

Panama Canal expansion: emission changes from possible US west coast modal shift

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Background: We analyzed the potential for the Panama Canal expansion to change CO₂ and criteria pollutant emissions (oxides of nitrogen, oxides of sulfur and particulate matter) from Asia–US container flows by estimating the modal shift from landside truck/rail network to larger ships enabled by canal expansion. We develop an intermodal case study comparison within the Geospatial Intermodal Freight Transportation framework, assuming potential diversion of 1.2 million 20-foot equivalent units (TEUs) to 5000 origin–destination pairs. **Results:** Potential TEU diversions of land-bridge transport through an expanded canal reduced mode-specific emissions substantially, but land-bridge emission reductions due to cargo diversion to post-Panamax vessels, with lower emissions per TEU, cannot offset higher waterborne emissions from longer routes. **Conclusion:** Green-freight policy measures must consider multimodal network solutions to maximize emission benefits.

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