

EXECUTIVE SUMMARY

Charting the Course to Zero: Port of Seattle’s Maritime Climate and Air Action Plan (the Plan) is a comprehensive plan to address climate change and air pollution from maritime sources. It charts the course to achieve the Port of Seattle’s (the Port) Century Agenda targets for maritime-related greenhouse gas (GHG) emission reduction and implement the 2020 Northwest Ports Clean Air Strategy (2020 Strategy) vision to phase out emissions from seaport-related sources by 2050. The Plan was created to address the urgency of the climate crisis and the needs of near-port communities in Seattle that are disproportionately impacted by air pollution. The Plan identifies strategies and actions the Port will take to reduce maritime-related air and GHG emissions in the next ten years towards a vision of zero emissions by midcentury. It covers GHG emission sources related to administrative operations of the Port’s Maritime and Economic Development Divisions, such as energy used in port buildings, fuel used in fleet vehicles and equipment, and emissions associated with employee commuting and solid waste transportation and disposal. It also covers air pollutant and GHG emission sources from Port Maritime tenants and the maritime supply chain, such as cruise sailings, grain terminal operations, commercial fishing, and recreational marinas. In addition to emission reduction opportunities, the plan encompasses the future carbon sequestration potential of the Port’s shoreline and habitat restoration programs.

The Plan does not include GHG, or air pollutant emissions associated with Seattle-Tacoma International Airport (SEA Airport) administration, airlines, tenants, or ground transportation, as SEA Airport creates its own separate plans and inventories to track and address these sources. The Plan also excludes emissions from the Northwest Seaport Alliance’s (NWSA) lines of business, such as container trucks.

 <p>Port of Seattle</p> <p>Maritime Businesses</p> <ul style="list-style-type: none"> • Cruise operations • Grain cargo operations • Commercial and recreational marina operations • Commercial and industrial real estate 	 <p>THE NORTHWEST SEAPORT ALLIANCE</p> <p>Port maritime lines of business managed by The Northwest Seaport Alliance (a marine cargo operating partnership of the Port of Seattle and Port of Tacoma):</p> <ul style="list-style-type: none"> • Containerized cargo operations • Breakbulk and bulk (non-grain) cargo operations
 <p>SEA Seattle-Tacoma International Airport</p>	

While this Plan provides detail on how the Port will address the 2020 Strategy objectives, implementation, and the specific actions the Port will take will continue to be defined by ongoing engagement with near-port communities, government agencies, and maritime industries.

The Port's greenhouse gas reduction targets

In 2017, the Port Commission adopted GHG reduction targets that aligned with the Paris Climate Agreement. The Port's targets include a critical interim goal to cut emissions in half by 2030. The targets also entail a long-range commitment to "decarbonize" maritime activity and make Port operations carbon neutral or carbon negative by 2050 and reduce Port-influenced emissions by 80% by 2050.¹ Subsequently, the International Panel on Climate Change (IPCC) released a Special

Report stating that climate change impacts could be significantly reduced by limiting global warming to 1.5 degrees Celsius, and demonstrating that reaching net-zero carbon by 2050 is imperative.² This Plan is based on the 2020 Strategy vision for 2050 which incorporates the latest IPCC recommendations.

SCOPES 1 AND 2

Port-controlled and Port indirect emissions

- 15 percent below 2005 levels by 2020
- 50 percent below 2005 levels by 2030
- Carbon neutral OR carbon negative by 2050

SCOPE 3

Port-influenced, but not directly controlled

- 50 percent below 2007 levels by 2030
- 80 percent below 2007 levels by 2050

Community health and equity considerations


The adverse effects of climate change are more likely to be borne by historically marginalized communities, including Black, Indigenous, and people of color (BIPOC). In addition, BIPOC communities are also disproportionately exposed to air pollution and other environmental hazards. Although King County meets national air quality standards, the Port recognizes that pollution exposure, access to economic opportunity, and human health vary based on where people live. In Seattle, communities in the Duwamish Valley bear a disproportionate burden of health impacts and environmental injustices compared to other areas of the city. In 2019 The Port demonstrated its commitment to equity, diversity, and inclusion through adoption of Port Commission Resolution 3767, the Duwamish Valley Community Benefits Commitment, and creation of an Office of Equity, Diversity, and Inclusion. This Plan furthers these initiatives by identifying actions and investments needed to combat global climate change and address air pollution faced by near-port communities.

¹ This Plan uses the terms "carbon" and "greenhouse gas" interchangeably, unless otherwise noted.

² IPCC, 2018. [Summary for Policymakers](#). An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.). In Press.

