

Chapter 6: Implementation

A. Strategies and Objectives

B. Freight Investments

6.A. Strategies and Objectives

While the freight transportation system is the backbone of California’s economy, its unintended societal and environmental consequences are significant. As such, the implementation of the CFMP must not only focus on improving goods movement, but also on improving the quality of life for Californians.

This chapter serves as the implementation portion of the CFMP. The beginning of this chapter outlines several programs, policies, and operational improvements to support and achieve the CFMP’s seven goals and corresponding objectives identified in **Chapter 1**. Additionally, this chapter will review the freight investment strategy approach which highlights region-based strategies that clearly articulate the funding priorities for the seven core regions in California.

As described in **Chapter 1**, the CFMP goals and objectives were created through a rigorous consensus-driven process with the CFAC, which is comprised of freight leaders and stakeholders from both the public and private sectors throughout the State. This chapter builds upon that effort and identifies several strategies that are intended to help the State reach these goals and objectives. Many of these strategies are already in progress and are led by various public and private agencies and entities, while others have yet to begin.

Identifying roles, responsibilities, performance metrics, and targets assigned to these strategies have yet to be determined. These efforts will be a future endeavor considered by the CFAC and should be completed after FHWA’s approval of the CFMP. These strategies are intended to act as a starting point for discussion amongst freight stakeholders on the types of strategies to pursue to meet the seven goals of the CFMP.

Goal 1 - Multimodal Mobility

Strategic investments to maintain, enhance, and modernize the multimodal freight transportation system to optimize integrated network efficiency, improve travel time reliability, and to achieve congestion reduction.

Objective MM-1: Identify causes and solutions to freight bottlenecks

Objective also supports: Economic prosperity, environmental stewardship, safety and resiliency, connectivity and accessibility

Strategy MM-1-A: Create multimodal freight bottleneck list for priority corridors

- Eliminate bottlenecks along California’s key multimodal trade corridors. MM-1-A would begin with a quantitative identification of bottlenecks along each corridor – regardless of mode. Additionally, the analysis would identify interconnected bottlenecks, which should be treated as one large bottleneck needing a solution. Along each facility, bottlenecks could be prioritized based on factors such as congestion, reliability, and safety.

Strategy MM-1-B: Conduct alternatives analysis – Determine if the highway build-out is the best solution

- When conducting freight corridor major investment studies, include an analysis of an alternative to a highway project, such as the feasibility of a rail project or another strategic investment.

Objective MM-2: Invest strategically to optimize system performance

Objective also supports: Economic prosperity, safety and resiliency, asset management, connectivity and accessibility

Strategy MM-2-A: Identify the most congested freight corridors and facilities; prioritize for improvement

- Using a common set of performance measures, identify the State’s most congested freight corridors. Once the initial quantitative analysis is complete, this strategy could employ a GIS-driven Jenks Natural Breaks Classification to identify the most congested segments. When this process is completed, overlay the Caltrans freight project list and identify nearby freight facilities impacted by (or potentially causing) the congestion.

Strategy MM-2-B: Conduct dedicated truck lane feasibility study

- Investigate the feasibility of developing dedicated freight lanes, including truck-only toll or truck bypass lanes. Separating trucks from automobile traffic may reduce congestion, especially near border crossing areas. If tolls become a reliable source of funding, revenues from tolling could systematically be reinvested to improve transportation infrastructure facilities and mass transit systems that improve traffic flows and minimize traffic conflicts. Dedicated freight lanes may reduce congestion and bottlenecks, enhance access and mobility, contribute to reliability and efficiency, reduce environmental impacts, facilitate intermodal integration; and - most importantly - enhance safety by separating trucks from passenger cars, thereby reducing traffic conflicts, related congestion, and maximizing the efficiency of freight movement.

Strategy MM-2-C: Explore variable tolling for passenger vehicles and trucks to maximize peak capacity

- Conduct a feasibility study to determine the viability of the identified congested corridors (MM-2-A) and bottlenecks (MM-1-A) for a variable tolling pilot project. By varying toll prices based on congestion levels, Caltrans could use economics as a demand management tool. Effectively, tolls may allow passenger and/or freight vehicles to purchase travel reliability within the corridors.

