

# NO<sub>x</sub> Emission Control Area in the Mediterranean Sea

This fact sheet is part of the EU LIFE project: *LIFE4MEDECA* to designate a Mediterranean Sea Emission Control Area to reduce health and climate damaging emissions of air pollution from ships.

## Background

- Air pollution with NO<sub>x</sub> from shipping contributes significantly to mortality and morbidity as well as to eutrophication and acid rain thereby damaging cultural heritage, crops and nature.
- Without further regulation, NO<sub>x</sub> emission from shipping will increase due to increased shipping even though it is very cost-effective to reduce the emission from new-build ships.
- Establishing a NO<sub>x</sub> Emission Control Area (NECA) in the Mediterranean Sea for new-build ships would eventually reduce NO<sub>x</sub> emission from shipping in this region by 80%.
- A NECA is needed to provide populations and nature in the Mediterranean the best possible protection i.e. the same protection as already established in Northern Europe and USA.

## Adverse effects from NO<sub>x</sub> emissions

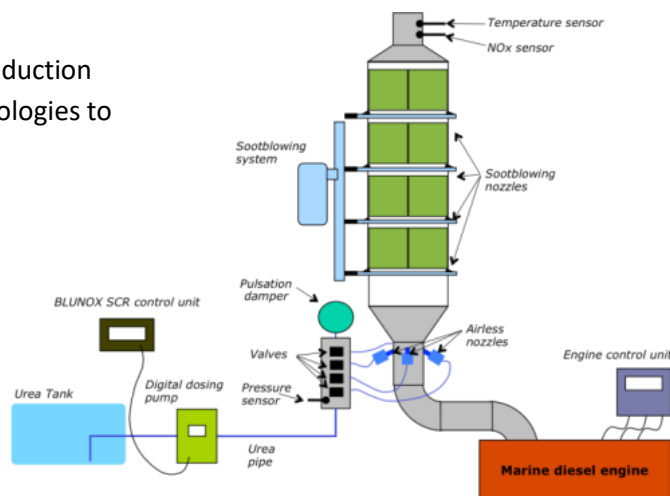
- NO<sub>x</sub> increases formation of the toxic gas NO<sub>2</sub> and health hazardous fine particles (PM<sub>2.5</sub>) thereby contributing significantly to mortality and morbidity.
- The WHO's basic air quality criteria for NO<sub>2</sub> and PM<sub>2.5</sub> is not fulfilled in the Mediterranean and air pollution is one of the main risk factors for premature mortality in the region.
- NO<sub>x</sub> contributes to eutrophication (NO<sub>3</sub>) and acid rain (HNO<sub>3</sub>) and thereby damage cultural heritage, crops and nature.

## Technical solutions

- NO<sub>x</sub> can be reduced from new-build ships by cleaner fuels, less NO<sub>x</sub>-formation in the engine (exhaust gas recirculation) or by flue gas cleaning (selective catalytic reduction).

**Figure 1:** Selective catalytic reduction (SCR) is one of the best technologies to remove NO<sub>x</sub> from ships.

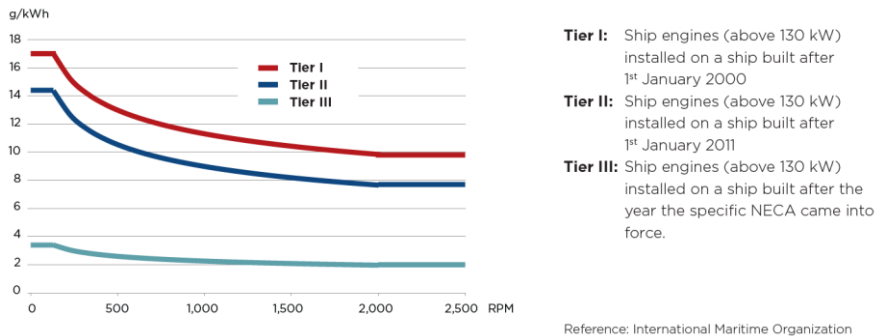
Source: *Dansk Teknologi*



## NOx regulation

Figure 2 shows international NOx regulation from shipping. The ambitious NOx regulation (Tier III) only applies to new-build ships sailing inside a NECA.

**Figure 2:** Regulation of NOx from shipping inside NECA



## Cost-effective solution

In the Northern European Seas, the health costs of NOx are around USD 42 per kg NOx emitted.

The air pollution control cost (SCR on a ship, figure 1) is around USD 1-2 per kg NOx removed.

Society thereby saves (earns) around USD 42 billion from reduced adverse health effects when society invests USD 1-2 billion in NOx control on ships – net earnings of USD 40 billion. The rate of return is around a factor 27.5 (2,750%). In addition, less damages on cultural heritage, crops and nature are achieved.

All reports on establishing a NECA in the Mediterranean Sea underline that the health benefits due to less NOx emissions from shipping are much higher than the costs to reduce these emissions. Hence, the Mediterranean Sea NECA is highly beneficial for Mediterranean societies.

Maximum costs 30 years from now, when all older ships have been replaced with ships built after the Mediterranean Sea NECA came into force (all ships are included), will be less than the costs of the intended Mediterranean Sea Sulphur Emission Control Area.

## Enforcement

- Compliance is documented by a NOx-emission certificate from the engine producer.
- Certificate control in ports (can be combined by measurements at sea by helicopters).

## Experiences from Northern Europe

- The NECA (and SECA) in Northern Europe did not cause a cargo transfer from ship to road.
- Ship transport actually had higher growth compared to road inside the SECA and NECA.
- The NECA and SECA in Northern Europe did *not* cause notable price increases (< 0.005%).
- The administrative burden for maritime authorities, ports and ship-owners is insignificant.
- The costs for ship-owners are passed on as minute (< 0.005%) consumer price increases.

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