The Northwest Ports Clean Air Strategy 2020 vision

For more than a decade, the Port has worked collaboratively with regional ports, government, community, and industry partners to reduce seaport-related air pollution and GHG emissions. With the release of the 2020 Strategy, the Port continues its commitment to work jointly with the NWSA, the Port of Tacoma, and the Port of Vancouver (Canada) to phase out emissions in the ports' shared airshed. The ports recognize that broad, transformative changes are needed to reduce the impacts of seaport-related emissions on public health and limit global climate change as soon as possible, and that ports must play a key role in enabling those changes. The updated 2020 Strategy reflects a new vision that acknowledges the urgency of the climate crisis and the need to reduce and ultimately eliminate air pollution in communities that experience environmental health disparities.



Phase out emissions from seaport-related activities by 2050, supporting cleaner air for our local communities and fulfilling our responsibility to help limit global temperature rise to 1.5°C.

Port emission sources

Port emissions include Port-owned or controlled sources (GHG Scope 1), indirect emissions from purchased electricity (GHG Scope 2), and Port-influenced sources (GHG Scope 3). This Plan addresses all three scopes, but sorts emissions into two main categories which overlay the scope designations: Port Maritime Administration and Maritime Activity.

Port Maritime Administration sectors covered by this Plan include Port-owned buildings and campuses, fleet vehicles and equipment, solid waste generated by the Port and its tenants, and Port employee commuting. Although these sources account for only 6% of the Port's total emissions, the Port has control or influence in these areas.

Maritime Activity sectors covered by this Plan include cruise and grain ships, harbor vessels (tugboats, commercial fishing vessels, and recreational vessels), locomotives, trucks (including cruise buses), and cargo-handling equipment. These sectors account for 94% of the Port's emissions. However, the Port does not own the vessels, vehicles, and equipment. Addressing these emissions will require collaboration with tenants and industry. This Plan details the Port's strategies to encourage the development of new technologies and partner with tenants and industry to meet reduction targets.

Table ES-1. Emission sectors by level of control (GHG Scopes)

Category/Sector	% of Scopes 1 and 2 emissions	% of Scope 3 emissions	% of Total emissions (2019)
Port Maritime Administration			
Building and Campus Energy – assigned to Port	51%		2%
Building and Campus Energy – assigned to tenants	16%	1%	1%
Fleet Vehicles and Equipment	32%		1%
Employee Commuting		1%	1%
Solid Waste			<1%
Maritime Activity			
Ocean-going Vessels (OGVs)		77%	74%
Harbor Vessels		14%	14%
Cargo-handling Equipment		<1%	<1%
Trucks		<1%	<1%
Rail		6%	6%

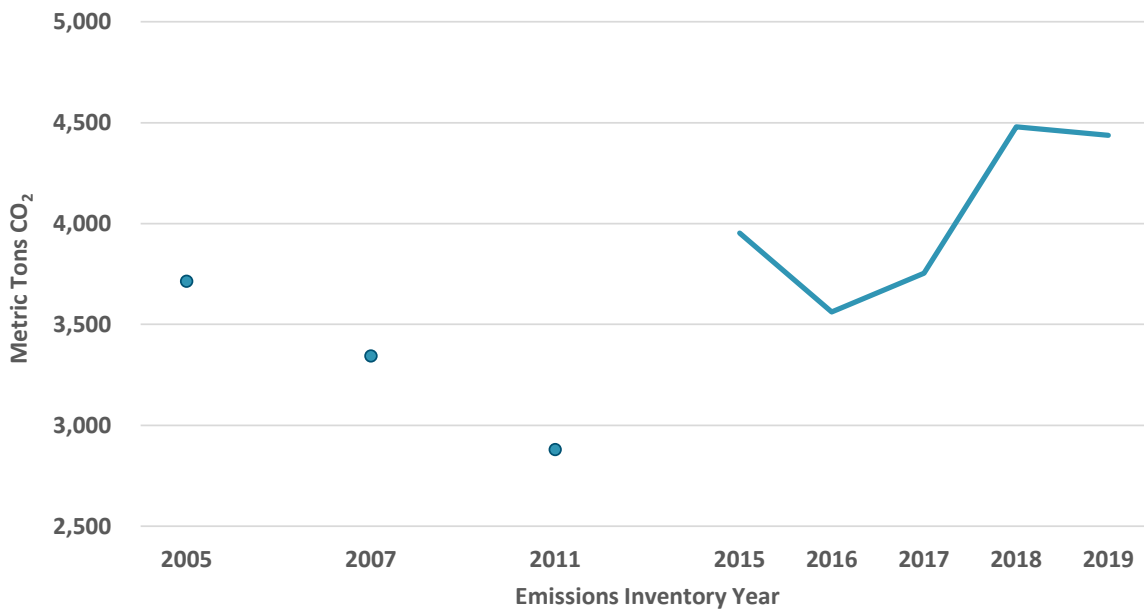
Emission trends

In 2019, Port Maritime emissions of GHG totaled 78,688 metric tons (MT) of carbon dioxide (CO₂). Without adopting aggressive strategies, emissions could grow by over 20% by 2030, under a business-as-usual scenario that includes projected business growth and no new actions to address climate change or air pollution.³

Port Maritime Administration sectors have not made consistent progress toward the Port’s emission reduction targets since the 2005 baseline year, despite improvements in some areas. Most of the increase is from building and campus energy use.

