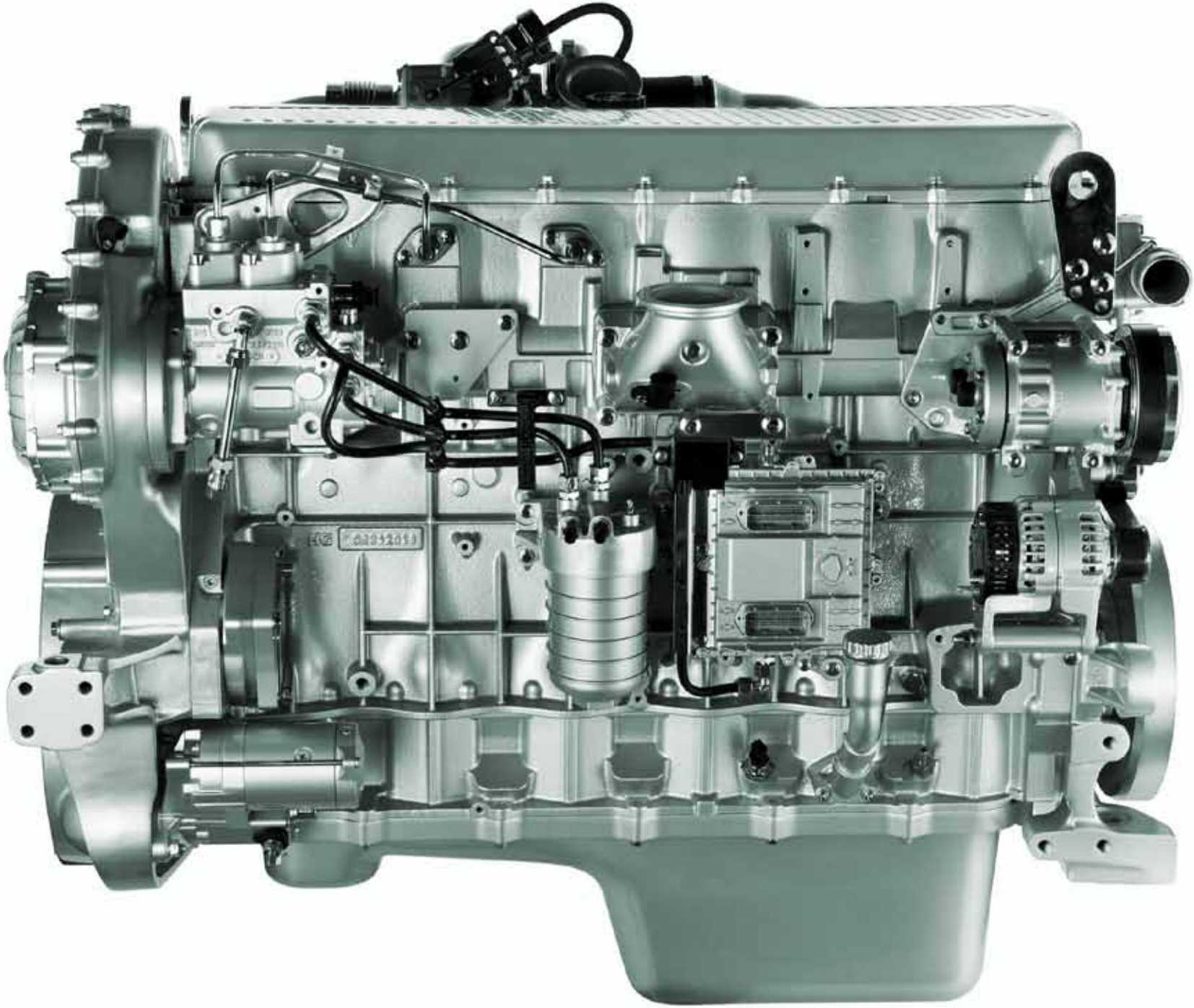
EUROMOT

ACTIVITY REPORT 2009-2012


2011
YEARS
Promoting Engine in Society

Contents



Chapter 1
Why Euromot?

Dynamics and Complexity

When we talk of the future, we often think in time in front of us, for whom we develop our strategies, and know that the future is already here: it is mostly already there before we expect.

Companies and organisations are working on their future viability and thereby have the external markets, tough global competition and the social and technological evolutions in mind. In parallel, the capacity of staff needs to be focused on the future. One factor to consider here is that people will work together in a different manner than before. The team work is flowing, cross-border, overlapping and international. Knowledge and skills are acquired spatially independent, cooperation takes place virtually.

The conditions for success have changed dramatically in recent years: knowledge becomes obsolete in shorter periods of time, markets are changing dramatically and organisations are in extremely diverse, sometimes even intransparent networked relationships. Our world is becoming increasingly complex and dynamic. The networking of all things grow, as the pace of change. It is this increasing dynamism and complexity, which leads directly to the question of how, under these conditions, we still can think and act sustainably forward.

20 Years of Promoting Engine in Society

More than 20 years ago some forward-looking men and women in the internal combustion engine business decided to prepare for the future, giving up national thinking and acting, and to establish an association for interest representation in Europe and worldwide: The European Association of Internal Combustion Engine Manufacturers, EUROMOT, was founded in London on 21 January 1991.
Since that time EUROMOT is promoting engines in society. Internal combustion (IC) engines are used in a broad range of nonroad, marine and stationary applications. IC engines are at the heart of modern societies.

For more information on the Association and our members, please refer to chapter 5.

Speek to the Legislators

EUROMOT is a reliable partner in the European and international regulatory dialogue. Our primary focus is communicating the assets of IC engine power to regulators in Europe and worldwide. We provide reliable know-how on advanced engine technologies in general and environmentally efficient and cost-effective product regulations. So our regulatory network has expanded over the years. Our key partners are:

- European Commission, Council and Parliament;
- Central Comission for the Navigation on the Rhine (CCNR);
- United Nations Economic Commission for Europe (UN ECE);
- United Nations International Maritime Organisation (IMO);
- US Environmental Protection Agency (EPA).

In addition, we closely co-operate with national administrations and agencies in the Member States of the European Union, the Americas, Asia & Oceania.

For more information on our lobbying activities, please refer to chapter 2 and 4.

Rely on our Expertise

EUROMOT is a centre of excellence and knowledge for the internal combustion (IC) engine industry in all matters related to product regulation. We are particularly active in rulemaking activities related to exhaust gas and sound emissions of internal combustion engines. In this context, we are committed to support decision makers in their efforts to achieve sustainable solutions in the following fields:

- air quality and climate change programmes;
- nonroad mobile machinery (agricultural, lawn/ garden and forestry equipment; construction, mining and material handling equipment; compressors and pumps);
- inland navigation / marine equipment and recreational craft;
- stationary sources, power plants and industrial emissions;
- transportation fuels (nonroad and marine) and renewables;
- environmental noise;
- industrial policy, competitiveness and market surveillance.

Our member companies participate in both the information work flow and active debate on current and future legal requirements on internal combustion engines thus enabling us to provide sound and robust industry positions on our priority issues.

For more information on our ativities, please refer to chapter 3.

Take Advantage of Networked Actions

EUROMOT actively seeks the close dialogue with other associations of the nonroad, marine and stationary engine industry sectors in engaging with regulators on engine issues. Our key partners in this field are:

- Engine Manufacturers Associations in the EU Member States, China, India, Japan and the United States of America;
- Equipment Manufacturers Associations in Europe.

For more information on our networks, please refer to chapter 4.

More than 40 member companies - €25 billion of annual output – Thousands of applications

The European internal combustion engine industry successfully competes in a globalised world. Why? Because our member companies are dynamic and focused. They grow due to innovation developed with highly-skilled staff who invest their knowledge and capabilities into developing the new products which give their companies their fine competitive edge. Because they could rely on a supportive legislative framework in Europe which allowed them to grow. And because they decided to establish a common platform to co-ordinate their regulatory knowledge on internal and external markets at a precompetitive level, to consult members on the potential significance of complex and highly-dynamic legislative developments in these markets, to help emerging markets to make progress in the reduction of emissions and to promote implementation of internationally harmonised regulations.

Greeting Address

by Michael G Hawkins,
Euromot President

Michael G Hawkins, Euromot President 2009-2012

I took over the EUROMOT presidency in 2009, when after some very good trading years, the global economic crisis has had a dramatic and negative impact on the mechanical engineering industry in general and in particular on the engine and equipment manufacturing industries. In the first two quarters of 2009, the industry saw orders drop by an average of 40% and was expecting negative growth in production of -10 to - 20% for the current year. These figures show that the complete industry was in an exceptional situation.

The internal combustion (IC) engine industry provides technological solutions for central social challenges. As a key industry to the sustainable power and mobility needs of our modern society, we play an essential role for climate and environmental protection as well as providing solutions for energy efficiency. Even though many companies had taken drastic action to preserve their businesses and were operating at a break-even level, the industry continued to invest in research and development to provide the right conditions and opportunities to remain successful after the crisis.

The Assciation's role in this context was to bring our members together, adding value through sharing knowledge and ideas on how to consult European politics to also play its part in setting the right direction and avoiding unnecessary regulatory or bureaucratic hurdles. Business had to cope with global markets, with strong competition and a changed investment culture. Thus, it was and still is necessary to maintain and improve the high quality expected from our sophisticated products whilst at the same time remain competitive and affordable for our customers. Our member companies are customer focused: We want our products to be the most reliable, the most durable and the most sustainable in terms of fuel efficiency and being emissions friendly. This is a constant challenge for all companies and it was and will be no easy task to ensure survival through and after this dramatic economic downturn.

The mechanical engineering industry is still the backbone of Europe. EU Commission Vice-President Tajani believes that a third industrial revolution is emerging, one which must be actively driven by

EU policy. Such a master plan for growth must support industry's capacity to innovate and secure a competitive industrial base in Europe: Free trade, open global markets and harmonised product regulation, a single market fit for the challenges of the 21st century and an efficient European legislation for our engines.

