Regulatory Announcement

Designation of North American Emission Control Area to Reduce Emissions from Ships

The International Maritime Organization has officially designated waters off North American coasts as an area in which stringent international emission standards will apply for ships. These standards will dramatically reduce air pollution from ships and deliver substantial air quality and public health benefits that extend hundreds of miles inland. This fact sheet contains an overview of this new geographic emissions control program.

Overview

On March 26, 2010, the International Maritime Organization (IMO) amended the International Convention for the Prevention of Pollution from Ships (MARPOL) designating specific portions of U.S., Canadian and French waters as an Emission Control Area (ECA). The proposal for ECA designation was introduced by the U.S. and Canada, reflecting common interests, shared geography and interrelated economies. In July 2009, France joined as a co-proposer on behalf of its island territories of Saint-Pierre and Miquelon, which form an archipelago off the coast of Newfoundland. Allowing for the lead time associated with the IMO process, the North American ECA will become enforceable in August 2012.

Ships are significant contributors to the U.S. and Canadian mobile-source emission inventories, though most are flagged or registered elsewhere. Ships complying with ECA standards will reduce their emissions of nitrogen oxides (NOx), sulfur oxides (SOx), and fine particulate matter (PM2.5). In 2020, emissions from these ships operating in the ECA are expected to be reduced annually by 320,000 tons for NOx, 90,000 tons for PM2.5, and 920,000 tons for SOx, which is 23 percent, 74 percent, and 86 percent, respectively, below predicted levels in 2020 absent the ECA. The overall cost of the North American ECA is estimated at $3.2 billion in 2020, while

EPA United States Environmental Protection Agency

Office of Transportation and Air Quality
EPA-420-F-10-015
March 2010

its benefits are expected to include preventing as many as 14,000 premature deaths and relieving respiratory symptoms for nearly five million people each year in the U.S. and Canada. The monetized health-related benefits are estimated to be as much as $110 billion in the U.S. in 2020.

The area of the North American ECA includes waters adjacent to the Pacific coast, the Atlantic/Gulf coast and the eight main Hawaiian Islands.[1]. It extends up to 200 nautical miles from coasts of the United States, Canada and the French territories, except that it does not extend into marine areas subject to the sovereignty or jurisdiction of other States.