³ This analysis did not consider COVID-19 impacts, which are discussed later in the Plan.

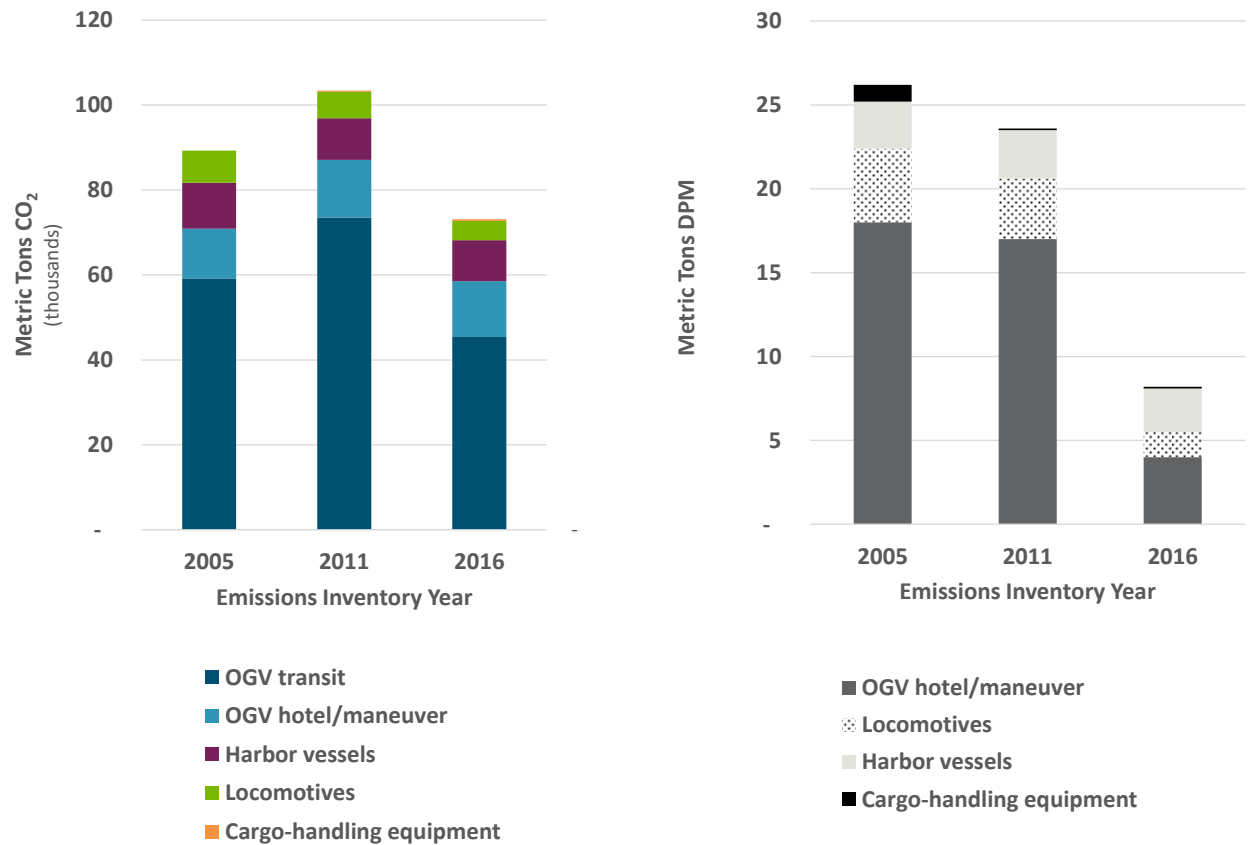
Figure ES-1. Annual GHG emissions from Port Maritime Administration sources 2005 – 2019.



Emissions were inventoried for the Port’s Century Agenda milestone years: 2005, 2007, and 2011, and annually since 2015. Note: the scale along the vertical axis has been narrowed to highlight the small changes in recent years.

Air pollutant and GHG emissions from **Maritime Activity** sectors have declined significantly since 2005. Emissions from these sources are measured every five years in the Puget Sound Maritime Air Emissions Inventory. The most recent inventory of Maritime Activity sectors was completed for the year 2016. Maritime Activity emissions were lower for all air pollutants and GHG in 2016 compared to 2005. Regulatory changes requiring the use of low sulfur fuel and more advanced pollution controls over this period resulted in a steep reduction in diesel particulate matter (DPM) and other air pollutants. GHG emissions declined due to lower cargo throughput, vessel efficiency improvements, and turnover to cleaner and electric cargo-handling equipment.

Figure ES-2. Annual GHG and DPM emissions from Maritime Activity sources 2005 – 2016.



