

## MEMORANDUM

TO: Rep. Kathy Castor, Chair  
U.S. House Select Committee on the Climate Crisis

FROM: Connor Harrington and Grace Brahler

CC: Prof. Greg Dotson, University of Oregon, School of Law

DATE: November 15, 2019

RE: United States Port Electrification

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### EXECUTIVE SUMMARY

The United States has approximately 360 commercial ports that act as gateways to the global economy. Port activities have historically been major sources of emissions that impact public health to the millions of people living within close proximity to the ports. However, many of the Nation's largest port complexes have been taking great strides to electrify infrastructure in pursuit of a zero emissions future.

This paper seeks to identify and analyze federal laws and regulations applicable to ocean-going vessels, cargo equipment, and drayage trucks that can be updated to incentivize or require electrification at ports along the East Coast. Although there is a vast regulatory scheme applicable to ports, there are some key areas of law that Congress should look to when seeking to incentivize or require port electrification. The U.S. Environmental Protection Agency (EPA) regulates port emissions but also works collaboratively with ports to plan and develop low-emission and zero-emission port infrastructure. In the event issues arise as to competition between ports, or regions, as a result of electrification measures, the Federal Maritime Commission (FMC) exists to ensure that ports and shipping opportunities remain competitive. The Maritime Administration (MARAD) is responsible for developing, promoting and assisting the daily functioning of ports, and provides federal assistance to ports through collaborative planning and creation of port programs. The National Oceanic Administration partners with ports to develop coastal management plans to address national coastal issues. In addition, there are numerous federal funding opportunities available that can be better utilized to incentivize port electrification.

Implementing port electrification requires long-term planning. Many ports and port-related industries have invested in port infrastructure that contributes to emissions but still has significant useful life. Grid infrastructure at or near ports is not always capable of supporting electrified port infrastructure and must also be upgraded. To overcome these barriers, ports and port-related industries must be required or better incentivized to engage in comprehensive planning for the adoption of electrified infrastructure and equipment. This paper highlights

several regional efforts that demonstrate the effectiveness of cohesive regional strategic planning for electrification. Many electrification technologies have become more feasible and are being implemented today, and the federal government has the opportunity to encourage greater progress in this arena. This paper recommends that the federal government act to engage in further planning and implementation efforts with ports and industry to achieve a zero emissions future.

In an effort to evaluate the effectiveness of the current federal regulatory policies and identify ways to incentivize port electrification, this paper first outlines relevant regulatory entities, statutes, and potential federal funding opportunities. Next, the paper presents policy positions relevant to port electrification advanced by various interested parties in order to evaluate likely support for or opposition to port electrification planning efforts. Ultimately, the paper provides a planning-based policy recommendation, referring to various state and regional initiatives as examples of successful port electrification planning programs.

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## BACKGROUND

Ports are an integral part of the United States economy and infrastructure, and function as gateways connecting farmers, manufacturers, retailers and consumers with the world marketplace.<sup>1</sup> The United States has approximately 360 commercial ports.<sup>2</sup> U.S. seaport activity accounts for more than 23 million jobs and 26 percent of the United States economy, generating \$5.4 trillion in total economic activity and over \$378 billion in federal, state and local taxes in 2018.<sup>3</sup> With such a significant economic presence comes a significant environmental footprint, as port-related activities emit greenhouse gases from port-related trucks, locomotives, cargo handling equipment, harbor craft, and ocean-going vessels.<sup>4</sup>

Port activities and equipment—especially older, diesel-fueled engines—emit pollutants including fine particulate matter (PM<sub>2.5</sub>), nitrogen oxides (NO<sub>x</sub>), and carbon dioxide (CO<sub>2</sub>). These emissions threaten the health and welfare of the estimated 39 million people in the United States who live in close proximity to ports.<sup>5</sup> According to the Environmental Protection Agency (EPA), air pollution negatively impacts public health by increasing susceptibility to respiratory and cardiovascular health problems, increasing the risk of cancer and contributing to premature death.<sup>6</sup> Sensitive populations such as senior citizens, the chronically ill, pregnant women, and especially children are impacted the hardest by such emissions.<sup>7</sup>

America's trade volume is expected to see an increase of 300% by 2030.<sup>8</sup> While NO<sub>x</sub> and PM emissions are expected to decrease in response to EPA regulations of diesel, CO<sub>2</sub> emissions are expected to increase due to an increase in trade activity through the Nation's ports.<sup>9</sup> Many ports are located in non-attainment or maintenance areas for EPA's ozone and PM<sub>2.5</sub> national ambient air quality standards (NAAQS).<sup>10</sup> The EPA approximates that forty percent of "Principal Ports"<sup>11</sup> are located in or near areas that have violated a NAAQS (nonattainment areas) or have previously violated but are now meeting a NAAQS (maintenance areas).<sup>12</sup>

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<sup>1</sup> AMERICAN ASSOCIATION OF PORT AUTHORITIES, Ports, Jobs & Economic Growth, (available at: <https://www.aapa-ports.org/advocating/content.aspx?ItemNumber=21150>).

<sup>2</sup> UNITED STATES ENVIRONMENTAL PROTECTION AGENCY OFFICE OF INSPECTOR GENERAL, EPA Needs to Improve Its Efforts to Reduce Air Emissions at U.S. Ports, Report No. 09-P-0125, March 23, 2009, at 1.

<sup>3</sup> UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, National Port Strategy Assessment: Reducing Air Pollution and Greenhouse Gases at U.S. Ports, 2016, at 1 [*hereinafter* EPA ASSESSMENT]; AMERICAN ASSOCIATION OF PORT AUTHORITIES, Ports, Jobs & Economic Growth (available at: <https://www.aapaports.org/advocating/content.aspx?ItemNumber=21150>).

<sup>4</sup> U.S. EPA ASSESSMENT, *supra* note 3, at 1.

<sup>5</sup> *Id.*

<sup>6</sup> UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, Draft A Ports Primer for Communities, 2016 (available at: <https://www.epa.gov/sites/production/files/2016-07/documents/420p16001.pdf>).

<sup>7</sup> CALIFORNIA AIR RESOURCES BOARD, The Children's Health Study, 2015 (available at: <https://www.arb.ca.gov/research/chs/chs.htm>).

<sup>8</sup> AMERICAN ASSOCIATION OF PORT AUTHORITIES, Ports, Jobs & Economic Growth (available at: <https://www.aapa-ports.org/advocating/content.aspx?ItemNumber=21150>).

<sup>9</sup> EPA ASSESSMENT, *supra* note 3, at 8.

<sup>10</sup> *Id.*

<sup>11</sup> "Principal Port" is a U.S. Army Corps of Engineers designation based on total tonnage for the port each year. See U.S. ARMY CORPS OF ENGINEERS, *Principal ports of the United States* (available at: <https://usace.contentdm.oclc.org/digital/collection/p16021coll2/id/2062>).

<sup>12</sup> EPA ASSESSMENT, *supra* note 3.

## REGULATORY FRAMEWORK

United States port activities fall within the purview of a large swath of federal laws and regulations carried out by federal agencies. This paper focuses on areas of law in which Congress may take action to require and incentivize electrification of port infrastructure. This section analyzes the key laws and federal agencies that offer opportunities to further encourage and require electrification at U.S. ports., followed by federal funding sources available to U.S. Ports.

### **Laws and Regulations Applicable to U.S. Port Electrification**

#### *a. U.S. Environmental Protection Agency*

The Environmental Protection Agency (EPA) administers several environmental statutes and regulations that apply to ports, including air and water quality statutes and regulations. The Clean Air Act, enforced by the EPA, protects public health and wellbeing from air pollution by establishing national ambient air quality standards (NAAQS) and requiring states to adopt enforceable state implementation plans (SIPs) to meet those standards.<sup>13</sup> Many ports are located in non-attainment or maintenance areas for EPA’s ozone and PM<sub>2.5</sub> NAAQS.<sup>14</sup> The EPA approximates that 40 percent of “principal ports” are located in or near areas that have violated a NAAQS (nonattainment areas) or have previously violated but are now meeting a NAAQS (maintenance areas).<sup>15</sup>

The CAA regulates diesel engines, marine vessel loading operations, paint coatings, and emissions from vehicles and many types of equipment used at ports.<sup>16</sup> The CAA also regulates new and in-use U.S. flagged compression-ignition marine engines (also called marine diesel engines), emissions from such engines, as well as the sulfur content of marine fuel.<sup>17</sup> Diesel engines emit criteria air pollutants including particulate matter (PM), nitrogen oxides, (NO<sub>x</sub>), carbon monoxide (CO), and sulfur oxides (SO<sub>x</sub>), in addition to hazardous air pollutants and greenhouse gases.<sup>18</sup> CAA regulations do not apply to older models of diesel vehicles and equipment, often called the “legacy fleet.”<sup>19</sup> Instead, the effectiveness of the CAA relies on fleet turnover, which poses a challenge to ports working to reduce emissions while operating with older vehicles and equipment. States may regulate the use of the legacy fleet by establishing

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<sup>13</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, Ports Primer: 7.3 Federal Environmental Regulations, Initiatives and Standards (available at: <https://www.epa.gov/community-port-collaboration-and-capacity-building/ports-primer-73-federal-environmental-regulations>).

