

AMFI Newsletter



AMFI Newsletter is prepared for the members of the Implementing Agreement on Advanced Motor Fuels of the International Energy Agency (IEA/AMF).

AMFI provides four electronic Newsletters each year, describing recent news on advanced motor fuels, vehicles, energy and environmental issues in general. AMFI Newsletter is available on the website:

www.iea-amf.vtt.fi

Fuel efficiency was a central theme at the Geneva Motor Show in March 2009. Several vehicles with CO₂ emissions less than 100 g/km were on display. The manufacturers also displayed electrified vehicles and vehicles running on alternative fuels. Photo by Nils-Olof Nylund.

CONTENTS

GENERAL INTEREST

- ◇ International 50 by 50 goal for fuel economy
- ◇ Procurement of clean and energy-efficient vehicles in EU
- ◇ California's Low Carbon Fuel Standard
- ◇ EU's progress in renewable energy
- ◇ US EPA finds greenhouse gases as health threat
- ◇ Meanest and cleanest vehicles

GASEOUS FUELS (NG, LPG, biogas, DME)

- ◇ Lower WTW CO₂ emissions for CNG than for GTL
- ◇ NGVA's new website

ALCOHOLS, (BIO)GASOLINE

- ◇ Ricardo develops efficient ethanol engine
- ◇ Sekab in Sweden ends ethanol business

BIODIESEL ESTERS

- ◇ US NBB's sustainability principles for biodiesel
- ◇ Biodiesel operators slow down in Germany

- ◇ Biodiesel duty on imports from US to EU

- ◇ European project on Algae: BioMara

SYNTHETIC AND RENEWABLE DIESEL

- ◇ Standards for synthetic fuels, CEN and ASTM
- ◇ ASFE enlarged to cover hydrotreated oils

OTHER FUELS AND VEHICLES

- ◇ Electric vehicle Smart Fortwo

MISCELLANEOUS

- ◇ Facilities to test heavy-duty emissions at cold temperatures

- ◇ Primary NO₂ emissions are increasing

IEA & IEA/AMF News

- ◇ International Advanced Mobility Forum Geneva March 2009

- ◇ From the Executive Committee

- ◇ Progress of Annexes

PUBLICATIONS

GENERAL INTEREST

International 50 by 50 goal for fuel economy

The UN Environment Programme (UNEP), International Energy Agency (IEA), International Transport Forum (ITF), and International Automobile Federation (FIA) set out the '50 by 50' Global Fuel Economy Initiative (GFEI) to improve fuel efficiency of the world car fleet by 50% by 2050 with intermediate goals in 2020 and 2030.

Achieving the targets of the initiative would mean that even if the mileage of global fleet would double by 2050, the CO₂ emissions would stay at current levels.

The target would be achieved by using cost-effective technologies such as better engines and drive trains, more efficient components such as tyres, and lighter materials. For the later years, electrification such as plug-in hybrids is also needed.

Source: [Press release, 4 March 2009, launched at Geneva Motor Show \(www.50by50campaign.org\)](#).

Global Fuel Economy Initiative

- 50% by 2050 for the world car fleet
- 50% by 2030 for new cars worldwide
- 30% by 2020 for new cars in OECD countries

Procurement of clean and energy-efficient vehicles in EU

The EU Council of Ministers adopted a new directive that requires public authorities and certain operators to take into account lifetime energy and environmental impacts when purchasing road transport vehicles to promote the market for clean and energy-efficient vehicles. The operational energy and environmental impacts to be taken into account over the vehicle life-cycle shall include at least energy consumption, CO₂ emissions and emissions of NO_x, NMHC and particulate matter. In addition, other environmental impacts may be included. When calculating the lifetime environmental costs, the following prices are used: CO₂ 0,03-0,04 EUR/kg, NO_x 0,0044 EUR/g, NMHC 0,001 EUR/g, and particulate matter 0,087 EUR/g.

Source: [European Parliament 2005/0283 \(COD\), 16 March 2009 \(http://ec.europa.eu\)](#).

California's Low Carbon Fuel Standard

The California Air Resources Board (CARB) adopted a regulation that will implement Governor Schwarzenegger's executive order in 2007 requiring a low-carbon fuel standard, LCFS (see AMFI 1/2007). The new regulation requires a 10% reduction in greenhouse gas emissions from California's transportation fuels by 2020. The GHG intensity should drop only 5% by 2017, then 5% in the final three years to encourage new fuel technologies. The LCFS takes effect in 2010, but compliance isn't mandatory until 2011.

Credits are given for fuel providers that achieve lower GHG intensities, and these credits can be sold to those who fail to meet the target. Suppliers of clean fuels (e.g., electric utilities, biogas) can earn credits as well. The LCFS includes standard values for greenhouse gases for fuels produced by different pathways.

Regulators expect that a new generation of fuels will be produced from algae, wood, agricultural waste such as straw, switchgrass, and even municipal solid waste. According to CARB, production of some 1.5 billion gallons of biofuels needs over 25 new biofuel facilities. The standard is expected to drive the availability of plug-in hybrid, battery electric, and fuel-cell powered cars.

Sources: [CARB News Release, 23 April 2009 \(http://www.arb.ca.gov\)](#). [EERE Network News, 29 April 2009 \(http://apps1.eere.energy.gov\)](#). [CARB Proposed Regulation to Implement the Low Carbon Fuel Standard, 5 March 2009 \(http://www.arb.ca.gov\)](#).