Emissions were inventoried in the Puget Sound Maritime Air Emissions Inventories for years 2005, 2011, and 2016.

Strategies to reduce impacts

The Plan identifies a set of ambitious, timely strategies and actions to be taken by 2030 for both Port Maritime Administration and Maritime Activity sectors to decrease GHG and air pollutant emissions and keep on track to reach zero emissions by 2050. Strategies and actions align across the following themes:

- Transition from fossil-based energy to zero-emission energy in Port maritime administration and facilitate the transition for maritime industries
- Continually reduce energy use and emissions in the interim to proactively address the impacts of climate change and air quality on community health
- Involve communities in decision-making and take an equity approach to climate and air emissions reductions
- Advance policy, funding, and technology development for climate and clean air action through partnerships
- Leverage habitat restoration projects to sequester carbon, among other benefits.

The strategies in the Plan represent one path to achieve the 2030 goal of 50% GHG reduction and reduce air emissions in the next 10 years and will be refined in updates as more information becomes available.

Section 3 of the Plan highlights 23 strategies across five sectors to reduce GHG emissions from Port Maritime Administration sources. Implementing these strategies will reduce annual 2030 emissions by almost 1,400 MT (CO₂), which will collectively reduce Port Maritime Administrations emissions by 50% from the baseline level.

Section 4 of the Plan identifies 19 strategies across 5 Maritime Activity sectors. Reducing emissions from Maritime Activity sources is especially challenging because the Port does not own the own the vessels, vehicles, and equipment and must collaborate with tenants and industry partners to effect change. Equally important is the fact that zero-emission pathways for some sectors are not yet developed or demonstrated for port applications.

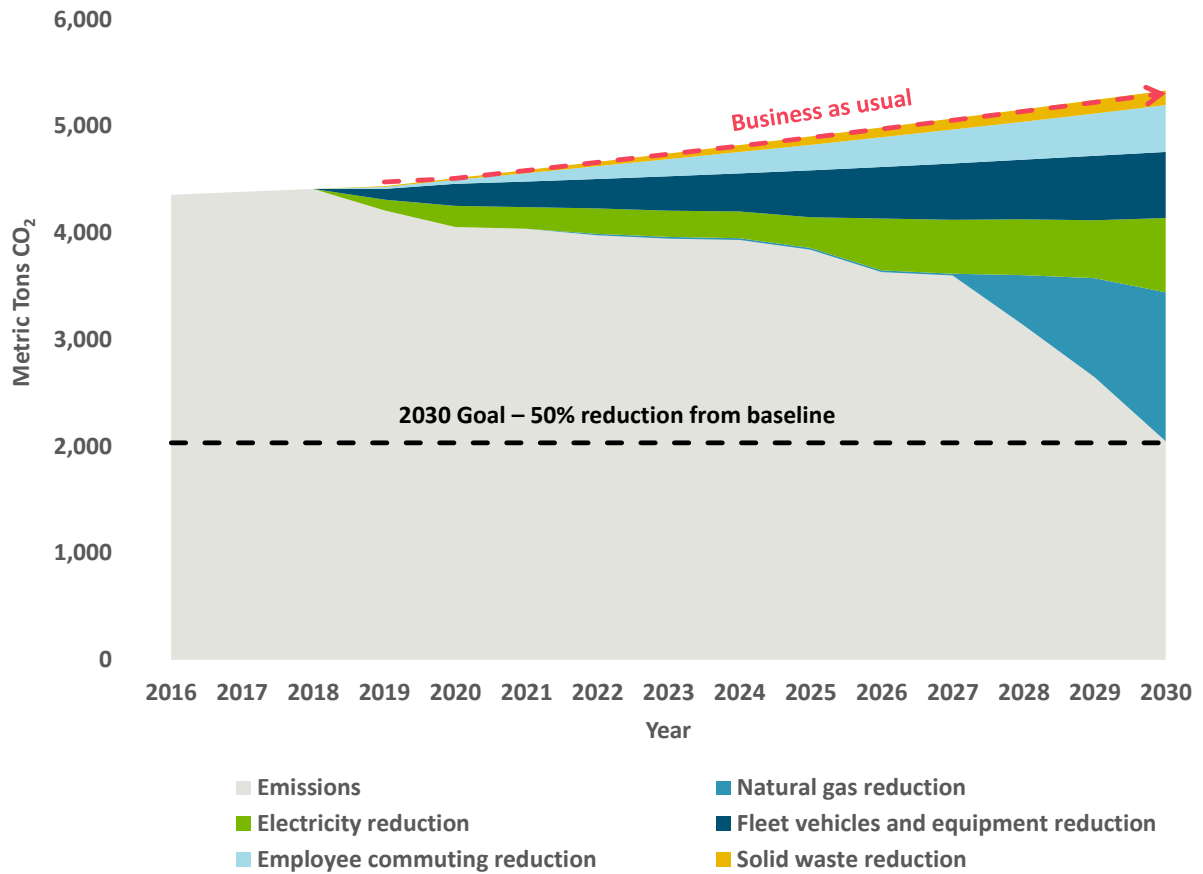
In addition to sector-specific strategies, Section 4 includes cross-sector strategies that take a holistic approach to emission reduction efforts and will enable future action across the board. These strategies are foundational to achieving deep decarbonization in Maritime Activity sectors, focusing on cross-industry energy planning; sustainability requirements in leases; regulatory policy advocacy; and engagement with community, industry, and government.