<sup>14</sup> EPA ASSESSMENT, *supra* note 3.

<sup>15</sup> EPA ASSESSMENT, *supra* note 3.

<sup>16</sup> *Id.*

<sup>17</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, Air Enforcement (available at: <https://www.epa.gov/enforcement/air-enforcement#ocean>). See 42 U.S.C. 7401-7671q; 40 C.F.R. § 1042.

<sup>18</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, Ports Primer: 7.2 Air Emissions (available at: <https://www.epa.gov/community-port-collaboration-and-capacity-building/ports-primer-72-air-emissions>).

<sup>19</sup> *Id.*

more stringent air quality standards.<sup>20</sup> These emissions controls also do not apply to foreign-flagged vessels.<sup>21</sup>

The EPA also participates on the U.S. delegation to the International Maritime Organization (IMO).<sup>22</sup> EPA enforces international standards for marine engines and their fuels contained in Annex VI to the International Convention on the Prevention of Pollution from Ships (a treaty called MARPOL) under the authority of the Act to Prevent Pollution from Ships (APPS).<sup>23</sup> The first set of standards limited sulfur concentrations in marine fuels and NOx rates in engine exhaust.<sup>24</sup> The treaty was later amended to include more stringent regulations of these emissions, especially for designated Emission Control Areas.<sup>25</sup> Vessels operating in the North American Emission Control Area and the U.S. Caribbean Sea Emissions Control Area must meet more stringent fuel-sulfur limits and NOx emissions standards.<sup>26</sup> These standards apply to U.S. and foreign-flagged vessels.<sup>27</sup>

EPA helps U.S. ports reduce emissions through its Ports Initiative.<sup>28</sup> EPA supports ports in various ways, including (1) helping ports find and capitalize on funding opportunities for clean technologies; (2) providing measurements tools, expert guidance, and technical assistance to help ports identify the best clean air investments; (3) promoting collaboration between ports and communities to promote planning that includes clean air projects; and (4) assembling resources on best practices, funding, and other information useful to ports, communities, and governmental entities.<sup>29</sup>

As part of its goal to offer technical resources to ports, EPA completed a National Port Strategy Assessment in 2016. The report evaluated various national-scale strategies to reduce port emissions. In addition, EPA prepared a Shore Power Technology Assessment in 2017.<sup>30</sup> This report reviewed the availability of shore power at ports throughout the country and presented the ‘Shore Power Emissions Calculator’ to allow ports to easily gauge the effectiveness of shore power installation in reducing harmful air pollutant emissions. The report noted that because shore power systems are typically supplied by regional electricity grids, the related emissions

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<sup>20</sup> *Id.*

<sup>21</sup> 40 C.F.R. §1042.5(a).

<sup>22</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, International Standards to Reduce Emissions from Marine Diesel Engines and Their Fuels (available at: <https://www.epa.gov/regulations-emissions-vehicles-and-engines/international-standards-reduce-emissions-marine-diesel>).

<sup>23</sup> *Id.* See 40 C.F.R. § 1043.

<sup>24</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, International Standards to Reduce Emissions from Marine Diesel Engines and Their Fuels (available at: <https://www.epa.gov/regulations-emissions-vehicles-and-engines/international-standards-reduce-emissions-marine-diesel>).

<sup>25</sup> *Id.*

<sup>26</sup> *Id.*

<sup>27</sup> *Id.*

<sup>28</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, About EPA Ports Initiative (available at: <https://www.epa.gov/ports-initiative/about-epa-ports-initiative>).

<sup>29</sup> *Id.*

<sup>30</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, Shore Power Technology Assessment at U.S. Ports (available at: <https://www.epa.gov/ports-initiative/shore-power-technology-assessment-us-ports>).

depend on the shares of renewable energy sources versus fossil fuel energy sources supplying the grid.<sup>31</sup>

The potential emissions reductions due to increased shore power depends on the grid relying on zero- or low-emission energy sources, which are currently highly variable and cost-prohibitive.<sup>32</sup> Still, EPA listed several studies showing that significant emissions reductions are possible by employing techniques such as limiting engine use or installing emissions control technologies.<sup>33</sup>

Using shore power not only benefits communities by improving air quality and reducing noise, but it also increases port efficiency by allowing maintenance crews to repair and maintain machinery that might otherwise be inaccessible if engines were running.<sup>34</sup> EPA's partnership with Port Everglades, discussed in more detail later in this paper, was part of its technical support goal as well. EPA is using the lessons learned through the Port Everglades partnership to update its Port Emissions Inventory Guidance.<sup>35</sup>

To assist ports in locating and successfully obtaining funding for low-emission technology updates, EPA compiles lists of funding opportunities and provides tips for successful applications.<sup>36</sup> EPA directs port authorities; state, local, and tribal governments; and private developers, to federal, state, and private funding sources including grants, cooperative agreements, bonds, apportionments, loans, rebates, incentives, and settlements.<sup>37</sup>

### ***b. Federal Maritime Commission***

The Shipping Act of 1984, the Foreign Shipping Practices Act of 1988 and Section 19 of the Merchant Marine Act provides the Federal Maritime Commission (FMC) regulatory authority over port facilities that create “links in the same chain of maritime commerce as to wharfage, dockage and warehousing.”<sup>38</sup> A primary function of the FMC is to maintain competition throughout the Nation's ocean transportation supply chain.<sup>39</sup> To this end, the FMC carries out the following tasks to ensure there is competitive and efficient ocean transportation for U.S. shippers:

- Reviews and monitors agreements among ocean carriers and terminal operators;
- Provides a forum for exporters, importers and shipping stakeholders to obtain relief from ocean shipping practices or disputes that impede the flow of commerce; and

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<sup>31</sup> *Id.* at 3.

<sup>32</sup> *Id.*

<sup>33</sup> *Id.* at 4.

<sup>34</sup> *Id.* at 5.

<sup>35</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, EPA and Port Everglades Partnership: Emission Inventories and Reduction Strategies, June 2018 (available at: <https://www.epa.gov/ports-initiative/epa-and-port-everglades-partnership-emission-inventories-and-reduction-strategies>) [hereinafter PORT EVERGLADES PARTNERSHIP].

<sup>36</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, Funding for Ports and Near-Port Communities (available at: <https://www.epa.gov/ports-initiative/funding-ports-and-near-port-communities>).

<sup>37</sup> *Id.*

<sup>38</sup> Todd Buchwald, *Federal Maritime Commission Jurisdiction Over Terminal Operators*, JOURNAL OF MARITIME LAW AND COMMERCE, Vol. 12, No. 2, January 1981, at 20.

<sup>39</sup> FEDERAL MARITIME COMMISSION, Federal Maritime Commission Strategic Plan FY2018-2012, February 2018.

- Addresses unfavorable conditions caused by foreign government or business practices in U.S. foreign shipping trades.

