

Emissions Management Systems (EMS) PreTreatment Technology Commercial and Recreational Vessels



The EPA Tier III and Tier IV Regulations have created a market where unreliable and expensive exhaust aftertreatment products seem to be the only option for diesel engine users to stay in EPA compliance. Global Marine Consulting specializes in reducing exhaust emissions, managing fuel usage, and oil consumption. Our one of a kind **EMS System™** (Exhaust Management System) is a complete **PreTreatment** combustion technology for soot, smoke, and NOx reduction.

The Marine Industry continues down the path of expensive DPF (Diesel Particulate Filter) and SCR (Selective Catalytic Reduction) post combustion exhaust AfterTreatment equipment adapted from the transportation Industry. Global Marine's approach to emissions reduction is **PreTreatment**, achieved by its **EMFIS Technology**, an injection process of a proprietary gaseous mix into the fuel and air delivery systems producing a near complete burn of the fuel resulting in virtually no soot, smoke, and NOx. The benefit is a higher level of combustion and fuel burn resulting in more power, increased fuel efficiency, and a reduction of harmful exhaust emissions that meet EPA Tier IV standards without the use of heavy and expensive aftertreatment devices.

Global EMS PreTreatment Technology

Marine Series System Benefits:

- Increase Fuel Efficiency up to 18%
- Reduce Exhaust Emissions up to 70%
- Reduce Soot in Engine Lube Oil
- Improve Diesel Fuel Combustion
- Longer Engine Life
- Reduce Maintenance and Repair Costs
- Low Initial Cost, Fast Return-on-Investment

Global EMS with **EMFIS Technology** will make any engine instantly compliant in the USA and anywhere in the world. It doesn't matter the year or size of the engines, **EMFIS** is easily sized and available for all diesel engines. Market research has identified there is a potential aftermarket in excess of 3 million marine engines that will require emission reduction technology to be in compliance over the next decade.

Global EMS is the most cost effective emission reduction and fuel management control system available. The estimated cost of a DPF (Diesel Particulate Filter) and a SCR (Selective Catalytic Reduction) system is expensive to purchase, approximately \$32,000 for a single 15 Liter diesel engine, and expensive to maintain, adding to operating costs and creating additional downtime. The **EMS System** cost approximately \$18,000 for the same 15 liter engine; however, the fuel efficiency can improve by as much as 18%. The **EMS System** will cost approximately half of the DPF and SCR equipment and pay for itself in the first year of operation with the combination of fuel and maintenance savings. DPF and SCR offer no payback opportunities.

Global EMS estimated savings for a 15 Liter diesel, 44% less to purchase and up to \$25,000 a year.

Compliance Options	Technology Investment	Annual Operating Cost			
		Maint.	Fuel		Total
DPF / SCR Technology	\$32,000	\$5,000	\$10,000	=	\$15,000
Global EMS Technology	\$18,000	\$0	(\$10,000)	=	(\$10,000)
Global EMS Advantage	(\$14,000)	(\$5,000)	(\$20,000)	=	(\$25,000)

Current EPA Validated Technology

The Diesel Particulate Filter (DPF) and SCR (Selective Catalytic Reduction) NOx Reduction Technology

The Diesel Particulate Filter is usually based on a ceramic honeycomb structure. The exhaust gases flow through the porous honeycomb walls so that 99 percent of soot particulates with a size of 20-300 nanometer are retained. The soot is continuously burned off with a full-flow diesel burner. The SCR system reduces the other harmful substances in the exhaust stream such as NOx and HC by injecting urea as the reactant as required.

Additional DPF and SCR Benefits: NONE

AfterTreatment technologies have proven to be highly problematic and expensive on new engines and retrofit alike;

- The equipment is expensive to purchase, maintain, and inefficient with no Return-On-Investment.
- In most cases the systems will require custom design and manufacturing adding potential downtime for the vessel.
- As the filter clogs with carbon the fuel efficiency is reduced, increasing fuel costs.
- Carbon deposits remain in engine from unburned fuel and cylinder blow-by gases contaminate the lube oil creating excessive wear on the engine.
- The filter must be frequently cleaned (regenerative type) by injecting excess diesel fuel into the combustion chamber putting all the trapped carbon back into the atmosphere as well as the extra fuel used.
- Diesel Exhaust Fluid, known as DEF Fluid, (a mixture of urea and water) must be purchased.
- Potential increased health hazards as Carbon Nano-Particles below 20 nanometers are not contained and Isocyanic Acid is a produced by-product of urea injection at high heat.

EMS Technology Validation

Currently, Global is working towards an EPA Verification as well as other regulatory agency approvals, such as ABS, which is expected to be complete early 2014. Using our own test equipment that includes a UEI 5-gas analyzer, exhaust opacity meter, fuel flow meter and engine dyno we have successfully met or exceeded the EPA requirements for validation. Our primary test engine, a pre-compliance Cummins 6BTA (mechanically direct injection, turbocharged 5.9 liter) representative of our target market produces zero CO, zero HC, less than 55 ppmv NOx and 11% opacity (30% allowed) and a horsepower increase from 130 to 159.

Currently, we are installing EMS on any engines that are currently using DPF's immediately removing the associated costs of filter cleaning and maintenance. With an EMS System in place the DPF filter will no longer plug with soot. And, as an additional benefit, increased fuel efficiency will be realized, creating a very short ROI on the EMS System.

Return on Investment

This ROI example is an estimate only based on a 110' ocean going tug operating 240 days at sea with a fuel consumption rate of 2800 gallons per day for a total of 672,000 gallons.

DPF and SCR equipment and installation cost is estimated at \$250,000 installed with a yearly maintenance expense of \$50,000 - \$100,000. A potential increase in fuel usage of 10% (\$200,000) could all add up to as much as \$300,000 a year out of pocket, not a good option.

Global EMS equipment and installation cost is estimated at \$180,000 with no real maintenance costs. A 10% savings in fuel is approximately \$200,000 in the first year. Emissions reduction and control by improving fuel efficiency increases profits. **Global EMS**, the fastest way to **\$Green\$**.

Contact us for a FREE quote today!

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