To keep on course to attain the 2050 vision, implementation of Maritime Activity strategies will need to reduce annual GHG emissions by at least 37,000 MT CO₂/year by 2030, which will collectively reduce Maritime Activity emissions by 50% from the baseline level. Actions taken will also reduce DPM emissions by 2030.

Key Objectives by 2030

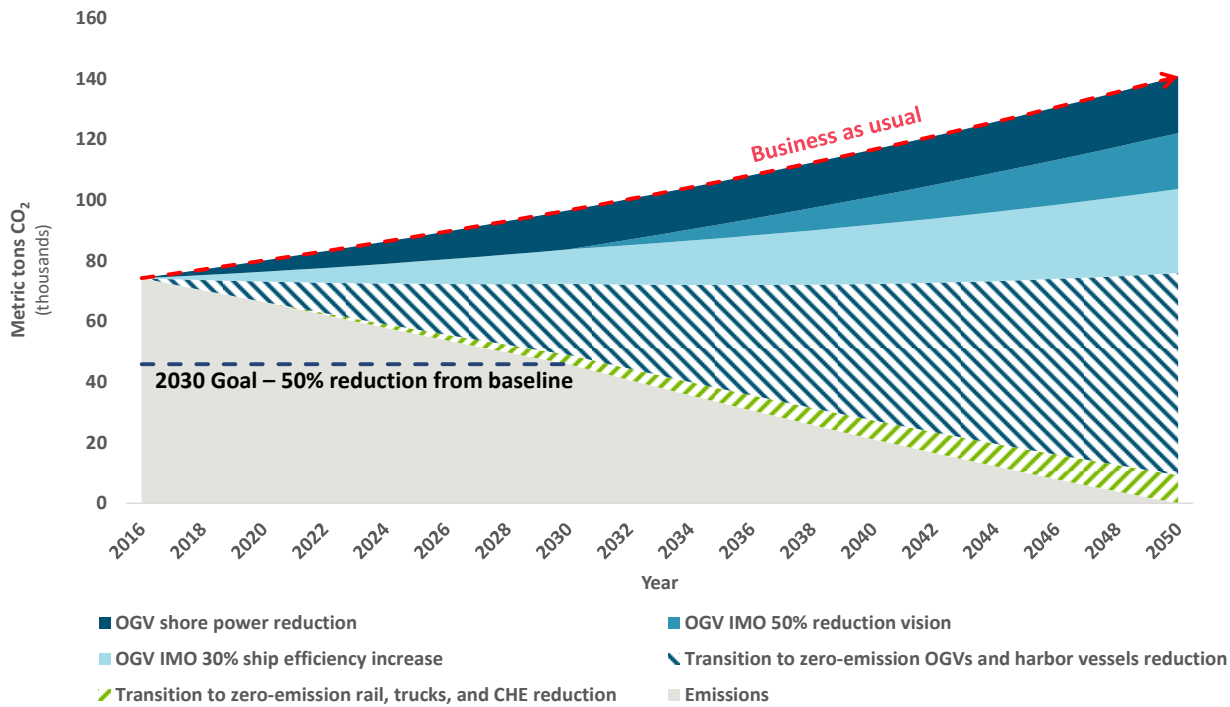
- Continual engagement with community, industry, and government to reduce emissions
- 100% of Port-owned light-duty vehicles are electric or use renewable fuels
- No fossil natural gas use in Port-owned buildings
- Shore power infrastructure installed at all cruise ship berths
- 100% of homeport cruise ship calls connect to shore power
- The Seattle Waterfront Clean Energy Strategic Plan has established industry and utility partnerships to address key constraints and deploy enabling infrastructure for zero-emissions equipment, locomotives, vehicles, vessels and buildings.

Figure ES-3. Annual GHG emissions from Port Maritime Administration projected to 2030.