Access to markets has become more and more critical to competitiveness. Operating in the global village, we have to make the best of globalisation so that investments in innovation and skills have their counterpart in the ability to sell products into world markets. Regulatory convergence of technical regulations and standards becomes more and more important. Often, technical regulations, test methods and the requirements of certifiers vary considerably. Reaching a higher degree of convergence continues to be a priority. For us as engine manufacturers, compliance with the same rules worldwide greatly facilitates our job and avoids unnecessary expenses, which at the end of the day results in cost impact to our customers, especially where we are producing small quantities of technically sophisticated products. This annual review gives a few examples of how we rose to the challenge.

Market surveillance and enforcement of European legislation in the EU internal market is the other side of the coin. If we, as engine and equipment manufacturers, respect our environmental responsibility and invest a great deal of money into innovative and sustainable new technology, the European Commission must watch and act against unfair practices that would undermine the internal market or distort competition and, most importantly, negate the primary purpose of the legislative initiative, especially where it relates to the conservation of our climate, environment and health. We must fight against any non-compliance from our competitors to ensure a level playing field. So we very much welcome the joint initiative of our partner associations in the machinery and mobile equipment businesses to launch a support platform for market surveillance[1]. We are successful as manfacturers in Europe. We are competing with our innovative products worldwide. But we although need a healthy homebase.

My personal highlight as President of EUROMOT is the relaunch of the "EUROMOT Engine in Society Forum" to enhance the dialogue between the IC engine industry, politics, research and civil society. The 2012 event will be held on 13 November 2012 at the prestigious Solvay Library in the Brussels' European District.

The EiSF shall highlight the efforts undertaken by our member companies for helping meet the world's growing need for advanced agricultural and construction equipment, mobile machinery in general, air quality, sustainable mobility, transport and power. The increasingly densely populated and developed nature of our society has created new environmental demands. Our industry has responded to the challenge. In the last 50 years engineers in our industry and related machinery and equipment businesses have through their creativity developed new technologies which made possible a dramatic reduction in the environmental impact that arises from the use of the internal combustion engine enabling it to retain its role as society's most economic and versatile power source.

I hope that in reading this report on the Association's activities during the past four years, you will see how active EUROMOT is for its members on a wide range of issues. For this I would like to thank our staff in the General Secretariat in Frankfurt and our members in Europe and worldwide who contribute to making EUROMOT what we are - the prime voice of Europe's internal combustion engine industry. Your commitment is the chief reason I remain so confident about the association's prospects and ability to deliver significant value to members in the years ahead.

It has been a priviledge to serve as your President. I wish EUROMOT continued success in the coming years.

[1] http://machinery-surveillance.eu

Greeting Address

by Dr Peter Scherm,
Euromot General Manager

2011 was the year of our twentieth anniversary. It sounds modest compared to the more than 100 years of existence many of our member companies can look back on. However, it is a time to connect the success of the past with the opportunities of the future.

Our achievements are many. Guided by the ambitious regulatory plans of the European Union and the international MARPOL and LRTAP conventions until 2020 and far beyond, some even look forward to the year 2050, we face the air quality and climate change challenges that lie ahead of us based on our societies' growing need for sustainable mobility, transport and power as well as for clean air and health. Our goal is to build on the excellent reputation our association has developed over the last twenty years under the chairmenship of cool-headed presidents and highly skilled technical, environmental and communications experts from our member companies in order to deliver increasing value for both our members and our partner authorities in the years ahead.

Our society has witnessed unprecedented growth and prosperity in the past decades, with the size of the world economy more than tripling and population increasing to over 3 billion people since 1970. The growth, however, has been accompanied by environmental pollution and natural resource depletion. In 2008, then, the growth itself, all of a sudden, temporarily depleted. Despite the many uncertainties about the future economic development, some agencies continue to develop assumptions based on very complex modelling tools on what demographic and economic trends might mean for our societies and their environment in 2050. The answer to the question of what policies could actually change that picture for the better remains controversial. We, however, prefer to concentrate on robust strategies ready for 2020.

The 51 Parties in Europe and North America to the Convention on Long-range Transboundary Air Pollution (LRTAP) reached a deal on amending the 1999 Gothenburg Protocol in May 2012. New national emission reduction commitments to be achieved by 2020 were agreed, as well as updated emission standards for a number of emission sectors, such as industry and transport. Besides stricter limits for the four already regulated pollutants (NO_x, SO_x, VOC and CO), limits were introduced also for particulate matter (PM). EUROMOT contributed to this important revision process through its Stationary Engines Working Group and thanks the Chairman, Johan Boij - Wärtsilä, for these achievements.

The IMO-adopted MARPOL Convention 73/78 is the leading international convention covering the prevention of the pollution of the marine environment by shipping. In line with MARPOL Annex VI regulations, that came into effect on 19 May 2005, Tier I ELVs for NO_x emitted by CI engine powered vessels were introduced. Later the convention was revised and a new NO_x emission level Tier II came into force on 1 July 2010. Moreover, the third reduction stage was adopted in 2008, targeting vessels to be constructed from 2016 on to reduce NO_x emissions by about 80 percent from Tier I. The IMO regulatory processes managed by the Marine Environment Protection Committee (MEPC) are supported by the expertise of our Marine Engines Sub-Group on Seagoing Vessels under the chairmanship of Fritz Fleischer - MAN Diesel & Turbo.

The review of the EU Nonroad Mobile Machinery Engines Directive 97/68/EC, managed by EC DG Enterprise and Industry, is a very complex procedure which needs time. The EU nonroad mobile

machinery markets are characterised by literally thousands of applications, many in niches with annual production volumes of hundreds of units or less. In order to provide latest engine and emission reduction technology in a cost-effective way into those niche markets, it is vital for the engine and equipment industries to strive for internationally aligned emission requirements in order to create global markets with higher sales volumes for the particular applications. The current air quality requirements for NRMM are grossly harmonised with those of the United States, important Asian economies, such as India, China, and Japan, and with other fast-emerging economies such as Brazil or Russia.

The EUROMOT Working Groups on Nonroad CI Engines, SSI Engines, Rail Traction Engines and Inland Waterway Transport Engines chaired by Jürgen Stein - DAIMLER, Dr Holger Lochmann - STIHL, Ulrich Beutke - MTU Friedrichshafen, and Richard Payne - CUMMINS, have been cooperating since 2007 with the European Commission to further develop requirements for nonroad mobile machinery engines including the development of technical provisions for the proper implementation of already adopted Stages IIIB and IV and to elevate the stringency of applications which are yet on a pre-Stage IV level or do not have requirements at all:

- Two comitology packages for the effective implementation of Stage IIIB and IV have been successfully developed. Proposals include modifications to 97/68/EC intended to ensure emission requirements are implemented and operated properly.
- Full amendment of the NRMM Directive including a wide range of proposals to broaden the scope of the Directive and introduce emission limit values (ELV) where they do not yet exist:
  - introduction of new ELVs and implementation dates for diesel engines below 8kW, between 8-19kW and above 560kW;
  - introduction of Stage IV ELVs and implementation dates for diesel engines between 19-37kW, engines for inland marine vessels and constant speed engines.

Many of these new ELVs are targeted to enter into force from 1.1.2016.

- Considerations and pre-work for a potential further stage for 2020 and beyond. We are fully committed to deliver technically feasible and cost-effective emission reduction technology to improve air quality. The implementation of Stages IIIB and IV results in a very significant reduction of air pollutants emitted from nonroad mobile machinery engines: 96% reduction in NO_x from Stage I to Stage IV, 96% reduction in PM from Stage I to Stage IV. Proceeding beyond Stage IV will provide a much lower reduction potential than moving from Stage IIIA to Stages IIIB and IV. A reduction of PM emissions as required by Stages IIIB and IV will also reduce PM number emissions.
- Development of an in-service conformity programme for nonroad engines in the power band 56-560kW will prepare the grounds for evaluating real-world emissions from NRMM.
- Development of UN ECE retrofit regulations for nonroad mobile machinery to provide the regulatory framework for testing, evaluating and implementing retrofit devices to the numerous applications.
- Pre-work for the inclusion of small stationary sources (below 2 MWth) into the scope of the Directive. In conjunction with the Industrial Emissions Directive (IED) and the recently adopted revised Gothenburg Protocol, the whole band of engine power from very small up to very large installations would then be covered by air quality regulations.

It is hoped that the NRMM Review will be completed before the 2014 European Elections.

The EUROMOT partnership with international regulatory authorities over the past 20 years has allowed our member companies to bring evolutionary and breakthrough technologies to the market faster and at a lower cost than each manufacturer could have done going it

alone. Furthermore, we appreciate the open and collaborative processes that our partner authorities have used in proposing exhaust emission regulations in their various air quality programmes. By building on our long history of consultation and co-operation, we can together deliver the air and fuel quality benefits envisioned in these rulemakings.

Actions with a focus on political priorities are only one aspect of EUROMOT's work. Throughout the year, the Association remains responsible for implementing and overseeing agreed policies, reporting and taking stock of existing regulatory strategies and action plans, contributing to conferences and major business events. The General Secretariat manages a wide range of operational tasks. Much of this ongoing work results in the adoption of reports and documents which do not feature in this activity report, although this work absorbs an important share of the Association's human resources. In its responsibilities for the implementation of the Association's operational budget, we seek to ensure the best use of limited human and financial resources to secure our agreed objectives. The available resources must be targeted to policies and areas where they can make a real difference. This policy is closely related to 'resource efficiency' and is one of the key tools to deliver EUROMOT 2020.

To all who share our ambitions for delivering advanced engine technologies supporting efficient and cost-effective regulations and our optimism for meeting the high expectations of legislators and civil society, I express on behalf of the EUROMOT Team our thanks for the encouragement and support.

