

# CHAPTER 7: MARINE VESSELS

This chapter describes the minimum criteria and requirements for Carl Moyer Memorial Air Quality Standards Attainment Program (Moyer Program) marine vessel projects. Air quality management districts or air pollution control districts (air districts) may set more stringent requirements based upon local priorities.

## A. Projects Eligible for Funding

The Air Resources Board (ARB) has adopted two regulations that impact funding opportunities for marine vessel projects: 1) Amendments to the Regulations to Reduce Emissions from Diesel Engines on Commercial Harbor Craft Operated Within California Waters and 24 Nautical Miles of the California Baseline (Commercial Harbor Craft regulation or CHC) and 2) Regulations to Reduce Emissions from Diesel Auxiliary Engines on Ocean-Going Vessels While At-Berth at a California Port (Shore Power Regulation). There are limited funding opportunities for marine vessels subject to this regulations.

**Table 7-1  
Summary of Funding Opportunities**

Project Type	Subject to ARB Rule	Moyer Funding Opportunities <sup>(a)</sup>
Vessels subject to Commercial Harbor Craft Regulation Schedules for Meeting Tier 2 or Tier 3 Standards (ex: barge, crew & supply, dredge, excursion, ferry, towboat, tugboat) - engine repower, remanufacture, retrofit or new purchase	Commercial Harbor Craft Regulation <sup>(b)</sup>	Opportunities depend on compliance status
Vessels <i>not</i> subject to Commercial Harbor Craft Regulation Schedules for Meeting Tier 2 or Tier 3 Standards (ex: fishing vessel or pilot/work boat) - engine repower, remanufacture, retrofit or new purchase	No	Not limited by regulation
Shore power - vessel retrofit	Shore Power Regulation <sup>(c)</sup>	Limited opportunity

<sup>(a)</sup> A fleet's compliance status with the ARB regulations must be determined. Contact air district Moyer Program staff or consult CHC regulation Moyer Program Implementation Charts at: <http://www.arb.ca.gov/msprog/moyer/guidelines/supplemental-docs.htm> in addition to these guidelines.

<sup>(b)</sup> Harbor Craft Regulation: <http://www.arb.ca.gov/ports/marinevess/harborcraft.htm>

<sup>(c)</sup> Shore Power Regulation: <http://www.arb.ca.gov/ports/shorepower/shorepower.htm>

Project Types:

1. **Engine Repower.** Replacing an old vessel engine with a newer, lower emission engine. Limited opportunities remain for those vessel engines subject to the in-use compliance requirements of the CHC regulation. Repower must be completed at least three years prior to the vessel's in-use compliance date. Based on the vessel's operation, the newer engine's emissions must be surplus to the currently required United States Environmental Protection Agency (U.S. EPA) marine engine emission standard (i.e., Tier 3 or cleaner).
2. **Remanufacture Kit.** Kits are comprised of engine component parts that, when installed, reduce the engine's emissions. Limited Moyer funding opportunities remain for those vessel engines subject to the in-use compliance requirements of the CHC. Remanufacture must be completed at least three years prior to the vessel's in-use compliance date.
3. **Retrofit Device.** The installation of an ARB verified diesel emission control strategy (VDECS). This project type will be considered for funding on a case-by-case basis.
4. **Hybrid System.** The installation of an EPA verified hybrid system. A hybrid system implements various strategies (e.g. engine switching, electric power) to reduce emissions of NOx, ROG, and PM.
5. **Ship-Side Shore Power Projects.** The retrofit of a marine vessel to enable shore power connection. Ship-side shore power projects are not eligible unless the applicant can demonstrate that it will be surplus to the implementation requirements of ARB's Shore Power Regulation. For marine infrastructure projects, including Shore-Side Shore power, see Chapter 10: Infrastructure.
6. **Marine Vessel Exhaust Capture and Control System.** The purchase of an EPA verified marine vessel exhaust capture and control system. EPA verifications of exhaust capture systems include specific percentage reductions of NOx and PM. In lieu of EPA verification an ARB Executive Order will suffice.

Please see Section C (Project Criteria) for detailed minimum eligibility requirements.

**B. Maximum Eligible Funding Amounts**

Table 7-2 summarizes the maximum funding for each project type as a percentage of eligible costs. All projects are also subject to the cost-effectiveness threshold defined in Appendix C.

