Appendix B: Freight Targets

Executive Order B-32-15 (see Appendix A) directed the State agencies to establish targets to improve freight efficiency, transition to zero emission technologies, and increase the competitiveness of California's freight system. Below are the Targets to meet this direction. The State agencies will evaluate the targets for necessary adjustments in 2019.

A.   System Efficiency

Target: Improve freight system efficiency 25 percent by increasing the value of goods and services produced from the freight sector, relative to the amount of carbon that it produces by 2030.

This target will indicate overall statewide success toward the goal of improving freight transport system efficiency while simultaneously reducing greenhouse gas emissions. Caltrans' Strategic Management Plan, released in 2015, set the target of a 10 percent increase in freight transport system efficiency by 2020. This 2030 target represents further progress from Caltrans' 2020 target.

Traditional measures of system efficiency and performance will also continue to be used to measure progress such as system throughput, reliability, speed, and delay among others. The target and its associated metric are intended to capture overall system-wide efficiency under a single measure. More work is necessary to refine the inputs and to provide a broader basis of comparison with national data where feasible.

To measure progress toward the 25 percent system efficiency target, the State agencies have developed a metric that compares the value of goods and services produced from the freight sector, relative to the amount of carbon that it produces. The metric acknowledges the role of business profit margins while promoting low carbon economic growth in alignment with the State's climate goals and policies.

The metric is the relationship between California freight transportation sector gross domestic product, identified by the North American Industry Classification System codes (NAICS 48-49 minus passenger components), and carbon dioxide emissions equivalent for the same sector. The following represents freight system efficiency:

<u>Gross Domestic Product (NAICS 48-49 minus passenger components)</u>
Carbon Dioxide Emissions Equivalent (from California freight movement)

The use of gross domestic product as a metric is consistent with industry practice. The U.S. Department of Commerce's Bureau of Economic Analysis defines gross domestic product as the sum of consumer, business, and government spending on final goods and services, plus investment and net foreign trade. For California,

gross domestic product represents the portion of national gross domestic product across all industries in the State.

To measure progress towards meeting the efficiency target in the Action Plan, the Transportation and Warehouse Sector, identified by the North American Industry Classification System Codes (NAICS 48-49) minus transit and ground passenger transportation, populates gross domestic product estimates. This sector comprises establishments primarily engaged in: air transportation, rail transportation, water transportation, truck transportation, pipeline transportation, other transportation and support activities, and warehousing and storage. This sector excludes transit and ground passenger transportation, as they do not relate to freight.[1]

The other element of the efficiency equation is carbon dioxide emissions equivalent. Greenhouse gas emission values are derived by ARB as part of the California Greenhouse Gas Emission Inventory Program.[2] Values used in the freight system efficiency metric represent carbon dioxide emissions equivalent from the movement of freight and the use of freight transport equipment (e.g., aircraft, trains, ships, trucks, cargo handling equipment, etc.) as discussed in the *Sustainable Freight Pathways to Zero and Near-Zero Emissions Discussion Document*.[3]

Using 2014 as the base year for analysis, gross domestic product totaled $43.9 billion for the California freight sector and the estimated carbon dioxide emissions equivalent amount totaled 28.35 million metric tons. The resultant freight system efficiency equates to $1,550 of economic output per ton of carbon dioxide emissions equivalent produced.

Table B-1 depicts, for illustrative purposes only, historic and projected future gross domestic product and carbon dioxide emissions equivalent levels and the resultant efficiency calculation. While both gross domestic product and carbon dioxide emissions equivalents may vary significantly in the coming years, using the assumptions for future projections indicates the need for more work to meet the State's target of a 25 percent efficiency improvement.

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[1] U.S. Department of Commerce's Bureau of Economic Analysis, Regional Gross Domestic Product Data, http://www.bea.gov/iTable/index_regional.cfm, accessed February 2015.
[2] ARB, California Greenhouse Gas Emission Inventory Program, http://www.arb.ca.gov/cc/inventory/inventory.htm.
[3] ARB, *"Sustainable Freight Pathways to Zero and Near-Zero Emissions Discussion Document"*, April 2014, http://www.arb.ca.gov/gmp/sfti/sustainable-freight-pathways-to-zero-and-near-zero-emissions-discussion-document.pdf.