Dr Peter Scherm, Euromot General Manager

Chapter 2

EUROMOT Engine in Society Forum 2012

Room to Breathe: EU Air Quality – Today and Tomorrow

With a view to the Year of Air 2013, EUROMOT has invited political representatives of the European Commission, the European Parliament, the Regions and Civil Society to debate on 13 November 2012 at the prestigious Solvay Library in the Brussels European District the impact of two important policy reviews: the EU Air Quality Directives and the Nonroad Mobile Machinery Engines Directive 97/68/EC. The keynotes will be held by Mrs Valentina Superti, Deputy Head of the Cabinet of Commission Vice President Antonio Tajani, and Mr Thomas Verheye, Head of Unit of the Industrial Emissions Department (C.3) of the Commission's Environment Directorate.

The core of the event is the panel discussion on best ways and possible options to define environmentally efficient and cost-effective regulations for nonroad mobile machinery engines to the benefit of local, regional and ambient air quality in Europe while sustaining livabiliy, mobility, competitiveness and economic growth in a modern transboundary society.

The Back-Story

Annual conferences on internal combustion engines and their role in the environment and air quality policy (outdoor noise, exhaust emissions) of the European Union were held already in the years 1996 to 2001 where among others Environment Commissioner Margot Wallström or MEP Bernd Lange, former Chairman of the EP Environment Committee, participated. This successful series of events has now been resumed.

We want to thank for the very dedicated work of the Brussels-based EU Government Relations Managers of our member companies in the preparation of the Engine in Society Forum 2012.

Our Engine in Society Claim

Livability

- For more than 100 years the internal combustion (IC) engine has played a central role in our social and economic developments.
- Engines power our daily lives: They are at the heart of modern societies.
- Our members provide approximately 200,000 jobs for highly skilled and motivated men and women across the world.

Sustainability

- More recently the increasingly densely populated and developed nature of our society has created new environmental demands.
- Our members have responded to the challenge and through their creativity developed new technologies which made possible a dramatic reduction in the environmental and health impact that arises from the use of the internal combustion engines.
- We recognise our responsibility to minimise the effect of our activities on the environment and protect it for future generations.

Variety

- Internal combustion engines are sustainable solutions for an almost infinite number of propulsion and power needs.
- Our members provide power solutions - diesel, petrol, gas - to enhance the business of their customers in the nonroad mobile machinery, marine propulsion and power generation markets whilst creating better technologies that benefit both the customer and the environment.
- Our engines are sold worldwide and can be found in a wide range of environmental conditions: from deserts to glaciers.

Quality

- Millions of euros have been devoted to research and development to continually advancing internal combustion engine technologies, reducing emissions, improving engine system efficiency and minimising operating costs.
- Our member companies design and manufacture safe, reliable, quality and high performance products.
- Modern advanced IC engines meet customer requirements and governmental regulations set by authorities all over the world.

If you want to learn more about our industry, the nearly infinite range of engines and applications and our activities at political level, please visit us on **www.euromot.eu.**

Engine in Society Forum - 13 November 2012

Bibliothèque Solvay - Leopoldpark, 137 rue Belliard, 1040 Brussels

Room to Breathe: EU Air Quality - Today and Tomorrow &
Review of the EU Nonroad Mobile Machinery Engines Directive 97/68/EC

16:30 Registration

17:00 EU Air Quality & the Review of the EU Nonroad Mobile Machinery Directive 97/68/EC
Valentina Superti, Deputy Head of Cabinet
Commission Vice President Antonio Tajani
European Commission, DG Enterprise and Industry

17:20 EU Air Quality and the Review of the Thematic Strategy on Air Pollution
Thomas Verheye - Head of Unit C.3 / Industrial Emissions
European Commission, DG Environment

17:40 Panel discussion on defining environmentally efficient and cost-effective regulations for nonroad mobile machinery engines to the benefit of local, regional and ambient air quality in Europe while sustaining livability, mobility, competitiveness and economic growth in a modern transboundary society.

Introduction: Dr Peter Scherm - EUROMOT General Manager
Moderation: Dr Fraser Cameron - Senior Adviser, European Policy Centre (EPC)

Panelists: Anne Bliek-De Jong - Committee of the Regions, Randstad Region
Bas Eickhout - MEP, Environment Committee
Jos Dings - Director, Transport & Environment
Michael G Hawkins - EUROMOT President

19:00 Networking reception

20:00 Close

Chapter 3
Regulatory Activities

The EEA Air Quality 2012 Report

The European Environment Agency (EEA) issued in September its 2012 air quality report. The positive message is that since the eighties, emissions into the air in Europe have been reduced considerably and air quality has profited. Over the last decade (2001-2010), European Union policy has substantially reduced emissions of many air pollutants, resulting, for some of the pollutants, in improved air quality across the region. Sulphur dioxide (SO_2) is a big success story: emissions have been reduced significantly in recent years. 2010 was the first year that the EU urban population was not exposed to SO_2 concentrations exceeding the EU limit value. Despite these achievements, many European countries still do not comply with one or more emission ceilings as set by the EU air quality legislation. For example, reported emission data for NO_x shows emissions higher than the respective ceilings in a majority of the 27 EU Member States.

Furthermore, due to the complex interactions between particular types of emissions and air quality, specific emission reduction measure do not always produce a corresponding drop in atmospheric concentrations, especially when it comes to PM and O_3. Moreover, substantial contributions to elevated levels of ozone and PM concentrations in Europe are due to transboundary intercontinental transport. As a result, improving our understanding of the sources of emissions and the interrelated processes that lead to air pollution remains a challenge for regulators and all stakeholders in their strive to develop and implement effective and sustainable measures for improving air quality. Additional research is needed to understand and quantify the possible additive, synergetic and antagonistic effects between pollutants (exposure-response functions for pollutant combinations) which are encountered simultaneously in the ambient air.

Particulate matter:

- The EU limit and target values for PM were exceeded widely in Europe in 2010.
- 21% of the EU urban population lives in areas where the EU air quality 24-hour limit value for PM_{10} was exceeded in 2010. For EEA-32 countries the estimate is 41%.
- EU urban population exposure to PM_{10} levels exceeding the WHO Air Quality Guidelines (AQG) is significantly higher, comprising 81% of the total urban population in 2010.

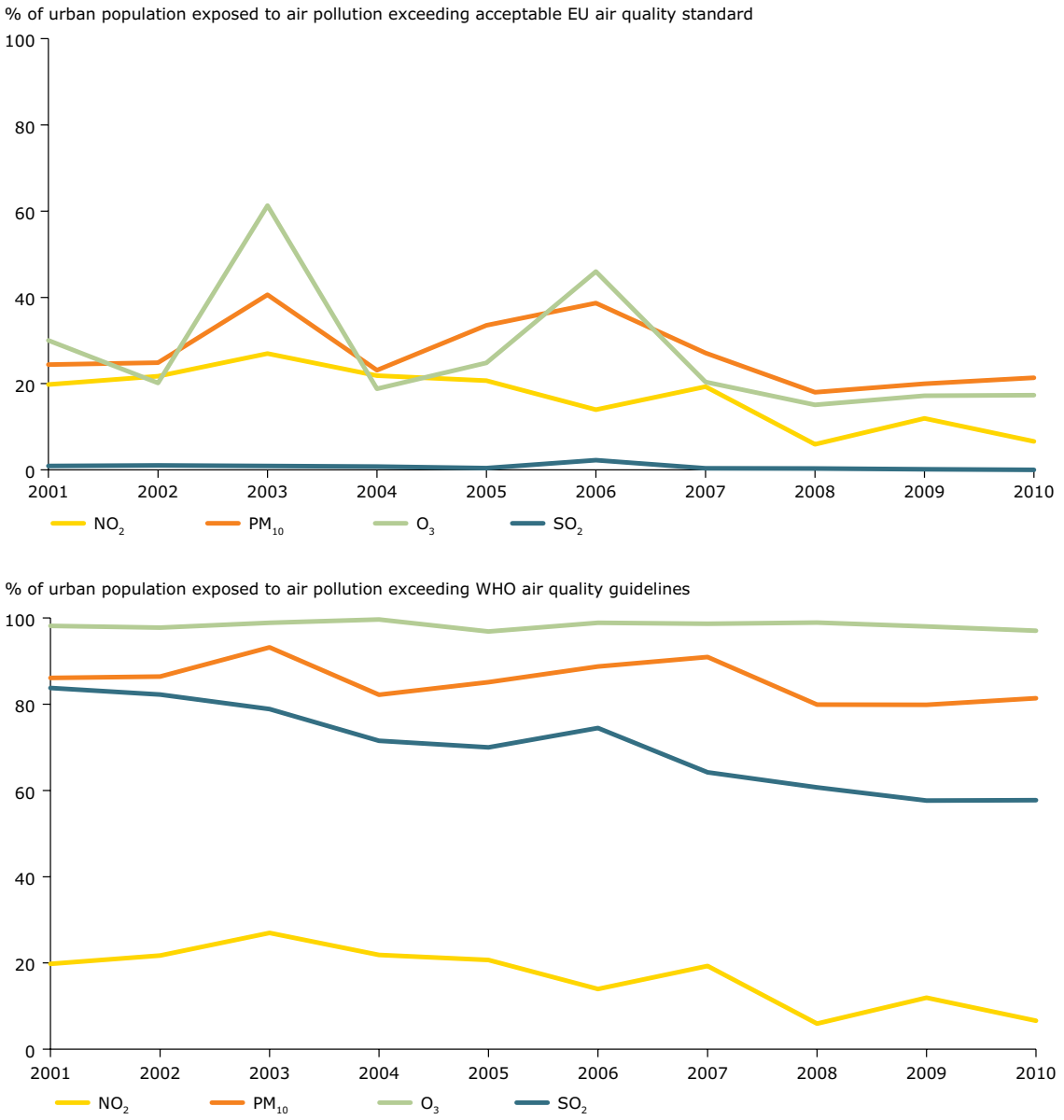
Nitrogen oxides:

- Some cities in Europe show an increase in concentrations of NO_2 measured close to traffic. This reflects the increasing numbers of newer diesel vehicles. Exhaust emissions from such vehicles are lower for CO, NMVOC and PM.
- The decrease in NO_x transport emissions (27% between 2001 and 2010 in the EU) is considerably greater than the fall in NO_2 annual mean concentrations (ca. 8% measured at stations close to traffic). This is attributed primarily to the increase in NO_2 emitted directly into air from diesel vehicles.
- 7% of the urban population lives in areas where the annual EU limit value and the WHO AQG for NO_2 were exceeded in 2010.

