Emissions Impacts of Freight Movement Increases and Congestion near Ports of Los Angeles and Long Beach: June 2022

June 30, 2022 Update

- The San Pedro Bay Ports (SPBP), which include the Ports of Los Angeles and Long Beach, continue to operate at a high level of cargo imports through the first portion of the year (January – May 2022) at 1,741,931 Twenty-foot Equivalent Units (TEU) per month, which is 28 percent higher than levels observed for the same period in 2019.
- As of June 2022, the California Air Resources Board (CARB) estimates this this level of cargo transport to still result in additional emissions from freight-related categories of equipment such as trucks, rail, and cargo handling equipment as summarized in Tables 1 and 2.
- Following a significant peak in November 2021, excess emissions from ocean-going vessel (OGV) containerships at anchorages have decreased and remain close to business-as-usual (BAU) levels since January 2022.
- Pacific Maritime Management Services (PacMMS) implemented a queuing system[1] in mid-November 2021 to encourage ships to wait outside of the "Safety and Air Quality Area" until they are within 72 hours of a berthing assignment. The queuing system has pushed vessels to drift 50 to 150 nautical miles off the shore of California and Baja California, reducing the impact of the emissions due to distance from the shore and populated areas, but has not prevented the emissions entirely.

Table 1. Summary of Excess Oxides of Nitrogen (NOx) Emissions (tpd) near San Pedro Bay Ports by Source Category

Month-Year	Port Trucks[2]	Regional Rail[3]	Cargo Handling Equipment	Containerships at Anchor
November 2021	2.2	2.3	0.5	24.4
December 2021	2.3	1.3	0.3	6.4
January 2022	0.9*	1.5*	0.3*	2.5
February 2022	2.1*	3.5*	0.6*	1.3
March 2022	3.7*	6.1*	1.1*	0.9

[1] *https://www.pacmms.org/one-page-express/stm/resources/*

[2] Data for truck movement is pending for January 2022 through May 2022, therefore port truck emission estimates may be updated in a later revision of this port congestion fact sheet.

[3] Regional rail methodology has changed from using Alameda Corridor Transit Authority (ACTA) TEU to SPBP TEU, as described in Background Section, for January 2022 through May 2022.

Month-Year	Port Trucks[2]	Regional Rail[3]	Cargo Handling Equipment	Containerships at Anchor
April 2022	2.1*	3.4*	0.6*	1.3
May 2022	2.7*	4.5*	0.8*	0.7
6-Month Average	**2.3**	**3.4**	**0.6**	**2.2**

**Estimated from San Pedro Bay Ports TEU data. See more details in the Background section.*

Table 2. Summary of Excess Particulate Matter (PM) Emissions (tpd) near San Pedro Bay Ports by Source Category

Month-Year	Port Trucks[4]	Regional Rail[5]	Cargo Handling Equipment	Containerships at Anchor
November 2021	0.014	0.055	0.015	0.638
December 2021	0.014	0.031	0.008	0.178
January 2022	0.006*	0.038*	0.011*	0.071
February 2022	0.013*	0.085*	0.025*	0.035
March 2022	0.023*	0.150*	0.044*	0.022
April 2022	0.013*	0.083*	0.025*	0.033
May 2022	0.017*	0.110*	0.033*	0.019
6-Month Average	**0.015**	**0.083**	**0.024**	**0.060**

**Estimated from San Pedro Bay Ports TEU data. See more details in the Background section.*

Containership Anchorage

Figures 1 and 2 show increased emissions from auxiliary engines and boilers used by the record number of vessels at anchorage in November 2021; however, recent months have seen a reduction in emissions due to the new queuing system[6] described above. BAU for OGV anchorage emissions are calculated from the 2016 calendar year.