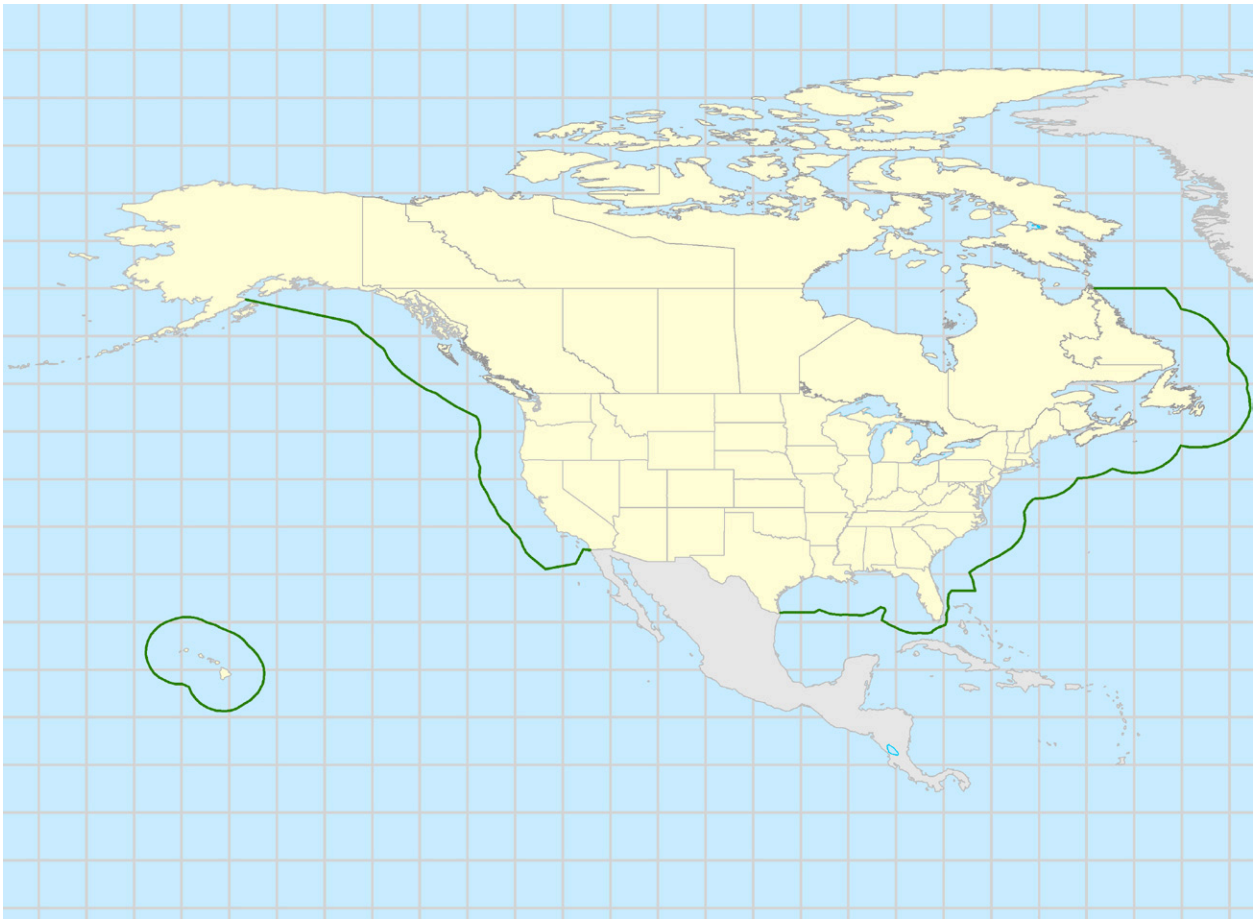

Figure 1: Area of the North American ECA

EPA is continuing to investigate whether other areas of the United States and its territories may benefit from ECA designation. We are currently performing analyses to examine whether ECA designation would be appropriate for the U.S. territories of Puerto Rico and the U.S. Virgin Islands. Some other areas for future consideration include the Pacific U.S. territories, smaller

[1] As used here, the main Hawaiian Islands include the islands of Hawaii, Maui, Oahu, Molokai, Niihau, Kauai, Lanai, and Kahoolawe. These islands are the main populated islands of the Hawaiian Islands chain, with the exception of Kahoolawe, which is an uninhabited nature reserve.

Hawaiian Islands, and Western Alaska. If further information supports the need for an ECA designation in any of these areas, a separate proposal would be submitted to the IMO, following the criteria contained in the international treaty known as MARPOL Annex VI.

The Need to Reduce Emissions from Ships

The diesel engines that power ships are significant mobile source emitters. The largest ship propulsion engines being produced today must meet relatively modest emission requirements.[2] In addition, both the main propulsion and the smaller auxiliary engines installed on these ships operate on fuel that can have extremely high sulfur content. As a result, these ships generate significant emissions of fine particulate matter (PM2.5), NOx, and SOx that contribute to nonattainment of the National Ambient Air Quality Standards for PM2.5 and ozone. Emissions from these engines also cause harm to public welfare, contributing to visibility impairment and other detrimental environmental impacts across the United States.

Many of our nation's most serious ozone and PM2.5 nonattainment areas are affected by emissions from ships. Currently more than 30 major U.S. ports along our Atlantic, Gulf of Mexico, and Pacific coasts are located in nonattainment areas for ozone and/or PM2.5.[3]

EPA has been advancing a coordinated strategy for many years to control air pollution from large ships. In addition to our Clean Air Act program[4], designation of U.S. waters as an ECA is a key component of EPA's strategy. Also, the ECA and other requirements of Annex VI are implemented in the United States through regulations adopted under the Act to Prevent Pollution from Ships (APPS). Finally, EPA's Clean Ports USA Program, as part of our broader National Clean Diesel Campaign, fosters innovation to achieve additional emission reductions from existing diesel engines and nonroad equipment at ports.

Air pollution from ships is expected to grow over the next two decades. Without EPA's coordinated strategy, by 2030, NOx emissions from ships would be projected to more than double, growing to 2.1 million tons a year while annual PM2.5 emissions would be expected to almost triple to 170,000 tons. The North American ECA ensures that emissions from ships that operate in our waters and ports will be reduced significantly, delivering substantial benefits to large segments of our population, as well as to marine and terrestrial ecosystems.