Sulphur dioxide:

- SO_2 concentrations were halved in the EU, as Member States cut their SOx emissions by 54% (EEA-32 44%) in the period 2001-2010.
- 2010 was the first year for which the urban population has not been exposed to SO_2 concentrations above the EU-24-hour limit value (EEA-32 1.6%).
- The EU urban population exposed to SO_2 levels exceeding WHO AQG is significantly higher, amounting to 58-61% of the total urban population between 2008 and 2010.

Figure ES.2 Percentage of the EU urban population exposed to air pollution exceeding acceptable EU air quality standards (top) and WHO air quality guidelines (bottom)



Source: EEA, 2012d (CSI 004).

Relevant Policy Instruments and Legislation

Within the European Union, the Sixth Environmental Action Programme called for the development of a Thematic Strategy on Air Pollution (TSAP) wich set in 2005 specific long-term objectives to improve the air quality in Europe by 2020. These objectives have been substantiated by the 2011 Commission Roadmap to a Resource Efficient Europe requesting that by 2020, the EU's interim air quality standards will have been met, including urban hot spots, and that those standards will have been updated and additional measures defined to further close the gap to the ultimate goal of achieving levels of air quality that do not cause significant impacts on health and environment. To achieve this policy target, various legal instruments have been implemented. They comprise:

- limits or targets for ambient concentrations,
- limits on total emissions (eg national ceilings),
- limits for sources or sectors either by setting ELVs (eg transport emissions) or requirements on product quality (eg fuel quality).

1 Policy instruments regulating ambient air concentrations:

- EU Directive 2008/50/EC on ambient air quality and cleaner air for Europe (AAQD, 2008): Regulates ambient air concentrations of SO_2, NO_2 and NO_x, PM_{10} and $PM_{2,5}$, Pb, C_6H_6, CO and O_3 (2008). In case of non-compliance with the limit and target values, national air quality action plans must be developed and implemented in the areas where exceedances occur.

2 Policy instruments regulating total national emissions:

- EU Directive 2001/81/EC on national emission ceilings for certain atmospheric pollutants (NECD, 2001).
- UN Convention on Long-Range Transboundary Air Pollution (CLRTAP) (2012).

Both instruments set total national emission limits for PM and O_3 precursors, such as SO_2, NO_x, NMVOC and NH_3.

3 Policy instruments regulating emissions from specific sources and sectors:

- EU Directive 1997/68/EC on emissions of gaseous and particulate pollutants from internal combustion engines in nonroad mobile machinery engines (NRMM, 2004).
- EU Directive 2005/55/EC on emission of gaseous and particulate pollutants from compression-ignition engines for use in vehicles, and the emission of gaseous pollutants from positive-ignition engines fuelled with natural gas or liquefied petroleum gas for use in vehicles (Euro 4, 2005).
- EU Directive 2003/17/EU on the quality of petrol and diesel fuel (FQD, 2010).
- EU Directive 2005/33/EC on the sulphur content of marine fuels (2012).
- EU Directive 2010/75/EU on industrial emissions (IED, 2010).
- IMO MARPOL 73/78, Annex VI, on air pollution from ships (NTC, 2010).

EU-wide versus Local Requirements

Air quality in Europe must meet the legal requirements which are prepared by the European Commission and subsequently accepted by the EU Member States. By accepting the same air quality requirements, all EU countries create a level playing field for health and nature. Setting equal emission standards for specific sources or sectors establishes a level playing field for industry. However, when concentrations exceed the air quality requirements, additional measures have to be taken.

For NO_x and PM many EU countries face this problem. The Netherlands, for example, is a 'hot spot' for many forms of air pollution with high levels of ozone, particulate matter, nitrogen oxides, heavy metals and persistent organic substances. It has one of the lowest emission per GDP or per capita but still the highest emissions per km^2. The Netherlands took action through its national air quality collaboration programme (NSL). This national action plan consists

of mostly local measures to reduce concentrations in certain streets. These are expensive source-oriented measures (eg cleaner buses, filters on diesel cars) or effect-oriented measures (eg one way traffic in streets). The costs of the NSL are estimated at 1.5 to 2 billion euro over nine years. Regulations at European or international scale are much more cost effective according to several cost-benefit analyses which have been prepared for the recent revision of the UNECE Gothenburg Protocol, not least because the target groups (eg industry, transport sector) bear the costs of the development and implementation of the agreed lower emission limits and not governments.

Table 1.2 Legislation in Europe regulating emissions and ambient concentrations of air pollutants

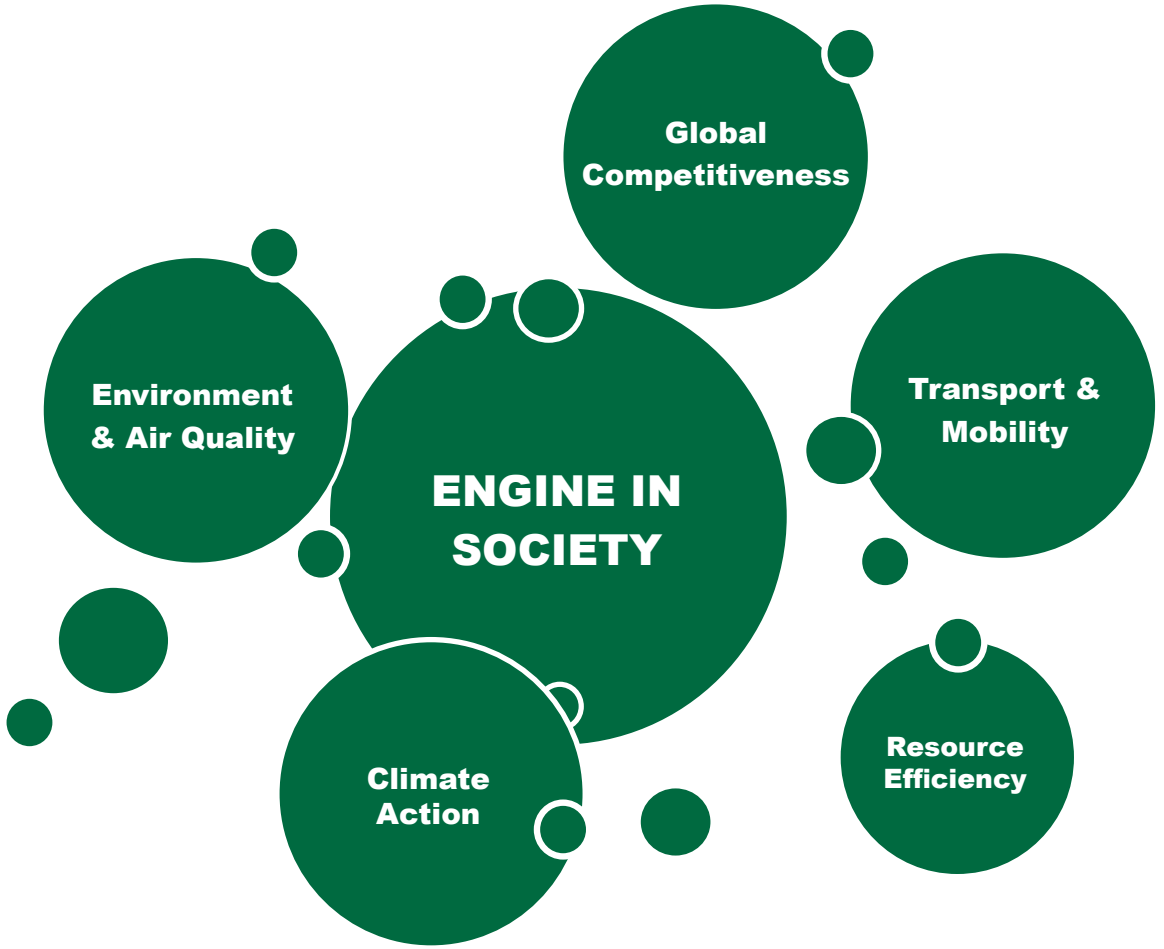
Policies \ Pollutants		PM	O_3	NO_2 NO_x NH_3	SO_2 SO_x S	CO	Heavy metals	BaP PAH	VOC
Directives regulating ambient air quality	2008/50/EC	PM	O_3	NO_2	SO_2	CO	Pb		C_6H_6
	2004/107/EC						As, Cd, Hg, Ni	BaP	
Directives regulating emissions of air pollutants	2001/81/EC	(a)	(b)	NO_x, NH_3	SO_2				NMVOC
	2010/75/EU	PM	(b)	NO_x, NH_3	SO_2	CO	Cd, Tl, Hg, Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V		VOC
	Euro limits on road vehicle emissions	PM	(b)	NO_x		CO			HC, NMHC
	94/63/EC	(a)	(b)						VOC
	2009/126/EC	(a)	(b)						VOC
	1999/13/EC	(a)	(b)						VOC
Directives regulating fuel quality	1999/32/EC	(a)			S				
	2003/17/EC	(a)	(b)		S		Pb	PAH	C_6H_6, HC, VOC
International conventions	MARPOL 73/78	PM	(b)	NO_x	SO_x				VOC
	LRTAP	PM (a)	(b)	NO_2, NH_3	SO_2	CO	Cd, Hg, Pb	BaP	NMVOC

