



Legal Issues in Decarbonizing Shipping and Port Operations

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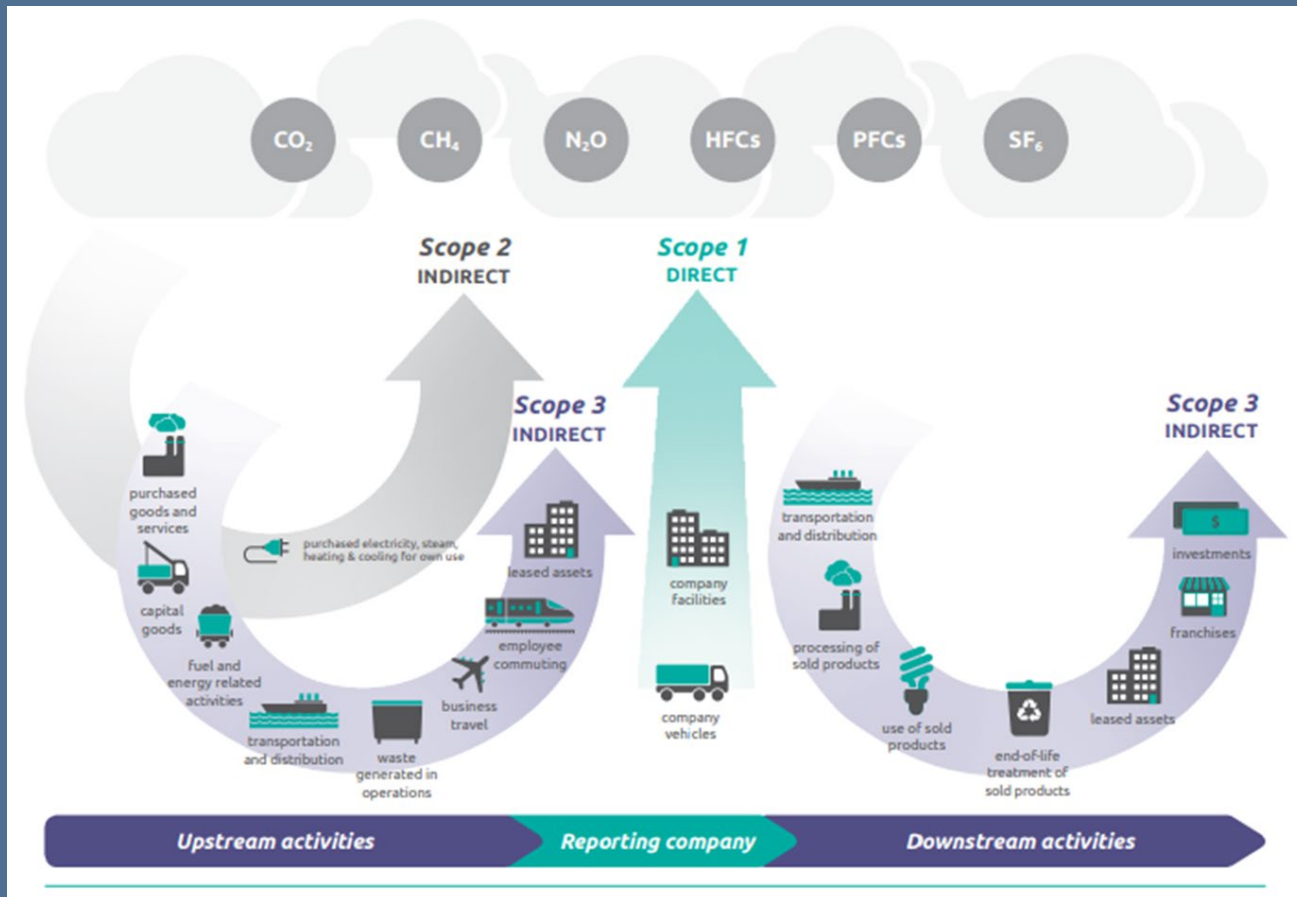
INTRODUCTIONS