[4] Data for truck movement is pending for January 2022 through May 2022, therefore port truck emission estimates may be updated in a later revision of this port congestion fact sheet.
[5] Regional rail methodology has changed from using Alameda Corridor Transit Authority (ACTA) TEU to SPBP TEU, as described in Background Section, for January 2022 through May 2022.
[6] *https://www.pacmms.org/one-page-express/stm/resources/*

Figure 1. NOx Emissions from Anchored Containerships at the San Pedro Bay Ports

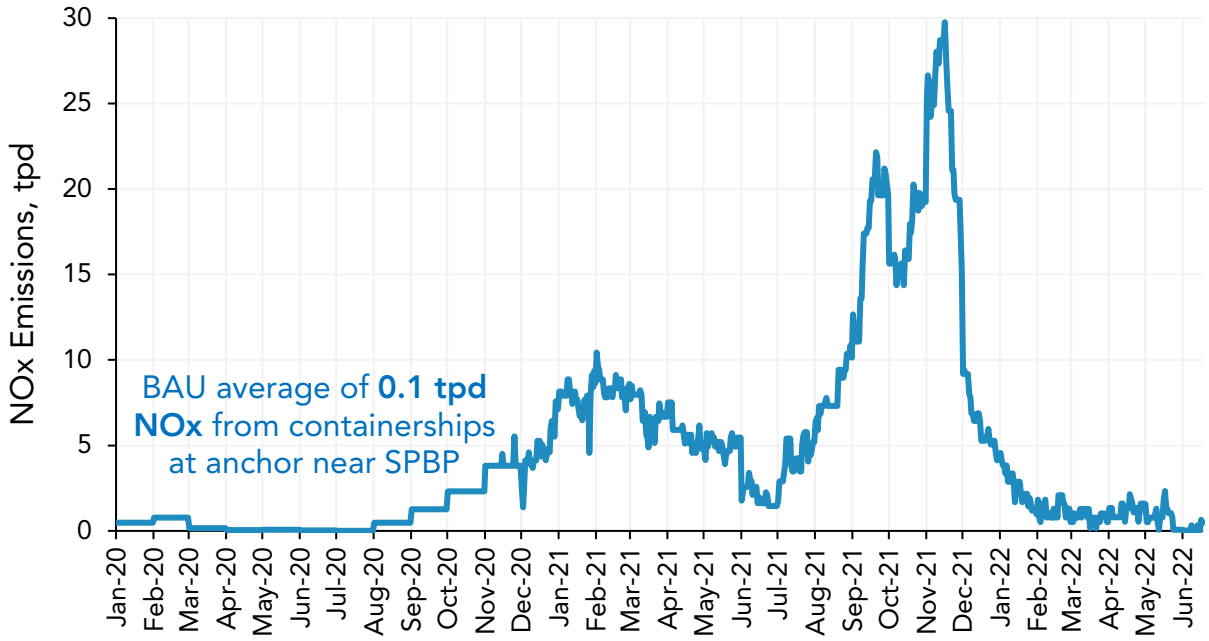
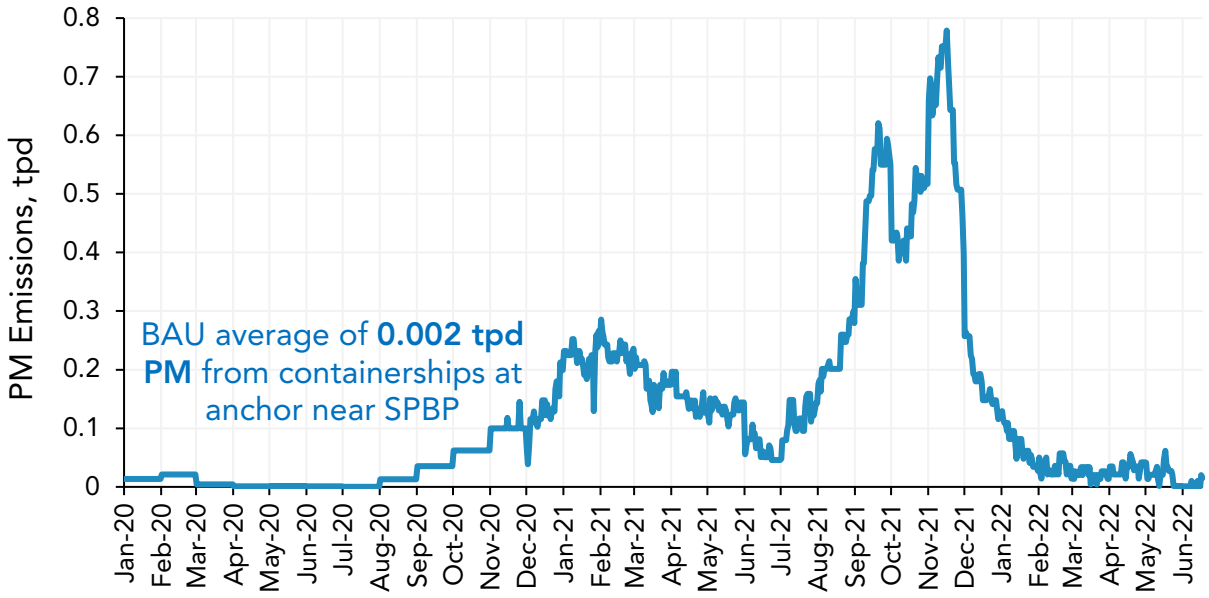