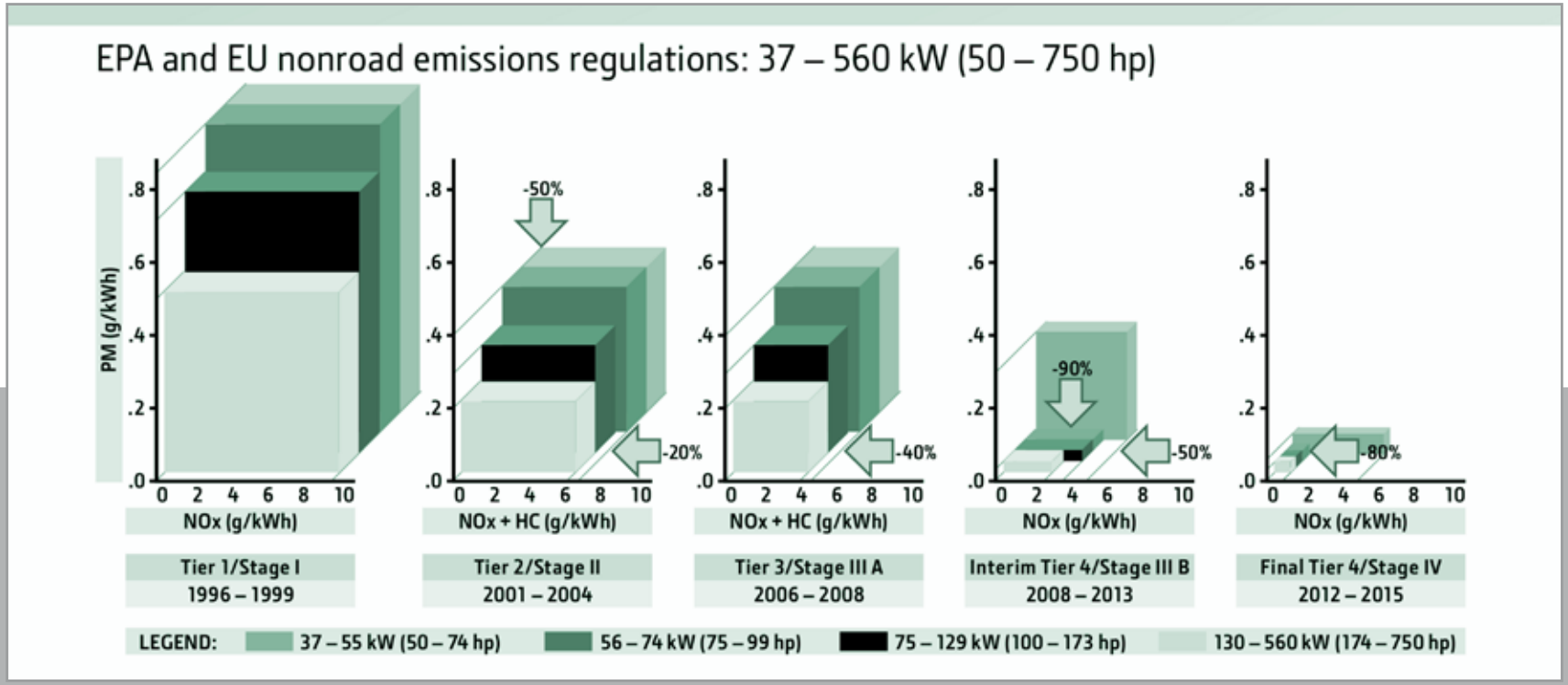
Note: (a) Directives and conventions limiting emissions of PM precursors, such as SO_2, NO_x, NH_3 and VOC, indirectly aim to reduce PM ambient air concentrations.

(b) Directives and conventions limiting emissions of O_3 precursors, such as NO_x, VOC and CO, indirectly aim to reduce troposphere O_3 concentrations.

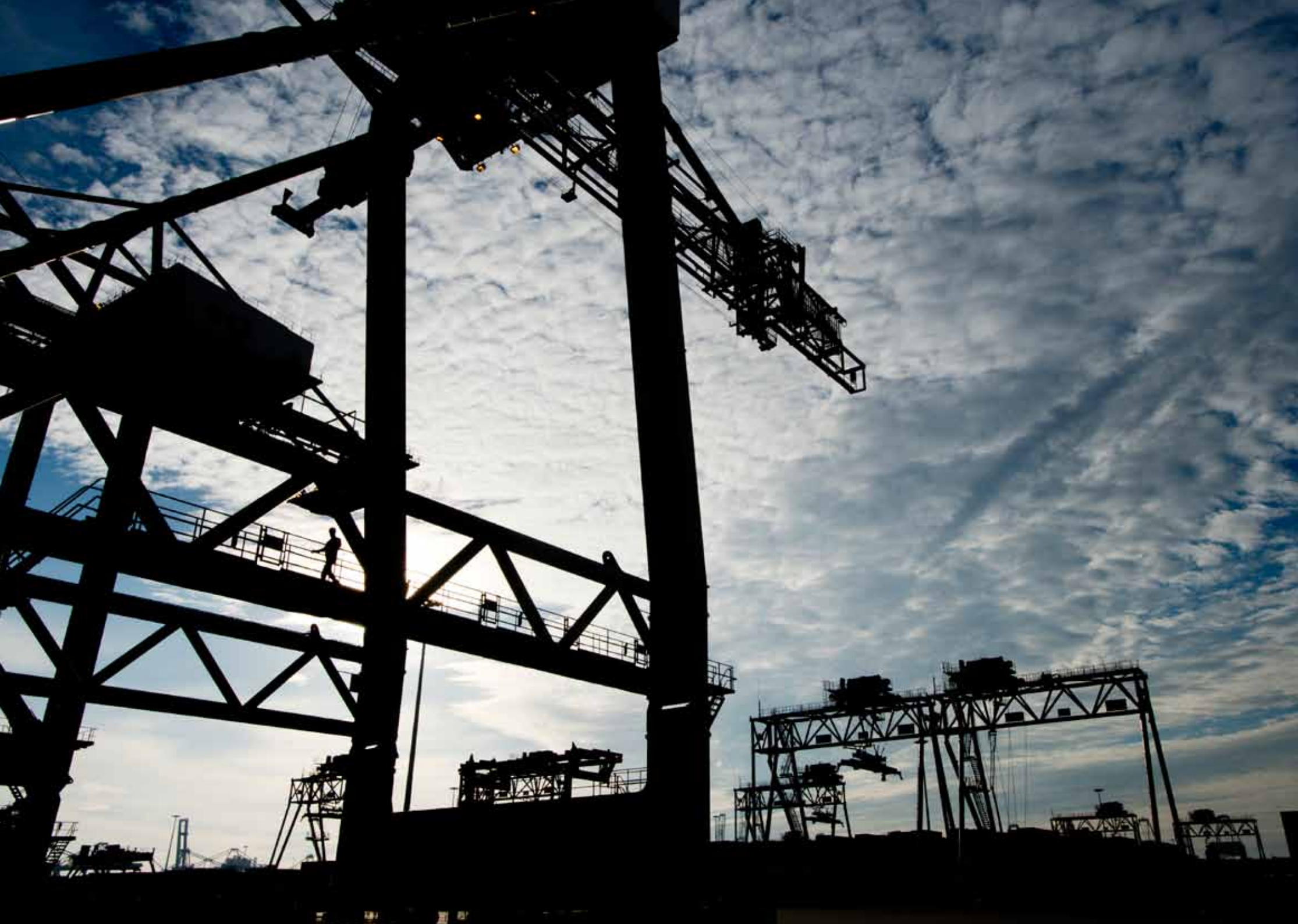
Source: Air quality in Europe - 2012 report

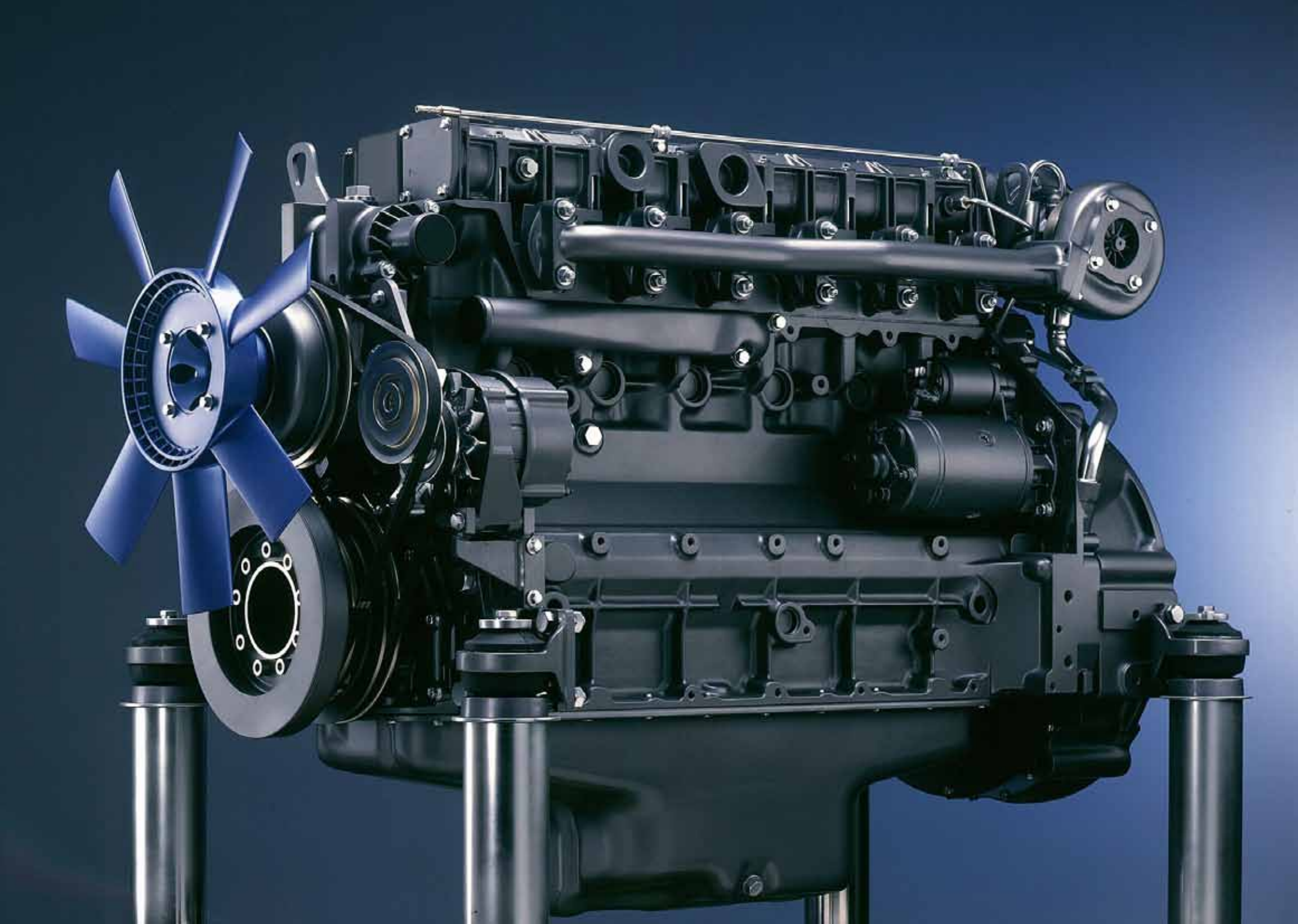
Regulatory Activities





Source: John Deere





NONROAD

MOBILE MACHINERY

Nonroad Mobile Machinery (CI)

The workhorse of society: Where there is work to be done, there is very often an internal combustion engine powering the mechanised part of the task.

