added level of assurance that the Authority's design standards are as robust as possible when planning for and mitigating risks associated with seismic activity. In 2020, the SAB welcomed three new Board members with extensive expertise and has remained an invaluable advisory group to the Authority through virtual meetings.

Construction Safety

Exhibit 5.4 shows injury rates and lost days in 2020. These are significantly lower than similar metrics for the construction industry statewide. The main types of injury include those to the upper body and upper extremities (arm, hand, fingers), requiring first-aid.

EXHIBIT 5.4: WORKER HEALTH AND SAFETY

INJURY RATE[14]	2020	State Benchmark[15]
Injury Rate – CP 1	1.60	-
Injury Rate – CP 2-3	2.18	-
Injury Rate – CP 4	1.09	-
Injury Rate – Overall Weighted Average	1.77	4.5
LOST DAYS RATE		
Lost Days Rate – CP 1	0.80	-
Lost Days Rate – CP 2-3	0.00	-
Lost Days Rate – CP 4	0.00	-
Lost Days Rate – Overall Weighted Average	0.24	2.8
FATALITIES		
Total Fatalities	0	55[16]

Employee Programs

To facilitate positive health outcomes, State of California employees and their eligible dependents have access to an Employee Assistance Program (EAP). This program is provided by the State of California as part of the state's commitment to promote employees' health and well-being.

It is offered at no charge to employees and provides a valuable resource for support and information during difficult times, as well as consultation on day-to-day concerns. Specially trained customer service representatives and professional EAP counselors are available 24 hours per day, 7 days per week to confidentially talk with employees and get them assistance when needed.

Each department also has an EAP coordinator and there is a Statewide EAP Benefits Manager available. This program is being operated by the California Department of Human Resources, and more information is available here: ***http://www.calhr.ca.gov/employees/pages/eap.aspx***

Grade Separations

Keeping the rail alignment separate from roadway crossings is a core element of a safe, high-speed system. The new grade separations that the Authority is planning and building represent one of the most significant investments that we are making to increase rail safety. In the Central Valley, the high-speed rail system will be fully grade-separated, which is essential to safety because the trains will travel at speeds in excess of 200 miles per hour in this region.

Grade separations not only create important safety benefits for communities, they produce practical, environmental and economic benefits:

- Improved safety for pedestrians and bicyclists;
- Reduced noise due to the decreased need for audible signals, such as train horns;
- Reduced greenhouse gas (GHG) emissions and air pollutants from idling vehicles;
- Improved train operations reliability;
- Improved access to employment centers and jobs; and
- Disadvantaged communities are no longer isolated.

In August 2020, a newly constructed overpass at Avenue 15 opened to traffic. The overpass, located between State Route 99 and Road 32, allows traffic to travel over the existing BNSF railroad tracks and the future high-speed rail line. Additional grade separation projects that were completed in 2020 include the Avenue 10 Grade Separation (September), the Avenue 7 Grade Separation (October) and the American Avenue Grade Separation (November).

Construction of various other grade separation projects is currently underway in the Central Valley. For example, by December 2020, work was nearing completion at the Avenue 12 Grade Separation. Once complete, the overpass will carry Avenue 12 traffic over the high-speed rail line and eliminate the existing freight rail crossing. The Avenue 12 overcrossing will eliminate the existing at-grade rail crossing outside the town of Madera, improving safety. Additionally, in November 2020, a new construction site broke ground in Fresno County at the Adams Avenue overcrossing. Crews have completed the initial grade preparations, including closing and demolishing the roadway, and are now hauling in dirt for preliminary work

on the slopes of the structure. When completed, the structure will be 357 feet long and 43 feet wide.

We are also planning to eliminate or improve grade crossings along the system through Northern and Southern California, improving safety and reliability for train operations, reducing noise (due to less need for trains to sound warnings at crossings) and reducing vehicle emissions. We have also identified additional grade separations to be constructed in these corridors.

In Southern California, we have been coordinating with local agencies to advance grade-separation projects at specific locations south of Bakersfield. These projects provide important short-term safety and traffic flow benefits but also prepare for future high-speed rail construction.

Some examples of projects that are currently being environmentally cleared as part of the high-speed rail program include:

» Morning Drive (SR-184) at the UPRR along Edison Highway on the eastern edge of Bakersfield;

» Rancho Vista Boulevard at the UPRR and Sierra Highway in the city of Palmdale;

» Palmdale Boulevard at the UPRR and Sierra Highway in the city of Palmdale; and

» Avenue M at the UPRR and Sierra Highway on the boundary between Lancaster and Palmdale.

These projects build on our earlier efforts in the region, including the Rosecrans/Marquardt Grade Separation Project, which is currently in construction.

Management, Resilience and Adaptation

In 2017, we finalized a Program Risk Management Plan, which supersedes the June 2013 Project Risk Management Plan. In 2019, our risk mitigation approach was incorporated into the draft Climate Adaptation Plan (CAP), and in 2020 the CAP was completed, with a release date set for 2021. Our approach to risk management is systemic, collaborative and cross-disciplinary and is viewed as essential for successful project management, building upon and extending other project management processes.

Our risk management approach also incorporates the precautionary principle, particularly in the application to climate adaptation planning, which identifies actions to be taken even in the absence of complete certainty concerning particular climate risk scenarios. The actions to be identified in the climate adaptation plan will rely on reasonable evidence of considerable potential risk.

To foster efficiency, redundancy and diversity, we ensure a high degree of integration between our various infrastructure networks. For example, the project is in alignment with the larger California Central Valley revitalization program and seeks to create cross-sector and sustainable system improvements.

Emergency and Disaster Recovery Planning

One way we seek to manage risk focuses on planning for emergencies and disasters. Our Safety and Security Management Plan establishes our commitment and philosophy to achieve the highest safety standards and to establish a framework for emergency preparedness. Prior to the start of operations, we will develop an Emergency Management Plan (EMP) and a Passenger Train Emergency Preparedness Plan (PTEPP) to govern safety and security during system testing and operations. The PTEPP will identify training program requirements for operations and maintenance personnel, as well as local emergency response departments including fire, police and medical responders. The goal of the PTEPP is to verify and validate:

» Adequacy of emergency plans and procedures;

» Readiness of railroad operating and maintenance personnel to perform under emergency conditions;

» Effective coordination between railroad operations and emergency response agencies, such as police, fire and emergency medical services; and

» Familiarization of fire, police and emergency medical services personnel with the physical and operating characteristics of high-speed rail operations and hazards inherent to the high-speed rail system.

Fire and Life Safety and Security Committees (FLSSC) were formed during the preliminary engineering phase of the project to provide outreach to local and regional

emergency response agencies. As the project moves into the testing and startup phase, the FLSSCs will review operating plans and procedures, results of after-action reviews following major emergency response incidents or exercises, and training programs for content appropriateness and effectiveness.

Furthermore, the emergence of the COVID-19 pandemic in early 2020 created a variety of new and unforeseen risks, neither anticipated nor planned for. Although we responded to its immediate impacts quickly, the full magnitude of the pandemic is still unknown. Given this uncertainty, there still may be possible residual impacts at a macro-economic perspective. Under this new global risk overlay, we have enhanced our risk assessment efforts.

Climate Adaptation Planning

2020 PROGRESS: The Climate Adaptation Implementation Committee (CAIC), a work group that was formed in alignment with state guidance, "Planning and Investing for a Resilient California", drafted a climate adaptation plan for the system in 2020.

As the Authority looks toward the future, another key consideration is planning to adapt to the effects of climate change. Scientists agree that climate change is driving temperature rise, increasing extreme weather and related disasters. In recent years, California residents have experienced natural disasters, such as heat waves, drought, wildfires, floods and mudslides, events which may have been worsened or even triggered as a result of climate change. As we look to develop the infrastructure of the future, it is important to consider what is known and explore what is unknown about the future climate impacts.

Preparing for future conditions and designing resilient infrastructure is important to the State of California and its communities. In 2015, a landmark Executive Order by Governor Jerry Brown (EO B-30-15) required state agencies to account for climate change impacts in investment decisions. This legislation was followed by others and a statewide guidance document, "Planning and Investing for a Resilient California", which provides recommendations for how state agencies can begin to evaluate climate change impacts and develop adaptation responses.

Stakeholders consistently emphasize that resilience and adaptation are of the highest importance. The Authority's Climate Adaptation Implementation Committee (CAIC) has continued focusing on resiliency outcomes for the system, identifying system infrastructure that would be most severely affected by climate change and reviewing potential responses to increase project and community resiliency.

In 2019, the CAIC discussed adaptation implementation opportunities for the system and worked collaboratively with the Safety and Security team to incorporate climate risks into the Authority's risk assessment process. In 2020, this led to the integration of a climate-risk-evaluation approach into the Authority's SSMP. This action provides one consistent and streamlined way to evaluate climate change impacts to the program.

In 2020, the CAIC also finalized the first Climate Adaptation Plan for the system. As discussed, this plan responds to and organizes mitigation for the impacts of climate change.

Furthermore, to ensure resiliency is incorporated into system design, the Authority continued mandating new climate change adaptation and resiliency requirements in its procurements. These requirements include the completion of site-specific hazard analyses, as defined in the SSMP, for climate-change-related hazards including, but not limited to, sea level rise and surge and average and extreme precipitation, is a core element of climate adaptation.

Requiring site-specific assessments for elements of the project potentially vulnerable to future climate change projections is part of risk mitigation. These assessments must be provided by contractors in a climate risk and resiliency report outlining any present day and future, potential impacts of climate change-related risks—such as sea level rise and surge, average and extreme precipitation, average and extreme temperatures, and wildfire—to system assets.

Planning for the Future in a Changing Climate

It is important for the California high-speed rail system to be built in a way that is resilient and prepared for climate change throughout the full life of the system. Recognizing the need to understand how changing climate could affect the system and how to prepare for the future, the Sustainability Team of the Authority developed the program's first Climate Adaptation Plan.

The Climate Adaptation Plan summarizes work completed to date by the Authority to assess system exposure to changing climate hazards including temperature rise, wildfire, precipitation-based flooding, and sea level rise and storm surge. The assessment evaluated changing projections over the coming century for a range of models and a high greenhouse gas concentration scenario. The results of this analysis identified areas along the alignment where there may be future exposure from the hazard evaluated.

Increasing Wildfire Risk for the Southern Segment of the Phase I Alignment

The Climate Adaptation Plan compiles ways the Authority is preparing for climate change through design, operations and maintenance, and programmatic strategies, and summarizes key next steps for the agency, which include:

- Reevaluate climate change impacts to the system as new information becomes available;
- Implement a climate change policy for the agency;
- Integrate climate risks into the Authority's risk management process;
- Leverage the Authority's asset management system to collect weather and climate-related data and any impacts they have on the system when operational;
- Continue to develop design, operations and maintenance, and programmatic responses to future climate conditions and extreme weather events; and
- Reconvene the Authority's internal committee on climate change adaptation to continue to review climate data and adaptations.

The plan will be a useful resource for Authority staff and project stakeholders who need to understand how climate change may affect the system and decisions they make day-to-day. The Climate Adaptation Plan is expected to be the first of its kind and will be updated as new climate data and information become available, and as the Authority makes progress on the next steps identified to prepare for an uncertain future.