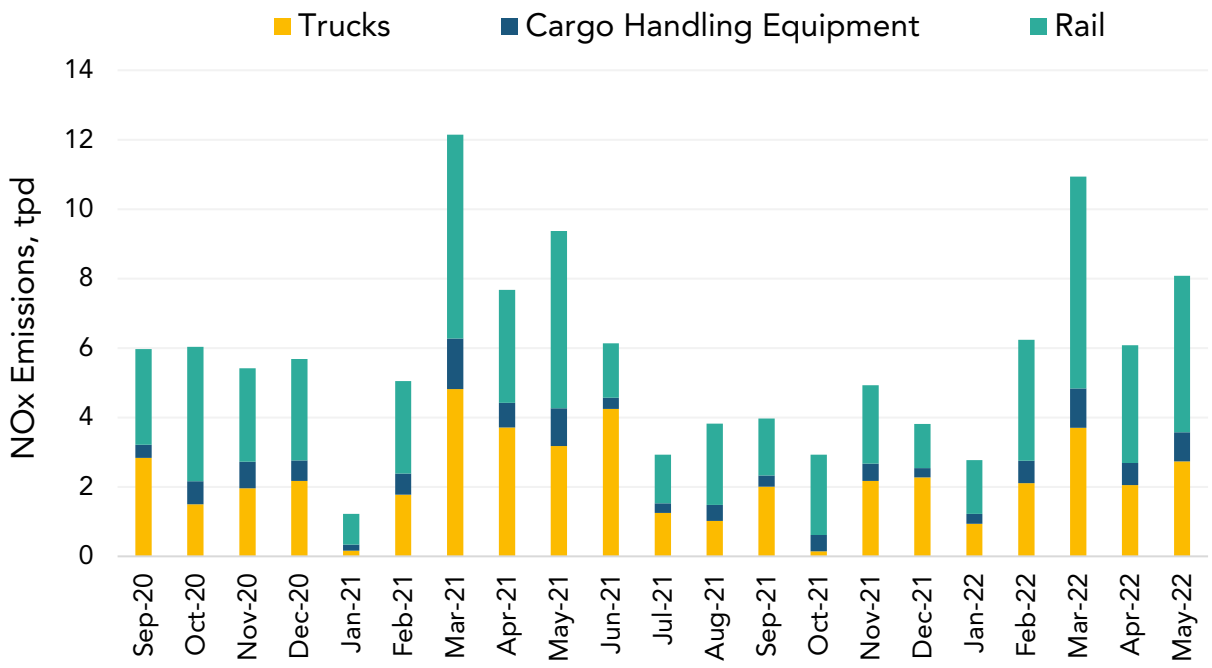
Figure 2. PM Emissions from Anchored Containerships at the San Pedro Bay Ports