SCOPE 1, 2 AND 3 EMISSIONS

- Scope 1 emissions - direct greenhouse gas (GHG) emissions that occur from sources that are controlled or owned by an organization (e.g., emissions associated with fuel combustion in boilers, furnaces, vehicles)
- Scope 2 emissions - indirect GHG emissions associated with the purchase of electricity, steam, heat, or cooling
- Scope 3 emissions - the result of activities from assets not owned or controlled by the organization, but that the organization indirectly impacts in its value chain
- The scope 3 emissions for one organization are the scope 1 and 2 emissions of another organization

Source: United States Environmental Protection Agency, [GHG Inventory Development Process and Guidance](#).

OVERVIEW OF SCOPES AND EMISSIONS ACROSS THE VALUE CHAIN



Source: [WRI/WBCSD Corporate Value Chain \(Scope 3\) Accounting and Reporting Standard \(pdf\)](#), page 5.

STATEMENT OF COOPERATION ON LEADING THE TRANSITION TO AN EQUITABLE AND PROSPEROUS LOW-CARBON, CLIMATE-RESILIENT FUTURE

- In October 2022, California, Oregon, Washington and British Columbia signed a Statement of Cooperation to accelerate the transition to a low-carbon economy, invest in climate infrastructure, and protect communities from climate effects
- Among other things, the parties committed to support the region's maritime ports in their work to decarbonize and modernize equipment and operations
 - Launch a regional dialogue with ports and other levels of government where appropriate about how to achieve collective decarbonization goals through strategies such as electrifying drayage and cargo handling equipment;
 - Invest in infrastructure for shore power that helps reduce emissions from ships; and
 - Pursue strategies to advance low- and zero-carbon shipping, including increased dialogue and coordination with shippers to advance green shipping and the supply chain

Source: Pacific Coast Collaborative, [Statement of Cooperation on Leading the Transition to an Equitable and Prosperous Low-Carbon, Climate-Resilient Future](#).

RECENT FEDERAL ANNOUNCEMENTS

- Last month, the US jointly announced the Green Shipping Challenge, which encourages governments, ports, maritime carriers, cargo owners, and others in the shipping value chain to come forward with concrete steps that will help put the international shipping sector on a credible pathway toward full decarbonization no later than 2050
- As part of the Green Shipping Challenge, the Department of Energy, the Department of Transportation, the Environmental Protection Agency, and the Department of Housing and Urban Development will commence in 2023 the development of a U.S. maritime decarbonization strategy, which will identify the pathways for—and the agency-specific actions that can support—decarbonization of the domestic maritime sector
- The United States is working with countries in the International Maritime Organization (IMO) to include in the revision of the Initial IMO Strategy on the Reduction of GHG Emissions from Ships a goal of phasing out greenhouse gas emissions from international shipping to zero no later than 2050 and goals for 2030 and 2040 that align with the midcentury target

Source: U.S. Department of State, [U.S. Announcements Under the Green Shipping Challenge at COP27](#).

MARPOL ANNEX VI AND THE ACT TO PREVENT POLLUTION FROM SHIPS

- MARPOL, the International Convention for the Prevention of Pollution from Ships developed through the IMO, is the main international agreement covering all types of pollution from ships
- Annex VI of MARPOL addresses air pollution from ocean-going ships
- Annex VI was implemented in the United States through the Act to Prevent Pollution from Ships (APPS)
- Annex VI requirements comprise both engine-based and fuel-based standards, and apply to U.S. flagged ships wherever located and to non-U.S. flagged ships operating in U.S. waters or within 200 nautical miles of the coast of North America
- APPS contains criminal penalties for knowing violations and civil penalties up to \$25,000 per violation

Sources: 33 U.S.C. §§ 1901-1915; [EPA, MARPOL Annex VI and the Act To Prevent Pollution From Ships](#).