**Table 7-2  
Maximum Percentage of Eligible Costs for  
Moyer Program Marine Projects**

	<b>Baseline Technology</b>	<b>Project Type</b>	<b>Maximum Percentage</b>
Vessels subject to Commercial Harbor Craft Regulation Schedules for Meeting Tier 2 or Tier 3 Standards (ex: barge, crew & supply, dredge, excursion, ferry, towboat, tugboat)	Tier 0,1 <sup>(a)</sup>	Engine repower or remanufacture kit compliant to EPA marine Tier 3	50%
		Engine repower or remanufacture kit compliant to EPA marine Tier 4 <sup>(b,c)</sup>	85%
	Tier 2	Engine repower or remanufacture kit compliant to EPA marine Tier 3	80%
		Engine repower or remanufacture kit compliant to EPA marine Tier 4 <sup>(b,c)</sup>	85%
Vessels <b>not</b> subject to Commercial Harbor Craft Regulation Schedules for Meeting Tier 2 or Tier 3 Standards (ex: fishing, pilot, work boat)	Tier 0,1,2	Engine repower or remanufacture kit compliant to EPA marine Tier 3	80%
		Engine repower or remanufacture kit compliant to EPA marine Tier 4 <sup>(b,c)</sup>	85%
Any vessel propulsion engine repower with an off-road Tier 3 or cleaner certified engine			Case-by-case basis
EPA Verified Marine Retrofit Device			Case-by-case basis
Installation of an EPA verified Hybrid System			85%
Shore Power- ship side			100% of retrofit cost 50% of transformer cost
Purchase of an EPA verified marine vessel exhaust capture and control system			Case-by-case basis

<sup>(a)</sup> Chapter 1, Section A, Part 2 requires projects to provide three years of surplus reductions prior to any applicable regulatory compliance deadline

<sup>(b)</sup> Due to the absence of emission factors, 2016 and newer model year Tier 4 emission standards (Table D-16) will be used for funding calculations.

<sup>(c)</sup> Engines using a Family Emission Limit (FEL) or Averaging, Banking, and Trading (ABT) to meet the Tier 4 emission standards will be funded at Tier 3 engine levels. Tier 3 emission factors will be used for funding calculations.

## **C. Project Criteria**

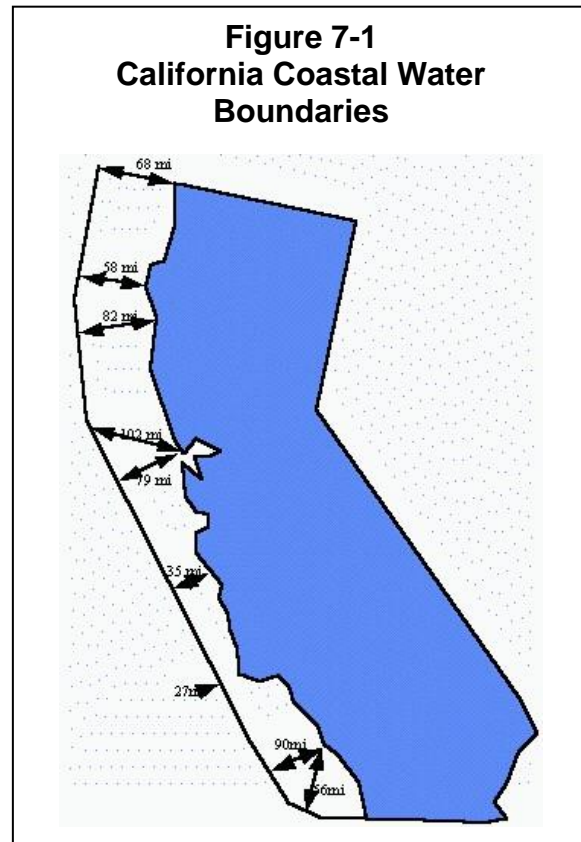
The minimum qualifications for marine vessels are listed below. All projects must also conform to the requirements in Chapter 2: General Criteria, and in Chapter 3: Program Administration. Participating air districts retain the authority to impose additional requirements in order to address local concerns.

### **1. General Marine Project Criteria**

- (A) To be eligible for Moyer Program funding, an applicant for harbor craft funding must have a United States Coast Guard Documentation Number, except in cases where such documentation is not required (such as fishing boats constructed outside the United States, vessels of less than five net ton displacement, or vessels owned by non-United States citizens). In such cases, the applicant must include with the application documentation at least one of the following:
  - (1) A valid California vessel registration (CF) number and a copy of the California Department of Fish and Game license can be provided instead of a Coast Guard Documentation Number.
  - (2) The vessel's Lloyd's/International Maritime Organization (IMO) number for an oceangoing vessel that does not have any of the above documentation.

