



# Method for Determining the Generating Capacity of the Waste Heat Recovery System of Main Engines

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**Abstract.** A study of waste heat recovery systems for robust ship power systems (tens of MW) and installations of relatively low power (1...3 MW) of diesel locomotives has been carried out. A method for calculating the power of gas and steam turbines as part of the waste heat recovery systems has been developed. Based on simple calculations for two operating points, the method allows you to get the amount of the waste heat recovery system generated energy in other modes, different from those given in the instructions for technical operation. Preference for one or another type of turbine generator or their combination should be provided based on a feasibility study, taking into account capital investments and the power of energy consumers in the vehicle, as well as long-term prospects in fuel-saving and reducing greenhouse gas emissions. The waste heat recovery system's energy characteristics can be used to confirm the compliance of the main power plant with the requirements of the MARPOL 73/78 convention in terms of improving energy efficiency design index and reducing greenhouse gas emissions at loads of 50%, 75%, 100%.

**Keywords:** Waste heat recovery system · Main engine · Heat balance · Energy efficiency design index

## 1 Introduction

With the signing of the Kyoto Protocol in 1997, the regulation of greenhouse gas (GHG) emissions, including related economic activities, which was the exclusive prerogative of national governments, became the subject of international agreements. The Kyoto Protocol pioneered reducing GHG emissions to curb global warming by setting emission

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