REGULATION OF GHGS UNDER ANNEX VI

- In 2021, the IMO's Marine Environment Protection Committee adopted amendments to Annex VI that will require ships to reduce their greenhouse gas emissions
- Beginning in 2023, the measures will require all ships to calculate their Energy Efficiency Existing Ship Index (EEXI) following technical means to improve their energy efficiency and to establish their annual operational carbon intensity indicator (CII) and CII rating (carbon intensity links the GHG emissions to the amount of cargo carried over distance travelled)
- These short-term carbon intensity measures are in line with the ambition of the Initial IMO GHG Strategy, which aims to reduce carbon intensity of international shipping by 40% by 2030, compared to 2008

Source: MEPC 76.

FEDERAL SUPPLIER CLIMATE RISKS AND RESILIENCE RULE

- On November 14, 2022, the Defense Department, the General Services Administration, and the National Aeronautics and Space Administration proposed a rule to amend the Federal Acquisition Regulation (FAR) to implement a requirement to ensure certain Federal contractors disclose their greenhouse gas emissions and climate-related financial risk and set science-based targets to reduce their greenhouse gas emissions
- Under the proposed rule, the largest suppliers, including Federal contractors, receiving more than \$50 million in annual contracts would be required to publicly disclose Scope 1, Scope 2, and relevant categories of Scope 3 emissions, disclose climate-related financial risks, and set science-based emissions reduction targets
- Federal contractors with more than \$7.5 million but less than \$50 million in annual contracts would be required to report Scope 1 and Scope 2 emissions
- All Federal contractors with less than \$7.5 million in annual contracts would be exempt from the rule
- Small businesses with over \$7.5 million in annual contracts would only be required to report Scope 1 and Scope 2 emissions under the proposed rule

Source: Federal Acquisition Regulation: Disclosure of Greenhouse Gas Emissions and Climate-Related Financial Risk, 87 Fed. Reg. 68312 (Nov. 14, 2022).

WASHINGTON'S CLIMATE COMMITMENT ACT

- Builds upon the Climate Pollution Limits bill, which in 2020 set a limit on greenhouse gas (GHG) emitted in the state to 45% below 1990 levels by 2030, 70% below 1990 levels by 2040, and 95% below 1990 levels as well as net-zero emissions by 2050
- The cap-and-invest program sets a limit, or cap, on overall carbon emissions in the state and requires businesses to obtain allowances equal to their covered greenhouse gas emissions
- Exempt emissions sources include aviation and most marine fuels
- Generally, businesses are covered under the program if they generate emissions that exceed 25,000 metric tons of CO₂ equivalent per year

Sources: RCW 70A.45.020, 70A.65.060, 70A.65.080.

WASHINGTON'S CLIMATE COMMITMENT ACT

- When covered entities purchase allowances at auction, revenue is generated and directed towards investments in local communities throughout the state
- Carbon emissions reduction account (CERA) – expenditures intended to affect reductions in transportation sector carbon emissions through a variety of carbon reducing investments, including emission reduction programs for freight transportation, including motor vehicles and rail, as well as for ferries and other maritime and port activities
- Deposits into CERA: FY2023 - \$127,341,000; FY2024 - \$356,697,000; FY2025 - \$366,558,000; FY2026-2037 - \$359,117,000 per year
 - 56% to the climate transit programs account and 24% to the climate active transportation account
- The Legislature is responsible for selecting which projects are funded with auction proceeds

Sources: RCW 46.68.490, 46.68.500, 70A.65.100, 70A.65.240.