Objective MM-3: Develop, manage, and operate an efficient, integrated freight system

Objective also supports: Economic prosperity, environmental sustainability, safety and resiliency, and asset management

Strategy MM-3-A: Implement detection on priority corridors to identify problem areas across modes, particularly targeted to truck data

- Evaluate the existing ITS network, identify system gaps, determine priority improvements, and develop an implementation strategy. Valuable information regarding truck trips and techniques to improve freight efficiencies can be gained using roadside technology. Caltrans and its partners should support deployment of truck trip planning software and technology such as real-time traveler information systems, marine terminal appointment and reservation systems, load matching at inland hubs, and truck stop reservation systems. By integrating ITS into rest areas, traffic information can be pushed to travelers providing smart truck parking and/or reservation systems.

Strategy MM-3-B: Construct railroad grade separations at high volume roadway crossings where feasible; prioritize crossings that facilitate the movement of trucks

- Develop a statewide inventory of priority grade separation locations, estimate the cost of construction, quantify all eligible funding available for constructing grade separations, identify the funding gap, develop an implementation strategy, allocate and leverage State and local freight funds, and advocate for additional federal and private funding.

Strategy MM-3-C: Implement systems management approach and active traffic management (ATM) technologies to support efficient and safe freight operations

- Develop an ATM plan to improve trip reliability, safety, and throughput of the surface transportation system by deploying operational strategies that dynamically manage and control travel and available capacity, based on prevailing and anticipated conditions. Examples of ATM technologies: adaptive ramp metering, adaptive traffic signal controls, dynamic lane reversals, shoulder lanes, and speed limits.

Strategy MM-3-D: Expand freight travel information availability

- Broadcast freight travel information widely to the trucking community. This could include the expansion of the Smart Truck Parking (STP) pilot along I-5. Similarly, Caltrans could develop a program to share real-time traffic data with carrier company dispatchers and increase the number of dynamic messaging signs statewide.

Strategy MM-3-E: Give priority in the freight plan to projects implementing state-of-the-art and demonstration technologies

- Increase the focus on pilot and demonstration projects to help mitigate the impacts of freight travel on California's residents. Such projects could entail supply chain digitization and its integration with freight ITS. Likewise, freight mobility challenges in the State are so significant that traditional improvements alone are not going to meet future challenges.

Strategy MM-3-F: Support pilot projects for autonomous truck platooning both on open road and in transition zones

- Implement pilot projects, such as autonomous truck platoons, as a potential part of a future solution. As the magnitude of future freight challenges continue to grow in California, traditional roadway projects will not be able to keep up with the demand. However, to be successful, these pilot projects must take place both in rural and urban corridors.

Strategy MM-3-G: Coordinate with other states and regions to improve multi-jurisdictional freight corridors to reduce delay, increase speed, improve reliability, and improve safety:

- Lead the development of a multi-state/multi-jurisdictional freight group under the Western Association of State Highway and Transportation Officials (WASHTO) umbrella. Other AASHTO regions have organized and regularly convene these groups as a vehicle to secure federal discretionary funding on multi-jurisdictional freight projects.

Objective MM-4: Identify causes and solutions to freight rail network improvements bottlenecks

Objective also supports: Economic prosperity, environmental stewardship, healthy communities, safety and resiliency, connectivity and accessibility

Strategy MM-4-A: Identify freight rail projects and funding strategies that create freight rail efficiencies

- Work with seaports, terminal operators, rail carriers, shippers, regional agencies, and communities to support efforts to improve rail operational efficiency through practices such as technology improvements, facilitation of longer trains, and partnerships with Class I railroads to implement mainline improvements. This action will require investment leveraging and is suitable for public-private partnerships.

Strategy MM-4-B: Identify projects that reduce freight/passenger rail conflict

- Invest in shared rail corridor improvements to minimize delay to both freight and passengers. In most cases, the Class I corridors in California are owned by either the UPRR or BNSF, but in some cases, the rail infrastructures are owned by public entities, such as the Alameda Corridor Transportation Authority (ACTA), Los Angeles- San Diego- San Luis Obispo (LOSSAN), and Caltrain. Mutual solutions, such as double tracking in key areas, may create win-win scenarios. The focus should be to minimize conflicts and delay in high-priority corridors. Further discussion of freight and passenger rail conflicts and opportunities is included in the California State Rail Plan.

Objective MM-5: Identify freight rail network operational improvements and mode shift options

Objective also supports: Economic prosperity, environmental stewardship, healthy communities, safety and resiliency, asset management, connectivity and accessibility

Strategy MM-5-A: Support short line railroad improvements through infrastructure upgrades and advanced technologies

- Short line railroads are often overlooked as transport solutions. This strategy would develop a short line rail improvement plan to encourage track upgrades, industrial rail access improvements, advanced technologies, and clean alternative energy considerations to improve system efficiency (increase speeds, reduce emissions), and to promote cost-effective shifts of truck to rail. It would also assist shippers in obtaining access and improved services through development of new rail spurs.