A two-page overview of the Climate Adaptation Plan is available at ***https://hsr.ca.gov/wp-content/uploads/2021/05/CHSR-Climate-Adaptation-Plan_ExecutiveSummary_FINAL-ADA_5-21-21.pdf.***

PHOTO: The rooftop green space of the Salesforce Transit Center offers an urban hideaway.

CHAPTER 6: STATION COMUNITIES AND RIDERSHIP

Introduction

Stations are, arguably, the most critical factors in the success of the system. They are significant sites in the state: the point where customers board the trains, bringing dramatic new levels of activity and acting as magnets for development in the host communities. High-speed rail will bring thousands more people into the city core without the need for more roads.

The high-speed rail system serves as an organizing principle for California's anticipated growth. Already, the Central Valley is the site for the swiftest growth in the state, even during the pandemic. Fixed-rail systems are a unique opportunity to focus urban growth within existing communities, protect natural landscapes and dramatically reduce transportation greenhouse gas (GHG) emissions. The stations can help strengthen the identity and sense of place in these communities.

No other state investment provides this opportunity for sustainable economic development, environmental benefit and social resilience.

Reducing the miles that are traveled every day and every year in automobiles is one of the key goals of the state. Several cities have used the opportunity of high-speed rail stations to craft visions for development, underpinned with adopted plans that capitalize on the system potential. Well-planned high-speed rail station areas and the access to and from them is critical in unlocking the potential of the rail system to meet transformative statewide goals.

Even in an era of zero-emissions vehicles, compact and mixed-use development, reflecting coordinated land-use planning around high-speed rail is necessary to achieve long-term sustainability goals. Putting development adjacent to low-carbon transportation investments, such as high-speed rail, is a crucial means to help protect the agricultural lands that the economy relies on, as well as the forests, streams, watersheds and other natural lands that clean our air and water and provide beauty and recreation.

Highlights

- In 2020, we continued to foster a vital public-agency partnership with the City of San José, the Santa Clara Valley Transportation Authority (VTA) and the Peninsula Corridor Joint Powers Board to redesign and expand Diridon Station in San José. In 2020, the Diridon Integrated Station Concept (DISC) partnership continued considering and analyzing in detail the integration of the multi-agency rail program with a proposed development adjacent to the station.
- The Authority initiated station site planning work in Fresno and Bakersfield—critical project delivery work to advance for early service.
- The Authority, in partnership with the Los Angeles County Metropolitan Transportation Authority (Metro) and the Los Angeles—San Diego—San Luis Obispo Rail Corridor Agency (LOSSAN), continued progress on a brownfield study in an approximately one-mile radius around Los Angeles Union Station (LAUS), funded through an awarded grant from the U.S. Environmental Protection Agency (EPA).
- The Authority continues to partner with Metro on the Link US project, which involves improvements to LAUS that accommodate expanded regional and intercity rail service and high-speed rail trains. This included an agreement to invest more than $400 million at LAUS.

Enhancing Public Space and Amenities

2020 PROGRESS: The Authority began specific conversations with stakeholders in Fresno and Bakersfield to identify early site activation; placemaking activities that include physical improvements and programming in advance of high-speed rail service.

While the Authority is partnering with each of the station communities on a variety of planning activities, 2020 saw the tailoring of planning work in Fresno, Bakersfield and the Kings-Tulare corridor to understand what actions the Authority can, logically, undertake in advance of service. This activity, called early site activation, looks at the parcels the Authority owns. Given the progress of construction and right-of-way acquisition, most of this work in 2020 was focused in Fresno. One result has been input into potential use of the historic Fresno Depot, as shown in Exhibit 6.0. A diverse stakeholder group provided crucial feedback and priorities to the Authority, which will be incorporated into site activities in the next few years:

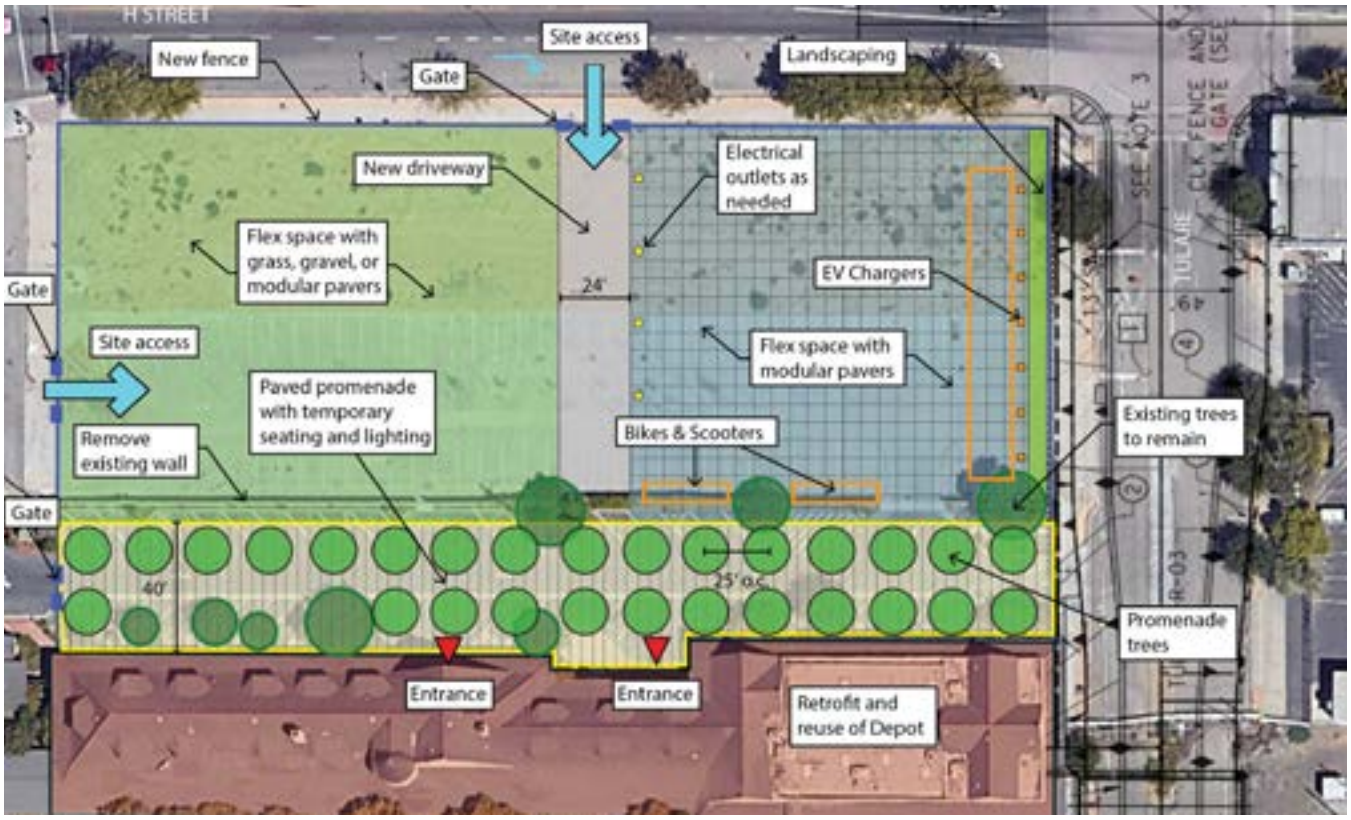
1. Emphasize the distinct character of each station-adjacent neighborhood;
2. Connect neighborhoods across the railroad through physical bridges as well as consistent quality and character of public realm improvements;
3. Activate station sites as soon as possible; and
4. Maintain regular communication and inclusion in the process to build confidence in outcomes.

The Authority is working closely with local Fresno partners and the Strategic Growth Council to implement public art and food events in 2021.

Planning Process

In other regions and globally, we have seen that the rail investment must be accompanied by other policy changes and interventions specifically to benefit station cities for the system to have the type of impact sought. To best realize the value of the high-speed rail investment, the Authority has worked with local governments over the last several years to prepare for future high-speed rail stations. In partnership with the Federal Railroad Administration (FRA), we dedicated funding to support station cities in completing station area plans that are

EXHIBIT 6.0: REVITALIZING THE FRESNO DEPOT



consistent with and supportive of local and regional planning efforts required by SB 375 and our Station Area Development Policies.

To date, we have executed planning agreements with the cities of Gilroy, Merced, Fresno, San José, Bakersfield, Millbrae, Palmdale and Burbank, as well as the Tulare County Association of Governments and the Santa Clara Valley Transportation Authority.

These agreements allow the Authority to work closely with station jurisdictions and other service providers to promote regeneration opportunities and enable more sustainable, district-scale development. The vision for station planning is to create community hubs and help transform cities. The goals being advanced through this program include:

- Fostering sustainable development and operations;
- Reducing GHG emissions;
- Helping maximize system performance;
- Creating economic engines for local communities; and
- Making great places.

Our station planning process focuses on transforming the communities in which we operate. The aim is to connect California's megaregions while contributing to sustainable development, job creation, downtown revitalization, and protection of important agriculture land and other open spaces.

In 2020, we continued to focus on project delivery for the stations in the Central Valley service segment. This work is grounded in the building block approach expressed in the 2020 Business Plan. At each station site, project delivery work will result in a preliminary configured station footprint that includes identified space for access, transit-orientated development, station facilities and early site activation.

This work happens in close coordination with all delivery functions of the Authority and station cities to identify phasing for each station so that the stations fit with and enhance the local context. This phasing is intended to align station investments with station-area market drivers, Authority funding and the vision of local jurisdictions. The Authority will continue to work closely with environmental and public interest groups, developers, investors and others to pursue the development of public spaces and amenities near rail stations.

Planning for the New Diridon Station

A convergence of transportation and land use activity is inspiring planning for a new, re-envisioned Diridon Station. Currently, the station is the primary transit hub in the San José area, serving approximately 17,000 daily passengers and anticipated to grow to more than 100,000 passengers per day by 2040. The station today provides access to Caltrain, the Capitol Corridor, the Altamont Corridor Express (ACE) and Amtrak as well as VTA light rail and bus service, and other regional bus transportation providers. With the future addition of high-speed rail, Bay Area Rapid Transit (BART) and enhanced service by the current providers, Diridon Station will provide more connections than any other station in Northern California.

Diridon Station was identified as a major hub for the high-speed rail system with its connections to Silicon Valley and with its robust access to current and future access to transit and its important connectivity to downtown San José and the rest of the Bay Area. Planning for a new larger station is also being driven by Google's Downtown West development, which will encompass approximately 80 acres in the station area.

In 2019, the Authority joined the Santa Clara Valley Transportation Authority (VTA), the City of San José and Caltrain to lay the groundwork for developing the first phase of the Diridon Integrated Station Concept (DISC)—a shared vision for the future of Diridon Station. In 2020, the Metropolitan Transportation Commission (MTC) joined the partnership, adding a regional perspective and voice to the DISC planning effort.

Planning efforts have included the development of a concept layout that has been accepted by the DISC partners, along with the validation of both heavy and light rail engineering and development of a Conceptual Transit Planning Boundary. This critical work continues to advance the planning for the station. The planning effort seeks to leverage billions of dollars spent on transit systems and connectivity to maximize transit ridership, reduce auto dependence, create travel choice and attract investment.