Table B-1. Freight Transport System Efficiency Metric 2000-2050

Year	Transportation & Warehousing Gross Domestic Product (GDP) (Millions $) [4] [5]	Carbon Dioxide Emissions Equivalent (CO_2e) (Million Metric Tons) [6]	GDP/CO_2e ($/Metric Ton)	GDP/CO_2e % Change from 2014 Base Year
2000	$36,731	28.63	$1,283	-
2005	$41,934	31.26	$1,341	-
2010	$41,497	26.55	$1,563	-
2012	$42,262	26.97	$1,567	-
2013	$43,581	27.66	$1,576	-
2014	**$43,950**	**28.35**	**$1,550**	**-**
2015	$44,829	29.03	$1,544	-0.4%
2020	$49,495	31.97	$1,548	-0.1%
2030	$60,334	37.48	$1,610	3.8%
2040	$73,547	44.63	$1,648	6.3%
2050	$89,653	52.50	$1,708	10.2%

B.   Transition to Zero Emission Technologies

Target: Deploy over 100,000 freight vehicles and equipment capable of zero emission operation and maximize near-zero emission freight vehicles and equipment powered by renewable energy by 2030.

The State agencies developed this target to support the transition of freight vehicles and equipment to zero emissions technologies. ARB staff undertook a bottom-up analysis of what may be possible between now and 2030 for zero emission operations of freight vehicles and equipment. The analysis considered how far current and near-term regulations incentive programs, market demand and turnover, expected technology development, and potential future policies will advance freight vehicle and equipment technologies by 2030. ARB's analysis anticipates the population of both zero and near-zero emission freight vehicles and equipment to grow through the 2030 timeframe. To measure progress toward the technology

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[4] U.S. Department of Commerce's Bureau of Economic Analysis, Regional Gross Domestic Product Data, http://www.bea.gov/iTable/index_regional.cfm, accessed February 2015.
[5] 2015–2050 gross domestic product estimated assuming a two percent average increase in gross domestic product for the period.
[6] 2000-2050 carbon dioxide emissions equivalent estimated using ARB 2015 California Greenhouse Gas Emissions Inventory.

target, staff will use vehicle and equipment counts; tracking zero emission freight technologies as they are introduced into service.

The 100,000 figure anticipates that regulatory requirements, incentives, research programs, industry initiatives, and other programs will contribute to the availability of multiple types of vehicles and equipment that are capable of operating with zero emissions in California's fleet by 2030, along with the associated fueling and energy infrastructure. From a technology perspective, the equipment categories with the greatest potential for zero emission technology and/or zero emission operation include: trucks, locomotives, transport refrigeration units, cargo equipment, commercial harbor craft, and airport ground service equipment.

C.   Increased Competitiveness and Economic Growth

Target: Establish a target or targets for increased State competitiveness and future economic growth within the freight and goods movement industry based on a suite of common-sense economic competitiveness and growth metrics and models developed by a working group comprised of economists, experts, and industry. These targets and tools will support flexibility, efficiency, investment, and best business practices through State policies and programs that create a positive environment for growing freight volumes and jobs, while working with industry to mitigate potential negative economic impacts. The targets and tools will also help evaluate the strategies proposed under the Action Plan to ensure consideration of the impacts of actions on economic growth and competitiveness throughout the development and implementation process.

Competitiveness targets will be developed in conjunction with an economic competitiveness working group comprised of State agency representatives, economists, industry representatives, and subject matter experts. As there is no single definition, application, or metric which applies to the concept of economic competitiveness across the many different modes, markets, and impacts associated with the freight sector, the targets will need to be based on a multi-pronged suite of metrics and models, which will indicate overall statewide progress in improving California's economic competitiveness. Given the dynamic nature of the freight industry economy, the working group will need to continuously monitor and update these metrics.

These metrics may help analyze individual decisions made by State agencies when implementing actions. Functional metrics may support evaluation of cumulative economic impacts of freight projects, incentives, regulatory requirements, and efficiency measures.