

# Chapter 13

## Diesel Engine Waste Heat Recovery Schemes for Improved Fuel Economy and Reduced Emissions: Simulation Results



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**Abstract** Diesel engines are widely used for road and marine transports. Stationary diesel engines are also used for off-grid supply of electricity for households or to run the auxiliary equipment such as pump, compressor, etc. A significant portion of the thermal energy input to diesel engines is ultimately rejected as waste heat. Exhaust flue gas from marine diesel engines are at about 300 °C. On the other hand, jacket cooling water and scavenging air cooling water are available at below 100 °C. Available waste heat from road transport system may be utilized to produce cooling/heating effect for conditioning of the cabin environment. The waste heat may also be used in turbo chargers for a higher power density. In marine applications, the waste heat may drive a bottoming power cycle to supply the auxiliary power. Waste heat available from a stationary diesel power plant can even be used to run a cogeneration/polygeneration unit satisfying some of the localized energy needs. In the present chapter, simulation results of possible schemes and effects of waste heat recovery from diesel engines have been explored. Finally, generalized principles for the simulation of diesel engine waste heat recovery have been discussed.

**Keywords** Engine waste heat · Fuel economy · Cogeneration · Bottoming cycle · Simulation studies

### Abbreviations

AFS	Annual fuel saving
AOH	Annual operating hours
AGHR	Annual greenhouse gas reduction
EF	Emission factor
EGHRU	Exhaust gas heat recovery unit

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