Strategy MM-5-B: Support tax credits and/or loan programs for short line railroads

- The State of California could consider a state tax credit or loan program to help offset the maintenance and expansion costs of short line railroads. These costs often exceed the financial capacity of short lines, and as a consequence, over the long-term service degrades.

Strategy MM-5-C: Preservation of rail lines and rail right-of-way for potential future capacity

- Develop a program that mirrors the National Trail System’s railbanking program.

Goal 2 - Economic Prosperity

Grow the economic competitiveness of California’s freight sector through increased system efficiency, productivity, and workforce preparation.

Objective EP-1: Promote economic development by investing in freight infrastructure projects and operational improvements

Objective also supports: Multimodal mobility, safety and resiliency, asset management, connectivity and accessibility

Strategy EP-1-A: Reduce transportation costs by eliminating bottlenecks and recurrent delay, making operational improvements, and accelerating rapid incident response on priority freight corridors

- Enhance existing incident management program to clear incidents quickly and to re-route traffic when necessary. These tactics should be employed with new operational ATM improvements detailed in Strategy MM-3-C.

Strategy EP-1-B: Collaborate with freight industry to identify critical projects and develop strategic investment strategies, including public-private partnerships

- Identify mega-projects that are critical to the State’s economy but cannot be completed through existing funding streams – either because of cost or eligibility issues. Work with the CFAC to develop these projects and identify/position them for public-private partnerships.

Strategy EP-1-C: Create incentives to attract private investment in innovative, transformative, new technological goods movement systems through pilot programs or major emerging projects:

- Advocate for incentive programs that position the state as a natural choice for private sector transportation innovation projects

Strategy EP-1-D: Measure throughput of pass-through freight and identify friction points

- Undertake a commodity flow study to understand how pass-through cargo traverses the State. Combine this analysis with freight congestion and bottleneck analysis, the cost of pass-through freight can be measured. California serves as a global gateway for the United States. While this has resulted in significant economic growth for the State, the volume of freight moving through California is significant – as well as the corresponding negative externalities. To mitigate these impacts, Caltrans can undertake a commodity flow study to understand how pass-through cargo traverses the State. When this analysis is combined with freight congestion and bottleneck analysis, the cost of pass-through freight can be measured.

Strategy EP-1-E: Advocate for additional funding appropriations for freight infrastructure investments and operational improvements

- Actively engage and encourage Caltrans public and private sector partners to advocate for increased freight funding levels and for project level appropriations. When appropriate, Caltrans should actively participate and champion these efforts.

Objective EP-2: Promote freight projects that enhance economic activity, freight mobility, unique capabilities, reliability, system resiliency, and global competitiveness

Objective also supports: Multimodal mobility, safety and resiliency, connectivity and accessibility

Strategy EP-2-A: Encourage the creation of regional freight advisory committees at regional/county transportation agencies

- Encourage/support the development of regional Freight Advisory Committees designed to support each region’s perspective freight issues and to feed issues to the CFAC.

Strategy EP-2-B: Support funding to completion and then funding and partnership with GOBiz to implement CSFAP Action Item 6.A. “Competitiveness Data Development and Utilization.”

- There is a need for data and information to support the freight transportation system’s competitiveness and to set the State’s competitiveness target or targets. The type of information needed includes a suite of quantitative metrics to measure and track California’s freight industry competitiveness, analyses of the costs and benefits of State actions, and an ongoing benchmarking of the State’s freight industry

Objective EP-3: Increase workforce availability and training

Objective also supports: Connectivity and accessibility

Strategy EP-3-A: Identify and actively advocate for workforce mobility, accessibility, and training needs and job training programs through collaboration with the freight industry and California's higher education system

- Facilitate an ongoing dialog between the CFAC and the California Workforce Development Board. By creating a two-way dialog among State agencies, it can help inform the future workforce development programs focused on the freight industry. Undertake a series of mobility studies to uncover gaps in workforce accessibility. This effort could be paired with travel demand management strategies to reduce the impact of passenger vehicles on freight flows near major logistics centers.
- Expand the availability of training programs or degrees at the community college and university level, such as but not limited to: logistics, global supply chain management, supply chain technology, and logistics management.
- Encourage tech transfer from California's world-class research universities to support freight technology development. New discoveries can be made by continuing to fund cutting-edge sustainable freight transportation research from the talented, high-skilled knowledge base that exists in California through programs such as UC-Davis STEPS and USC METRANS, for example.