The automotive engine has become the most obvious manifestation of Rudolf Diesel's or Nikolaus Otto's great inventions. While this type of engine is making such an enormous contribution to one of the Western World's most treasured privileges - personal mobility - few realise that passenger cars are merely the most recent extension of the IC engine's vital role in making many aspects of society function. Indeed, while many would know that a truck or a bus are IC engine-powered, few realise how extensive is the market for nonroad engines powering mobile machinery:

- **Construction equipment:** Extraction - construction - handling. IC engine driven machinery is building the cities, towns, streets, highways and bridges in your neighbourhood and in communities around the globe. Extraction machinery dig, excavate, load and haul the heaviest materials with power and strength. Construction machinery moves large volumes of material even where roads do not exist.

- **Agricultural equipment:** Farming is not done when the seed is planted. IC engines power the full line of agricultural equipment throughout

the lifecycle of the crop: seeders, combines and harvestors, tractors. Farming requires plenty of pulling power to perform specific tasks in the fields, whereas narrow and winding roads in vineyards, orchards or olive groves require small and compact machinery. IC engine solutions are tailored precisely to the farmer's or planter's need.

- **Forestry equipment:** Forests and soil need responsible care and concern. Engines and equipment are purpose-built for challenging site conditions. This versatility provides the ground for improved productivity, safety and minimized ground disturbance, soil compaction or air pollution.

- **Material handling equipment:** Moving materials means moving production forward: forklifts hauling loads in industrial plants, high-lift cranes moving steel on building sites, crushers preparing aggregates for road projects. Engines in machines like these work hard. If they stop, so does the flow of essential material.

- **Municipal and airport equipment:** Municipal equipment responds to the citizens' needs for clean living standards or emergency support. Community services cover maintenance of urban areas (greans and spaces), road and sewer cleaning, leaf/waste collection and recycling, winter maintenance and road services as well as firefighting and emergency utilities. Special urban areas like airports need special equipment like ground power units for portable airport power or purpose-built vehicles such as terminal tractors, aircraft load lifters, service vehicles. IC engine powered tractors are suited for cargo handling as well as for aircraft pushback.

- **Power carriers and pumps:** Pumps for fresh water irrigation, jetting, sprinkling, fire emergency use or pumping of trash water are essential for modern societies. Power carriers for construction, lighting, DIY, landscape gardening, trackside, footpath or stonewall maintenance, ie from low-noise over light-weight handy applications to heavy-duty work on the toughest building sites, ensure that you don't get left in the dark.

Key regulatory issues for the reporting period:

Directive 97/68/EC:

- Technical Review (full amendment) Stages EU NRMM IIIB/IV.
- Comitology Packages 1 & 2 for engine certification and type approval.
- In-service conformity (ISC): Development of PEMS (Portable Emissions Measurement System) pilot programme for nonroad engines and machinery.
- Flexibility (EU NRMM IIIB) / Transitional Provisions (EU NRMM IV/V).
- Considerations on a next stage "EU NRMM V".

Directive 2009/30/EC:

- Revision of the Fuel Quality Directive 98/70/EC on the specification of petrol, diesel and gas-oil.

UNECE GRPE:

- R96: (a) Alignment with provisions of EU Directive 97/68/EC (EU NRMM IIIB/IV), (b) Transposition of GTR (Global Technical Regulation) No. 11.
- R120: Alignment with provisions of R96 and GTR11.
- REC: Development of a Regulation for performance verification of retrofit emission control (REC) devices.

Others:

- SWITZERLAND: Consultation with the Swiss Federal Office for the Environment (FOEN / BAFU - Bundesamt für Umwelt) on the review of the Ordinance on Air Pollution Control (OAPC / LRV - Luftreinhalteverordnung).
- TURKEY: Consultation with the Ministry for Science, Industry and Technology on the implementation of 97/68/EC and amendements into Turkish law.
- US EPA: Consultation on the appropriateness of the NRTC cycle for small diesel engines below 19kW.

Railways

Railways are the answer to sustainable development in the transport sector. They are one of the most environmentally-friendly mode of land freight and passenger transport in terms of energy consumption and ‚greenhouse gas' emission.

In developing countries, a robust rail system will be crucial to cope with the increase in travel and mobility demands. In the developed countries, infrastructure needs to be upgraded to achieve the full benefit of rail for society. Euromot manufacturers provide sustainable drive solutions for mainline and multipurpose locomotives, railcars or special-purpose vehicles for construction and maintenance work in underground railway and metro systems.

<u>Key regulatory issues for the reporting period:</u>

EU Directives:

- 1997/68/EC - Nonroad Mobile Machinery Engines (NRMM): Revision and adaptation to technical progress.

UIC (International Union of Railways):

- Observing the Clean European Rail-Diesel Project (CleanER-D): The project aims to develop, improve and integrate emissions reduction technologies for diesel locomotives and rail vehicles. Furthermore it uses innovative methods and hybrid solutions for the best possible contribution to reductions in CO2 emissions.
- Consultations on energy efficiency improvements of railing stock.
- Consultation on UIC Leaflets.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Nonroad Small SI Equipment

On the green, along the cart path, around sport fields, in the gardens - SI powered products for turfs, parks, forests and gardens satisfy both professional users and demanding consumers.

Outdoor power products include lawn and turf care (mowers, cutters and edgers), tree care (chain saws, top handling saws), ground care, clean up & clearing (blowers, trimmers, power cutters, brushcutters, utility vehicles).

Key regulatory issues for the reporting period:

EU Directives:

- 1997/68/EC - Nonroad Mobile Machinery Engines (NRMM): Revision and adaptation to technical progress.
- 2000/14/EC - Noise emission in the environment by equipment for use outdoors (OND): Revision and adaptation to technical progress.
- 2009/125/EC - Framework for the setting of eco-design requirements for energy-related products (ErP): Observation of the study work on the eco-design work plan.
- 2010/30/EC - Indication by labelling and standard product information of the consumption of energy and other resources by energy-related products.
- 2011/65/EU - Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS II).
- 2012/19/EU - Waste Electrical and Electronic Equipment (WEEE recast).

EU Policies:

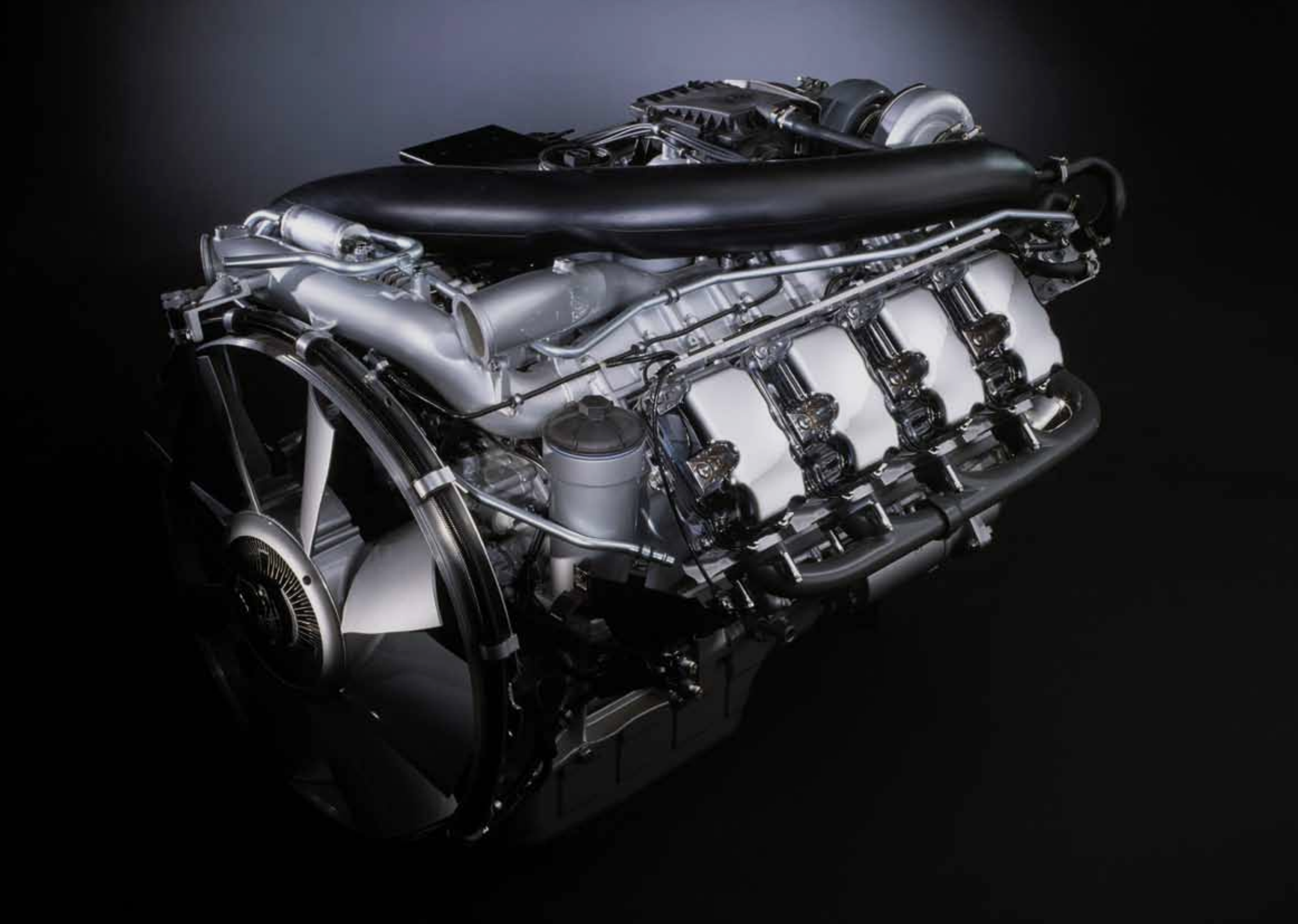
- Green Public Procurement and Eco-Labelling.
- Market Surveillance: Develop a common approach to conformity assessment and market surveillance in co-operation with the equipment industries.