Transportation Hub Activation and Mass/ Active Transportation

High-speed rail stations anchor points for intermodal networks as well as community hubs. As emphasized by Authority policy and local plans, they can act as catalysts for transit-oriented development, attracting significant new investment into intermediate cities as they are connected with high-speed rail service.

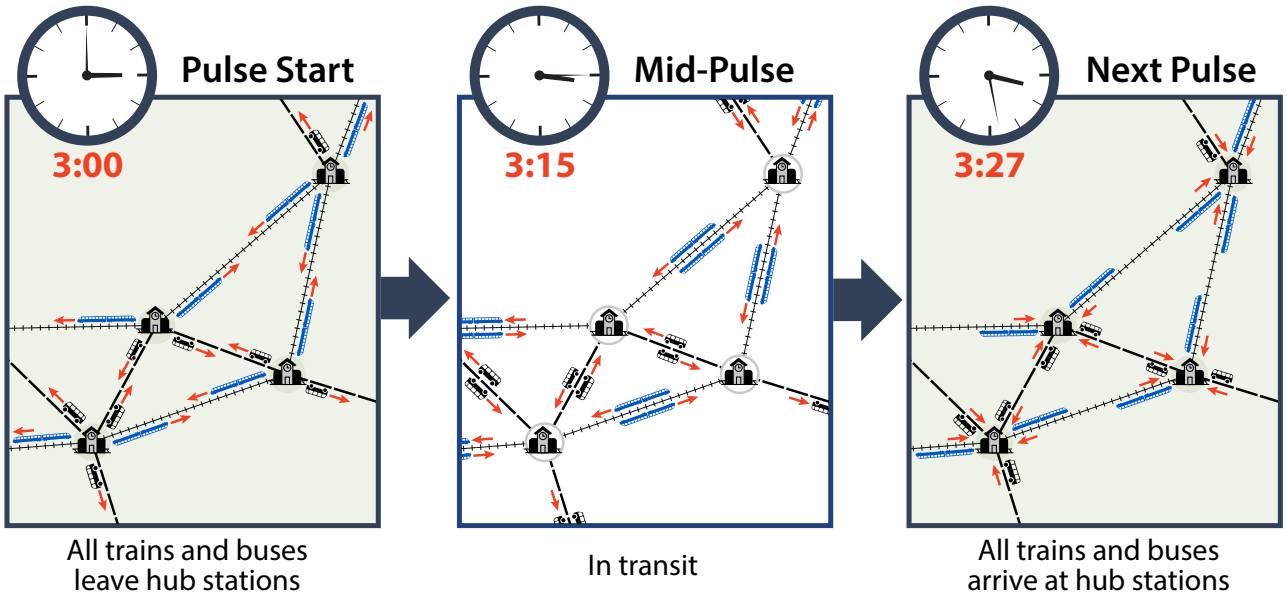
High-speed rail stations are being designed to function as a transportation hub for a seamless, interregional travel experience. Starting with local and regional bus transit, bus stops with frequent service and access to other rail services will be located within a 5-minute walk of the high-speed rail platform, where possible. In 2020, the Authority worked closely with local transit providers to start planning for enhanced transit service at stations at opening day and to accommodate their operational needs to provide seamless connections for passengers.

Thousands of transit users will benefit from the implementation of more robust transit networks in association with high-speed rail, even if they never take high-speed rail. Developing stations as hubs, with coordinated, pulse-timed schedules, as shown in Exhibit 6.1, will serve to better saturate less-dense areas with transit and increase ridership on all systems, including the local and regional transit networks that connect to the high-speed rail system. It also supports our ability to develop a commercially successful high-speed rail system that operates without a subsidy by making sure customers have ready access to any mode they need for their complete journey.

And not just access facilities themselves, but also creating 15-minute neighborhoods within the station area means more compact, bike- and pedestrian-friendly development. This reinforces the potential for the system to reduce not just vehicle miles traveled at the regional scale, but for the first-mile/last-mile access to the station and within the station district.

We are engaging with local and regional transit providers, as well as the different cities, to enable provision of bike facilities at station sites, including making bike racks available in the stations, courtesy of the Authority. Stations are being designed to facilitate pedestrian access by having direct connections to sidewalks. In 2020, we continued this work by meeting virtually with local active transportation organizations to develop supportive policies and optimize the use of state funding available to for active transportation facilities.

EXHIBIT 6.1: PULSE-TIMED NETWORKS LEAD TO INCREASED RIDERSHIP



Access Planning

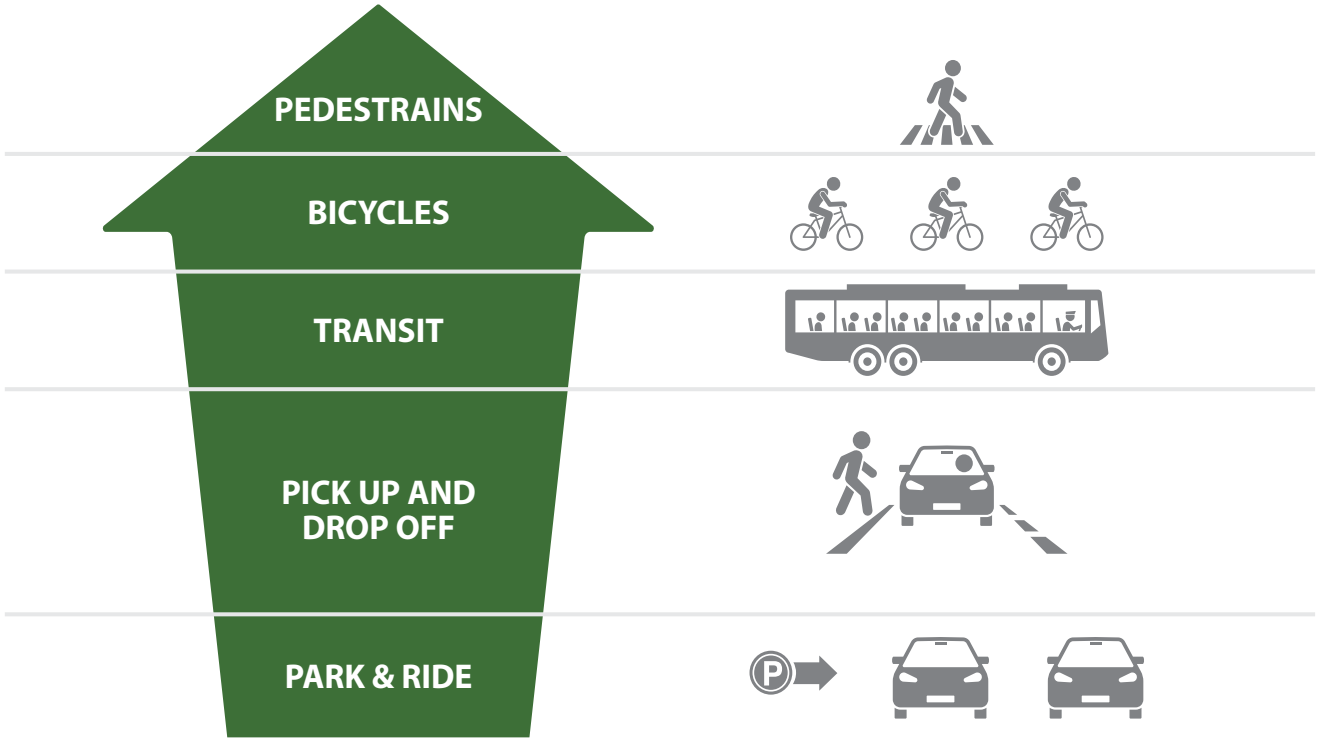
The stations will prioritize public-space and amenities to support access for people arriving on low-carbon modes, such as transit, as well as via foot, bike, scooter and other individual modes. Stations will also include locations for passenger pick-up/drop-off. Exhibit 6.2 presents an access hierarchy for high-speed rail stations.

In 2020, the Authority advanced more detailed access planning for the stations on the initial operating line to support the delivery of service. Access improvements and parking are focal points for early discussion and investment. We are mindful of how thoughtfully designed and coordinated parking infrastructure can support development in some markets. We also recognize how vital it is to prioritize walking, biking and transit over single-occupancy-vehicle use to reflect demographic and market trends.

Infrastructure investment supports development in most markets. In this era, as we contend with both the public health and economic crises resulting from the COVID-19 pandemic, the design and functioning of our transit systems and public realm is ever-more crucial.

We need our public realm, sidewalks and roadways to allow us space to move and interact safely. Our communities and economic recovery depend on transit. Even in a post COVID-19 era, where social distance is vital to maintain public health, transit is still substantially more spatially efficient than automobiles.

EXHIBIT 6.2: ACCESS HIERARCHY FOR STATIONS



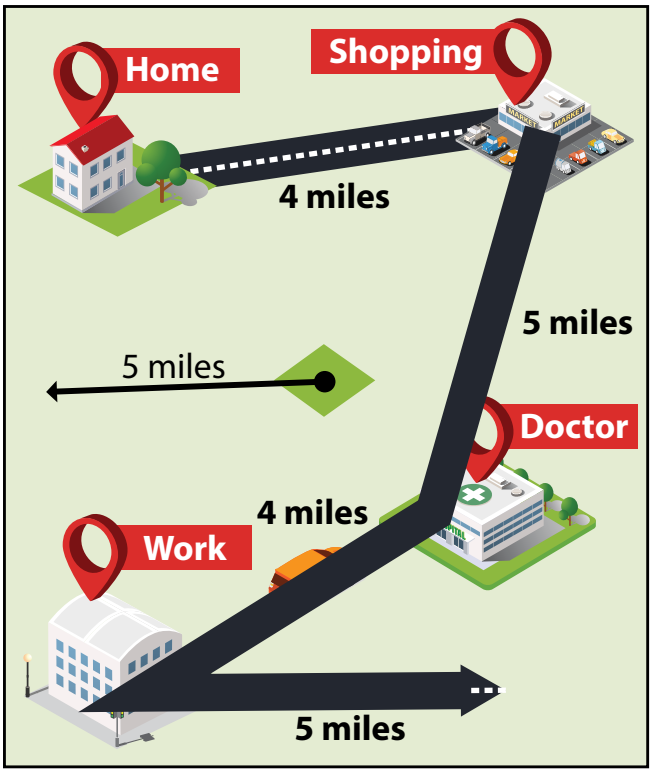
Community Partnerships Reduce Vehicle Miles Traveled (VMT)

California has been clear about the need to reduce vehicle miles traveled. The Authority has worked in partnership with station communities and mobility service providers to promote urban regeneration and district-scale sustainable development at and around the stations. The 2017 SPUR report, "Harnessing High-Speed Rail", explained that "rail systems link major employment districts with dense mixed-use areas. These districts extend beyond a station area to include the surrounding downtown with its mixture of office, retail, entertainment and residential uses. Businesses, property owners and employees in this area can all benefit from the improved accessibility that high-speed rail brings."