Objective EP-4: Promote the State's competitive logistics advantages

Objective also supports: Multimodal mobility, connectivity and accessibility

Strategy EP-4-A: Identify incentives for the retention, expansion, and new development of logistics industry facilities (warehouses)

- Develop a comprehensive assessment of available State and local economic development incentives. The focus of this assessment will be to evaluate the current practices of Caltrans and how they fit within the bigger picture of economic development.

EP-5: Identify the needs and gaps of the agricultural goods movement system to improve the safe and efficient movement of agricultural goods to, from, and through California

- EP-5-B: Partner with local and regional agencies' in the development of local and regional goods movement plans and studies.

Goal 3 - Environmental Stewardship

Support strategies that reduce, avoid and/or mitigate adverse environmental impacts from the freight transportation system.

Objective ES-1: Continue to integrate environmental health considerations into freight planning, development, implementation, and operations of projects as feasible

Objective also supports: Economic prosperity, safety and resiliency, and connectivity and accessibility

Strategy ES-1-A: Promote the use of sustainable pavement types that enhance the movement of goods while reducing environmental impacts

- Wherever feasible, implement the use of sustainable pavement types that reduce impacts on the environment, re-charge the State's aquifers, mitigate the negative impacts of seasonal drought, and reduce runoff.

Strategy ES-1-B: Encourage freight mode shift to rail and water to reduce VMT and GHG emissions from roadway freight transport where and when viable

- Support the State Rail Plan by prioritizing projects that promote mode shift to rail.
- Support intermodal facilities throughout the State in accordance with the State Rail Plan to create efficient mode transfer points and increased access to the rail and marine freight transportation network.

Objective ES-2: Minimize, and where possible, eliminate toxic air contaminants, criteria pollutants and GHGs emitted from freight vehicles, equipment, and operations.

Objective also supports: Safety and resiliency, economic prosperity

Strategy ES-2-A: Develop a standardized performance-based metric used for monitoring and reducing GHG emissions and criteria pollutants of freight vehicles, equipment, and operations

- Freight fleets operating from public and private organizations use differing approaches to measuring performance-based metrics for emissions. By standardizing this requirement, outcomes will remain consistent while reducing the costs incurred through labor intensive corrections and regulatory fines.

Strategy ES-2-B: Standardize medium and heavy-duty vehicle and equipment charging standards and protocols

- Promote standardized near zero and zero emission technologies, that promotes operator and public safety and avoids costs and confusion associated with having numerous charging standards. Consider lessons learned from the deployment of light-duty plug-in electric vehicle/plug-in hybrid electric vehicles. Standardized charging protocols and infrastructure can reduce costs associated with the deployment of zero-emission vehicles and accelerate the deployment of the vehicles.

Strategy ES-2-C: Decarbonize the commercial freight fleet

- Help establish proof of concept of zero-emission commercial freight vehicles by employing such technology where feasible within the State of California's fleet.

- While transitioning to a fully, renewable energy grid, facilitate access to low-carbon fuel options such as renewable diesel in the interim.

Strategy ES-2-D: Explore decarbonization of last mile delivery to decrease the freight system’s impact on air quality in dense urban environments

- Work with local governments to encourage strong parking pricing programs in the urban core to limit competition for curbside commercial freight parking; the intent of this action is to reduce VMT and emissions generated by “cruising for parking” and engine idling activities. This promotes better curb space utilization.
- Consider utilizing congestion pricing in dense urbanized areas to create low-, or zero-emission zones to manage demand for cleaner last mile delivery.
- Support research and funding for emerging forms and infrastructure for low-carbon last mile delivery, such as cargo bike delivery programs and drones.
- Support research on emerging efficient forms of last-mile delivery management, such as various distribution warehouse location models to reduce VMT and trips; off-hour deliveries; consolidation centers; efficient siting of lockers and pickup points. Create a set of statewide development standards for urban areas to proactively facilitate more efficient last-mile deliveries. These standards would likely recommend the developer considers any of the following, for example: building a centralized delivery location, secure storage room, lockers, enforcement techniques and a smart loading dock appointment system.

Objective ES-3: Promote land use planning practices that prioritize mitigation of negative freight project impacts upon the environment.