Local Air Quality Regulations:

- Berlin Green Public Procurement Guidelines: Develop an industry position against the proposed ban of 2-stroke engine technology.

Emissions Monitoring:

- USA (EPA, CARB), Canada, China, India, Japan, Australia.



MARINE

Marine Leisure Equipment

Marine leisure boating and fishing, jet-ski riding, sailing and yachting are only a few examples for modern leisure activities. EUROMOT engine manufacturers deliver leading-edge technology for water and power sports enthusiasts.

- pods, inboard/outboard, sterndrives.
- sailing, motorboating, yachts and mega-yachts.

Key regulatory issues for the reporting period:

EU Directives:

- 2003/44/EC - Recreational Craft (RCD): Revision and adaptation to technical progress.

Others:

- BSO (Bodensee-Schifffahrts-Ordnung - Lake Constance Shipping Ordination): Revisions and Adaptation to technical progress (BSO III).
- Australia - Department on Environment and Water Resources: (a) Environmental performance of marine outboards and personal watercraft; (b) National cleaner nonroad diesel engine project.

Inland Navigation

The economic and environmental benefits of waterborne (multi-modal) transport across the European Union are obvious: Europe's network of navigable rivers and canals offers access to the continent's urban and industrial centres, allowing for the more efficient, cleaner, quieter, and safer transport of goods large and small.

While large ships carry a great deal of large-scale inland freight, small and modern dedicated vessels are used on smaller waterways and for city distribution opening up road-water transport to a growing number of customers. IC engines provide reliable power for the inland waterway transport fleet:

- **Dry bulk and general cargo ships:** Capacity from 350 tonnes up to 16,000 tonnes for dry bulk products such as agricultural products, building materials, waste and recyclables, also suited for pallets and racks.
- **Container ships:** Capacity from 22 TEU up to 500 TEU, for all goods which can be containerized in regular boxes, reefers, tank containers. Container lines work with regular services.
- **Self-loading ships:** Dry bulk or container ships with self-loading and unloading facilities onboard such as cranes (for unitesed goods) or vacuum suckers (for bulk).
- **Tankers:** Capacity from 650 tonnes up to 9,000 tonnes for liquid bulk products such as fuels, chemicals, gas, food liquids, powders.
- **Ro-ro vessels:** Non-accompanied transport of vehicles.
- **Push convoys:** Flexible capacity from 2 convoys up to 9 convoys depending on waterway dimensions, suited for all kind of dry bulk, containers and abnormal indivisible loads.
- **Sea-river and estuary ships:** Small coasters with capacity from 1,000 tonnes up to 4,500 tonnes.

<u>Key regulatory issues for the reporting period:</u>

EU Directives:

- 1997/68/EC - Nonroad Mobile Machinery Engines (NRMM): Revision and adaptation to technical progress.
- 2006/87/EC - Technical Requirements for Inland Waterway Vessels: Revision and adaptation to technical progress.

EU Policies:

- Participation in the European Commission's Common Expert Group (EC DG MOVE) on emission reduction of the inland waterway transport fleet.

CCNR (Central Commission for Navigation of the Rhine):

- Workshop on Inland Navigation's CO2 Emissions.
- Inland Navigation Fuel Efficiency and CO2 Emissions Report.
- Workshop on Emissions from the Legacy Fleet.

Shipping

When you work with our members in the maritime transport sector, you benefit from some of the world's finest marine experience dedicated to delivering both the internally agreed environmental standards and the best customer service during the entire life of an engine - through design to build and operation. The broad range of robust and reliable engines power a magnitude of civil and naval marine applications:

- **Passenger ships:** Cruise vessels, ferries or catamarans/trimarans up to more than 30,000kW and a capacity of more than 1,000 people, 300 cars and trucks, commuting between the shore lines, holiday islands and remote residential areas.
- **Transport ships:** Big oceangoing vessels like tankers, container ships or bulk carriers (up to 75,000kW and 9,000 TEU).
- **Commercial vessels:** Multi-purpose freighters, fishing vessels, barges or workboats such as pushertugs performing the most diversified services, ranging from bow and stern manoeuvring assistance, ship relocation, icebreaking, and salvage to fire fighting.

Key regulatory issues for the reporting period:

EU Directives:

- 2005/33/EC - Sulphur Content of Marine Fuels: Revision and alignment with IMO MARPOL Annex VI 2008 requirements (review finalised in September 2012).

EU Policies:

- EC DG Climate Action (CLIMA): Technical stakeholder consultation on reducing greenhouse gas emissions from ships under the European Climate Change Programme (ECCP II).
- EC DG Transport and Mobility (MOVE): Observing the EU Transport GHG: Routes to 2050 (I & II) project.
- EC DG Research and Innovation (RTI): Observing the activities of the European Waterborne Technology Platform.

IMO (International Maritime Organisation) / MEPC (Marine Environment Protection Committee):

- IMO MARPOL Annex VI NOx Technical Code (NTC): (a) Revision of technological developments to implement the Tier III NOx standards; (b) Revision of NTC non-mandatory instruments (eg replacement engines, NOx reducing devices); (c) Guidelines for the IGF Code (International Code of Safety for Ships Using Gases or other Low-Flash Point Fuels).
- Observing the designation of ECAs (emission control areas for NOx, SOx, PM).
- Observing the IMO process of monitoring the worldwide average sulphur content of marine fuel oils.
- Observing the IMO activities on reducing the impact of Black Carbon and other Particulate Matter on the Arctic Region.


RO-BOOM
RO-BOOM
RO-BOOM
RO-BOOM

STATIONARY

Power Generation

Regardless where people live and work access to electricity is essential. Ensuring the reliability of that power supply is significant, particularly in remote locations or for emergency needs.

EUROMOT members supply IC engine-operated power stations and maintenance services to electricity utilities, industry and local authorities. They provide solutions based on oil, gas, dual-fuel reciprocating engines, and on biomass-fuelled plants. Our competitve advantage is the plant's high efficiency coupled with operational flexibility in times of increasing or volatile fuel prices.

Key regulatory issues for the reporting period:

EU Directives:

- 2010/75/EU - Industrial Emissions (IED): (a) Revision and adaptation to technical progress (replacing the IPPC (integrated pollution prevention and control) directive and several sector diectives); (b) Revision of the Best Available Technology (BAT) reference document (BREF) for Large Combustion Plants (LCP).
- 1997/68/EC - Nonroad Mobile Machinery Engines (NRMM): Inclusion of exhaust emissions from small stationary sources (below 20 MWth).

EU Policies:

- Development of framework guidelines on electricity grid connection.
- Contribute to harmonising the gas quality in the European Union.

International Regulations:

- UNECE Convention on Long-Range Transboundary Air Pollution (CLRTAP): Review of the Gothenburg Protocol and Technical Annexes.
- WORLD BANK GROUP: (a) Review of the EHS Guidelines for Thermal Power Plants; (b) Review of Policy and Performance Standards on Social and Environmental Sustainability – PS3 "Resource Efficiency and Pollution Prevention".

Chapter 4
Networks Across the Globe

Networks across the Globe

For more than 20 years, we have strong links with our partner organisations around the world.

Particularly, EUROMOT cooperates with the internal combustion engine manufacturers associations in:

- Europe – FIM ÉNERGÉTIQUE (Association Syndicale des Équipements Énergétiques, France), OHEEG SMMT (Off-highway Engine and Equipment Group, United Kingdom), UNAMOT (Associazione Costruttori Motori per l'Agricoltura, Italy) and VDMA (Motoren und Systeme, Germany),
- China – CICEIA (Chinese Internal Combustion Engine Industry Association),
- India – IDEMA (Indian Diesel Egine Manufacturers Association),
- Japan – LEMA (Land Engine Manufacturers Association), JICEF (Japan Internal Combustion Engine Federation), JSMEA (Japan Ship Machinery & Equipment Association), and
- the United States – EMA (Truck and Engine Manufacturers Associations), OPEI (Outdoor Power Equipment Institute).

Our special thanks go to the German VDMA Engines and Systems Association in Frankfurt/M. which has been hosting the General Secretariat since our foundation in 1991.

In addition, EUROMOT is particularly pleased that we were able to organise this year along with our Engine in Society Forum (please refer to chapter 2) a networking and regulatory briefing meeting of the aforementioned associations in Brussels on 14 November 2012. We would appreciate it if this Engine International dialogue could take place regularly in the future.

Just as we get together regularly with the machinery and equipment manufacturers in Europe as part of the Industry Task Force Nonroad Mobile Machinery (NRMM):

- CECE – Committee for European Construction Equipment,
- CEMA – European Agricultural Machinery Association,
- FEM – European Material Handling Association,
- EGMF – European Garden Machinery Federation

or in regular bilateral talks:

- ORGALIME – European Engineering Industries Association
- EUROPGEN – European Generating Set Association,
- SEA EUROPE – European Ships and Maritime Equipment Association.