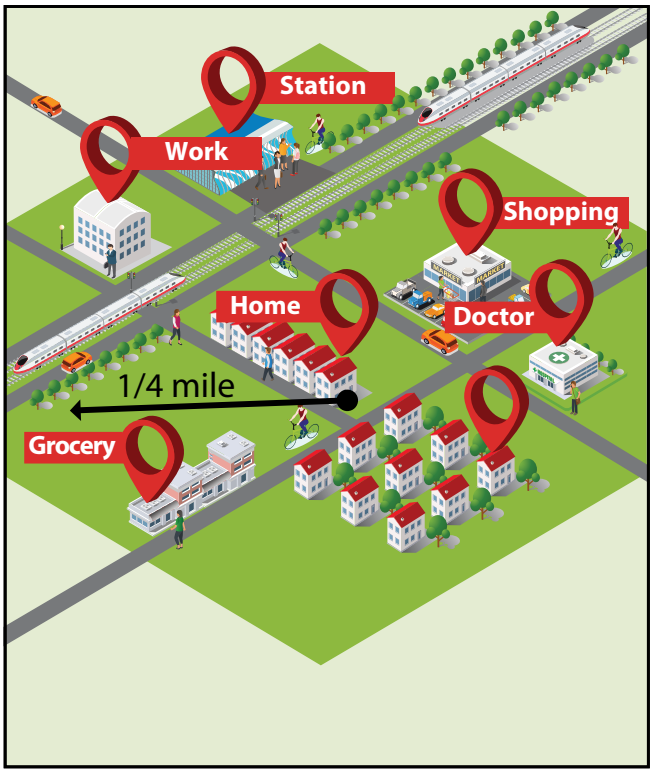
Updating local plans is a key first step in using the high-speed rail stations to focus growth. Funding for station-area planning is helping stimulate local planning for smart development, updates to local land use plans and zoning codes, and promoting transit-oriented development around high-speed rail stations. Exhibit 6.3 illustrates how development around high-speed rail stations, in response to high-speed rail service, has the potential to lower the average daily vehicle miles traveled (VMT) for existing and future residents and workers near the rail stations. These infill efforts align with critical policy objectives of AB 32 and have the potential to reduce millions of tons of GHG emissions.

Locating high-speed rail stations in existing downtown cores, as envisioned by Proposition 1A, will assist with infill development, stimulate the local economy, reinforce SB 375 regional plans and reduce the pressure on agricultural land.[17] Looking forward, the Authority will advance its own development policies in 2021 to bring clarity to our many community partners as to the affordable housing, equity and mixed use intensity goals it has for development on high-speed rail controlled land.

EXHIBIT 6.3: REDUCING VMT EMISSIONS THROUGH INFILL DEVELOPMENT AROUND STATIONS



Left: Today, destinations in our communities are spread out, requiring the need to drive many miles every day.



Right: High-speed rail attracts businesses and others to locate near the stations, reducing the need to drive to every destination.

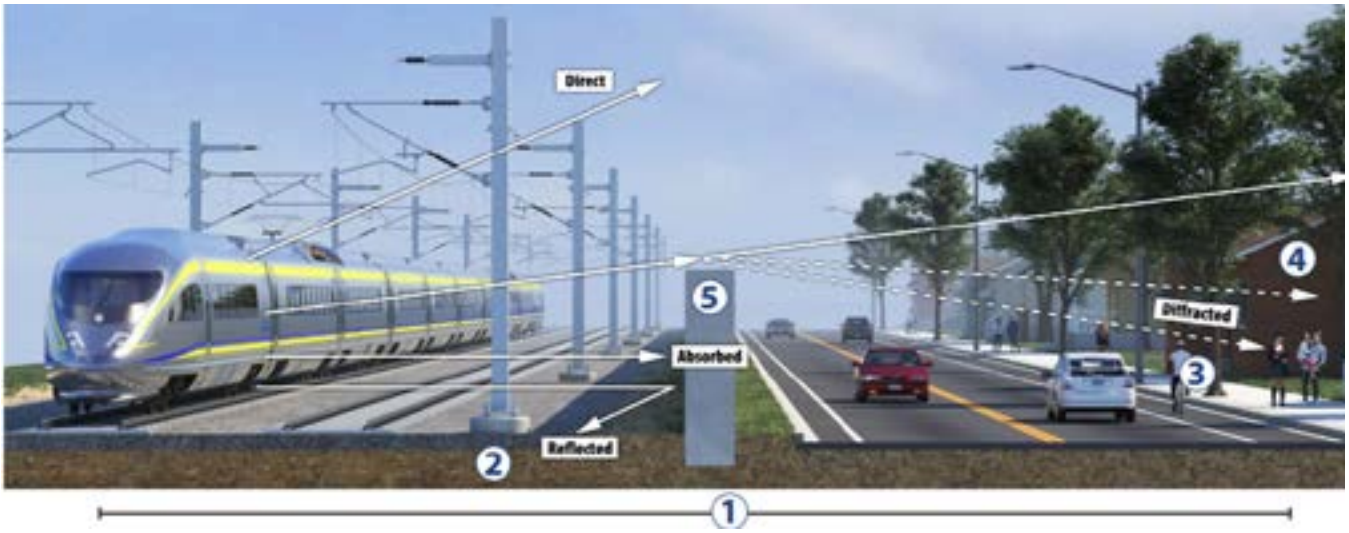
Mitigating Noise and Vibration

Although high-speed rail will remove some persistent noise from roadways, it will result in a different soundscape for adjacent communities. This has been a strong focus of environmental planning and study. The Federal Railroad Administration (FRA) developed rigorous procedures to manage potential noise impacts, which the Authority uses to guide in systems design. Because high-speed trains are electrically powered, they are generally quieter than conventional diesel trains.

However, the Authority is making plans, as shown in Exhibit 6.4, to mitigate potential noise disturbances associated with train service through sound walls, sound barriers (solid and/or transparent) or earthen berms built between the train tracks and residential or other noise-sensitive areas.

With the planned upgrades and eliminations of grade crossings along the system through Northern and Southern California, trains will no longer have to sound noisy horns at crossings. At areas where the train will need to travel through at-grade crossings, the establishment of "quiet zones," where additional safety measures remove the need to sound train horns, will help significantly reduce noise disturbance.

EXHIBIT 6.4: MITIGATING NOISE DISTURBANCES



The distance (1) between the train tracks and the listener, the type of ground surface (2), ambient noise (3), and the presence of buildings (4) or sound barriers (5) will all influence the noise level that is heard by a listener at any given location.

Engaging Communities

2020 PROGRESS: Throughout 2020, the Authority continued a focused and comprehensive engagement process with all communities along the high-speed rail alignment to best identify and address community issues, such as construction impacts, noise during operation and relocation processes, and capture ideas for mitigation.

We recognize that trust and support are vitally important to what we do. Engaging our many stakeholders at the federal, state and local levels provides us with invaluable insight and helps inform and strengthen our decisions. We value community meetings and open houses as opportunities to gather comments and feedback from those communities that may be directly affected by the high-speed rail project.

Engaging with communities and stakeholders enables us to incorporate unique community values and priorities into our project plans and helps to improve community benefits while considering the collective rights of local communities. For example, community meetings on aesthetics have enabled local preferences for unique landmarks to be included in the infrastructure design.

Outreach Efforts

Statewide, through community engagement and public-outreach events, we work with more than 200 local community organizations and elected officials to educate and inform the public about the high-speed rail program, as shown in Exhibit 6.5.

In 2020, 260 of the 340 community events were hosted in virtual settings, such as telephone town halls, live webinars, virtual open houses and office hours, due to the COVID-19 pandemic. Engagement with communities in 2020 brought unique challenges but was successfully carried out through a range of virtual engagement processes.

Generally, we promote public participation through various outreach methods, including, but not limited to:

- Engaging people within their own communities and at regularly scheduled community meetings;
- Establishing community and/or stakeholder working groups to help inform stakeholders on the latest developments in those regions);
- Participating in public involvement activities (meetings, hearings, advisory groups, workshops and task forces) to help the community understand the project, as well as to identify community interests and needs and define project goals;
- Encouraging collaboration between diverse groups of community leaders;
- Hosting tables or booths at community-based events;
- Partnering with community-based organizations that serve underrepresented populations, and minority and women business organizations;
- Encouraging public comments at monthly Board of Directors' meetings and quarterly Business Advisory Council meetings;
- Streaming live webcast of the monthly Board of Directors' meetings; and
- Maintaining a toll-free hotline that includes multiple language options.

EXHIBIT 6.5: 2020 COMMUNITY OUTREACH

Connecting Students to the California High-Speed Rail Project

I Will Ride, originally founded by college students in the Central Valley, is a student outreach initiative designed to inform, engage, inspire and connect students to the nation's largest and greenest infrastructure project, California high-speed rail. I Will Ride alumni established local student chapters in their regions to stay engaged in the development of the California high-speed rail project. The founders of I Will Ride believe that significant investments in mass transportation, infrastructure, and transit-oriented development will spur economic growth, promote regional connectivity, and provide environmentally friendly transit for the 21st century.

Since the inception of I Will Ride, we have welcomed hundreds of college and university students on construction tours in the Central Valley as part of the initiative's I Will Ride Day.

In the fall of 2020, the Authority relaunched the I Will Ride program as a statewide initiative to expand the program beyond local school-based chapters. This allowed the Authority to reach a diverse student demographic with a wide range of interests on the high-speed rail project. Though the relaunch faced many challenges due to the COVID-19 pandemic, we found that virtual platforms allowed us to connect professionals on the project more easily through video calls, no longer needing to account for travel times and costs.

I Will Ride now offers myriad engagement opportunities, such as classroom and campus presentations, high-speed rail construction site tours in the Central Valley, virtual webinars, job and internship opportunities, and networking with professionals in a variety of fields including engineering, transportation, and public policy. In addition, we hired a full-time student engagement liaison and established existing partnerships with the Cal-in-Sac Fellowship program and the California State University Sacramento Executive Fellowship program.

Since the relaunch, I Will Ride has reached students of all ages—ranging from elementary school to colleges and universities, part of a bigger mission to encourage civic and government participation and expand student opportunities. The program also seeks to draw students from diverse backgrounds, especially students from communities historically underrepresented in transit development. In 2020, we did a total of 17 student outreach/I Will Ride events.

We look forward to reaching students in person when it is safe to do so but will continue to utilize a hybrid model of in-person and virtual events as we expand our student outreach efforts.

PHOTO: The Women in Transportation Seminar at UC Davis featured leading engineers including Maritza Acosta (third row from top, second from left), who owns Acosta Engineering Solutions. Her firm has designed high-speed rail structures being built in the Central Valley.

Working with Stakeholders

Along with engaging communities and the public, partnering with stakeholders and oversight agencies is critical to the success of the high-speed rail program. Our Office of Strategic Communications focuses on stakeholder involvement, working collaboratively with the Authority's Regional Directors in the Central Valley and in Northern and Southern California to provide a centralized focus on addressing stakeholder interests and concerns related to potential project effects.

The Chief of the Strategic Communications Office and the Deputy Director of External Affairs support the Authority's statewide and regional stakeholder-related activities to ensure consistent and accurate dissemination of information and to address questions or concerns. Key topics and issues often raised through stakeholder engagement include cost, schedule, alignment choices and compliance with enabling legislation.

These issues are addressed through the publication and regular updates of project information on the Authority's website; 12 newsletters every year, which includes quarterly small business newsletters and Northern and Southern California newsletters; presentations; information sharing at open-house sessions; responses to information requests; providing technical reports and background data related to Business Plans; and specialized reports, including the small business and jobs reports.

Reaching Disadvantaged Communities During COVID-19

COVID-19 impacted every aspect of the high-speed rail project, not least of which was our ability to connect with surrounding disadvantaged communities.