Objective also supports: Healthy communities

Strategy ES-3-A: Support freight technology development and fuels data collection and analysis

- Encourage better data collection methods and coordination efforts with partner agencies with robust resources dedicated to this effort, such as the California Energy Commission (CEC), California Air Resources Board (CARB), research institutes such as the University of California System, and the Transportation Research Board (TRB). This work will help uncover best practices and the pros and cons of various technologies to inform policy makers. Innovations in the freight industry are closely tied to the private sector and their protected data; thus, strong public-private, as well as interagency collaboration, is necessary to gain adequate insight to the industry’s research and development of sustainable technologies and clean fuels.

Strategy ES-3-B: Promote the use of low-carbon renewable fuels development and support fuel efficiency and emissions reduction requirements for moving goods to support prosperity by sustainable means, by decreasing GHG consumption while increasing goods movement

- Encourage the development and availability of renewable energy resources and low-carbon fuel to result in enhanced low-emission diesel requirements.

Strategy ES-3-C: Promote land uses that are conducive to protecting the environment while supporting freight operations

- Work with local economic development and planning agencies to identify locations along rail spurs and inland waterway routes to create shovel-ready development opportunities for freight intensive uses. When siting future freight uses in these areas, focus should be given to locating the highest and best use of these strategic locations.
- Promote mixed-use development, support consolidation centers and proximate and co-location of producers and shippers to reduce freight movement. Work with local governments and its land use agencies to identify various freight efficient land use decisions. To accomplish this strategy, changes to long-range planning documents and current planning (zoning) will have to be considered. Encourage the development of urban consolidation centers.
- Encourage land use planning that provides an adequate supply of housing for the freight workforce, and plan for housing that is proximate to freight related job centers. Related to strategy EP-3-B.
- Collaborate with CARB to utilize their freight handbook document that identifies best practices for the siting, design, and operation of freight facilities that minimizes exposure to air toxins, incorporates the use of clean technologies and alternative fueling infrastructure, and maximizes the capacity of transportation infrastructure.

Strategy ES-3-D: Create incentives to attract private investment in innovative, transformative, new technological goods movement systems through pilot programs or major energy projects

- Advocate for incentive programs that position the State as a natural choice for private sector transportation innovation projects. s

Strategy ES-3-E: Incentivize freight projects that minimize GHG, criteria pollutants, and other emissions

- Increase the importance of minimizing emissions as part of future freight project evaluation processes. This could be accomplished by putting more weight on performance measures that align with the air quality State Implementation Plan

Goal 4 - Healthy Communities

Enhance community health and well-being by mitigating the negative impacts of the goods movement system across California's communities.

Objective HC-1: Prioritize social equity for freight-related projects by developing alternative methods that avoid or mitigate negative impacts on or near existing communities adjacent to high-volume freight routes and facilities

Objective also supports: Environmental Stewardship and Economic Prosperity

Strategy HC-1-A: Implement projects in freight corridors that are specifically targeted to avoiding, reducing, or mitigating freight impacts on the environment and communities

- Incorporate public health data sources when analyzing a freight project’s potential impact. Direct the Local Development Intergovernmental Review Process to request and comment on this analysis when reviewing freight projects, using a health equity lens.
- Prioritize projects that will facilitate a reduction in GHG emissions and criteria pollutants in communities disproportionately burdened by pollution, as identified using the Cal Enviro Screen.
- Strategically plan for and/or divert heavily used freight routes to alternative routes that are further removed from residential neighborhoods.
- Develop environmentally conscious and coordinated land use policies in conjunction with freight goods movement plans, e.g. to reduce conflicts by establishing buffers between industrial and sensitive land uses, influencing location and design decisions through zoning tools, preserving existing industrial land uses, and promoting context-sensitive solutions for site and building design.

Objective HC-2: Conduct meaningful outreach and coordination efforts with other agencies focused on environmental justice communities disproportionately burdened by the freight transportation system in urban areas and rural areas by identifying and documenting their needs.

Objective also supports: Environmental Stewardship

Strategy HC-2-A: Partner with metropolitan planning agencies, tribal organizations and community groups to identify conveniently located and accessible public facility venues and relevant times for hosting engaging public workshops

- Work with key community stakeholders to plan outreach opportunities that are convenient, accessible and timely for stakeholders. Collaborate where possible with existing community events so that stakeholder time is respected.
- Contract local community-based organizations to staff the outreach process when possible. Write contracts so that food and childcare services are offered to outreach attendees during the meeting to increase convenience for stakeholders to attend.
- Document conversations and feedback from public workshops to identify barriers and resulting recommendations for mitigation methods to reduce negative effects of freight impacted communities.
- Implement findings in planning activities.