INFLATION REDUCTION ACT

- The Inflation Reduction Act includes a new \$3 billion rebate and grant program at the Environmental Protection Agency (EPA) to provide funding for zero-emission port equipment or technology, along with technical assistance for electrification and emissions reductions planning and port climate action plan development
- More specifically, the EPA was appropriated \$3 billion (\$2.25 billion for any area and \$750 million specifically for nonattainment areas) for fiscal year 2022 to remain available until September 30, 2027, to award rebates and grants to eligible recipients on a competitive basis-
 - (A) to purchase or install zero-emission port equipment or technology for use at, or to directly serve, one or more ports;
 - (B) to conduct any relevant planning or permitting in connection with the purchase or installation of such zero-emission port equipment or technology; and
 - (C) to develop qualified climate action plans.

Sources: 42 U.S.C. 7433; EPA, [Events Related to EPA Ports Initiative](#).

INFLATION REDUCTION ACT

- The term “zero-emission port equipment or technology” means human-operated equipment or human-maintained technology that-(A) produces zero emissions of any Clean Air Act criteria pollutant (or any precursor to such an air pollutant) and any greenhouse gas other than water vapor; or (B) captures 100 percent of such emissions that are produced by an ocean-going vessel at berth
- EPA will administer the grant program and is currently conducting public outreach scoping sessions

Sources: 42 U.S.C. 7433; EPA, [Events Related to EPA Ports Initiative](#).

BIPARTISAN INFRASTRUCTURE LAW

- The Bipartisan Infrastructure Law designated \$450 million annually for five years (FY2022-2026) for the Port Infrastructure Development Program, a discretionary grant program administered by the U.S. Maritime Administration
- Eligible projects can fall into one of four categories:
 - Loading and unloading of goods at a port
 - Movement of goods into, out of, around, or within a port
 - Resilience (such as projects addressing rising sea-level, flooding, extreme weather events, natural disasters)
 - Environmental and emissions mitigation measures (such as projects to reduce or eliminate port-related pollutants or greenhouse gas emissions)

Sources: Public Law 117-58; U.S. Maritime Administration, [Bipartisan Infrastructure Law: Maritime Administration](#).

CALIFORNIA'S AT-BERTH REGULATIONS

- 2007 Rule:
 - Compliance requirements began in 2014, phased in over time
 - Applied to container ships, cruise ships, and reefer ships
- 2020 Rule
 - Applies to 100% of vessel visits (2023) (with exception allowances)
 - Adds auto carriers (2025) and tankers (2025 (Port of Los Angeles and the Port of Long Beach) and 2027 (Northern California))
- The rule requires that every vessel coming into a regulated California port either use shore power (e.g., plug in to the local electrical grid) or a California Air Resources Board-approved control technology to reduce harmful emissions

Source: 17 CCR 93130-93130.22.

OVERVIEW OF PORT OPERATIONS



Lines of Business

- 1) Traditional waterfront cargo operations
- 2) Marinas
 - Commercial fishing
 - Recreational vessels
 - Tour boats
- 3) Airports
- 4) Rental properties
 - Shoreside storage facilities for fuel (ex. Tote and LNG in Tacoma)
 - Property for the development of new fuels (ex. NWIW in Kalama)

MARINE TERMINAL CARGO OPERATIONS

Large

- Northwest Seaport Alliance: Seattle & Tacoma container operations

Medium

- Break bulk ports: Longview, Kalama, Vancouver, Everett, Tacoma, Olympia, Grays Harbor and others.

Focus

- Port equipment
- Shore power or “Cold Ironing” vessels
- Drayage
- Fueling infrastructure

NWSA

Port equipment – Tariffs, Leases with Stevedores or Carriers

- Container cranes fully electric
- Pre-commercial stage for most yard equipment (RTGs, Top Picks)

Shore Power – Tariffs, Agreements with Carriers

- Dedicated vessels

Drayage – Longstanding and continuing efforts

Fueling Infrastructure – Development Agreements, Leases



BREAK-BULK AND BULK PORTS

Port equipment

Tariffs, Agreements with Shippers

- Mobile equipment – difficult to retrofit away from diesel
- Pre-commercial stage for most yard equipment (RTGs, Top Picks)