(B) Both propulsion and auxiliary engines may be eligible for Moyer Program funding.

(C) Only marine vessel activity in California coastal waters and internal waters may be used to determine project emission reductions. Figure 7-1 depicts the boundary of California coastal waters (defined as that area between the California Coastline and a line starting at the California-Oregon border at the Pacific Ocean, thence to 42.0°N 125.5°W, thence to 41.0°N 125.5°W, thence to 40.0°N 125.5°W, thence to 39.0°N 125.0°W, thence to 38.0°N 124.5°W, thence to 37.0°N 123.5°W, thence to 36.0°N 122.5°W, thence to 35.0°N 121.5°W, thence to 34.0°N 120.5°W, thence to 33.0°N 119.5°W, thence to 32.5°N 118.5°W, and ending at the California-Mexico border at the Pacific Ocean).



(D) Marine projects are not required to meet the minimum California usage requirement in Chapter 2, Section S. Air districts may impose more stringent operational requirements.

(E) Non-captive California fleets and vessels may be considered for funding on a case-by-case basis if their operation in California coastal waters can be properly documented.

(F) Funding is not available for projects where spark-ignition engines are replaced with diesel engines. Repowering a diesel engine to a spark-ignited engine may be considered on a case-by-case basis.

(G) Only marine engines equal to or greater than 25 horsepower are eligible for Moyer Program funding.

(H) Harbor craft engines less than 50 horsepower are exempt from the in-use compliance requirements of the Harbor Craft Regulation. Emission reductions from projects involving these engines are surplus.

- (I) Engines on marine vessels with wet exhaust systems are eligible for Moyer Program funding if the project vessel meets all other applicable program requirements. The wet exhaust systems themselves are not eligible for Moyer Program funding. A wet exhaust factor of 0.80 must be applied to the baseline and reduced emission propulsion and auxiliary engine emission calculations for all projects on vessels with wet exhaust systems.
- (J) New engines must be installed and operational at least three years prior to the compliance deadline specified by the CHC regulation. Project life for an engine cannot extend beyond that engine's compliance deadline. For compliance deadlines, see implementation charts at: <http://www.arb.ca.gov/msprog/moyer/guidelines/supplemental-docs.htm>.
- (K) Air districts have the option of calculating the project cost-effectiveness on a per vessel basis.
- (L) All harbor craft vessels are required to install and maintain a functioning hour meter as required by the CHC Regulation.
- (M) Moyer Program funding can be based on engine hours or fuel use. Hours of operation are the preferred basis for project cost-effectiveness calculations and eligibility. Applicants must submit historical usage data as part of the application process. This data must be based on the previous two years of historical usage documentation specific to the vessel being funded. Acceptable forms of documentation may include hour meter readings, maintenance records, fuel logs, purchase receipts or ledger entries. Grant funding that is based on historical fuel usage may not exceed the grant funding amount that would be based on hours of operation; the more conservative calculation must be used.
- (N) Owners and operators of engines subject to the CHC Regulation must include a copy of the most recent Initial Report in their project application. The reporting requirements are outlined under California Code of Regulations, title 17, section 93118.5(h)(1).

**2. Repower.** Repower projects involving the replacement of an older harbor craft engine with a newer, cleaner engine must meet the following criteria:

- (A) All new engines and replacement engines purchased for Moyer Program marine vessel repower projects must meet the requirements of the CHC Regulation set forth under California Code of Regulations, title 17, sections 93118.5(e). The regulation includes requirements for newly acquired engines and requirements for replacement engines in vessels subject to the schedules to meet Tier 2 and Tier 3 standards. Use of an off-road certified engine must adhere to the requirements set forth under California Code of Regulations, title 17, sections 93118.5(e)(3) and (e)(4),

especially the marinization requirements set forth in Code of Federal Regulations, title 40, part 1042.605. Project proposals for repower of propulsion engines with off-road engines will be considered on a case-by-case basis.