Agreements originating at ports and agreements between ports and vessel operators must be filed with the FMC.<sup>40</sup> After an agreement is filed with the FMC, the FMC has the power to cancel or modify agreements it finds to be unjustly discriminatory or unfair, detrimental to the commerce of the United States, contrary to the public interest or otherwise in violation of the Shipping Act.<sup>41</sup>

Unless exempted under the Shipping Act, agreements among Marine Terminal Operators, or between Marine Terminal Operators and ocean carriers involving ocean transportation must be filed with the FMC if the agreement authorizes the parties to:

- Discuss, fix, or regulate rates;
- Regulate other conditions of service; or
- Engage in exclusive, preferential, or cooperative working arrangements.<sup>42</sup>

The Shipping Act prohibits three types of discriminatory conduct:

- 1) Behavior that injures competing carriers;
- 2) Behavior that unfairly routes traffic from its natural routing; and
- 3) Conduct that results in similarly situated shippers being treated differently.<sup>43</sup>

Agreements subject to FMC jurisdiction have included agreements to reduce port-related emissions. For example, in 2013 the FMC authorized the Ports of Los Angeles and Long beach to “discuss and agree upon joint programs and strategies to improve port transportation infrastructure and decrease port-related pollution emissions.”<sup>44</sup> A subsequent 2015 agreement between the ports included authorization for the ports to engage in joint discussions regarding implementation of a Clean Truck Program.<sup>45</sup> In 2015, the FMC also authorized an agreement between almost every ocean carrier and marine terminal operator serving U.S. West Coast ports permitting the parties to discuss and agree on measures to reduce port congestion on the West Coast.<sup>46</sup>

Competitive issues among U.S. ports arising from electrification of port infrastructure would come under the purview of the FMC to the extent agreements concerning electrification of port

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<sup>40</sup> Richard A. Lidinsky Jr., & Deborah A. Colson, *The Federal Regulation of American Port Activities*, 7 Md. J. Int'l L. 38 (1981).

<sup>41</sup> 46 U.S.C. § 40304.

<sup>42</sup> 46 U.S.C. § 40302.

<sup>43</sup> Richard A. Lidinsky Jr., & Deborah A. Colson, *The Federal Regulation of American Port Activities*, 7 Md. J. Int'l L. 38 (1981).

<sup>44</sup> Los Angeles and Long Beach Port Infrastructure and Environmental Programs Cooperative Working Agreement, FMC Agreement No. 201219, effective March 3, 2015.

<sup>45</sup> Los Angeles and Long Beach Port Infrastructure and Environmental Programs Cooperative Working Agreement, FMC Agreement No. 201219-001, February 27, 2015.

<sup>46</sup> FEDERAL MARITIME COMMISSION, Pacific Ports Agreement Clears FMC Review, April 15, 2015 (available at: <https://www.fmc.gov/pacific-ports-agreement-clears-fmc-review/>).



infrastructure are made among ports, terminal operators or ocean carriers. The FMC also has jurisdiction over environmental impacts of port projects and integrates the requirements of the National Environmental Policy Act with its regulatory obligations.<sup>47</sup> To the extent issues arise with competition between U.S. ports as a result of port infrastructure electrification, the FMC could address such issues with its current authority or through expanded authority granted to it by Congress.

### *c. Maritime Administration*

The Maritime Administration (MARAD) is the arm of the U.S. Department of Transportation responsible for the Nation's waterborne transportation system.<sup>48</sup> Whereas the FMC functions as a regulatory and policing agency, MARAD is responsible for "developing, promoting and assisting the daily functioning of ports."<sup>49</sup> MARAD is also responsible for promoting and developing waterborne transportation for domestic and foreign commerce of the Nation.<sup>50</sup> Included in its duties are the creation and implementation of programs that promote integrated transportation systems, developing plans for federal agency coordination and preparation of emergency plans for ports.<sup>51</sup> Through its Port Infrastructure Development Program, MARAD provides port investment assistance and produces reports to inform future port financial decisions.<sup>52</sup> MARAD has grant, loan and other funding streams designed to help with ship construction and repair, develop and expand port infrastructure, and promote growth and modernization of the maritime industry.<sup>53</sup> MARAD acts as a clearing house for information regarding technology innovations improving the efficiency of U.S. maritime transportation.<sup>54</sup>

MARAD's Maritime Environmental and Technical Assistance (META) program promotes "the research, demonstration, and development of emerging technologies, practices, and processes that improve maritime industrial environmental sustainability."<sup>55</sup> Through the META program, MARAD tests, evaluates and demonstrates the viability and applicability of technologies that reduce, mitigate or eliminate vessel and port air emissions.<sup>56</sup> A primary area of focus for MARAD's META program is reductions in vessel and port air emissions, and the agency has

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<sup>47</sup> 46 C.F.R. § 504.

<sup>48</sup> U.S. Department of Transportation, Maritime Administration, About Us, September 12, 2019 (available at: <https://www.maritime.dot.gov/about-us>).

<sup>49</sup> Richard A. Lidinsky Jr., & Deborah A. Colson, *The Federal Regulation of American Port Activities*, 7 Md. J. Int'l L.38 (1981).

<sup>50</sup> H. Marcus, T. Short, J. Kypers, *Federal Port Policy*, Massachusetts Institute of Technology, 1976.

<sup>51</sup> Richard A. Lidinsky Jr., & Deborah A. Colson, *The Federal Regulation of American Port Activities*, 7 Md. J. Int'l L. 38 (1981).

<sup>52</sup> U.S. DEPT. OF TRANSPORTATION, Maritime Administration, Office of Port and Infrastructure Development, September 4, 2019 (available at: <https://www.maritime.dot.gov/office-port-infrastructure-development/port-and-terminal-infrastructure-development/office-port-and>).

<sup>53</sup> U.S. DEPT. OF TRANSPORTATION, Maritime Administration, Grants and Finances, July 19, 2019 (available at: <https://www.maritime.dot.gov/grants-finances>).

<sup>54</sup> U.S. DEPT. OF TRANSPORTATION, Maritime Administration, Innovation, Research, and Technology, July 16, 2019 (available at: <https://www.maritime.dot.gov/innovation>).

<sup>55</sup> U.S. DEPT. OF TRANSPORTATION, Maritime Environmental and Technical Assistance (META) Program, October 9, 2019 (available at: <https://www.maritime.dot.gov/innovation/meta/maritime-environmental-and-technical-assistance-meta-program>).

<sup>56</sup> *Id.*

acknowledged that additional areas of study may need to be included among MARAD’s responsibilities as maritime environmental issues continue to emerge.<sup>57</sup>

MARAD partners with other agencies and stakeholders to develop and implement projects that provide useful information and insight as to maritime environmental issues.<sup>58</sup> MARAD and the Ship Operations Cooperative Program partnered in 2016 to develop an Energy Efficiency White Paper to provide ship owners and operators with an overview of energy efficiency measures, which discussed how the technology works along with the benefits and costs of the technology.<sup>59</sup> To promote electrification at U.S. ports, Congress could provide direction and funding to MARAD to educate and help U.S. ports develop and implement plans for electrification.

#### *d. National Oceanic and Atmospheric Administration*

The Coastal Zone Management Act of 1972 (CZMA) established the National Coastal Zone Management Program.<sup>60</sup> The program, administered by the National Oceanic and Atmospheric Administration (NOAA), is a partnership between the federal government and U.S. coastal and Great Lakes state and territories and aims to address national coastal issues.<sup>61</sup> One goal of the CZMA is to assist coastal states in developing coastal zone management plans that encourage “wise use of the land and water resources of the coastal zone.”<sup>62</sup> If a state or territory develops a coastal management plan that is approved by the Secretary of Commerce, the state or territory becomes eligible for federal grants and can perform federal consistency determination reviews.<sup>63</sup>

The act states that coastal management plans should consider ecological, cultural, historic, and esthetic values in conjunction with economic development, particularly in the context of port redevelopment.<sup>64</sup> Developing a plan can make a coastal state eligible for federal grants to assist the state in redeveloping “deteriorating and underutilized . . . ports that are designated in the state’s management program . . . as areas of particular concern.”<sup>65</sup> Since 1972, NOAA has allocated over \$2 billion in federal grants for coastal zone management efforts.<sup>66</sup>

The CZMA also requires that federal actions that have a reasonably foreseeable effect on coastal uses or resources must be consistent with enforceable policies within an approved coastal management plan.<sup>67</sup> Coastal Zone Management Program participants review thousands of federal consistency determinations annually, over half of which pertain to federal license or

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<sup>57</sup> *Id.*

<sup>58</sup> *Id.*

<sup>59</sup> SHIP OPERATIONS COOPERATIVE PROGRAM, Press Release, SOCP/MARAD Energy Efficiency White Paper, July 1, 2016 (<https://www.maritime.dot.gov/sites/marad.dot.gov/files/docs/innovation/meta/9601/pressrelease070116.pdf>).

<sup>60</sup> NOAA, National Coastal Zone Management Program: Strategic Plan 2018–2023.

<sup>61</sup> *Id.* at 2.

<sup>62</sup> 16 U.S.C. § 1452 (2).

<sup>63</sup> CONGRESSIONAL RESEARCH SERVICE, Coastal Zone Management Act (CZMA): Overview and Issues for Congress, January 15, 2019, at 1 [hereinafter CRS CZMA].