Despite facing restrictions due to an ever-changing landscape of the pandemic, the Authority's team delivered innovative outreach tactics to ensure that communities remained engaged and informed about the high-speed rail project. In addition to the traditional methods of outreach, such as social media campaigns, email, website updates and distribution of printed materials, the Authority also employed the following approaches:

- Conducting telephone town halls which utilized text messaging to inform residents along the corridor that the town hall was taking place. The text messages allowed residents to "opt-in" to receive a call on the day of the town hall to join the meeting;
- Hosting informational live webcasts, virtual open houses and office hours, Environmental Justice online listening sessions, and webinars to keep communities informed on key initiatives. Most of these sessions offered interpretation and translation services, which enabled non-English-speaking community members to participate; and
- Leveraging the established connections of our advocacy and community partners to ensure that key stakeholders, groups and community members were identified and reached.

Working with Partners to Transform Brownfields

The Authority, in partnership with the Los Angeles County Metropolitan Transportation Authority (Metro) and the Los Angeles – San Diego – San Luis Obispo Rail Corridor Agency (LOSSAN), applied for and received a grant from the U.S. Environmental Protection Agency (EPA) to study candidate brownfield properties in approximately a one-mile radius around Los Angeles Union Station (LAUS).

LAUS is centrally located in downtown Los Angeles and is one of the busiest transportation hubs in the nation, with almost 160,000 trips per day.

The study will gather and prepare information on environmental contamination of the properties so ongoing regional planning initiatives can identify suitable locations for potential redevelopment opportunities. The grant supported efforts to help prepare land for potential repurposing. These purposes fulfill the objectives of local, regional, state and federal policies, and move the LAUS target area from planning toward implementation.

In 2020, the Authority and the EPA agreed to add the Lincoln Heights Jail site to the scope of the EPA Brownfields Grant work at the request of the City of Los Angeles. A sampling and analysis plan was prepared for the site, and the Authority initiated procurement of a contractor for Lincoln Heights Jail Phase II sampling.

The Authority, Metro, LOSSAN and other stakeholder agencies share a vested interest in revitalizing land around LAUS to support system ridership and transit-oriented development. Exhibit 6.6 summarizes the key milestones for completing this grant and notes key partners involved in providing the necessary input.

EXHIBIT 6.6: BROWNFIELDS MILESTONES AND ESTIMATED COMPLETION

Milestone	Description	Estimated Completion	Partners
Site Selection	Identify up to 24 brownfield sites for environmental assessment based on community input and economic, social, environment and viability criteria	Completed Fall 2018	EPA, Authority, Metro, LOSSAN, City of Los Angeles, County of Los Angeles
Phase I Assessments	Produce site-specific reports on historical contamination through high-level environmental assessments	Completed June 2019	EPA, Authority, Metro, LOSSAN, City of Los Angeles, County of Los Angeles
Phase II Assessments	Determine the specific nature and extent of pollutants through sampling and analysis for up to eight of the Phase I sites	2022	EPA, Authority, Metro, LOSSAN, City of Los Angeles, County of Los Angeles
Cleanup Plans	Produce cleanup plans and schematic site plans for the Phase II sites	2022	EPA, Authority, Metro, LOSSAN, City of Los Angeles, County of Los Angeles

Connecting Existing Transportation Systems

2020 PROGRESS: The 13 connectivity projects identified in SB 1029 are being implemented across the state. They include the Central Subway project in San Francisco, the Regional Rail Connector in Los Angeles, new rail cars for the Bay Area Rapid Transit (BART) system and an upgrade of the Blue Line light-rail system in San Diego. These projects were fully funded in 2015, and we worked with our rail and transit partners on agreements to initiate and/or advance these projects through 2018. In 2020, the Authority continued its participation in regional rail coordination meetings organized by the California State Transportation Agency (CalSTA) and Caltrans.

The high-speed rail program is delivering benefits now through early investments in bookend and connectivity projects tied to California's existing urban and state passenger rail systems. These early investments will allow the high-speed rail system to connect with those systems, creating an integrated rail network that will offer a viable alternative to vehicle and air travel.

The Authority coordinates extensively with the California State Transportation Agency (CalSTA) and other regional partners on planning and implementing the overall Statewide Rail Modernization Program. The goal is to incorporate high-speed rail into a single, integrated state rail improvement strategy.

The 2018 State Rail Plan lays out a vision for statewide, integrated passenger rail and transit service, allowing for rail to connect all urban, suburban and rural communities with frequent, reliable service by 2040. One crucial element of the plan is a practical focus on pulsed schedules:

> "State network planning in the Rail Plan is based on pulse scheduling, which represents uniform train service patterns that repeat throughout the day on regular, recurring time intervals. This timetable-based planning approach allows for timed transfers between services at hub stations where a transfer is required to complete a trip across the state, or to a location served by local transit. The benefit to users of pulse scheduling is that a repeating timetable allows for easy trip planning and seamless travel by ensuring that connections between trains can be made throughout the day, with minimal transfer times."

High-speed rail serves as the statewide artery for this planned integrated system. In addition, the Authority continues to closely track the California Integrated Travel Project (Cal-ITP), given its role to underpin seamless travel.

Los Angeles Union Station – Link Union Station (Link US) Project

The Link Union Station (Link US) Project involves extensive track and station upgrades to Los Angeles Union Station (LAUS) in downtown Los Angeles. The upgrades will transform access for regional services as well as modernize the station into a world-class facility.

The Authority has contributed $18 million towards the environmental review and is responsible for the NEPA review of the project under the Authority's federal NEPA Assignment responsibilities. In this role, the Authority has supported the Los Angeles County Metropolitan Transportation Authority (Metro) in conducting additional scoping during Fall 2020 and provides federal review and oversight, working closely with Metro to advance the environmental impact statement.

The Link US project will transform how the regional rail system operates in Southern California by allowing trains to enter and exit the station from both the existing northern tracks and new run-through tracks to the south over U.S. Highway 101, as shown in Exhibit 6.7. The project is anticipated to significantly increase capacity for rail service while reducing train idling times. Improvements will accommodate future high-speed rail service, with new run-through tracks dedicated to high-speed trains heading south toward Anaheim.

The Link US Project will greatly expand the station's pedestrian capacity with a new expanded concourse and passageway under the tracks and new platforms, escalators and elevators. The project also includes opportunities for future transit-oriented development, improved connectivity to enhance the passenger experience, as well as design and safety improvements to U.S. Highway 101. The project is expected to generate more than 200 permanent jobs, and approximately 4,500 short-term jobs per year during the anticipated 5-year construction period.

Phase A of the project will implement the early action/ interim improvements primarily associated with regional/ intercity rail run-through track infrastructure south of LAUS, with two initial run-through tracks and associated property acquisition, as well as the necessary signal and roadway modifications.

EXHIBIT 6.7: LINK US PROJECT RENDERING

RENDERING: Rendering of high-speed rail train.

CHAPTER 7: **MOVING FORWARD**

At the 2021 Leaders Summit on Climate, the Biden administration announced a bold new greenhouse gas (GHG) pollution reduction target for the United States; a 50% to 52% reduction from 2005 levels of greenhouse gas (GHG) pollution by the year 2030. This target is designed to support two other Biden goals—creating a power sector free of carbon pollution by 2035 and a net-zero emissions economy by 2050.

In July 2021, Governor Newsom directed relevant state agencies to identify how the state can get to carbon neutrality by 2035.

The need for urgent action is clear. These actions demonstrate the current administration's commitment to addressing the effects of climate change, a commitment shared by California.

The Biden administration presents the opportunity to reestablish a collaborative federal partnership and to transform California's entire transportation sector. Over the last decade, California's leaders have focused on policies and funding programs to advance clean transportation, spur job growth and improve air quality. The results of these efforts can be seen on the largest, greenest infrastructure project in the country—California high-speed rail.

Our actions are guided by the recognition that delivering high-speed rail to California is critical to our state's success in achieving its far-reaching policies to address climate change, develop clean energy, curb air pollution and GHG emissions, and protect endangered species as we transition to a sustainable, low-carbon future.

California's efforts to build transportation infrastructure that reduces GHG emissions and shifts passenger rail from fossil fuels to clean, renewable energy could not be better timed. President Biden has laid out an ambitious and bold transportation plan supporting transformative investments in regional and intercity passenger rail that will build a modern, sustainable infrastructure and create an equitable clean energy future.

Californians voted for high-speed rail as the means to achieve essential climate and economic-development goals, and we have honored that trust by working to create the greenest infrastructure project in the nation. California continues to focus on planning, design and construction practices that are already delivering measurable results across the delivery of the system and will continue to deliver results as we move into operations.

Electrified high-speed rail is key to transforming California's transportation system in an era where addressing climate change has become increasingly urgent. California is not just talking about the vision; we are building that system now, and California is leading the nation toward a faster, cleaner and more sustainable transportation future.

Maximize the Potential of the System

The high-speed rail system is a signature tool in California's future transportation kit. Unique to other ground transportation, its speeds rival those of airplanes. Although zero-emissions vehicles (ZEVs) will certainly be greener than conventional cars, electric-battery vehicles will still contribute to the congestion that California has signaled it no longer wants to continue feeding with building more highway lane miles. In addition, ZEVs do not support compact, walkable development.

High-speed rail has the potential to shift tens of billions of vehicle miles and air trips. As shown in Exhibit 7.0, the 102 million metric tons of emissions reductions currently forecast are just a fraction of possible emissions reductions associated with travelers using high-speed rail to its fullest potential. For example, global experience demonstrates that high-speed rail can supplant 50% to 100% of the air market in corridors it serves, significantly more than the 30% we currently estimate.

It is not just air trips that the system can dramatically impact. Currently we project to shift 50% of the growth in the long-distance automobile travel (interregional) market to rail, but that shift could be much higher. If the cost of the electricity, diesel and gas to fuel our vehicles is high, and congestion remains as it is, a high-speed rail trip, which is already much faster, is that much more attractive.

But the greatest opportunity is centered on the daily vehicle miles that Californians endure. We drive dozens of miles for our daily needs, even during the pandemic. The potential for the highest use of the system centers on maximizing transit and active transportation locally for the first and last miles for system access. Communities that focus offices, housing, education, health care facilities and other development around high-speed rail stations can create "15-minute" communities where daily needs are within walking or cycling distance.