- (B) For all marine engine repower projects, the replacement engine must provide at least a 15 percent NO<sub>x</sub> reduction relative to the baseline engine. The replacement engine cannot be significantly modified or reconfigured in any way during the project life.
- (C) Funding of Tier 4 marine repower projects:
  - (1) Due to the absence of emission factors, 2016 and newer model year Tier 4 emission standards (Table D-16) will be used for emission reduction calculations.
  - (2) Tier 4 Engines using a Family Emission Limit (FEL) or Averaging, Banking, and Trading (ABT) to meet the Tier 4 emission standards will be funded at Tier 3 engine levels. Tier 3 emission factors will be used for emission reduction calculations.
- (D) The maximum project life for a marine vessel repower project is 16 years. A longer project may receive case-by-case approval if applicants provide justifying documentation. The maximum project life does not consider regulatory requirements and may be shorter.
- (E) The total project repower cost may include charges for the following:
  - (1) The capital cost of the new engine.
  - (2) Purchase of or modifications to the cooling system; fuel and exhaust system; wiring, panel, and harness system; power take-offs; propulsion control system; gauges and alarms; and radiator and ventilation, if attached to or integral to the functioning of funded engine.
  - (3) Costs related to the purchase and/or installation of a new transmission may be eligible when it is a necessary part of the engine repower; and an ineligible expense when it is required for maintenance or repair purposes. Ordinarily, a statement from the vendor or applicant that the new reduced emissions engine is not compatible with the existing baseline transmission is sufficient justification for eligibility; please retain a copy of the vendor or applicant's statement(s) or other documentation in the project file.
  - (4) Frames needed to be extended or other parts needed to be cut or modified in order to accommodate the new engine, as well as paint

or coating needed to protect those specific areas that were cut or modified.

- (5) Tax and transport for eligible parts or costs.
  - (6) Labor for installation of or modification to parts eligible for funding.
- (F) The total project repower cost may not include charges for the following:
- (1) Rudders or propellers.
  - (2) Steering system.
  - (3) Sea trials and dry docking.
  - (4) Paint, coatings, or hull work not directly related to the engine repower.
  - (5) Tax and transport for ineligible parts or costs.
  - (6) Labor for installation of or modification to parts ineligible for funding.
  - (7) Any parts or labor typically included as part of the vessel or engine overhaul, maintenance, repair, or upkeep.
  - (8) These and other items may be eligible for funding on a case-by-case basis if it can be proven that they are not part of the typical vessel overhaul, repair, upkeep or maintenance and are a necessary part of the engine repower.
- (G) All engines replaced as part of a marine vessel repower project must be scrapped, consistent with the requirements of Chapter 3: Section BB.

**3. Engine Remanufacture Kit.** Engine remanufacture kit projects must meet the following criteria:

- (A) A remanufacture kit for a specific vessel type may be certified by the U.S. EPA, IMO, or approved by ARB to meet the requirements of the CHC Regulation, but must be surplus to the current in-use requirements of CHC Regulation.
  - (1) Engine remanufacture kits specific to vessels not subject to the in-use requirements of the CHC Regulation must meet U.S. EPA Tier 3 marine or Tier 3 non-road engine emission standards or cleaner (e.g., Tier 3 or higher).



- (2) Engine remanufacture kits specific to vessels subject to the in-use requirements of the CHC Regulation must be surplus to the current requirements of the regulation.
  - (B) The applicant must provide a copy of the regulatory compliance letter from ARB (similar to an Executive Order) to the air district demonstrating that the remanufacture kit is compliant with the CHC Regulation. Remanufacture kits which reduce NOx only are not eligible for Moyer Program funding.
  - (C) Remanufacture kit projects have a maximum project life of six years.
  - (D) If the U.S. EPA Emissions Warranty for the project kit requires fuel injectors to be replaced before the end of the project life, the applicant must replace the injectors with equivalent low-emission injectors. The Moyer Program project cost may include the replacement injectors. The project annual report must include documentation that all required maintenance identified in the U.S. EPA Emissions Warranty (if applicable) is completed on schedule. Maintenance other than replacement of low-emission fuel injectors is not eligible for Moyer Program funding.
- 4. Retrofits.** Retrofits include selective catalytic reduction, diesel oxidation catalysts or diesel particulate filters. A retrofit device must be verified by ARB to reduce emissions from the project engine in order to be eligible for funding. This project type will be considered for funding on a case-by-case basis.
- 5. Hybrid System.** A Hybrid System project must meet the following criteria:
- (A) The hybrid system must be verified by the United States EPA to reduce the total vessel emissions of NOx, ROG, and PM by specific percentages compared to the baseline vessel.
  - (B) The hybrid system must be verified to reduce NOx by at least 15 percent compared to the baseline vessel.
  - (C) The vessel must meet the EPA verification parameters (i.e. vocation, duty cycle, horsepower range) for the proposed hybrid system.
  - (D) The vessel must be compliance with the CHC Regulation engine replacement schedule for meeting Tier 2 or Tier 3 standards.
  - (E) The vessel must have Tier 3 or cleaner propulsion engines and Tier 2 or cleaner auxiliary engines.
  - (F) The applicant must be able to provided individual usage history for each engine on the baseline vessel.