<sup>64</sup> 16 U.S.C. § 1452 (2)(D), (F).

<sup>65</sup> 16 U.S.C. § 1455a (b)(2).

<sup>66</sup> CRS CZMA, *supra* note 63, at 6.

<sup>67</sup> *Id.* at 7.

permit activities.<sup>68</sup> The review process encourages negotiations between participating states or territories and federal actors and, as a result, program participants almost always concur with federal consistency determinations.<sup>69</sup> While such federal consistency considerations are important to changing uses along the coast, this may be less relevant in the context of encouraging electrification efforts at existing ports.

### **Federal Funding Opportunities**

United States port infrastructure developments benefit from the existence of a diverse pool of federal funding opportunities. Three pools of funding that can be targeted to greater enhance the ability of ports to implement electrification are described in more detail below, but there are many other federal funding opportunities that have historically been available to ports, and have been or could be used for port electrification projects, including:

- U.S. DOT Infrastructure for Rebuilding America (INFRA) grant program for highway and freight projects of national or regional significant;
- U.S. DOT Better Utilizing Investments to Leverage Development (BUILD) grant program for surface transportation projects that improve safety, maintain infrastructure, benefit the economy, foster livable communities, and advance environmental sustainability;
- U.S. DOT Consolidated Rail Infrastructure and Safety Improvements (CRISI) grant program to improve the safety, efficiency and reliability of rail systems;
- MARAD America’s Marine Highway Projects grant funding for previously designated Marine Highway Projects that support development and expansion of documented vessels, or port and landside infrastructure;
- U.S. DOT Congestion Mitigation and Air Quality Improvement (CMAQ) grant program for transportation projects designed to reduce traffic congestion and improve air quality, particularly in non-attainment areas; and
- U.S. DOE Clean Cities Funding for communities to transition local fleets to cleaner fuels and vehicles, and to develop new alternative fueling infrastructure.

This section focuses on the Harbor Maintenance Trust Fund, Diesel Emissions Reduction Act and Fixing America’s Surface Transportation Act. These funding mechanisms present opportunities to emphasize electrification planning and/or implementation as a condition of receiving federal funding.

#### ***a. Harbor Maintenance Trust Fund***

The Water Resources Development Act of 1986 created the U.S. Harbor Maintenance Tax (HMT). The HMT is a tax paid by shippers on the value of import freight and freight transported between any two U.S. coastal ports. Revenues from the HMT were intended to be used for port maintenance conducted by the U.S. Army Corps of Engineers, which includes dredging and

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<sup>68</sup> *Id.* at 10.

<sup>69</sup> *Id.* at 10.

filling activities in U.S. waters and adjacent wetlands.<sup>70</sup> Dredging and filling operations conducted by both the U.S. Army Corps of Engineers and public and private entities require evaluation of the impacts that dredging and filling will have “on the marine environment, wildlife, habitats, and the overall environment, including the probable impact on the well-being of man.”<sup>71</sup>

HMT revenues are placed in the Harbor Maintenance Trust Fund, which Congress uses to appropriate funds for dredging to remove sand and silt that naturally accumulate in waters surrounding the ports. However, Congress has restricted spending on harbor maintenance due to budgetary constraints. Currently, more revenues are collected from shippers than are appropriated to the U.S. Army Corps of Engineers to perform harbor maintenance, which has resulted in \$9.3 billion in collected revenues that are not being used for harbor maintenance.<sup>72</sup> On October 28<sup>th</sup>, 2019, The U.S. House of Representatives passed H.R. 2440, the Full Utilization of the Harbor Maintenance Trust Fund Act, which is bipartisan legislation intended to unlock collected HMT funds to the U.S. Army Corps of Engineers for harbor maintenance. The lack of harbor maintenance funds increases cost burdens on and decreases traffic to U.S. ports.<sup>73</sup> Releasing Harbor Maintenance Trust Funds relieves these financial burdens and enhances the financial capability of ports to invest in electrification upgrades.

#### ***b. Diesel Emissions Reductions Act***

The Diesel Emissions Reduction Act (DERA) was established in 2005 and reauthorized in 2010 to provide funding to replace or retrofit equipment with old legacy diesel engines.<sup>74</sup> DERA funding has often been prioritized for port related projects, as goods movements through ports have relied heavily on diesel powered equipment, and communities surrounding ports are disproportionately impacted by higher levels of diesel exhaust emissions.<sup>75</sup> Diesel reduction project awards totaling \$629 million from FY 2008 and FY 2016 are estimated by EPA to result in reductions of 5,089,172 tons of CO<sub>2</sub>, 427,700 tons of NO<sub>x</sub> and 15,490 tons of PM<sub>2.5</sub>.<sup>76</sup> A total of \$148 million has been awarded to port specific projects from DERA funding.<sup>77</sup>

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<sup>70</sup> HARBOR MAINTENANCE TRUST FUND, American Great Lakes Ports Association Position Paper, 2019 (available at: <http://www.greatlakesports.org/wp-content/uploads/2019/04/AGLPA-HMTF-19.pdf>).

<sup>71</sup> Richard A. Lidinsky Jr., & Deborah A. Colson, *The Federal Regulation of American Port Activities*, 7 Md. J. Int'l L. 38 (1981).

<sup>72</sup> HOUSE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE, Press Release, Investing In America: Full Utilization of the Harbor Maintenance Trust Fund Act, April 30, 2019 (available at: <https://transportation.house.gov/committee-activity/investing-in-america-unlocking-the-harbor-maintenance-trust-fund-act>).

<sup>73</sup> John Schumake, *Witnesses Say Harbor Maintenance Funding 'Crucial'*, *American Shipper*, April 11, 2019 (available at: <https://www.freightwaves.com/news/witnesses-say-harbor-maintenance-funding-crucial>).

<sup>74</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, Office of Transportation and Air Quality, DERA Fourth Report to Congress: Highlights of the Diesel Emissions Reduction Program, EPA-420-R-19-005, July 2019, (available at: <https://www.epa.gov/sites/production/files/2019-07/documents/420r19005.pdf>).

<sup>75</sup> *Id.* at 2.

<sup>76</sup> *Id.*

<sup>77</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, Overview of Clean Diesel Grants Awarded for Port Projects (available at: <https://www.epa.gov/ports-initiative/overview-clean-diesel-grants-awarded-ports-projects#summary>)

DERA funding has been used for port electrification, including electric cranes, electric retrofitting of port equipment, and installation of shore-to-ship electrical systems.<sup>78</sup> Reauthorization of DERA funding through 2024 has been introduced to Congress in 2019 through Senate Bill 747 and Senate Bill 2302. Reauthorization of the DERA program by Congress would provide continued funding incentives for ports to voluntarily implement electrification.



Note: 2018 Number does not include State DERA Grants awarded.

**c. FAST (Fixing America's Surface Transportation) Act**

The Fixing America’s Surface Transportation (FAST) Act of 2015 provided long-term funding for surface transportation infrastructure planning and development.<sup>79</sup> The FAST Act authorized funding of \$305 billion over FY 2016 through FY 2020.<sup>80</sup> A component of the FAST Act is the Congestion Mitigation and Air Quality Improvement Program, which provides funding to state and local governments for transportation projects and programs to help meet Clean Air Act requirements.<sup>81</sup> Nationally and regionally significant freight projects are also eligible for competitive Infrastructure for Rebuilding America (INFRA) grants created by the FAST Act. INFRA grant program goals include improvements as to the efficiency of the movement of freight and congestion reduction.<sup>82</sup>

**STAKEHOLDER POSITIONS ON PORT ELECTRIFICATION**

Successful port emissions reduction and electrification programs have engaged stakeholders early and often. Important lessons have been learned from stakeholder feedback at ports that have electrified their infrastructure, which are further described below.

**Trucking Industry**

The core challenges associated with achieving zero and near zero emissions from trucks include costs of upgrading equipment and uncertainty as to the availability of clean trucks to meet operational needs. For example, when the Ports of L.A. and Long Beach were developing plans

<sup>78</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, Clean Diesel National Grants Awarded (available at: <https://www.epa.gov/cleandiesel/clean-diesel-national-grants-awarded>).

<sup>79</sup> Fixing America’s Surface Transportation Act (Pub L. No. 114-94).