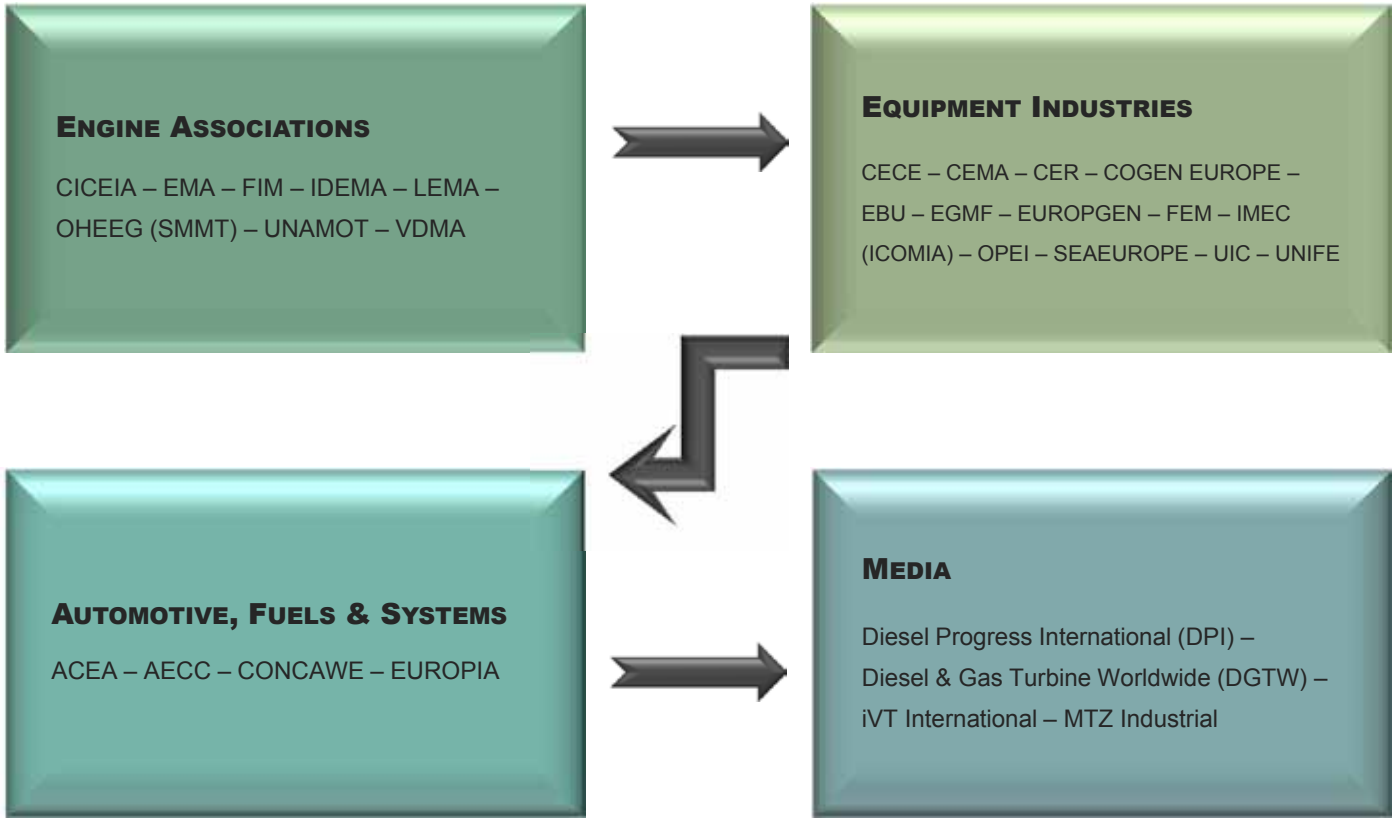
In addtion, our General Manager, Dr Peter Scherm, holds from time to time lectures on existing or proposed IC engine emission legislation at leading conferences and congresses of the major world markets:

- 2009 - CECE & CEMA Summit 2009, Brussels/Belgium
- 2011 - AVL International Powertrain Conference, Graz/Austria,
- 2011 - Tianjin Internal Combustion Engine Research Institute Small SI Engine Conference, Tianjin/China,
- 2012 - Integer Research Diesel Emission Conference, Saint Petersburg/Russia.

Europe	United Nations	Worldwide
European Commission: • Climate Action • Enterprise • Environment • Energy • Joint Research Center • Mobility & Transport	**Economic Commission for Europe (UNECE):** • Environment Division • Transport Division / World Forum for Vehicle Harmonization	**Asia:** • Japan Ministries of Environment (MoE) and Land, Infrastructure and Transport (MLIT) • Indian Ministry for the Environment and Forests (MoEF) and Central Pollution and Control Board (CPCB) • Chinese Ministry of Environmental Protection (MEP)
European Parliament & Council / European Environment Agency / European Pollutant Emission Register	**International Maritime Organization (IMO):** • Marine Environment Protection Committee (MEPC)	**Australia:** • Department of Environment and Conservation (DEC)
Regional Authorities: • Central Commission for the Navigation of the Rhine (CCNR) • Lake Constance (BSO)	**World Health Organisation (WHO):** • Europe Centre for Environment and Health	**North America:** • US Environmental Protection Agency (EPA) • California Air Resources Board (CARB) • Environment Canada (EC)
National Ministries and Authorities of the EU Member States	**Environment Programme (UNEP):** • Clean Fuels and Vehicles	**Others:** • **Israel, Korea, Russia, Turkey, …**

International Partners

Legislators & Authorities



International Partners

Associations / Media

Chapter 5
The Association

About us

Established in 1991, EUROMOT has been providing reliable know-how on advanced engine technologies in general, and on environmentally efficient and cost-effective product regulations.

We partner with other associations and stakeholders around the world to develop the right regulation for the local or global environment while sustaining mobility and economic growth in a modern transboundary society. EUROMOT is:

- a European Interest Representative registered in the EU Transparency Register (id. no. 6284937371-73),
- a non governmental organisation in observer status with the UN Economic Commission for Europe UNECE and the International Maritime Organisation IMO.

Our membership includes all major manufacturers of internal combustion engines in Europe and in the World, spark ignition and compression ignition, representing 85% of the EU market.

Internal combustion engines are at the heart of our modern societies. Engines range from 1 to more than 100,000 kW power:

- power generation, pumps, compressors;
- rail traction: locomotives & rail cars;
- lawn, garden & recreational equipment;
- nonroad mobile machinery: agricultural & forestry, material handling & ground support, construction & mining equipment;
- inland marine & seagoing vessels, workboats, pleasure boats.

Our members employ all over the world approximately 200,000 highly skilled and motivated men and women. The market turnover for the business represented exceeds 25 billion Euros.

Member Companies

National Associations

Structure

BOARD

From left to right: Ari Suominen, Dr Manlio Mattei, Michael G Hawkins, Georg Diderich, Hans Matthiasson, Alan Tolley

President:

Michael G Hawkins - CNH (until 31.12.2012)
Georg Diderich - DEUTZ (as of 01.01.2013)

Executive Committee (2009-2012)

- **Nonroad Engines (SSI):**
  Fausto Bellamico - EMAK
- **Nonroad Engines (CI):**
  Georg Diderich - DEUTZ
  Dr Manlio Mattei - SAME DEUTZ-FAHR
  Alan Tolley - JCB POWER SYSTEMS
  Matthieu Turbé-Bion - JOHN DEERE
- **Marine and Stationary Engines:**
  Dr Thomas Knudsen - MAN
  Hans Matthiasson - VOLVO PENTA
  (until 30.09.2011)
  Tom Tveitan - VOLVO PENTA
  (as of 01.10.2011)
  Ari Suominen - WÄRTSILÄ
- **National Associations:**
  Ian Bacon - OHEEG SEMT (United Kingdom)
  Dr Giorgio Billi - UNAMOT (Italy)
  Thorsten Herdan - VDMA ENGINES (Germany)
  Rémy Leclerc - FIM ENERGETIQUE (France)

Internal Auditor:

Klaus Pöpsel (TOGNUM - until 31.12.2011)
Dr Dirk Bergmann (TOGNUM/FPT INDUSTRIAL -
as of 01.01.2012)

From left to right: Richard Payne, Dr Holger Lochmann, Jürgen Stein, Johan Boij

WORKING GROUPS

- **Government Relations:**

  Michael G Hawkins - CNH (until 31.12.2012)
  Georg Diderich - DEUTZ (as of 01.01.2013)

- **Nonroad Engines (SSI):**

  Dr Holger Lochmann - STIHL

- **Nonroad Engines (CI):**

  Jürgen Stein - DAIMLER
  (Nonroad Mobile Machinery)
  Ulrich Beutke - MTU FRIEDRICHSHAFEN
  (Rail Traction Engines)
  Dr Giuseppe Duri - LOMBARDINI
  (Small CI Engines - until 30.09.2012)
  Dr Stefano Manelli - LOMBARDINI
  (Small CI Engines - as of 01.10.2012)

- **Marine and Stationary Engines:**

  Richard Payne - CUMMINS ENGINE
  (Marine Engines)
  Tom Tveitan - VOLVO PENTA
  (Recreational Craft)
  Dr Thorsten Kuhn - MTU FRIEDRICHSHAFEN
  (Inland Navigation)
  Fritz Fleischer - MAN DIESEL & TURBO
  (Maritime Transport)
  Johan Boij - WÄRTSILÄ
  (Stationary Diesel Engines)
  Michael Wagner - GE ENERGY
  (Stationary Gas Engines)

From left to right: Dr Peter Scherm, Nadine Pörtner, Petra Tutsch, Paul Zepf

GENERAL SECRETARIAT

- **Dr Peter Scherm - General Manager**
  EU & International Legislation,
  Governmental Affairs

- **Petra Tutsch - Communications Manager**
  Internal & External Communications,
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- **Paul Zepf - Technical Manager**
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- **Nadine Pörtner - Team Assistant**
  Member Support, Corporate Design &
  Publications, Events

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