Strategy HC-2-B: Establish development standards to avoid and mitigate environmental and social impacts of freight on communities

- Work with State agencies and professional organizations such as the American Planning Association, Transportation Research Board, and/or the Urban Land Institute, and utilize

existing plans and guides to develop a freight land use design guide. This guidebook would help local communities implement standards that minimize the environmental impacts of freight. These standards may include providing appropriate buffers, designating truck routes to avoid residential neighborhoods, implementing multimodal safety measures to reduce intermodal conflicts on roadways, requiring the use of cleaner trucks (highest EPA standard available at time of development approval), etc.

Strategy HC-2-C: Leverage partnerships to strengthen the outreach process

- Partner with community-based leaders of environmental justice communities to conduct and assess the economic, environmental and social impacts of freight to these communities.
- Partner with private freight stakeholders to not only bring reliable service of goods to a spectrum of geographies, but also to facilitate symbiotic relationships with affected communities, particularly those that may be disadvantaged and lacking in resources and/or employment opportunities.

Objective HC-3: Promote noise and other pollution abatement strategies associated with the movement of goods alongside residential areas and sensitive habitat near freight corridors

Objective also supports: Environmental Stewardship

Strategy HC-3-A: Promote abatement best practices in freight projects

- Work with local governments to encourage fixed, time-based vehicle size restrictions in their curbside parking. By prioritizing different modes or movements by the time of day, an urban core can strategically address curbside parking demand to, in turn, reduce VMT and emissions generated by “cruising for parking” and engine idling activities.

Goal 5 - Safety and Resiliency

Reduce freight-related deaths/injuries and improve system resilience by addressing infrastructure vulnerabilities associated with security threats, effects of climate change impacts, and natural disasters.

Objective SR-1: Reduce rates of incidents, collisions, fatalities, and serious injuries associated with freight movements

Objective also supports: Multimodal mobility

Strategy SR-1-A: Expand the system of truck parking facilities

- Execute the recommendations from the 2020/21 California Truck Parking Study to expand existing public and private sector truck parking facilities and the development of new parking facilities in strategic locations.

Strategy SR-1-B: Promote public-private partnership for implementation of truck stop and shipping terminal vehicle charging or charge-in-motion

- Support ARB, PUC, and Energy Commission efforts to work with electric utilities, technology providers, truck stops (and NATSO), and freight terminals to employ electric charging terminals along key freight corridors. Likewise, Caltrans should continue to study inductive charging opportunities within its right-of-way.

Strategy SR-1-C: Develop design guidelines for truck routes that consider other modes

- Utilizing logistics land use guides, develop a context-sensitive roadway design document that supplements Caltrans' Complete Streets guidance.

Strategy SR-1-D: Prioritize projects that address high-crash, truck-involved locations

- Collaborate with California Highway Patrol and use a common set of performance measures to identify commercial vehicle crash hot-spots statewide. Use this information to improve State and regional prioritization efforts and to focus safety-related funding efforts.

Objective SR-2: Utilize technology to provide for the resilience and security of the freight transportation system

Objective also supports: Multimodal mobility, economic prosperity, asset management

Strategy SR-2-A: Expand the number and scope of cargo security screenings

- Work with State and Federal homeland security partners to ensure that future transportation design decisions near sea, air, and land ports of entry account future space requirements for cargo screening facilities.

Strategy SR-2-B: Ensure consistent and effective safety and security requirements at all California ports

- Ensure consistent and effective safety and security requirements at all California ports
- Strengthen partnership between State, federal, and private stakeholders to ensure the safe and secure access of goods moving to and from the State's sea, air, and land ports of entry.

Strategy SR-2-C: Identify alternate freight routes to maintain freight movement at times of disruption by disaster

- Conduct an alternative routes study to ensure continuity of freight movement during and immediately following a disaster. This study would include bringing critical trade lanes online and ensuring relief materials reach California's residents and businesses. Existing evacuation routes and plans must be integrated into the proposed alternative routes study.

Strategy SR-2-D: Support V2V and V2I communication alerts on congestion and safety hazards

- Monitor technological innovations and invest appropriately in V2V and V2I infrastructure that will allow freight users advanced information on congestion, safety hazards, and traffic information (i.e. red light count down, speed limits, etc.). This information can help truck drivers make active choices about how they select their route and how they operate their commercial vehicles.