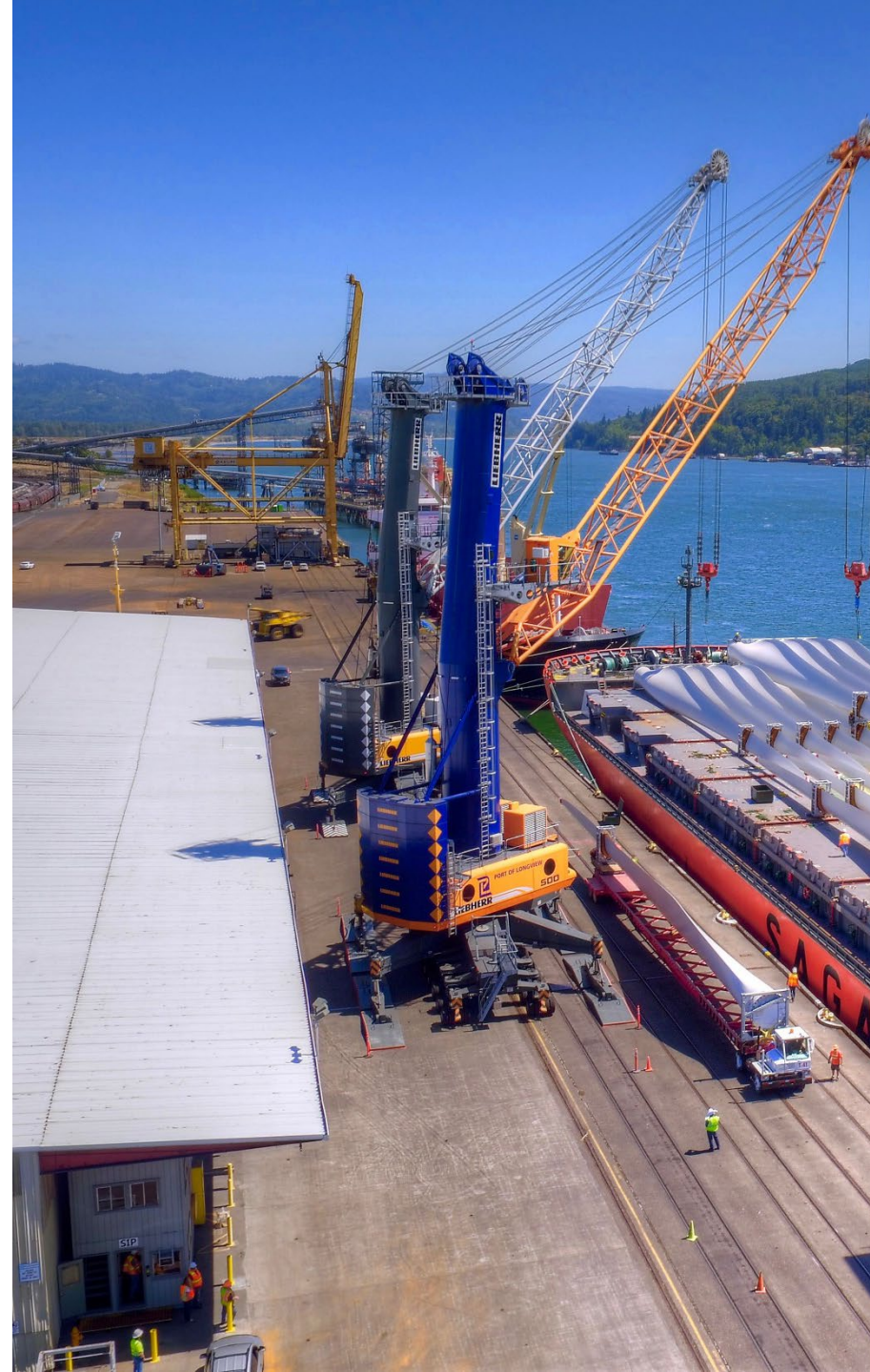
Shore Power - N/A ?