<sup>80</sup> *Id.*

<sup>81</sup> *Id.*

<sup>82</sup> U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION, Fixing America’s Surface Transportation Act or “FAST Act,” August 2017 (available at: <https://www.fhwa.dot.gov/fastact/factsheets/infragrantsfs.cfm>).

for a clean truck program, the trucking industry raised significant concerns about near-term requirements that would come into effect prior to existing regulatory deadlines.<sup>83</sup> Trucking companies develop fleet replacement investment plans years in advance and many companies purchased trucks to be compliant with existing regulations. Trucking companies pointed out that acceleration of emissions reduction timelines would make it significantly difficult to recoup investment in trucks purchased to meet current regulations, and plan and budget for replacements.<sup>84</sup> The trucking industry has also raised serious concerns about the impact of expensive new emissions reductions upgrades on the working conditions and living wages of drivers, as the costs of upgrades are passed on to drivers.<sup>85</sup>

The Ports of L.A. and Long Beach addressed these concerns by requiring new trucks registering with the Ports to meet the cleanest engine manufacturing standard; transitioning in near zero emissions trucks sooner than zero emissions trucks; providing a long-term schedule to accommodate budgeting and planning; including incentives and pilot programs to introduce new trucks; and including frequent feasibility assessments.<sup>86</sup>

### **Terminal Operators**

Concerns from terminal operators regarding a push towards zero emissions have mostly focused on the feasibility of new technology and that aggressive zero emissions timelines will not allow terminal operators to capture full useful life for recently upgraded equipment. Port infrastructure must also be upgraded to support electric and alternative fuel infrastructure. At the Ports of L.A. and Long Beach, the Ports forecasted such infrastructure upgrades to cost as much as \$2 billion and recognize that such upgrades must be in place before terminal operators can transition to new electric equipment.<sup>87</sup> Additional industry-wide issues of concern include access to energy during times of emergency and the sustainability of the electric grid.<sup>88</sup>

### **Railroad Industry**

Generally, the railroad industry has not had much reason to oppose electrification efforts at ports. Freight railroads use fuel efficiency of moving goods by rail as a sales pitch and boast that “freight rail is well ahead of other modes of transportation when it comes to limiting greenhouse gas emissions.”<sup>89</sup> The railroad industry has been adopting zero emissions technology along with the ports that the railroads serve. For example, at CSX’s North Baltimore intermodal terminal in Ohio, the railroad installed seven electric cranes that generate power every time a load is

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<sup>83</sup> SAN PEDRO BAY PORTS, 2017 Clean Air Action Plan Update, at 36 (available at: <http://www.cleanairactionplan.org/documents/final-2017-clean-air-action-plan-update.pdf/>).

<sup>84</sup> *Id.*

<sup>85</sup> *Id.* at 37.

<sup>86</sup> *Id.* at 37, 38.

<sup>87</sup> *Id.* at 52.

<sup>88</sup> AMERICAN ASSOCIATION OF PORT AUTHORITIES, Environment and Energy, September 2019 (available at: <http://aapa.files.cms-plus.com/PDFs/Environment%20and%20Energy%209-19.pdf>)

<sup>89</sup> AMERICAN ASSOCIATION OF RAILROADS, Freight Rail: The Most Environmentally Friendly Way to Move Freight Over Land (available at: <https://www.aar.org/issue/freight-rail-and-the-environment/>).

lowered.<sup>90</sup> This technology has the capacity to replace 20 diesel-powered cranes and approximately 20 diesel trucks used for moving containers within the facility. According to the American Association of Railroads, moving freight by rail rather than by truck reduces greenhouse gas emissions by 75%.<sup>91</sup>

### **Environmental Advocacy Groups**

In order to combat the large carbon footprint of the freight movement industry, the Environmental Defense Fund (EDF) assembled a Clean Air Guide for Ports and Terminals.<sup>92</sup> The guide outlined several strategies for reducing port air emissions.<sup>93</sup> The guide evaluated various clean truck programs around the country and concluded that the most successful programs have included the following characteristics: administrative partner such as local council of governments, a comprehensive driver and fleet outreach plan, support and visibility from port leadership, clear methodology to calculate emissions benefits, coupling with other strategies such as GPS and green driving to maximize emission benefits, and targeted replacement of the oldest trucks and introduction of trucks meeting most stringent emissions standard.<sup>94</sup>

The guide identified cargo-handling equipment electrification as “one of the most direct paths to emissions reductions,” stating that replacing energy-intensive cranes was a “highly cost-effective opportunity” for ports to reduce fuel use and emissions.<sup>95</sup> The guide promotes several non-electric emissions reductions efforts as well, such as mobile scrubbers for ocean-going vessels and hybrid or LNG fueled harbor vessels.<sup>96</sup> The guide promotes community involvement and transparency as ports make these emissions reductions investments.<sup>97</sup>

The Moving Forward Network (MFN), a coalition comprised of over forty member organizations representing two million Americans, advocates strongly for overhauling the nation’s freight transportation system to achieve environmental and climate justice.<sup>98</sup> MFN raised concerns about the thirteen million people who live near major marine ports and rail yards to the House Select Committee on the Climate Crisis during a recent hearing.<sup>99</sup> Low-income communities of color are disproportionately exposed to harmful air pollution emitted by the freight industry and face heightened, severe health risks as a result.<sup>100</sup>

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<sup>90</sup> AMERICAN ASSOCIATION OF RAILROADS, Freight Rail & the Greening of America (available at: <https://www.aar.org/article/freight-rail-greening-america/>).

<sup>91</sup> *Id.*

<sup>92</sup> ENVIRONMENTAL DEFENSE FUND, Clean Air Guide for Ports & Terminals, 2015 (available at: [https://www.edf.org/sites/default/files/content/edf\\_clean\\_air\\_guide\\_for\\_ports\\_terminals\\_0.pdf](https://www.edf.org/sites/default/files/content/edf_clean_air_guide_for_ports_terminals_0.pdf)).

<sup>93</sup> *Id.*

<sup>94</sup> *Id.* at 16.

<sup>95</sup> *Id.* at 17.

<sup>96</sup> *Id.* at 17, 18.

<sup>97</sup> *Id.* at 3.

<sup>98</sup> See MOVING FORWARD NETWORK, Members, <http://www.movingforwardnetwork.com/members-and-allies/>.

<sup>99</sup> House Select Committee on the Climate Crisis, Hearings, Solving The Climate Crisis: Cleaning Up Heavy Duty Vehicles, Protecting Communities (available at: <https://climatecrisis.house.gov/committee-activity/hearings/solving-climate-crisis-cleaning-heavy-duty-vehicles-protecting>).

<sup>100</sup> *Id.*

Broadly, MFN opposes any bills that weaken Clean Air Act (CAA) protections or exempt projects from the CAA or the National Environmental Policy Act.<sup>101</sup> MFN supports a nationwide strategy to combating freight industry pollution, including pollution from seaports and inland ports, and recommends providing states with more guidance to reduce violations of national air quality standards.<sup>102</sup> Specifically, MFN suggests applying advanced standards to heavy-duty trucks, new standards to ocean-going vessels, and Tier 5 standards to locomotive engines.<sup>103</sup> MFN also supports pairing regulatory requirements with funding programs, increasing funding for EPA Environmental Justice programs and the Diesel Emissions Reduction Act.<sup>104</sup> MFN wants carbon pollution to be cut off at its source.<sup>105</sup>

## **PORT PLANNING POLICY RECOMMENDATIONS**

Though each port complex is unique in the context of geographic and economic considerations, all ports are significant sources of greenhouse gas emissions. However, several regional efforts showcase the effectiveness of cohesive regional strategic planning. The federal government can take inspiration from these initiatives to develop a more aggressive national port strategy at the federal government level, including minimum clean-up targets and long-term environmental goals.<sup>106</sup>

### **Examples of Regional Port Electrification Strategic Planning**

The following examples of regional strategic planning carried out by ports in California and Washington to address port emissions are instructive. Key strategic planning initiatives and resulting benefits are highlighted to demonstrate the importance of engaging in comprehensive planning to reduce port emissions.

#### ***a. San Pedro Bay Ports (Los Angeles and Long Beach)***

The San Pedro Bay Ports of Los Angeles and Long Beach have had the greatest success in constructing long-term energy plans to reduce port emissions. The San Pedro Bay Ports of Los Angeles and Long Beach comprise one of the biggest freight gateways in the world. The Port of Long Beach is the second-busiest port in the United States.<sup>107</sup> Chris Cannon, director of environmental management for the Port of Los Angeles, has stated that “the ports of L.A. and Long Beach are probably the toughest testing venues there are for new technology” and “if the equipment can work here, it can work anywhere.”<sup>108</sup> Not only are these port complexes massive (the Port of Long Beach alone occupies 3,200 acres), but they are also located in high density

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<sup>101</sup> *Id.*

<sup>102</sup> *Id.*

<sup>103</sup> *Id.*

<sup>104</sup> *Id.*

<sup>105</sup> *Id.*

<sup>106</sup> James S. Cannon, *U.S. Container Ports and Air Pollution: A Perfect Storm, An Energy Futures, Inc. Study*, at 23.