- (G) Hybrid system installation projects have a maximum project life of five years.
- (H) The hybrid system must include a manufacturer's warranty for the duration of the project life.
- (I) Eligible costs for a Hybrid System project include the components and labor costs directly related to the purchase and installation of a hybrid system.
- (J) Ineligible costs for a hybrid system include the following:
  - (1) Paint, coatings, or hull work not directly related to the hybrid system installation.
  - (2) Tax and transport for ineligible parts or costs.
  - (3) Sea trials and dry docking.
  - (4) Labor for installation of or modification to parts ineligible for funding.
  - (5) Any parts or labor typically included as part of the vessel or engine overhaul, maintenance, repair, or upkeep.
  - (6) Other items may be eligible for funding on a case-by-case basis if it can be proven that they are not part of the typical vessel overhaul, repair, upkeep or maintenance and are a necessary part of the hybrid system.
- (K) All engines replaced as part of Hybrid System project must be scrapped, consistent with the requirements of Chapter 3: Section BB.

**6. Ship-Side Shore Power Projects.** The retrofit of a marine vessel to enable shore power connection. For shore-side projects see Chapter 10: Infrastructure.

- (A) Only a marine vessel owner may apply to receive Moyer Program funding for a ship-side power project.
- (B) Vessels subject to the Shore Power Regulation:
  - (1) Applications for Moyer Program funding of shore power projects must include a copy of the most recent Vessel Plan, Annual Statement of Compliance as identified in Section (g) of the Shore Power Regulation. All subsequent project reports to air districts must include any new or updated Vessel Plans in order to evaluate compliance with the project contract.

- (2) The commitment of visits and hours made by the applicant, above those required by the Shore Power Regulation, must be used in the project cost-effectiveness calculation and is required in the contract between the applicant and the air district.
- (3) The entire fleet roster and all the California ports of harbor the fleet will be visiting. From the locales submitted, the fleet must indicate per location, the number of vessel visits and hours per year the fleet will be utilizing shore-side power.
- (C) Up to 100 percent of necessary vessel (non-transformer) retrofit costs, specifically required to allow the vessel to plug into shore-side power, are eligible for Moyer Program funding. Up to 50 percent of any necessary transformer costs on board the vessel are eligible for Moyer Program funding.
- (D) Docking at ports or terminals funded by the Proposition 1B Goods Movement Program is not prohibited; however, vessel retrofits funded with Moyer Program funds cannot claim emission reductions resulting from ship visits to ports or terminals during the active Proposition 1B Goods Movement Program contract period.
- (E) The Moyer Program shall not pay for energy costs (fuel or electricity), shore power routine maintenance, or labor costs for connection and disconnection of the vessel to shore-side power.
- (F) All contracts for Moyer Program funding of shore power projects must include a stipulation that receipt of program funding is contingent on the project being post-inspected and operational. The project contract must include a provision that if the shore power is not used for the total hours committed to in the contract, the project participant shall return the pro-rated contract amount (commensurate with the shortfall in usage) to the air district. If the contract activity is not met, air districts may refer to Chapter 3 Section FF.4. to address this underutilization. However, the contract must include language prohibiting the grantee from obtaining a waiver from the contracted usage, specifically Section FF.4.(D).
- (G) Shore power projects have a maximum project life of 20 years. A longer project may receive case-by-case approval if applicants provide justifying documentation. The maximum project life does not consider regulatory requirements and may be shorter.
- (H) The emissions from vessels using grid power in lieu of auxiliary engines when the vessel is at berth are assumed to be reduced by 90 percent. The emission reductions from a shore-side transformer project are calculated as the total emission reductions from each participating ship.

Each ship's emission reductions calculated as: (Ship emission rate \* berthing time \* power requirements \* number of visits \* 0.9).

- (I) Estimated berthing time shall include the time needed to connect and disconnect the vessel to shore power. Ship emission rates and power requirements are included in Appendix D.

**7. Marine Vessel Exhaust Capture and Control System.** Funding for the purchase of exhaust capture and control systems may be approved on a case-by-case basis.