- Tramp vessels

Drayage – not much change

Fueling Infrastructure

Development Agreements, Leases



BREAK-BULK AND BULK PORTS

Port equipment – Tariffs, Agreements with Shippers, Procurement Agreements

- Mobile equipment – difficult to retrofit
- Pre-commercial stage for most yard equipment (RTGs, Top Picks)

Shore Power – N/A ?

- Tramp vessels

Drayage – not much change

Fueling Infrastructure –
Development Agreements,
Leases





The Future of Sustainable Shipping Port Services

Paving the way for net-zero emissions

Our Mission.

“Crowley is on a mission to become the most sustainable and innovative maritime, logistics company in the Americas.”

Tom Crowley, chairman and CEO, Crowley

Creating the Port of the Future.

As we plan for the future of sustainable shipping and the push to net-zero emissions, we need to consider how our current infrastructure can support the transition to cleaner energy.

This means:

- Building and utilizing zero-emission vessels in port.
- Identifying gaps in clean energy refueling sources to support vessels operating on electric and hydrogen power.
- Implementing sustainable practices in design and construction, operations, and administrative practices.
- Adopting new technologies to reduce emissions in port.

Changing to Create the Port of the Future.

As we plan for the future of sustainable shipping and the push to net-zero emissions, we need to consider what we need to change.

This means:

- Commercial Relationships will become more collaborative and less competitive.
- Regulation promotes innovation through performance standards and minimized technology requirements.
- Regulation that is responsive to innovation.
- Asset Optimization focus versus open entry for port services, infrastructure, marine assets and central control.
- Government incentives for innovation through grants, funding and commercial arrangements.

Technology Challenges for the Port of the Future.

As we plan for the future of sustainable shipping and the push to net-zero emissions, we need to consider how our current infrastructure will need to change to support the transition to cleaner energy. Maritime propulsion has gone through 3 changes over the last 1500 years, wind, steam, internal combustion. We will see 4 or more changes over the next 40 years.

This means:

- Selecting technology today for an asset lifetime of 30+ years
- Which technology do we choose for an asset lifetime, which fuel? Internal combustion engine, fuel cell, battery, diesel, LNG, methanol, ammonia, formic acid, hydrogen and carbon capture and sequestration.
- Managing technology change requires engineering in flexibility.
- Ports need to provide infrastructure to support a technology horizon that is mixed and changing with decisions today.

Innovation. Sustainability. Performance.

- E-Wolf - the first Jones Act-compliant, all-electric powered harbor tugboat.
- Fully electric with full performance capabilities – and zero carbon emissions.
- 82-foot vessel with 70 tons of bollard pull.
- Versus a conventional tug - over the first 10 years of its use, the operation of the new e-tug will reduce:
 - 178 tons of nitrogen oxide (NOx)
 - 2.5 tons of diesel particulate matter
 - 3,100 metric tons of carbon dioxide (CO2)
- Replaces conventional tugs that consume more than 30,000 gallons of diesel per year.





Port Shoreside Charging

- 3 MWh of battery storage will manage the impact to the grid during peak demand times.
- 78 kW of solar power to enhance renewable, clean energy performance and results.
- Scalable, the charging system can be adapted and expanded as new zero-emission vessels are built in the future.
- Designed for the capability to use energy from any fuel cell source or hydrogen, ammonia or methanol.



PORT MARITIME
CONTROL CENTER

HYDROGEN STORAGE

CHARGING FACILITIES
For E-tug and other Electric Vessels

HYDROGEN & BATTERY POWER BARGES
Mobile power grid for deployment anywhere inside
the port or inside anchorage – Vessels and E-Tugs



E-TUG

EMISSIONS
BARGE

Emission-free E-Tugs tow emission-reducing barges into place for an effective, Environmentally effective solution to container vessel emissions treatment.

E-TUG / EMISSIONS BARGE



E-TUG / EMISSIONS BARGE MICRO-GRID