<sup>107</sup> NEMA CURRENTS, *Port of Long Beach at Epicenter of Seaport Electrification*, June 10, 2019 (available at: <https://blog.nema.org/2019/06/10/case-study-port-of-long-beach-at-epicenter-of-seaport-electrification/>).

<sup>108</sup> Daniel C. Vock, *Clearing the Air, Governing*, June 2019 (available at: <https://www.governing.com/topics/transportation-infrastructure/gov-california-ports-emissions-air-pollution.html>).



urban areas of Los Angeles. As described further below, an aggressive Clean Air Action Plan was developed to curb harmful effects from the emissions created by these port complexes.

Since 2005, voluntary emissions reductions efforts by the San Pedro Bay Ports have resulted in 87% reduction of diesel particulate matter (DPM); 56% reduction of nitrogen oxides (NOx); near complete elimination of sulfur oxides; and an 18% reduction of Greenhouse Gas (GHG) emissions.<sup>109</sup> The San Pedro Bay Ports estimate that since 2005, industry stakeholders invested nearly \$2 billion in emissions reduction technologies including cleaner trucks, cleaner cargo-handling equipment, and shore power for ships.<sup>110</sup> Such emissions reductions investments at the San Pedro Bay Ports have yielded great benefits, and between 2005 and 2012, cancer risks attributed to air quality near the Ports were reduced by 66 percent.<sup>111</sup>

In 2017, the San Pedro Bay Ports of Long Beach and Los Angeles introduced the 2017 Clean Air Action Plan (CAAP) Update to the Ports' 2006 CAAP, which is intended to provide guidance for emissions reduction activities with stakeholders for the next 20 years.<sup>112</sup> The updated CAAP strategies were crafted to align with the Clean Air Act and state air quality management and sustainable freight planning regulations.<sup>113</sup> On June 12, 2017, the mayors of the City of Los Angeles and the City of Long Beach entered into a joint declaration for creating a zero-emissions goods movement future, with the goal of having zero emissions from cargo handling equipment by 2030, and zero emissions for drayage trucks serving the ports by 2035.<sup>114</sup> Notable goals outlined by the two mayors include at-berth emissions reductions, pilot project testing of zero-emission drayage, and development of a Green Ports Collaborative to advance similar goals with mayors throughout the West Coast and country.

The CAAP strategies align with broad state agency freight planning actions, which include four main categories of strategies: 1) Clean Vehicles and Equipment Technology and Fuels; 2) Freight Infrastructure Investment and Planning; 3) Freight Efficiency; and 4) Energy Resource Planning.<sup>115</sup> These types of strategies, in conjunction with other port initiatives, are discussed in the subsections below.

### ***b. Northwest Seaport Alliance (Seattle and Tacoma)***

The Northwest Seaport Alliance is a strategic alliance of the Pacific Northwest's two largest ports, the Port of Seattle and the Port of Tacoma. The Northwest Seaport alliance has invested in

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<sup>109</sup> *Id.* at 10.

<sup>110</sup> *Id.*

<sup>111</sup> SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT, Multiple Air Toxics Exposure Study in the South Coast Air Basin, MATES IV, 2012 (available at: <http://www.aqmd.gov/docs/default-source/air-quality/air-toxic-studies/mates-iv/mates-iv-final-draft-report-4-1-15.pdf?sfvrsn=7>).

<sup>112</sup> San Pedro Bay Ports, 2017 Clean Air Action Plan Update, at 4 (available at: <http://www.cleanairactionplan.org/documents/final-2017-clean-air-action-plan-update.pdf/>).

<sup>113</sup> *Id.*

<sup>114</sup> *Id.* at 4, 5.

<sup>115</sup> *Id.* at 28.

crane electrification and substantial planning efforts to achieve emissions reduction goals.<sup>116</sup> The Port of Seattle was the first in the nation to invest in shore power for large ocean-going vessels.<sup>117</sup>

In 2017, Washington Governor Jay Inslee assembled the Maritime Innovation Advisory Council to develop a comprehensive plan to accelerate technology innovation and best practices for the state's maritime industry.<sup>118</sup> As part of this effort, the Ports of Seattle and Tacoma have worked with other Washington ports and stakeholders to develop the Washington Maritime Blue strategy. A key strategic goal of these strategies is a "thriving, low-carbon industry." This goal includes three main initiatives: First, the Low-Carbon Maritime Technologies on Board initiative seeks electrification of state and regional ferries and the establishment of case studies to demonstrate return on investment and reduction in emissions for transitions to near zero and zero emissions technologies.<sup>119</sup> Next, the Low-Carbon Shore-Side Infrastructure initiative focuses on planning to support investments in near zero and zero emissions energy and fuel infrastructure at Washington ports.<sup>120</sup> Finally, the Strategies for Emissions Reductions initiative strives for real-time emissions tracking to improve performance and development of regional agreements for common emissions targets on the West Coast and nationally.<sup>121</sup> Aspects of the three-part strategy are discussed, in conjunction with other port initiatives, in the subsections below.

## **Emissions Inventories**

Planning considerations should first start with mandatory emissions inventories, such as those included in the Northwest Seaport Alliance initiative mentioned above, so that each port can characterize the extent of its air pollution and track its emissions reductions progress while transitioning away from fossil fuel-reliant systems. For example, the Port Authority of New York and New Jersey (PANYNJ) has made strides in diesel and greenhouse gas emissions reductions, including development of a Clean Air Strategy in 2009. PANYNJ completed truck traffic studies and air emissions inventories as well to better inform electrification decisions.<sup>122</sup>

The Environmental Protection Agency (EPA) has played a role in tracking port emissions, in particular at Port Everglades. Port Everglades is South Florida's main port for receiving petroleum products, one of the busiest cruise ship ports in the world, and one of the busiest container ports in the nation.<sup>123</sup> The port has made significant investments in electric equipment such as electric cranes.<sup>124</sup>

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<sup>116</sup> NORTHWEST SEAPORT ALLIANCE, Port of Tacoma's Crane Electrician Bruce Koch Talks About our New Cranes, March 7, 2018 (available at: <https://www.nwseaportalliance.com/node/948919>); Terminal 5 Improvements, Project Overview (available at: <https://www.nwseaportalliance.com/about/strategic-plan/t5>).

<sup>117</sup> PORT OF SEATTLE, Local Action on Electrification, July 27, 2018 (available at: <https://www.portseattle.org/commission-blog/1985/local-action-electrification>).

<sup>118</sup> Washington State's Strategy for the Blue Economic, Final Report, January 2019, at 2.

<sup>119</sup> *Id.*

<sup>120</sup> *Id.*

<sup>121</sup> *Id.*

<sup>122</sup> THE PORT AUTHORITY OF NEW YORK & NEW JERSEY, Port Environmental Initiative (available at: <http://www.panynj.gov/about/port-initiatives.html>).

<sup>123</sup> FLORIDA PORTS COUNCIL, Port Everglades (available at: <https://flaports.org/ports/port-everglades/>).

<sup>124</sup> *Id.*

In 2016, the EPA Office of Transportation and Air Quality and Florida’s Port Everglades entered a voluntary partnership to study air emissions from port activities.<sup>125</sup> Under the partnership, the EPA and the Port worked together to develop baseline and future year emission inventories and evaluate technologies to reduce emissions. EPA evaluated the current and future emissions and potential strategies for three “off-port” transportation corridors—a marine corridor, truck corridor, and rail corridor—for port-related traffic outside the Port.<sup>126</sup> The partnership resulted in the 2015 Baseline Air Emissions Inventory, which identified and quantified pollutants emitted from port-related mobile vehicles and equipment operating at the Port.<sup>127</sup> The collaborative report analyzed how hypothetical voluntary strategies such as electrification of port infrastructure can reduce emissions.<sup>128</sup> Partnerships between federal agencies and ports, such as the partnership between the EPA and Port Everglades, represent an opportunity for the federal government to play an active role in encouraging and helping with the implementation of port electrification.