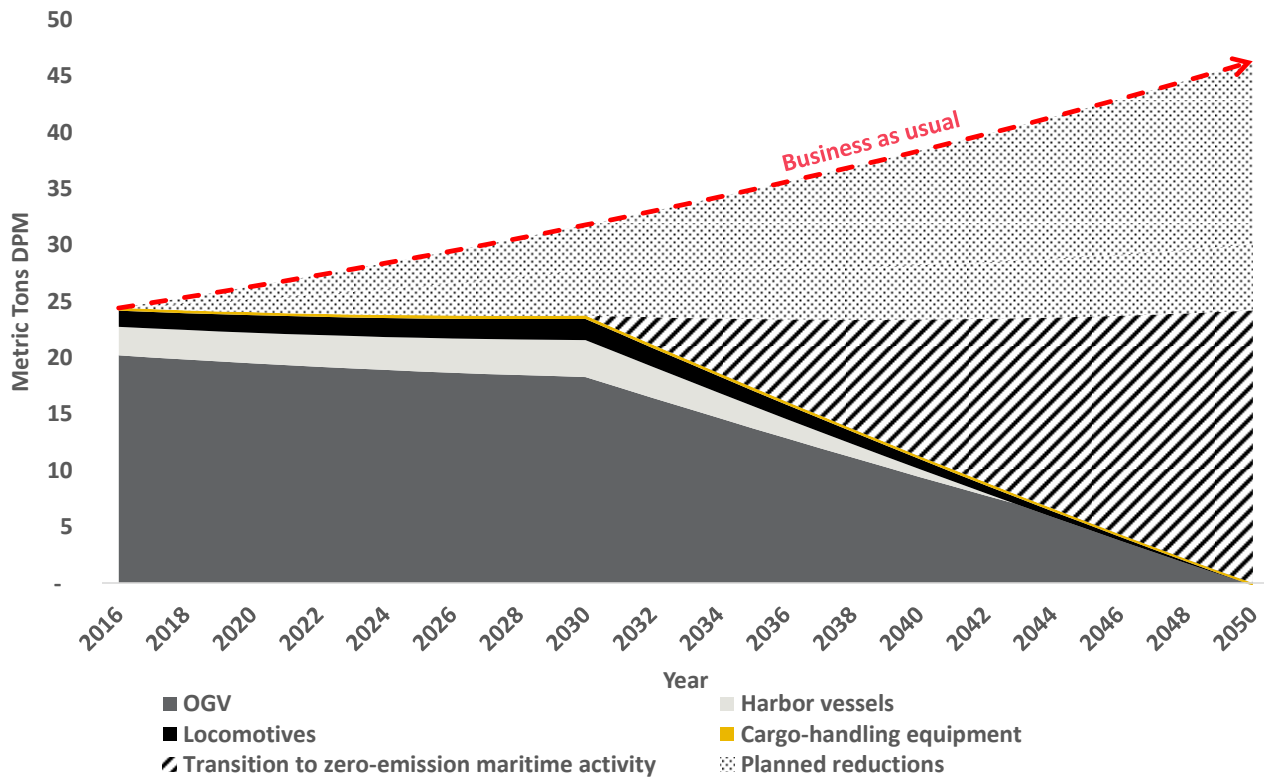
Annual emissions from Port Maritime Administration will continue increasing through 2030 under a business-as-usual scenario that includes projected growth and assumes that no further emission reduction actions are taken. The strategies identified in this Plan can reduce Port Maritime Administration emissions by 50% to meet the Port’s 2030 GHG reduction target.

Figure ES-4. Maritime Activity Future GHG Emissions Projection and 2050 Reduction Potential.



Annual emissions from Maritime Activity will continue increasing through 2050 under a business-as-usual scenario that includes projected growth and assumes that no further emission reduction actions are taken. The strategies identified in this Plan can reduce Maritime Activity GHG emissions by approximately half. Transition to zero-emission maritime activity represents reductions from strategies in this plan that are not quantified, and new/innovative technologies that will be required to meet the 2050 Northwest Ports Clean Air Strategy vision. These strategies include the International Maritime Organization (IMO) 30% vessel efficiency mandate, and the overall IMO goal to reduce shipping emissions by 50% (inclusive of vessel efficiency improvements) by 2050.

Figure ES-5. Maritime Activity Future DPM Emissions Projection and 2050 Reduction Potential.



Annual DPM emissions from Maritime Activity will continue increasing through 2050 under a business-as-usual scenario that includes projected growth and assumes that no further emission reduction actions are taken. The strategies identified in this Plan can reduce Maritime Activity DPM emissions by approximately half. Transition to zero-emission maritime activity represents reductions from strategies in this plan that are not quantified, and new/innovative technologies that will be required to meet the 2050 Northwest Ports Clean Air Strategy vision.

Table ES-2. Emission reduction strategies and emission reduction potential related to the Port's 2030 GHG reduction goals.