Strategy SR-2-E: Promote technology to support monitoring of truck parking locations and areas where rail traffic commonly stops

- Increase transportation security and decrease theft by placing cameras and other technologies in truck parking areas and near rail locations where intermodal trains frequently stop.

Strategy SR-2-F: Support the creation and development of a freight technology research center to advance research in innovative freight practices and incubate innovations to meet future demand

- Support the creation of a freight technology research center at the university level, or within a State agency department, to undertake freight related research and development.

Objective SR-3: Develop freight resiliency strategic plan

Objective also supports: Economic prosperity, environmental stewardship

Strategy SR-3-A: Develop resiliency vision, goals, and objectives

- Work with agency partners to develop a vision for a resilient freight system. This vision would be supported by goals and a series of objectives. The Freight Resiliency Strategic Plan would focus on identifying future issues as it relates to national disasters, sea-level rise, and the individual resiliency of major trade lanes in California.
- Collaborate with State, regional, and local agencies to leverage funding opportunities for implementation of climate resiliency work, adaptation plans, climate action plans, and/or master plans to increase resiliency of assets against climate related events.

Strategy SR-3-B: Identification of high priority safety concerns, critical infrastructure, and aspects of the State's key supply chains that have resiliency concerns

- Increase the resiliency of California's key industry supply chains. Identify and prioritize improvements to improve safety and keep business moving – these improvements could include rebuilding, strengthening, or improving facilities.

Strategy SR-3-C: Incorporate resilience strategies contained in port plans prepared pursuant to coastal commission guidelines

- Work with the State’s port authorities to incorporate resiliency strategies as part of Caltrans roadway improvement plans – in particular, assist ports in preparing for increased sea levels.
- Collaborate with partners to develop Vehicle Grid Integration as a resiliency strategy. This capability allows for battery-electric vehicles and other equipment to communicate with the grid when charging, especially in places where trucks are likely to plug-in for extended sessions like truck parking sites. This is also a technology that could promote resiliency for equipment like electric-powered Transport Refrigerator Units, particularly when shore powering at port terminals and warehouses.

Goal 6 - Asset Management

Maintain and preserve infrastructure assets using cost-beneficial treatment as indicated in the State Highway System Management Plan (SHSMP), per the federal FAST Act, Streets and Highway Code §164.6, and Caltrans Director’s Policy 35 Transportation Asset Management (DP-35), and other applicable state and federal statutes and regulations.

Objective AM-1: Apply preventive maintenance and rehabilitation strategies using sustainable best practices

Objective also supports: Multimodal Mobility, Safety and Resiliency, Connectivity and Accessibility

Strategy AM-1-A: Ensure adequate and sustainable funding for preservation and modernization of the freight system

- Conduct a study to explore the long-term maintenance and operational costs of the existing freight system. The results of this study should be integrated into long-term planning and funding strategies for the State. Expand scope of freight system rehabilitation projects to include facility modernization, where possible and merited, to increase range of available funding sources.

Strategy AM-1-B: Identify maintenance and preservation needs on priority freight corridors

- The maintenance and operation study identified in Strategy AM-1-A should use the corridors established in Strategy MM-1-A to focus investment in high priority trade lanes that support the California economy.

Strategy AM-1-C: Expand truck scale technology use: automated or technologically assisted weight enforcement (infrared cameras); expand weigh-in-motion (WIM) deployment

- Identify locations for new installations of WIM stations throughout the State and prioritize implementation. Caltrans uses advanced technology along highways to create efficiencies in freight movement and fulfill federal mandates for traffic. Weigh-in-motion devices verify compliance with weight requirements electronically without having to pull trucks out of and back into traffic at truck scale locations. Delays occur as trucks often queue at the scales to wait for weighing and verification. Technologies allowing trucks to bypass additional stops create a more efficient system.
- Currently, WIM systems are lacking near many port locations and in some areas where new corridors are growing. Truck scale technology allows for efficient use of static scales and enforcement personnel without affecting the flow of traffic. In addition to improving safety, the technology helps reduce overloading and subsequent pavement damage.

Strategy AM-1-D: Fortified bridges and pavement design standards to accommodate heavy freight travel

- Identify bridge rehabilitation and replacement needs and adapt the current bridge asset management program to focus on key freight corridors. All bridges along primary freight routes will be identified and separated by the various network categories for performance measurement. Assess freight bridge conditions and barriers to freight. Weight and dynamics of heavy-duty trucks, outdated design methods, poor quality materials, and unsuitable construction and maintenance practices are known to reduce pavement longevity. Newer, longer-lasting materials and improved technologies are regularly being developed internally and externally. Pavement technological advances to increase durability and safety and to reduce road noise and friction will improve system efficiencies, cost savings, and environmental impacts. The use of new, better-performing materials will enhance the life of the transportation process.