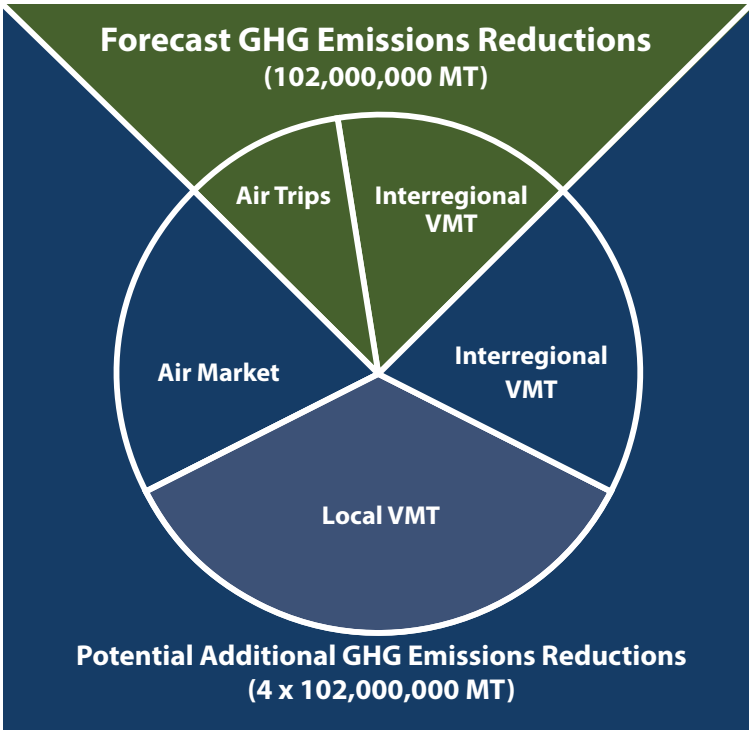
These 15-minute communities hold the greatest potential for significantly reducing daily vehicle miles traveled (VMT) within neighborhoods. These communities also offer dramatically improved quality of life. Given the potential of smart development, high-speed rail could deliver 4 times more than its current projected greenhouse gas emissions reductions.

The potential of high-speed rail outpaces any other transportation investment for the value it returns to the state in economic, social and environmental terms. It is key to a transportation future centered on giving people a viable choice for sustainable travel.

We won't wait for the future. We will work with pioneers in the field to deliver several strategies at our stations, including:

- Micro-mobility, including bike share and scooter share;
- Bike parking on the station sites;
- Enhanced existing infrastructure with ADA-compliant, well-shaded sidewalks;
- Seamlessly coordinated and timed transfers for public transit;
- Coordinated taxi, Transportation Network Companies (TNC) and ridesharing applications;

EXHIBIT 7.0: USING HIGH-SPEED RAIL TO SHIFT LOCAL VEHICLE MILES TRAVELED



- Convenient pick-up and drop-off locations near the stations; and
- Safe, shaded parking within an easy walk of the station entrance.

We plan to be flexible with station sites so that future advances in technology can be accommodated at stations. Each station will have a mix of these solutions based on the existing conditions and local context. We will also work closely with local jurisdictions as autonomous vehicle technology advances.

We will implement transportation solutions as appropriate in different station locations, respecting the nuances of each market.

Building Toward Tomorrow

We've used the best climate science to understand how the coming chaos could affect our system and our customers. We convened an internal committee to review these projections and identified ways to streamline review and use of climate data in our day-to-day work.

We've already incorporated climate change hazards as another consideration in our design requirements and risk management process, so that we can be sure these risks are adequately assessed and responded to across the project.

Supporting California's Climate Goals

The California high-speed rail project is focused on reducing GHG and mitigating climate change, but the Authority is also concerned with preparing for how climate change can impact our project.

Our project is part of a resilient California. The system will be able to safely and quickly move millions, even in the event of power outages. Accessible stations, serving as hubs for and bridges within station neighborhoods, will rely on a range of modes (walking, biking). We are using several robust resilience frameworks and conversations with station communities to prepare for the future and make our project as resilient as possible. We are developing a climate policy that details our commitment to climate change mitigation and adaptation.

> "And you know as well as I do, when people can take a train from point A to point B — conveniently and faster than you can drive your vehicle — they take the train." — *President Joe Biden*

Changing Perceptions of Public Transportation

Public transportation is a vital utility for our communities, but it is not always perceived as core to our lives. To change the perception of public transportation, we need it to be focused on the user: safe, efficient, accessible and competitive with other modes of travel. A safe, convenient and comfortable system is part of what the high-speed rail system will do for the transportation network in California. The project provides a competitive and unique interregional option while also improving local transportation around our station sites and with our regional partners.

Partnerships with stakeholders at Los Angeles Union Station and San José's Diridon Station illustrate the promise of high-speed rail. The Authority is contributing funding and working with local stakeholders to make physical improvements to the stations and create multimodal hubs for local communities in advance of high-speed rail service coming online.

Restoring Communities

The greatest promise of the system is its potential to focus growth and city-building in California. Station-area plans and other local land-use plans are crucial documents that set the stage for future compact, mixed use city building. We have been working in partnership with cities throughout the state to develop these plans and look forward to delivering stations.

PHOTO: Work continues on Construction Package 2-3 at South Avenue in Fresno County.

GRI CONTENT INDEX

This index allows GRI report users to quickly find the disclosure information they are seeking. The GRI indicators listed correspond to the information that the Authority's stakeholders noted was important to disclose. Consistent with the majority of GRI reports, the information presented here was not subject to third-party verification or external assurance, except for the methodology used to estimate future greenhouse gas (GHG) emissions reductions and air pollutant emissions co-benefits, which has been reviewed by the California Air Resources Board. The Authority may consider verification or external assurance of future reports as the high-speed rail program advances.

General Standard Disclosures

Organizational Profile Disclosures	Section	Page(s) of Associated Section
102-1 Name of the organization	Who We Are	1
102-2 Activities, brands, products, and services	Who We Are	1
102-3 Location of headquarters	Who We Are	1
102-4 Location of operations	Who We Are	1
102-5 Ownership and legal form	Who We Are	1
102-6 Markets served	Who We Are	1
102-7 Scale of the organization	Our Team; Highlights	3, 19
102-8 Information on employees and other workers	Our Team	3
102-9 Supply chain	Our Supply Chain	3
102-10 Significant changes to the organization and its supply chain	Our Team	3
102-11 Precautionary Principle or approach	Management, Resilience and Adaptation	69
102-12 External initiatives	External Frameworks and Assessments	11
102-13 Membership of associations	Working With Industry Partners	12

STRATEGY	Section	Page(s) of Associated Section
102-14 Statement from senior decision-maker	Message from the CEO	vi

ETHICS AND INTEGRITY	Section	Page(s) of Associated Section
102-16 Values, principles, standards, and norms of behavior	Our Values; Our Sustainability Priorities and Commitments	2, 6

GOVERNANCE	Section	Page(s) of Associated Section
102-18 Governance structure	Our Governance Structure	2

STAKEHOLDER ENGAGEMENT	Section	Page(s) of Associated Section
102-40 List of stakeholder groups	Engaging Communities	80
102-41 Collective bargaining agreements	Worker Protections	33
102-42 Identifying and selecting stakeholders	Engaging Communities	80
102-43 Approach to stakeholder engagement	Engaging Communities	80
102-44 Key topics and concerns raised	Engaging Communities	80

REPORTING PRACTICES	Section	Page(s) of Associated Section
102-45 Entities included in the consolidated financial statements	About this Report	2
102-46 Defining report content and topic boundaries	Materiality Assessment	13
102-47 List of material topics	Materiality Assessment	13
102-48 Restatements of information	About this Report	1
102-49 Changes in reporting	About this Report	1
102-50 Reporting period	About this Report	1
102-51 Date of most recent report	About this Report	1
102-52 Reporting cycle	About this Report	1
102-53 Contact point for questions regarding the report	Contact	3
102-54 Claims of reporting in accordance with the GRI Standards	About this Report	1
102-55 GRI content index	GRI Index	91
102-56 External assurance	About this Report	1

Specific Standard Disclosures

GRI Standard	Disclosure	Section	Page(s)	Omission
Economic Performance (2016)	201-4 Financial assistance received from government	Financial Responsibility; Performance (Economic Development and Governance)	22, 98	NO
Indirect Economic Impacts (2016)	203-1 Infrastructure investments and services supported	Economic Development and Governance; Performance (Economic Development and Governance)	19, 98	NO
	203-2 Significant indirect economic impacts	Economic Development and Governance; Performance (Economic Development and Governance)	19, 98	NO

GRI Standard	Disclosure	Section	Page(s)	Omission
Procurement Practices (2016)	204-1 Proportion of spending on local suppliers	Fostering Diversity and Equal Opportunity; Performance (Economic Development and Governance)	31, 98	NO
Energy (2016)	302-1 Energy consumption within the organization	Highlights; Energy Use in Construction; Energy Use in Authority Offices; Quantification Methodologies; Performance (Energy and Emissions)	37, 39, 40, 97, 99	NO
Water and Effluents (2018)	303-3 Water withdrawal	Conserving Water Resources	51	NO
Biodiversity (2016)	304-3 Habitats protected or restored	Managing Land Use	54	NO
Emissions (2016)	305-1 Direct (Scope 1) GHG emissions	Highlights; Reducing GHG Emissions; Reporting Actual and Avoided Emissions; Reducing and Managing GHG Emissions in Delivery; Quantification Methodologies; Performance (Energy And Emissions); Endnotes	37, 41, 42, 43, 97, 99, 105	NO
	305-2 Energy indirect (Scope 2) GHG emissions	Highlights; Reducing GHG Emissions; Reporting Actual and Avoided Emissions; Reducing and Managing GHG Emissions in Delivery; Quantification Methodologies; Performance (Energy And Emissions); Endnotes	37, 41, 42, 43, 97, 99, 105	NO
	305-3 Other indirect (Scope 3) GHG emissions	Highlights; Reducing GHG Emissions; Reporting Actual and Avoided Emissions; Reducing and Managing GHG Emissions in Delivery; Quantification Methodologies; Performance (Energy And Emissions); Endnotes	37, 41, 42, 43, 97, 99, 105	NO
	305-5 Reduction of GHG emissions	Reducing GHG Emissions	41	NO
	305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	Reducing GHG Emissions; Protecting Air Quality During Construction	41, 47	NO
Effluents and Waste (2016)	306-2 Waste by type and disposal method	Recycling Waste Responsibly	64	NO
Environmental Compliance (2016)	307-1 Non-compliance with environmental laws and regulations	Effective Governance	20	NO
Supplier Environmental Assessment (2016)	308-1 New suppliers that were screened using environmental criteria	Engaging Suppliers	33	NO
Employment (2016)	401-1 New employee hires and employee turnover	Our Team	3	YES

GRI Standard	Disclosure	Section	Page(s)	Omission
Occupational Health and Safety (2018)	403-9 Work-related injuries	Ensuring Health, Safety and Security; Performance (Worker Health and Safety, Injury Rate); Endnotes	66, 103, 105	NO
	403-10 Work-related ill health	Ensuring Health, Safety and Security; Performance (Worker Health and Safety, Injury Rate)	66, 103	NO
Training and Education (2016)	404-1 Average hours of training per year per employee	Our Team	3	YES
Diversity and Equal Opportunity (2016)	405-1 Diversity of governance bodies and employees	Our Team	3	YES
Local Communities (2016)	413-1 Operations with local community engagement, impact assessments, and development programs	Station Communities and Ridership	73	NO

Additional Disclosures

During the 2018 materiality assessment, the Authority identified a number of material topics that are not covered by available GRI Standards and disclosures. The location of this information in the report is summarized below.

Material Topic	Section	Page(s)
Emergency and disaster recovery planning	Materiality Assessment; Management, Resilience and Adaptation, Climate Adaptation Planning	13, 69, 70
Enhancing public space and amenities	Materiality Assessment; Enhancing Public Space and Amenities	13, 74
Land and water pollution*	Materiality Assessment	13
Life cycle approach	Materiality Assessment; Life Cycle Approach	13, 62
Noise and vibration	Materiality Assessment; Mitigating Noise and Vibration	13, 79
Resilience and adaptation, incl. extreme weather	Materiality Assessment; Management, Resilience and Adaptation, Climate Adaptation Planning	13, 69, 70
Third-party assessment	External Frameworks and Assessments; Materiality Assessment	11, 13
Transportation hub activation and mass/ active transportation	Materiality Assessment; Transportation Hub Activation and Mass/Active Transportation	13, 76

*Note: Material topic defined as "Air, land and water pollution"; air pollution is covered by GRI indicator 305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions.