Port Maritime Administration Strategies		
Building and Campus Energy	2019 Emissions: 2,480 MT CO ₂	GHG Scopes: 1, 2, 3
GHG Reduction Strategies		Approximate Annual MT CO ₂ Reduction Potential by 2030
BC1: Eliminate fossil natural gas		1,400
BC2: Implement energy audit conservation measures		380
BC3: Install energy efficient lighting and controls		200
BC4: Reduce plug loads and upgrade controls		70
BC5: Maximize use of renewable energy		40
BC6: Advance energy data management and planning		Critical to Other Efforts
BC7: Apply high performance lease terms		
BC8: Strengthen energy conservation communication and education		

BC: Building and Campus Energy

Fleet Vehicles and Equipment	2019 Emissions: 896 MT CO ₂	GHG Scope: 1
GHG Reduction Strategies		Approximate Annual MT CO ₂ Reduction Potential by 2030
FV1: Use drop-in renewable fuels		300
FV2: Transition to electric vehicles		250
FV3: Right-size vehicles and fleet		75
FV4: Use technology to gather data and improve efficiency		Critical to Other Efforts
FV5: Educate Port drivers on eco-driving and fleet use practices		

FV: Fleet Vehicles and Equipment

Employee Commuting	2019 Emissions: 800 MT CO ₂	GHG Scope: 3
GHG Reduction Strategies		Approximate Annual MT CO ₂ Reduction Potential by 2030
EC1: Encourage use of flexible work arrangements		220
EC2: Update employee commute benefits for low-emission commutes		130
EC3: Expand employee communication and education		40
EC4: Continue to advocate for better transportation access		40

EC: Employee Commuting

Solid Waste	2019 Emissions: 198 MT CO ₂	GHG Scope: 3
GHG Reduction Strategies		Approximate Annual MT CO ₂ Reduction Potential by 2030
SW1: Maximize diversion of common recyclables and organics		60
SW2: Minimize solid waste generation		60
SW3: Expand specialized items recycling		15
SW4: Enhance communications with employees and tenants		Critical to Other Efforts

SW: Solid Waste

Habitat Restoration and Carbon Sequestration		
GHG Reduction Strategies		Approximate Annual MT CO ₂ Reduction Potential by 2030
HR1: Complete Smith Cove Blue Carbon Benefits Study		To Be Determined
HR2: Continue shoreline restoration projects		

HR: Habitat Restoration and Carbon Sequestration

Maritime Activity and Cross-Sector Strategies		
GHG and DPM Reduction Strategies		Approximate Annual MT CO ₂ Reduction Potential by 2030
XS1: Facilitate cross-industry planning		Critical to Other Efforts
XS2: Leverage green lease terms		
XS3: Advocate for local, state, and federal policy and funding		
XS4: Engage with community, industry, and government		

XS: Cross-Sector

Waterside: Ocean-Going Vessels and Harbor Vessels	2019 Emissions: 69,323 MT CO ₂	GHG Scope: 3
GHG and DPM Reduction Strategies		Approximate Annual MT CO ₂ Reduction Potential by 2030
OGV1: Install shore power at all major cruise berths		13,000
OGV2: Support international efforts to phase out emissions from OGV		To Be Determined
OGV3: Support OGV efficiency improvements and emission reductions		
HV1: Provide infrastructure for zero-emission HV by 2030		Critical to Other Efforts
HV2: Support accelerated turnover of HV to zero-emission models		To Be Determined
HV3: Support HV efficiency improvements and emission reductions		

HV: Harbor Vessels

OGV: Ocean-going Vessels

Landside: Cargo-Handling Equipment, Trucks, and Rail	2019 Emissions: 4,909 MT CO ₂	GHG Scope: 3
GHG and DPM Reduction Strategies		Approximate Annual MT CO ₂ Reduction Potential by 2030
CHE1: Provide infrastructure for zero-emission CHE by 2030		Critical to Other Efforts
CHE2: Support adoption of zero-emission CHE by 2050		To Be Determined
CHE3: Support CHE efficiency improvement and emission reductions		
TR1: Provide infrastructure for zero-emission trucks by 2030		Critical to Other Efforts
TR2: Support adoption of zero-emission trucks by 2050		To Be Determined
TR3: Support truck efficiency improvements and emission reductions		
RR1: Provide infrastructure for zero-emission on-terminal rail by 2030		Critical to Other Efforts
RR2: Support adoption of zero-emission rail by 2050		To Be Determined
RR3: Support rail efficiency improvements and emission reductions		

CHE: Cargo Handling Equipment

TR: Trucks

RR: Rail Locomotives

At the sector level, the table shows 2019 GHG emissions, and GHG Scope designation. For each strategy, the table lists the approximate potential GHG emission reduction in 2030 (based on projected 2030 emissions levels which incorporate business growth assumptions).