The federal government may make the biggest impact by publishing a national emissions inventory, which can both reward ports for making emissions reductions advancements and put pressure on ports to match the emissions reduction efforts of other ports to avoid public backlash. For example, the San Pedro Bay Ports 2017 CAAP calls on the Ports to develop a voluntary recognition program to highlight achievements of terminals that minimize air emissions.<sup>129</sup> Overall, requiring and sharing emissions inventories from each port would likely lead to better-informed emissions reductions planning efforts and impactful investments in electrification technology and infrastructure.

### **Rollover and Replacement of Equipment**

Ports should plan to prioritize replacement of the most significant sources of emissions (the oldest, dirtiest equipment in use at the port). For example, outdated drayage trucks travel through or near environmental justice neighborhoods. Utilizing federal regulatory and funding power to phase out outdated diesel engines for electric drayage trucks could significantly reduce heavy impacts on those communities. Ports may accomplish this in the most effective manner by establishing a deadline by which the port must upgrade or replace a certain number of cranes or transition to a certain rate of shore power usage. While the 2016 EPA Assessment outlined support and encouragement for more areas to adopt and incentivize voluntary emissions reductions programs, the federal government could mandate some aspects of those programs to hasten electrification of reluctant ports. As outlined below, several ports have implemented equipment-replacement programs to varying degrees of success.

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<sup>125</sup> PORT EVERGLADES PARTNERSHIP, *supra* note 35.

<sup>126</sup> *Id.* at 3.

<sup>127</sup> *Id.* at 4.

<sup>128</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, EPA, Port Everglades Report Shines Light on New Methods for Analyzing Potential Air Pollution Reductions, June 1, 2018 (available at: <https://www.epa.gov/newsreleases/epa-port-everglades-report-shines-light-new-methods-analyzing-potential-air-pollution>).

<sup>129</sup> PORT EVERGLADES PARTNERSHIP, *supra* note 128, at 76.

### *a. California*

The San Pedro Bay Ports adopted a Clean Trucks Program (CTP) in 2008 to phase out the oldest and dirtiest trucks serving the Ports by banning trucks that had engine model years older than 2007.<sup>130</sup> By 2012, 100% of the fleet of trucks serving the Ports were 2007 EPA compliant trucks or newer, significantly reducing truck drayage air emissions.<sup>131</sup> To address the cost challenges, grant funding was dedicated for the purchase of new trucks.<sup>132</sup> The investments in new truck technologies have resulted in a 97% decrease in the Ports' truck-related DPM emissions since 2005.<sup>133</sup>

Zero and near zero emissions truck technologies are still being developed and most have yet to prove commercial feasibility. For near-zero emissions vehicles, trucks with ultra-low NOx engines and natural-gas-fueled engines are being developed.<sup>134</sup> Zero Emissions truck technologies such as battery-electric, fuel cell and plug-in hybrid are actively being developed, and the Ports have helped to financially support these areas of technological development.<sup>135</sup> The 2017 CAAP updates the Clean Trucks Program as follows:

- New trucks registering with the port as of 2018 must have at least a 2014 engine model year, but existing registered trucks can continue operation;
- In 2020, all trucks will be charged a rate to enter Port terminals, with exemptions for trucks certified to meet near zero emissions standards;
- In 2023, new trucks must meet near zero emissions standards, but existing registered trucks continue operation; and
- Staged modification to the truck rate so that by 2035 only certified zero emissions trucks will be exempted from Port truck rates.

In 2016, over 3,760 pieces of cargo handling equipment were in operation at the Ports, comprising 4% of DPM emissions, 6% of NOx emissions and 17% of GHG emissions.<sup>136</sup> Terminal operators have made investments in clean equipment to comply with Port lease requirements and state regulations. To achieve a zero-emission future for port terminal equipment, the 2017 CAAP proposed the following strategy:

- In 2019, terminals submit equipment inventory and 10-year procurement schedule for new equipment and upgrade procurement plans annually;
- In 2020, require new equipment purchases to have zero emissions if feasible, or if not feasible, the cleanest available feasible equipment; and
- Ports and operators work collaboratively to accelerate upgrading of equipment through terminal leases and grant funding.<sup>137</sup>

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<sup>130</sup> *Id* at 32.

<sup>131</sup> *Id.*

<sup>132</sup> *Id.*

<sup>133</sup> *Id.* at 33.

<sup>134</sup> *Id.* at 34.

<sup>135</sup> *Id.*

<sup>136</sup> *Id* at 49.

<sup>137</sup> *Id.*

### *b. Georgia*

The Georgia Ports Authority is comprised of the Ports of Savannah and Brunswick and a network of inland intermodal ports connected by truck and rail. The Georgia Ports Authority has converted all 27 of its ship-to-shore cranes from diesel to electric, which has reduced the amount of diesel fuel used by the ports by 1,857,000 gallons annually.<sup>138</sup> Electrification of equipment and fuel-efficiency saves 6,850,428 gallons of fuel annually.<sup>139</sup> By using electrified refrigerated container racks, the ports have reduced diesel fuel consumption in this area by 4,500,000 gallons per year.<sup>140</sup>

The Georgia Ports Authority has also been aggressive in replacing rubber-tired gantry (RTG) cranes used to handle containers at terminals. As of 2016, about one-third of the Georgia Ports Authority's RTG cranes were electric.<sup>141</sup> Electric RTG cranes use up to 95% less diesel fuel than conventional RTG cranes and the electric engines on these cranes are easier to maintain, resulting in significant cost savings.<sup>142</sup>

### *c. Washington*

The Northwest Seaport Alliance initially focused on reducing emissions from trucks and ships. As part of its emissions reduction strategy, the Ports developed financial incentives of \$3.23 million for vessel operators to burn low sulfur fuel, eliminating more than 850 metric tons of sulfur dioxide emissions.<sup>143</sup> The Clean Truck Programs require as of 2019 that trucks serving the Seattle and Tacoma Ports must have a 2007 or newer engine year model or a certified equivalent emission control system.<sup>144</sup> This program reduces DPM from trucks by up to 90% per truck.<sup>145</sup>

### *d. New York/New Jersey*

The Port Authority of New York and New Jersey (PANYNJ) provides several funding opportunities for replacing outdated equipment, including the Truck Replacement Program grant, which covers up to 50 percent of the cost of a replacement truck or \$25,000; the Cargo Handling Equipment Program rebate, which covers up to 20 percent of the purchase price or \$20,000 per unit of cargo handling equipment replace; and the Clean Vessel Incentive Program, which encourages operators of ocean-going vessels to make voluntary engine, fuel and technology enhancements that reduce emissions beyond the regulatory environmental standards.<sup>146</sup>

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<sup>138</sup> GEORGIA PORTS AUTHORITY, Reducing Consumption (available at: <http://gaports.com/about/sustainability/reducing-emissions>).

<sup>139</sup> *Id.*

<sup>140</sup> *Id.*

<sup>141</sup> AMERICAN SHIPPER, Port of Savannah Takes Next Step in RTG Electrification, November 16, 2016 (available at: <https://www.freightwaves.com/news/port-of-savannah-takes-next-step-in-rtg-electrification>).

<sup>142</sup> *Id.*

<sup>143</sup> *Id.*

<sup>144</sup> NORTHWEST SEAPORT ALLIANCE, Clean Truck Program Requirements, (available at: <https://www.nwseaportalliance.com/trucks>).

<sup>145</sup> *Id.*

<sup>146</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, Funding Opportunities for Ports and Near-Port Communities, (available at: <https://www.epa.gov/ports-initiative/funding-opportunities-ports-and-near-port-communities>).

However, PANYNJ rolled back the truck-replacement facet of its Clean Air Strategy in 2016, seven years after the strategy was released and one year before the deadline to replace outdated drayage trucks passed.<sup>147</sup> The original Clean Truck Program required drayage trucks to at least meet EPA emissions standards for 2007 on-road heavy duty vehicles or use alternative fuel or hybrid technology by 2017.<sup>148</sup> The weakened program required drayage trucks have an engine year of 1996 or newer or use alternative fuel or hybrid technology by 2018.<sup>149</sup> This allowed outdated drayage trucks that emitted an estimated 90% higher emissions than newer trucks.<sup>150</sup> A report estimated that, with an estimated five million truck calls at the ports in 2017 and 2018, this rollback resulted in seven to eight times higher fine particulate matter emissions and increased risks of mortality.<sup>151</sup>

As outlined above, several ports have had success implementing equipment replacement programs. However, while much of the clean technology available to ports is advancing quickly, new clean technology is likely still financially infeasible for many ports. For example, shore power is a relatively new technology in the United States with the potential to significantly reduce port emissions. Most onshore power supply systems have come into service in the last ten years.<sup>152</sup> Demands on these systems vary widely—time ocean-going vessels spend at berth varies from port-to-port and by vessel type, which affects how much shore power the vessel may use.<sup>153</sup> The federal government could help expedite electrification of East Coast ports by mandating that the EPA increase clean technology research efforts aimed directly at port electrification to better assist ports in making effective equipment replacement decisions.