GLOSSARY

Biodiesel: A diesel replacement fuel made from new and used vegetable oils or animal fats that have been chemically reacted with an alcohol.

Black Carbon: A component of fine particulate matter. It is produced from the incomplete combustion of fossil fuels and biomass burning, particularly from older diesel engines and forest fires. Black carbon warms the atmosphere by absorbing solar radiation, influences cloud formation and darkens the surface of snow and ice, which accelerates heat absorption and melting. Diesel particulate matter emissions are a major source of black carbon and are also toxic air contaminants.

CALGreenCode: The California Green Building Standards Code is Part 11 of the California Building Standards Code, and defines and encourages sustainable construction practices for residential and non-residential buildings.

Carbon Offsets: Emissions reductions that have been made by an entity and retained or sold to a different entity that seeks to reduce its impact.

Criteria Air Pollutants: Six common air pollutants regulated by the US Environmental Protection Agency due to their potentially harmful human health and environmental impacts. These pollutants include particulate matter, ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides and lead.

Direct GHG Emissions: Emissions from sources that are owned or controlled by the reporting entity.

Indirect GHG Emissions: Emissions that are a consequence of the activities of the reporting entity, but occur at sources owned or controlled by another entity.

Disadvantaged Community: Distinguished by higher risk of environmental hazards and/or lower socioeconomic status. Disadvantaged communities are the target of some high-speed rail programs. Criteria the California Environmental Protection Agency uses to identify disadvantaged communities include but are not limited to:

- Areas disproportionately affected by environmental pollution and other hazards that can lead to negative public health effects, exposure or environmental degradation.
- Areas with concentrations of people that are of low income, high unemployment, low levels of home ownership, high rent burden, sensitive populations, or low levels of educational attainment.

Environmental Product Declaration (EPD): A standardized statement summarizing environmental impacts throughout the product life cycle. EPDs may include information about global warming potential, ozone depletion, acidification, eutrophication, smog or other environmental impact areas.

Greenhouse Gas (GHG): Greenhouse gases trap energy in the atmosphere and are the primary driver of climate change and global warming. The United Nations Intergovernmental Panel on Climate Change (IPCC2) defines six gases under this category: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs – a family of gases), fluorocarbons (PFCs – another family of gases) and sulfur hexafluoride (SF_6). Carbon emissions are measured in the unit "carbon dioxide equivalent" (CO_2e) and expressed in metric tonnes ($MTCO_2e$).

Leadership in Energy and Environmental Design (LEED®): LEED® certification provides independent, third-party verification that a building, home or community was designed and built using strategies aimed at achieving high performance in the following key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

Net-Zero Energy: Refers to a facility or system that produces as much energy as it uses over the course of a year (or other defined period).

Particulate Matter (PM): An air pollutant made up of extremely small particles and liquid droplets. Small particles 10 micrometers (PM10) in diameter or less can be inhaled into the lungs, causing serious respiratory and circulatory health effects. Smaller particles of 2.5 micrometers (PM2.5) in diameter or less are also a significant contributor to haze. A component of particulate matter called black carbon can disrupt climate patterns.

Photovoltaic (PV): Technology using semiconductor material to convert sunlight into electricity. Power is produced when sunlight strikes the semiconductor material and creates an electric current.

Post-consumer Recycled Content: A material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item.

Pre-consumer Recycled Content: Material diverted from the waste stream following an industrial process that is capable of being reclaimed within the same process.

Reactive Organic Gases: Carbon-based gases (excluding carbon monoxide and carbon dioxide) that can react with other chemicals and light to produce smog and ozone.

Recycling: Material recovery from the solid waste stream for use in the manufacture of new products.

Renewable Energy: Energy resources such as wind power or solar energy that can be produced indefinitely without being depleted.

Senate Bill 375 (Steinberg, 2008): SB375 sets regional targets for greenhouse gas emissions reductions and requires cities and counties to address GHG reductions through a Sustainable Communities Strategy in the regional transportation plan.

Sustainability: The capacity to endure. Sustainable thinking recognizes how current decisions affect the capacity of current and future generations to lead healthy and rewarding lives.

Sustainable Transportation: Modes of transportation that does not rely on the use of fossil fuels.

Vehicle Miles Traveled (VMT): The total number of miles traveled by vehicles in a given geographic boundary over a specific time.

QUANTIFICATION METHODOLOGIES

Values reported in this Sustainability Report are quantified according to the following methodologies:

Energy

Office energy consumption is estimated from the number of Authority employees and consultants, along with the average energy intensity and occupant density of LEED®-certified buildings. Electricity consumption is converted from kilo-BTU (kBTU) to kilowatt hours (kWh) using a conversion factor from EPA Climate Leaders GHG Inventory Protocol, Appendix 2: Unit Conversions.

Fuel consumption is tracked for construction activities and is converted from gallons to gigajoules (GJ) using conversion factors from EPA Climate Leaders GHG Inventory Protocol, Appendix 2: Unit Conversions.

GHG Emissions

We take the operational control approach to quantifying GHG emissions, and we have adopted 2015 as the baseline year for reporting on emissions changes over time. GHG emissions are quantified using methodologies consistent with the GHG Protocol Corporate Standard, ISO 14064, California Air Resources Board methodologies and U.S. Environmental Protection Agency (EPA) models. All relevant greenhouse gases are included.

Scope 2 GHG emissions are calculated from annual electricity consumption, and emissions factors sourced from the U.S. EPA (2016) and eGRID for California (CAMX).

Scope 3 emissions from contractor vehicles are calculated using EMFAC2011 emissions rates from the California Air Resources Board.

Scope 3 emissions avoided through materials recycling are calculated using the amount of construction materials recycled and the EPA Waste Reduction Model (WARM).

Anticipated GHG emissions reductions during systems operations are calculated according to the methodology available online at: ***www.arb.ca.gov/cci-resources***.

All greenhouses gases relevant to the activities are included (CO_2, CH_4, N_2O). Reductions are reported relative to a scenario without high-speed rail, rather than relative to a baseline year. Emissions reductions occur as a result of the service provided by high-speed rail, so are classified as Scope 3 emissions reductions.

Air Pollutant Emissions

Air pollutant emissions from construction vehicles are calculated using the methodology and EMFAC2011 emissions rates from the California Air Resources Board.

Criteria pollutants are the most significant air pollutants related to human health and environmental impacts. Other categories of air emissions, such as persistent organic pollutants, volatile organic compounds and hazardous air pollutants, are not quantified.

Water

Office water consumption is estimated from the number of Authority employees and consultants, along with the average water intensity and occupant density of LEED®-certified buildings. Construction water consumption is tracked and reported.

Waste

Waste and recycling information is collected from contractors and tracked using an online data tool. Waste generation and disposal weights are recorded from records received from recycling and waste treatment facilities. Diversion rates are calculated by dividing the weight of materials diverted (through recycling, reuse and stockpiling) by the total materials weight.

Job Creation

Hours worked data come from certified payroll submissions while the number of workers is based on monthly submittals from prime contractors in compliance with the National Targeted Hiring Initiative (NTHI).

PERFORMANCE

Economic Development And Governance

Funding and Investment ($ In Billions)

Funding and investments	FY15-16	FY16-17	FY17-18	FY18-19	FY19-20
Total Invested	$2,306,018,994	$3,586,648,139	$4,766,182,047	$5,719,470,268	$7,237,392,348
Investment in California Firms/ Workers	94%	97%	97%	98%	98%
Percent of Authorized Federal Funds Expended	48%	73%	73%	73%	73%*

*The Authority has received $2.55 billion of the $3.48 billion in federal funds anticipated for the project. The remaining $929 million of FY10 grant agreement funds is unexpended at this time.

Dispatched Workers by Construction Package

Dispatched Workers	2015	2016	2017	2018	2019	2020
Dispatched Workers – CP 1	214	1,089	1,239	1,716	1,872	2,238
Dispatched Workers – CP 2-3	-	257	318	750	1,060	1,951
Dispatched Workers – CP 4	-	106	142	293	648	1,205

Construction Hours by Construction Package

Construction hours	2015	2016	2017	2018	2019	2020
Construction Hours – CP 1	83,154	666,033	539,547	1,538,063	1,884,039	2,484,311
Construction Hours – CP 2-3	-	59,638	60,032	297,334	487,560	1,213,608
Construction Hours – CP 4	-	8,219	8,627	47,037	158,151	496,902

Creating Opportunities for Disadvantaged Workers and Fostering Diversity: Worker Summary

Workers	2015	2016	2017	2018	2019	2020
Construction Workers Dispatched	214	1,525	1,699	2,759	3,580	6,243*
Disadvantaged Workers Dispatched	-	174	149	402	426	449**

*As of June 2021.
**As of May 2021.

Small and Disadvantaged Business Summary

Small and disadvantaged businesses	2015	2016	2017	2018	2019	2020
Small Business Participants – Total	318	417	427	474	530	626*
Disadvantaged Business Enterprises (DBE)	100	130	139	157	172	201*
Disabled Veteran Business Enterprises (DVBE)	36	49	51	52	56	70*
Small Business Located in Disadvantaged Communities	-	96	115	129	156	129
Local Procurement (U.S.-based businesses)	Nearly 100%	Nearly 100%	Nearly 100%	Nearly 100%	Nearly 100%	Nearly 100%
Expenditures in Disadvantaged Communities	-	52%	Nearly 60%	54%	50%	55%

*As of May 2021.

Energy And Emissions

Energy Consumption

TYPE	2015	2016	2017	2018	2019	2020
Office Energy Consumption* (Megawatt hours)	1,036	1,287	1,431	1,908	1,908	1,954
Off-Road Diesel Consumption (Gallons)	26,816	172,684	276,556	292,662	443,935	694,029
On-Road Diesel Consumption (Gallons)	5,859	26,665	54,524	115,495	241,737	342,392
On-Road Gasoline Consumption (Gallons)	116,947	203,304	383,994	333,317	598,208	556,952
Energy Content of Fuel Consumed (Gigajoules)	37,000	55,800	98,846	103,385	178,725	224,352

*Office energy consumption is estimated for the total number of Authority staff and RDP staff using 2015 average EUI and occupancy rates for LEED office buildings in California. No changes between 2018 and 2019 are recorded as total number of employees and RDP staff is unchanged between the years.

Projected Annual GHG Emissions Avoided For Phase 1 ($MMTCO_2e$)*

YEAR	MEDIUM	HIGH
2030	.075	.075
2040	1.54	1.88
2050	1.69	2.06
2079	2.20	2.68

* The greenhouse gas emissions reduction scenarios reflect the ridership range expressed in the 2020 Business Plan. Ridership is expressed as both a medium case and a 75% percentile, which provides the medium and high emissions scenarios. The Authority calculates emissions reductions for the initial 50-year span of operation for well-to-wheels for Phase 1 (2029-2079, per the 2020 Business Plan). These reductions are reported at intervals corresponding to state reduction milestones (2030, 2050), program milestones (2040), and at year 50 (2079).