Increased Freight Movement

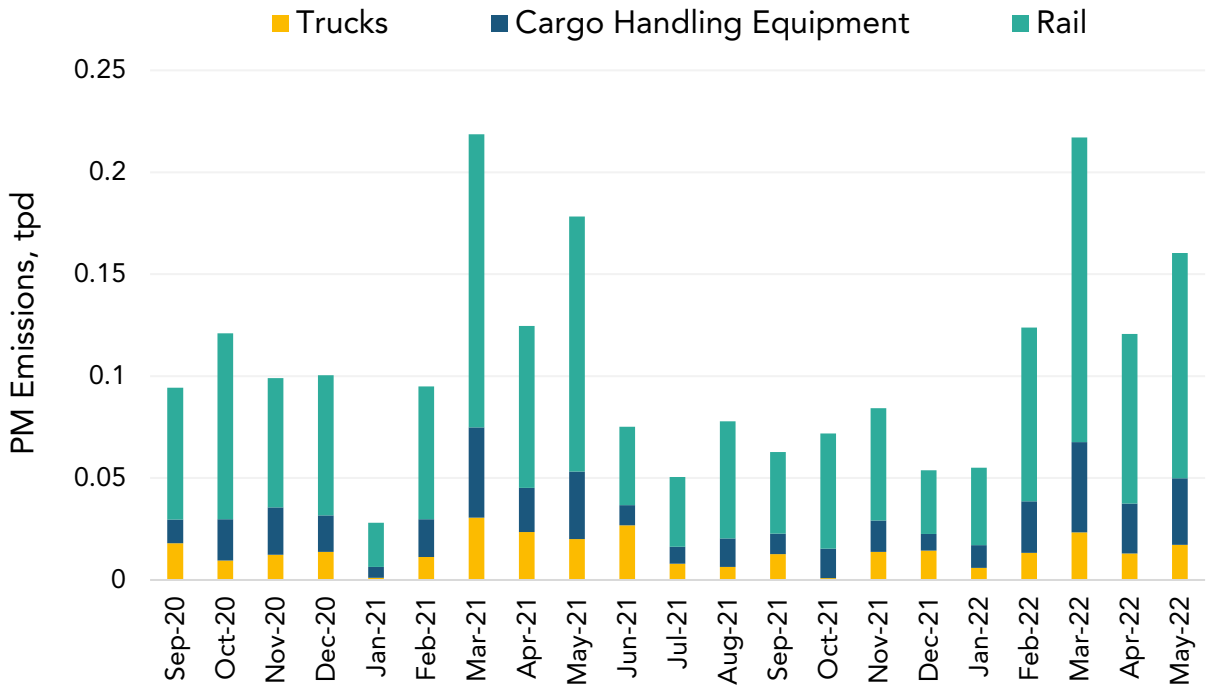
The number of containers, or TEUs, being moved through SPBP continue to be at historically high levels[7]. This increase in freight movement requires additional activity by port trucks and/or rail in the region, as well as cargo handling equipment used at the port. CARB staff calculated excess emissions using baseline emissions in 2019, and changes in reported port truck trips and TEUs moved through SPBP. More information on methodology is provided in the Background section.

Figure 3. NOx Emissions from Freight Movement by Trucks, Rail, and Cargo Handling Equipment near the San Pedro Bay Ports



[7] Port TEU data is available here *https://www.portoflosangeles.org/business/statistics/container-statistics* and here *https://polb.com/business/port-statistics/#latest-statistics*

Figure 4. PM Emissions from Freight Movement by Trucks, Rail, and Cargo Handling Equipment near the San Pedro Bay Ports



Background

- CARB's current estimates from the EMFAC Web Platform[8] shows the following emission from freight related categories in a BAU case, without the recent increase in freight movement.

Table 3: 2019 Baseline Emissions from Freight-Movement Sources in South Coast Air Basin

Source	NOx Emissions (tpd)	PM Emissions (tpd)
Port Trucks	8.47	0.050
Cargo Handling Equipment	2.59	0.101
Regional Rail	13.97	0.342

- The excess emissions for trucks, CHE, and rail that are calculated in this fact sheet represent all increased activity relative to 2019 activity levels. CARB staff acknowledges that prior to 2020, there was some amount of forecasted growth in activity between 2019 and 2022. For simplicity, CARB staff present all

