Legislation on exhaust gas emissions has increased rapidly in recent years, at IMO level (worldwide), regional level (Emission Control Areas & Rhine river) and national levels (EU and US EPA). A range of exhaust gas emissions from ships are currently regulated:

- Sulphur oxides (SOX)
- Nitrogen oxides (NOX)
- Carbon dioxide (CO2)
- Particulate matter (PM)
- Hydrocarbons (HC)
- Carbon monoxide (CO).

The emission legislation for shipping is still developing and is changing fast. The trends are that the emission limits will more strict in the future and that additional emissions will be regulated as well (particulate number (PN) & methane (CH₄)). It can be difficult to choose among the various technical solutions and fuel options for compliance with the emission legislation in certain regions. Especially with the wide range of technical possibilities to choose from and the regional legislation issues involved. Further, the total consequences for the design and operation of vessels can be hard to outline, as the equipment must be integrated into the systems of the vessel.

**Approach**

The optimal combination of engine technology, fuel and emission control technology for the vessel requires the definition of the operational profile of the vessel and the regions it is expected to operate. The integration of the optimal combination in the total vessel design will lead to the final emissions profile. IHC MTI has a wide range of drive system component models based on first principle physics which can predict the exhaust emissions profile of vessels with their operational profile. Further, the emissions under dynamic conditions can be also predicted, if desired.
Emissions prediction setup

Phase 1
Gathering data about the vessel design, operational profile and other requirements.

Phase 2
Modelling the vessel driveline and its emissions. Calculation of the total exhaust emission profile.

Phase 3
Advice of the choice of fuels, engine technology and emission control. Advice on integration issues and future trends/options for the long term depending on the specific situation.

Why MTI
IHC MTI has developed in-depth knowledge on drive system technology and its emissions aspects. First principle models of many drive system components are available (including e.g. dual fuel engines), that can predict drive system behaviour with high accuracy. Further IHC MTI is involved in various R&D projects at an international level, keeping our knowledge up to date and informed on the latest developments in technologies and emission legislation.