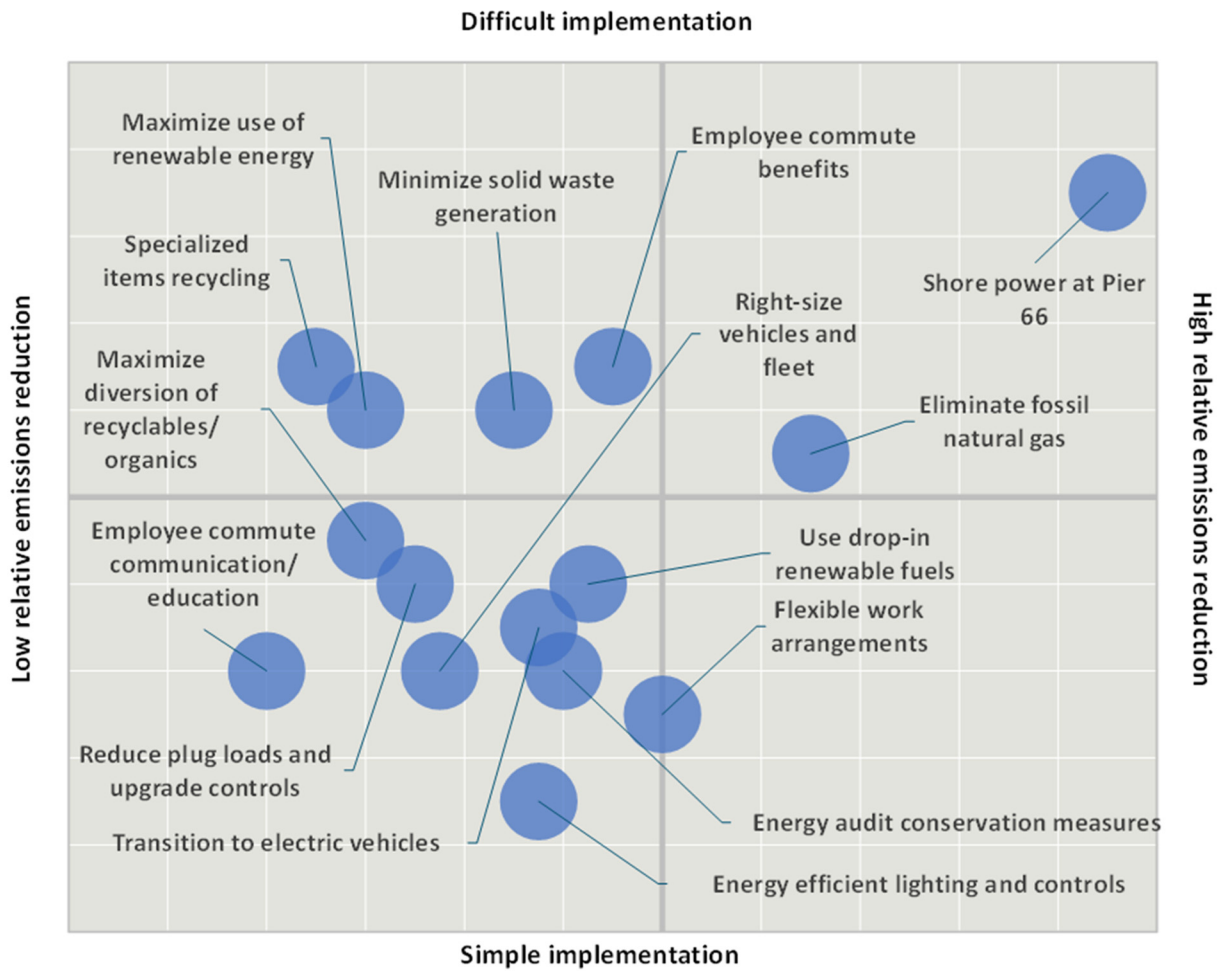
Implementation

The Port cannot fully implement the Plan alone. Collaboration throughout the region and with a coalition of partners is essential. The Port will continue to collaborate with the NWSA, Port of Tacoma and Port of Vancouver (Canada) to implement the 2020 Strategy. The Port will also continue to engage partners and support partner-led efforts across the port network, including with port tenants, industry, governments, non-governmental organizations, and near-port communities. When implementing the Plan, the Port will advance its commitment to collaboration with Duwamish Valley community members to identify projects and priorities of greatest impact and value in regions that need clean air and climate action most.

Implementation will also require a significant amount of leadership, innovation, and investment by the Port and by others. Actions proposed in the Plan will be evaluated and prioritized for implementation based on sustainability, cost, equity impacts, and emission reduction potential, per the Port’s Sustainable Evaluation Framework policy.

Tracking and reporting on progress is another key to successful implementation. The Plan relies on emissions inventory data to assess emission trends and to quantify impacts of strategy implementation. As more information is gathered—for example, impacts of the COVID-19 pandemic—the Port will revise emission inventory results and emission projections. The Plan also includes performance metrics that will be used to gauge annual progress in meeting targets and objectives. Progress reports will be published annually, and the Plan will be updated as needed. The Port will take an adaptive management approach to monitoring, reporting, and reviewing the Plan, which is consistent with the 2020 Strategy framework.

Figure ES-6. Estimated GHG reductions and implementation difficulty for strategies.



The strategies in the Plan are distributed according to relative emission reduction and implementation difficulty. Implementation difficulty incorporates cost, technology maturity, and the Port's control over the emissions and implementation of the strategy. The implementation and reduction rubrics are discussed in Appendix C.