### **Additional Port Operational Opportunities**

In addition to replacing equipment, there are several ways in which ports can operate more efficiently to reduce emissions, including reductions in idling, slowing ocean-going vessel speeds, or more efficiently moving freight by rail. What follows is a brief overview of operational strategies we found in our research that resulted in impressive port-related emission reductions.

#### ***a. Rail***

One of the key strategies to reduce emissions identified by the California San Pedro Bay ports is to expand the use of rail at the Port complexes, recognizing that rail is economically and environmentally superior to moving cargo by truck.<sup>154</sup> The Georgia Ports Authority has also

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<sup>147</sup> COALITION FOR HEALTHY PORTS NJ/NY, Evaluation of the Port of New York & New Jersey Clean Trucks Program Rollback (available at: <http://www.movingforwardnetwork.com/2017/07/coalition-for-healthy-ports-shows-dirty-diesel-trucks-are-killing-residents-demands-reinstatement-of-plans-to-ban-the-dirtiest-trucks/>).

<sup>148</sup> *Id.*

<sup>149</sup> *Id.*

<sup>150</sup> *Id.*

<sup>151</sup> *Id.*

<sup>152</sup> U.S. ENVIRONMENTAL PROTECTION AGENCY, Shore Power Assessment at U.S. Ports, at 5 (available at: <https://www.epa.gov/ports-initiative/shore-power-technology-assessment-us-ports>).

<sup>153</sup> *Id.*

<sup>154</sup> *Id.* at 73.

placed an emphasis on moving freight in and out of the ports by rail rather than trucking, noting that 2,000 pounds of freight can be carried 500 miles by rail on a single gallon of fuel.<sup>155</sup>

### ***b. Equipment Idling***

Idling of gas and diesel-powered equipment is a major source of emissions at and near ports. Idle limiting technologies, operational changes to reduce idling and training programs for operators to identify opportunities to reduce idling are being planned for and implemented by ports.<sup>156</sup>

Reservation systems for trucks entering Port gates are also being implemented to reduce truck idling at the Ports.<sup>157</sup> Emissions from vessel engines running during loading and unloading of cargo have historically been a significant contributor to air pollution. Ports and states have worked collaboratively to reduce vessel idling emissions. For example, California Air Resources Board (CARB) regulations require reductions of these emissions by plugging ships into electricity (shore power) and turning off engines during loading and unloading.<sup>158</sup>

### ***c. Vessel Speeds***

Ocean going vessels are the largest source of maritime goods movement related emissions and the Ports have developed incentive programs to encourage deployment of cleaner ships into San Pedro Bay.<sup>159</sup> Slowing vessel speeds decreases energy consumption resulting in fewer emissions.<sup>160</sup> Ports have provided financial incentives to shipping companies that voluntarily lower speeds and ports have expanded these incentives to increase the participation rate.<sup>161</sup>

## **Recommendations for Future Federal Funding Opportunities**

As discussed in Section II above, the federal government provides or points port entities to a wide variety of possible funding opportunities. However, these opportunities and transitions to cleaner technologies are voluntary. The federal government may benefit from requiring that ports begin to phase out older, diesel engines and mandate a quicker transition to electrification within a specified amount of time in order to unlock these federal funding opportunities.

The federal government could fund truck replacements, offer rebates for cargo handling equipment, or encourage ocean-going vessels to make engine, fuel and technology enhancements aimed at reducing emissions. While the EPA Diesel Emissions Reductions Act (DERA) Clean Diesel Funding Assistance Program awards grants for clean diesel projects, the funds cannot be used to fund emissions reductions mandated by federal law. Adjusting this program to allow for federally-mandated emissions reductions would improve its overall effectiveness. While immediate costs will increase, this would be an investment in long-term decarbonization. If the United States begins to transition away from fossil fuel dependence to mitigate the effects of the

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<sup>155</sup> *Id.*

<sup>156</sup> *Id.* at 59.

<sup>157</sup> *Id.* at 78.

<sup>158</sup> *Id.* at 61.

<sup>159</sup> *Id.* at 65.

<sup>160</sup> *Id.*

<sup>161</sup> *Id.*

climate crisis, the source energy for electrified ports will become less carbon-intensive and more cost-effective over time.

Further, the federal government could condition these funds on the adoption of a comprehensive planning scheme, including emissions inventories, equipment replacement programs, and efficiency measures.

If the federal government can increase the amount of funding made available by these opportunities, couple the funding with mandated electrification requirements, and prioritize funding allocations to ports with the most outdated technology and/or at-risk communities living nearby, the East Coast may be able to better emulate the electrification efforts underway at ports along the West Coast.

### **Collaboration**

Ports can also benefit greatly by forming interregional coalitions, consulting stakeholders, and providing meaningful opportunities for community involvement in decision making. For example, the Northwest Seaport Alliance ports have also engaged with the Port Metro Vancouver (Canada) to develop the Northwest Ports Clean Air Strategy to reduce emissions from shipping and port operations.<sup>162</sup> The strategy was first developed in 2007 with emissions reductions goals set for 2020.<sup>163</sup> The strategy was a collaborative development between the Ports, the Puget Sound Clean Air Agency, the US EPA, Environment Canada, Washington State Department of Ecology, as well as industry and community stakeholders.<sup>164</sup> The main goals of the strategy are to reduce DPM emissions by 80% of 2005 levels by 2020 and reduce GHG by 15% of 2005 levels by 2020.<sup>165</sup>

Further, the government should allow for community involvement in decision making processes that affect local air pollution and human health and wellbeing. Near-port communities, which tend to be low-income communities of color who are disproportionately at risk of negative health consequences from port emissions, as well as the port workforce must have a say in the electrification process. Environmental justice concerns have historically been an afterthought in the nationwide regulatory environmental scheme. Giving these concerns a spotlight may increase the local acceptance of electrification efforts and overshadow resistance from the fossil fuel industry or labor industries.

As an example, the San Pedro Bay Ports have recognized that transitioning to a zero emissions future will place a significant burden on the Ports' energy systems and utility grid.<sup>166</sup> Planning in this regard under the 2017 CAAP has focused on developing solutions with working groups that include utility providers to develop detailed energy resource plans.<sup>167</sup> The 2017 CAAP also

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<sup>162</sup> PORT OF SEATTLE, Northwest Ports Clean Air Strategy (available at: <https://www.portseattle.org/page/northwest-ports-clean-air-strategy>).

<sup>163</sup> *Id.*

<sup>164</sup> *Id.*

<sup>165</sup> *Id.*

<sup>166</sup> *Id.* at 82.

<sup>167</sup> *Id.*



recognizes that the Ports need a workforce that can operate and maintain near zero and zero emissions equipment. The Ports have developed training programs in coordination with stakeholders such as the International Longshore and Warehouse Union, the Pacific Maritime Association and the City of Los Angeles Economic Workforce Development Department to meet workforce objectives.<sup>168</sup>

## CONCLUSION

While ports are major sources of air emissions that contribute to climate change and negatively impact the health and wellbeing of those who live near or work for these ports, technological advancements and greater acceptance of emissions reductions strategies have greatly enhanced the capability of ports to reduce emissions through electrification. Our primary recommendation is to incentivize or require ports to engage in long-term, comprehensive planning for significant emissions reductions and infrastructure electrification, with the ultimate goal of reaching near-zero or zero emissions. Each port is unique both geographically and operationally, and while some ports have made significant strides as to port electrification, others have not. In order to effectively encourage all ports to invest in electrification efforts, a mechanism should be contemplated whereby ports must engage in comprehensive emissions reduction planning—including emissions tracking, targeted replacement of equipment, operational efficiency considerations, and meaningful inclusion of stakeholder input—in order to meet certain electrification targets. A hybrid incentive/mandate structure could be crafted to require such comprehensive plans as a condition of qualifying for federal funding to improve or develop port infrastructure and transition a greater number of U.S. ports away from fossil fuels and toward electrification.

### *Disclaimer*

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<sup>168</sup> *Id* at 85, 86.