Projected Cumulative GHG Emissions Avoided: Tailpipe ($MMTCO_2e$)*

YEAR	LOW	HIGH
2030	.12	.12
2040	8.63	10.51
2050	21.39	25.97
2079	65.93	79.98

* The greenhouse gas emissions reduction scenarios reflect the ridership range expressed in the 2020 Business Plan. Ridership is expressed as both a medium case and a 75% percentile, which provides the medium and high emissions scenarios. The Authority calculates emissions reductions for the initial 50-year span of operation (2029-2079, per the 2020 Business Plan). These reductions are reported at intervals corresponding to state reduction milestones (2030, 2050), program milestones (2040), and at year 50 (2079).

Projected Cumulative GHG Emissions Avoided: Well-to-Wheels*

YEAR	Medium	HIGH
2030	.16	.16
2040	10.96	13.39
2050	27.18	33.14
2079	83.85	102.14

*For this sustainability report, we also analyzed the avoided emissions by assigning an emissions factor that illustrates the full life cycle impacts of the fuels used for transportation; electricity, gas, diesel and jet fuel. Using this analytic technique enables all fuel types to be evaluated on equal terms. For this chart, "well-to-wheels" emissions factors were obtained from GREET and applied to the fossil fuel auto and air fleet. A life cycle emissions factor was also applied to the electricity required for system operation.

Greenhouse Gas Emissions in Metric Tons of Carbon Dioxide Equivalent ($MTCO_2e$)

Emissions Source	2015	2016	2017	2018	2019	2020
Office Energy Emissions: Scope 2	307	381	344	459	432	404
Contractor Vehicle Emissions: Scope 3	1,400	4,282	6,795	8,063	9,197	17,458

Emissions Avoided Source	2015	2016	2017	2018	2019	2020
Recycling	34,401	26,096	44,567	20,833	20,319	2,349
Bookend and Connectivity*	142,519	142,519	142,519	142,519	142,519	142,519
Agricultural Easements	-	-	-	-	36,600	115,030

*Calculated for Caltrain Electrification, Central Subway, Regional Rail Connector and grade separations in Southern California. Additionally, between 2026 and 2078, Link Union Station's estimated contribution to GHG reductions is estimated to be 13.5 million MT of CO_2e. ***https://media.metro.net/projects_studies/rr/LINKUS_DEIR/3.5_ AirQualityandGlobalClimateChange.pdf***

Criteria Air Pollutant Emissions (Construction Fleet) – Emitted and Avoided (in Pounds)

Criteria Air Pollutant	2015 Emissions	2015 Emissions Avoided	2016 Emissions	2016 Emissions Avoided	2017 Emissions	2017 Emissions Avoided	2018 Emissions	2018 Emissions Avoided	2019 Emissions	2019 Emissions Avoided	2020 Emissions	2020 Emissions Avoided
NOx – Nitrogen Oxide	4,006	-49%	23,024	-51%	20,0944	-70%	27,190	-54%	42,507	-49%	50,043	-67%
ROG – Reactive Organic Gas	549	-41%	1,715	-58%	2,441	-59%	2,318	-58%	2,802	-65%	3,982	-71%
PM – Particulate Matter	341	-41%	1,082	-60%	1,467	-61%	1,964	-43%	2,374	-50%	3,775	-55%
BC – Black Carbon	254	-42%	833	-60%	1,130	-61%	1,513	-43%	1,869	-51%	2,638	-58%

Voluntary Emissions Reduction Agreements (VERA)

VERA details	2015	2016	2017	2018	2019	2020
VERA Offsets: Total Lifetime Emissions (in tons)	26	1,006	1,369	1,358	1,358	1,358
VERA Investment - $ million		9	13	13	13	13
VERA Equipment – Tractors	20	46	82	84	84	84
VERA Equipment – Trucks		104	161	162	162	162
VERA Equipment – School Bus			1	1	1	1

Natural Resources

Water Consumption (in Gallons)

Water Usage	2015	2016	2017	2018	2019	2020
Office*	1,060,560	1,317,600	1,464,480	1,952,640	1,952,640	2,000,160
Construction**	2,517,153	14,500,000	31,207,986	13,150,724 (potable) 58,927,468 (nonpotable)	10,003,936 (potable) 105,632,701 (nonpotable)	88,075,850 (potable) 211,509,340 (nonpotable)

* Office water consumption is estimated for the total number of Authority staff and RDP staff using 2015 average WUI and occupancy rates for LEED office buildings in California. No changes between 2018 and 2019 are recorded as total number of employees and RDP staff is unchanged between the years.
** 2020 Construction water consumption includes both approved and in-review water consumption data as reported by the contractors.

Habitat and Agricultural Land Preservation (in acres)

Land	Type of Preservation	2015	2016	2017	2018	2019	2020
Habitat	Preserved and Restored	400	2,000	2,510	2,680	2,349*	2,320**
Agricultural	Approved for Conservation	-	1,200	1,200	1,200	1,200	3,096
Agricultural	Secured	-	-	273	273	273	273

*By the end of 2019, 2,349 acres were under preservation, while an additional 1,296 acres are undergoing approval process with regulatory agencies for preservation & restoration.
**By the end of 2020, 2,320 acres were under preservation, while an additional 2,136 are undergoing approval process with regulatory agencies for preservation & restoration.

Sustainable Infrastructure

Recycling and Reuse (in Tons)

Material	2015	2016	2017	2018	2019	2020**
Recycled/Reused Concrete	37,000	70,414	64,489	10,301	265	108.65
Recycled/Reused Asphalt*	-	10,544	38,802	691	0	15.20
Recycled Mixed Metals	2,700	1,284	3,311	716	78	74.56
Recycled Wood	-	513	361	714	33	8.89
Recycled Organics	-	2	2,306	6,044	4,633	2085.62
Mixed Recycling	3,500	4,088	11,063	2,936	393	714.74
Materials Landfilled	360	327	326	2,948	804	2,698

Recycling Details	2015	2016	2017	2018	2019	2020**
Recycled Concrete and Metal	100%	99.9%	100%	100%	100%	100%
Recycled Other Materials	91%	98.2%	99.4%	77.9%	86.3%	51%
Overall Recycling Rate	-	99.6%	99.7%	87.9%	87.0%	53%

* Contractors have not indicated any asphalt waste generated in 2020.
** Materials data have been provided by the contractors to the Authority working on four construction packages. At time of report publication, some records are still being validated for accuracy. If necessary, final updated figures will be published in the next Sustainability Report.

Worker Health and Safety, Injury Rate

Injury Rate	2015	2016	2017	2018	2019	2020	State Benchmark*
Construction Package 1	3.56	1.12	1.76	1.59	1.78	1.60	
Construction Package 2-3	0	0	0	0.29	1.00	2.18	
Construction Package 4	N/A	N/A	0	0	1.47	1.09	
Overall Weighted Average	2.09	0.54	1.1	0.97	1.38	1.77	4.5
Lost Days Rate							
Construction Package 1	0	0.37	0.7	0.4	0.3	0.80	
Construction Package 2-3	0	0	0	0	0	0.00	
Construction Package 4	N/A	N/A	0	0	0	0.00	
Overall Weighted Average	0	0.18	0.44	0.22	0.11	0.24	2.8
Fatalities							
Total Fatalities	0	0	0	0	0	0	55

* California Heavy and Civil Construction Industry 2016

Station Communities

Community Outreach

Event Information	2015	2016*	2017**	2018***	2019****	2020*****
Open Houses and Community Meetings	85	85	40	377	200	340 (260 virtual)
Attendees	6,000	6,000	953	15,000+	55,800+	18,800
Events in Disadvantaged Communities	130	130	15	238	87	12

* 2016 saw an increase in meetings related to construction as several sites came online. Work continued on those sites in 2017, but no new meetings were required.
** Although outreach in 2017 was ongoing, we held fewer large-scale community meetings and open houses, due to our focus on other areas of the program.
*** All reported statewide outreach (events, meetings, webinars).
**** This includes one Southern California event with an attendance of 40,000 attendees.
***** Most events took place virtually in 2020 due to COVID-19.

ENDNOTES

1 Board member diversity is not reported by age or minority group.

2 New hire and turnover rates are not reported by age group, gender or region.

3 Training hours are not reported.

4 We have not identified any significant noncompliance with environmental laws and/or regulations in 2020. Monitoring of monthly reporting has identified noncompliance with construction fleet requirements, per the Authority's contract with its design-builders. Corrective actions are underway.

5 Approximately $929 million of unexpended FY10 grant agreement funding was terminated by the Federal Railroad Administration in 2019. In June 2021, the U.S. Department of Transportation and the State of California finalized settlement negotiations to restore the $929 million dollars in federal grant funding to the project.

6 When summed, the total of the regions shown in this graphic do not equal the total benefits to the state. Exhibit 2.2 shows results for the regions only, not including the many counties in California where economic effects have taken place over this time period. For more information on the methodologies used to estimate these impacts, please see this report: ***https://hsr.ca.gov/wp-content/uploads/2021/04/Economic_Impact_Technical_Support_Document.pdf***

7 Authority Office electricity consumption is estimated based on number of Authority and Rail Delivery Partner staff working on the project in 2020.

8 "Details of the emissions reduction calculation methodology are available online at: ***https://ww2.arb.ca.gov/sites/default/files/classic/cc/capandtrade/auctionproceeds/chsra_hsr_finalqm.pdf?_ga=2.148574903.1671128837.1624544318-367035947.1612374395*** All greenhouses relevant to the activities are included (CO_2, CH_4, N_2O). Emissions are converted to metric tons of carbon dioxide equivalent (tCO_2e) using the Global Warming Potential (GWP) values published in the United Nations Intergovernmental Panel on Climate Change Second Assessment Report (IPCC SAR). Reductions are reported relative to a scenario without high-speed rail, rather than relative to a baseline year. Emissions reductions occur as a result of the service provided by high-speed rail, so are classified as scope 3 emissions reductions."

9 Scope 2 market-based emissions are quantified to be the same as location-based emissions. At this time, the Authority does not procure electricity with known attributes that differ from the grid average.

10 Water withdrawal and discharge data have been provided by the contractors to the Authority working on four construction packages. At time of report publication, some records are still being validated for accuracy. If necessary, final updated figures will be published in the next Sustainability Report.

11 Office water use is estimated based on number of Authority and Rail Delivery Partner staff working on the project in 2020.

12 LEED is a certification system that provides independent, third-party verification that a building, or community was designed and built using strategies aimed at achieving high performance in key areas of human and environmental health: location and transportation, sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

13 Material data have been provided by the contractors to the Authority working on four construction packages. At time of report publication, some records are still being validated for accuracy. If necessary, final updated figures will be published in the next Sustainability Report.

14 Reported as rate per 200,000 hours of work

15 California Heavy and Civil Construction Industry 2016

16 Fatal occupational injuries by selected characteristics, by major event or exposure. California, U.S. Bureau of Labor Statistics, 2016

17 Vision California; "Charting Our Future: Statewide Scenarios Report", May 2010. ***http://libraryarchives.metro.net/dpgtl/harvested/2010-Vision-California-charting-our-future.pdf***

California High-Speed Rail Authority

770 L Street, Suite 620, Sacramento, CA 95814 • (916) 324-1541

info@hsr.ca.gov • *www.hsr.ca.gov* • *www.buildhsr.com*

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