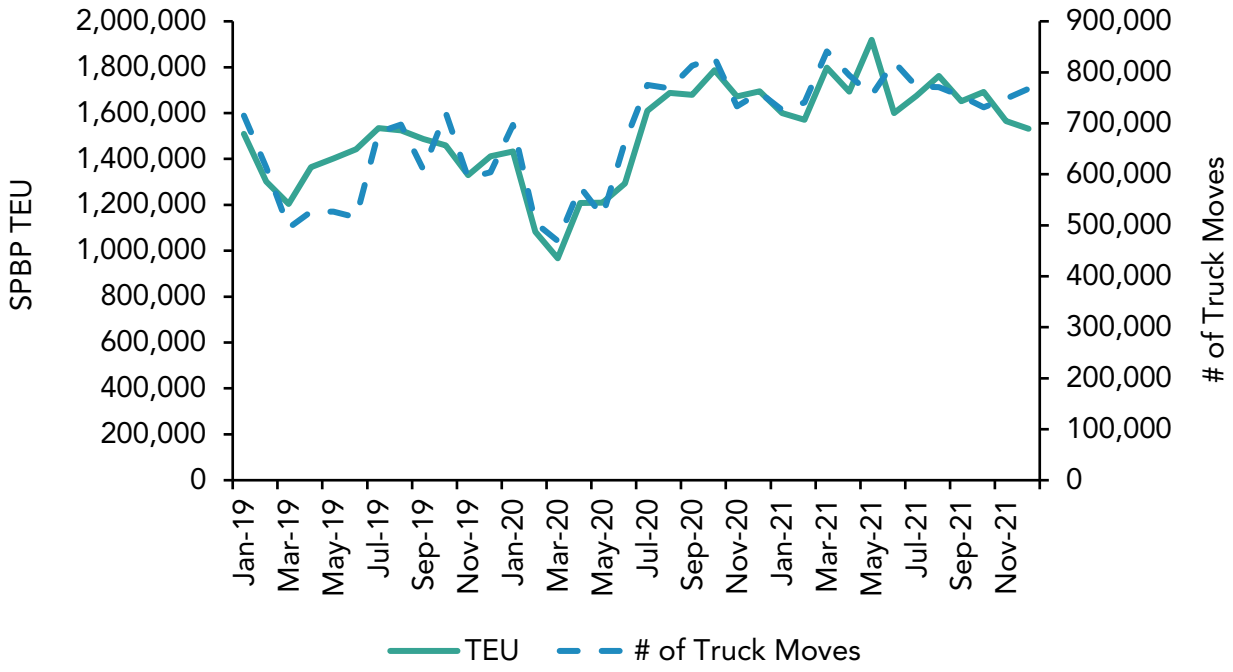
[8] *https://arb.ca.gov/emfac/emissions-inventory*

increased activity relative to the 2019 calendar year as "excess emissions" that is associated with increased freight transport.

Port Trucks

- Excess truck emissions from January 2020 through December 2021 were estimated using truck trip data.[9] Since TEUs and truck moves are correlated (see Figure 5 below), CARB staff estimated excess emissions from January 2022 to May 2022 using TEU data.
- According to truck traffic data provided by SPBP, truck trips to the port complex are closely correlated with the monthly increase/decrease of cargo movement. Figure 5 shows a comparison of truck moves and TEU movement between January 2019 and December 2021. **This figure illustrates that changes in port trucks activity are highly correlated to cargo movement.** This also shows the increase in TEUs since the beginning of 2019.

Figure 5. Comparison Between Truck Moves Data and TEU at the San Pedro Bay Ports



[9] Provided to CARB from the SPBPs. The last request for November and December 2021 data was made on February 24, 2022.

Cargo Handling Equipment (CHE)

- Prior to January 2022, CHE emissions increases were estimated using monthly TEUs observed in 2020 and 2021 relative to the TEUs observed in the same months from 2019.
- Beginning in January 2022, CHE emissions increases are estimated using TEUs observed in January through May 2022 relative to the annual average TEUs from 2019. This revised method is consistent with existing truck and rail methodology.

Regional Rail

- Previous estimates (in 2020 and 2021) of additional rail emissions from increases in freight transport relied on ACTA TEU estimates. However, this report updates rail estimates beginning in January 2022 through May 2022 based on SPBP TEU reporting for consistency and ease of comparison with truck and CHE methodology.
- Figure 6 shows a comparison of TEUs moved through the ports, and the number of TEUs reported by the Alameda Corridor Transportation Authority (ACTA), showing a trend, but no substantial correlation between TEUs transported through ACTA versus SPBPs.

Figure 6. Comparison Between San Pedro Bay Port and ACTA TEU Data