Strategy AM-1-E: Preservation of unique freight corridors and passageways

- *Identify system assets that provide unique capabilities to the freight system, such as the ability to move non-containerized cargo, HAZMAT cargo, oversized/overweight cargo, or cross-border freight and prioritize projects to protect those assets, as long as they still serve a need or alternatives to replacements are too costly.*

Goal 7 - Connectivity and Accessibility

Provide transportation choices and improve system connectivity for all freight modes.

Objective CA-1: Support research, demonstration, development, and deployment of innovative technologies

Objective also supports: Multimodal mobility, economic prosperity, environmental stewardship, safety and resiliency, and asset management

Strategy CA-1-A: Freight plan priority for projects implementing state-of-the-art and demonstration technologies

- Increase the focus on prioritizing pilot and demonstration projects to help mitigate the impacts of freight travel on California’s residents. Likewise, freight mobility challenges in the State are so significant that traditional improvements alone are not going to meet future challenges.

Strategy CA-1-B: Support pilot projects for autonomous truck platooning both on open road and in transition zones

- Implement pilot projects, such as autonomous truck platoons, as a potential part of a future solution. As the magnitude of future freight challenges continue to grow in California, traditional roadway projects will not be able to keep up with the demand. However, to be successful, these pilot projects must take place both in rural and urban corridors.

Strategy CA-1-C: Support the creation and development of a freight technology research center to advance research in innovative freight practices and incubate innovations to meet future demand

- Support the creation of a freight technology research center at the university level, or within a state agency department, to undertake freight related research and development.

Objective CA-2: Promote innovative technologies and practices utilizing real-time information to move freight on all modes more efficiently

Objective also supports: Multimodal mobility, economic prosperity, safety and resiliency

Strategy CA-2-A: Research opportunities for freight technologies

- Develop a freight technology research center within a state agency or university to help incubate innovations needed to meet future demand. Future freight technologies will be key to solving the significant freight challenges that await California in the future.

Objective CA-3: Coordinate with local and regional partners on freight facilities, siting, design, and operations

Objective also supports: Multimodal mobility, economic prosperity, environmental stewardship, safety and resiliency, asset management

Strategy CA-3-A: Freight transportation, transportation planning, and land use planning coordination

- Promote good project design that helps avoid community concerns and lengthy and potentially contentious approval processes for new and expanded freight facilities. Work with local agencies to avoid incompatible land uses and transportation alternatives that conflict with existing or future freight facilities. Tools, such as GIS, can assist with many facets of planning. With current accurate information, layers of data superimposed on each other can provide a visual idea of current and future scenarios. Freight can have negative impacts on communities, and the development of incompatible land use near large freight generators can influence the efficient flow of freight.

Objective CA-4: Utilize inland port facility, short-haul rail shuttle, and inland seaports to lessen impacts on nearby communities

Objective also supports: Multimodal mobility, economic prosperity, environmental stewardship, safety and resiliency, asset management

Strategy CA-5-A: Develop a competitive metric identifying the cost of transporting goods grown or manufactured in California to a common destination versus peer regions/states

- Create a goods movement competitiveness metric identifying a single product and comparing the transportation costs of the product from California to its most common destinations with those of competing states.

Objective CA-5: Improve truck trip planning, coordination, operational, and management

Objective also supports: Multimodal mobility, economic prosperity, environmental stewardship, safety and resiliency, asset management

Strategy CA-6-A: Measure throughput of pass-through freight and identify externalities, such as impacts on communities and air quality

- Explore avoidance incentives or disincentives at highly impacted areas that aim to limit pass-through traffic, thus allowing local businesses to operate more efficiently and minimizing impacts on local communities. While California sees significant economic benefit (such as jobs, sales tax) by serving as the nation's global gateway, there is an associated cost exerted by the significant pass-through freight moving by truck and train on the State and its residents. The resulted increase in congestion levels and emissions can be mitigated by requiring clean truck and locomotive technologies and off-peak operations.

Strategy CA-6-B: Support off-hour delivery/pick-up strategy development

Most urban truck traffic occurs during the busiest and most congested times of the day. Shifting last-mile cargo pick-up and delivery to off-peak hours alleviates congestion within urban boundaries.