Emission Control Area Standards

In October 2008, the member states of IMO agreed to amend MARPOL Annex VI, adopting new tiers of NOx and fuel sulfur controls. The most stringent of these new emission standards

[2] The modest Tier I engine NOx standards continue through 2010, the marginally lower Tier II standards apply from 2011 through 2015.

[3] U.S. Army Corps of Engineers, Principal Port Rankings for 2008.

[4] EPA's CAA program includes regulations at 40 CFR parts 94, 1042, 1043, and 1065. See www.epa.gov/otaq/oceanvessels.htm#regs.

apply to ships operating in designated ECAs, including the newly-designated North American ECA. The table below summarizes the Annex VI standards that apply globally and within ECAs.

Table 1: International Ship Engine and Fuel Standards (MARPOL Annex VI)

	Year	Fuel Sulfur	NO_x
Emission Control Area	Today to July 2010	15,000 ppm	
	2010	10,000 ppm	
	2015	1,000 ppm	
	2016		Tier III (Aftertreatment-forcing)
Global	Today to January 2011		Tier I (Engine-based controls)
	2011		Tier II (Engine-based controls)
	Today to January 2012	45,000 ppm	
	2012	35,000 ppm	
	2020 [a]	5,000 ppm	

Note:

[a] Subject to a fuel availability study in 2018, may be extended to 2025.

The 2015 fuel sulfur standard of 0.1 percent fuel sulfur (1,000 ppm) is expected to reduce PM and SOx emissions by more than 85 percent from today's levels. This most stringent ECA fuel standard is expected to be met through fuel switching. In most cases, ships already have the capability to store two or more fuels. However, to meet the 1,000 ppm fuel sulfur requirement, some vessels may need to be modified for additional distillate fuel storage capacity. As an alternative to using lower sulfur fuel, ship operators may choose to equip their vessels with exhaust gas cleaning devices ("scrubbers"). In this case, the scrubber extracts sulfur from the exhaust.

The current Tier I NOx standards range from 9.8 to 17 g/kW-h, depending on engine speed. The Tier II standards represent a 20 percent NOx reduction below Tier I, and the Tier III standards represent an 80 percent NOx reduction below Tier I. We expect ships to meet the Tier III standard through the use of high-efficiency aftertreatment technology.

Costs

The costs of implementing and complying with the ECA are expected to be small in comparison to the health and welfare benefits and on par with the costs of achieving similar emissions reductions through additional controls on land-based sources. We estimate the total costs of improving the emissions of ships operating in the ECA from current performance to ECA standards will be approximately $3.2 billion in 2020. The cost to reduce a ton of NOx, SOx and PM is estimated at $2,400, $1,100 and $10,000, respectively, which makes this program a very cost-effective method to improve air quality in the U.S. and Canada.

The economic impacts of complying with the program on ships engaged in international trade are expected to be modest. For example, operating costs for a ship in a route that includes about 1,700 nautical miles of operation in the ECA may increase by about 3 percent. This operating cost increase would raise the cost of transport of a 20 foot container by about $18.

Benefits

The U.S. coastline and much of the interior of the country will experience significant improvements in air quality due to reduced PM and ozone from ships complying with ECA standards. Coastal areas will experience the largest improvements; however, significant improvements will extend hundreds of miles inland to reach nonattainment areas in states such as Nevada, Tennessee and Pennsylvania. National treasures such as the Grand Canyon National Park and the Great Smoky Mountains will also see air quality improvements.

The North American ECA is expected to yield significant health and welfare benefits. ECA standards will begin to reduce ship-related adverse health impacts for the U.S. and Canada in 2012. EPA estimates that the annual benefits in 2020 will include preventing between 5,500 and 14,000 premature deaths, 3,800 emergency room visits, and 4,900,000 cases of acute respiratory symptoms in 2020. These benefits will increase beyond 2020, as normal fleet turnover occurs and more vessels complying with the 2016 NOx standards set sail.

The monetized health benefits in 2020 in the U.S. are projected to range from $47 to $110 billion in 2006 U.S. dollars, assuming a 3 percent discount rate.

For More Information

You can access the ECA standards, the proposal to the IMO and related documents on EPA's Office of Transportation and Air Quality web site at: www.epa.gov/otaq/oceanvessels.htm

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