EU's progress in renewable energy

The Commission has published a report on the progress of member states toward their 2010 targets for the share of renewable energy. The report concluded that the EU will reach a 19% share of renewables for electricity instead of a targeted 21%, and 4% biofuels instead of 5.75% in the transport sector, even though some member states have already reached their targets.

The Commission argues that administrative procedures, grid access, and lack of adequate support measures are to blame for this situation. EU's climate change package from 18 December 2008 (see AMFI Newsletter 1/2009) is expected to give better tools to facilitate the development of renewable energy sources over the next 12 years.

Source: [EurActiv News, 30 April 2009 \(http://www.euractiv.com\)](#).

US EPA finds greenhouse gases as health threat

The US Environmental Protection Agency proposal concludes that six greenhouse gases (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) are air pollutants that may be a health risk and belong under the Clean Air Act. Scientific analysis shows that concentrations of these six gases are at high levels due to human emissions, which is likely to cause an increase in average temperatures and other changes in our climate.

Global warming has many adverse health effects through e.g. increased ground-level ozone concentration, drought, heavy raining, flooding and storms. These impacts are emphasised within some groups, such as poor, old and unhealthy people. Climate change also has serious national security implications.

The proposed finding will go through certain steps before it is finalised. After that, regulations may be set to reduce greenhouse gases under the Clean Air Act.

Source: *US EPA News Release, 17 April 2009* (<http://yosemite.epa.gov>).

Meanest and cleanest vehicles

The American Council for an Energy-Efficient Economy has defined the greenest and meanest cars of the 2009 model year. The evaluation criteria included exhaust emissions, fuel consumption, and greenhouse gases. The greenest car was the Honda Civic GX, a dedicated natural gas vehicle. The next cleanest cars were the Toyota Prius hybrid, the Honda Civic Hybrid, the Smart Fortwo Convertible, the Toyota Yaris, and the Nissan Altima Hybrid. The Meanest Vehicle was the Hummer H2 flex-fuel vehicle, followed by the Lamborghini Murcielago.

Source: *ACEEE News Release, 3 February 2009* (<http://www.aceee.org>).

The automobile club ADAC of Germany also carries out environmental ratings for cars. Over the last five years, about 900 cars have been tested. The highest score of five stars has now been given for the first time; this distinction was given to the natural-gas fuelled Volkswagen Passat 1.4 TSI EcoFuel. In previous years, Toyota Prius was the leader. Harmful exhaust emissions are rated independently from vehicle class. However, CO₂ emissions are rated in six vehicle class categories, from very small to large cars. The Passat was evaluated in middle-size class.

The Passat got 50 points for harmful exhaust emissions (CO, HC, NO_x, PM) and 42 points for CO₂ emissions. The fuel consumption of the Passat is 4,9 kg/100 km and CO₂ emissions are 134 g/km over the real-life driving cycle. The Volkswagen Passat 1.4 TSI EcoFuel is optimised for natural gas.

Source: *ADAC, EcoFuel tests, April 2009* (<http://www.adac.de>).

Editorial: As used in this test, CO₂ rating method means that at a given level of CO₂-emissions, small cars get worse scores than large cars. Therefore, the scoring is for relative environmental impacts within a vehicle category, not absolute impacts.

GASEOUS FUELS (NG, LPG, biogas, DME)

Lower WTW CO₂ emissions for CNG than for GTL

John Baldwin, CNG Services Ltd., stated that on a Well to Wheels basis methane shipped as LNG and used in NGVs results in lower CO₂ emissions than methane converted to synthetic GTL diesel. The VW diesel Passat using GTL produces WTW CO₂ emissions 214 g/km, whereas LNG-CNG used in Passat NGV produces CO₂ emissions of 143 g/km. Editorial: Tailpipe CO₂ emissions of the Passat NGV is 124 g/km.

Source: *Presentation by John Baldwin at Energy Institute, 21st century fuels, 18 February 2009* (<http://www.cngservices.co.uk>).

NGVA's new website

NGVA Europe has a new website with information about market data, working groups, and political and technical activities. Standards and regulations are also available (submitted to NGVA by ENI from Italy).

Source: *NGVA Europe News, 3 April 2009* (<http://www.ngvaeurope.eu>).

ALCOHOLS, (BIO)GASOLINE

Ricardo develops efficient ethanol engine

Ricardo aims at developing an ethanol-fuelled engine that would be almost as efficient as diesel engines. Currently, Flexible Fuel Vehicles (FFVs) running on E85 suffer from poor fuel economy, which on a volumetric basis is some 30% higher than that for gasoline engines. The new engine technology is called Ethanol

Boosted Direct Injection (EBDI), which utilizes ethanol's high octane number and high heat of vaporization to increase efficiency. High level of turbocharging is used to achieve the high cylinder pressures. This is combined with technologies such as direct injection, variable valve timing, optimized ignition, and exhaust gas recirculation.

The prototype EBDI is a 3.2-liter V6 engine. Work has been carried out at the Detroit Technology Campus of Ricardo, Inc., in technical collaboration with Behr, Bosch, Delphi, Federal Mogul, GW, and Castings and Honeywell.

Source: *Ricardo News Release, 6 February 2009* (<http://www.ricardo.com>).

Sekab in Sweden ends ethanol business

Sekab ends sales of E85 in Sweden, closes production facilities in Tanzania and Poland, and closes research on cellulosic ethanol. This is due to oil refineries that are not willing to pay extra for Sekab's verified ethanol. Now distribution chains need to take care by themselves of using ethanol that fulfils sustainability criteria. Sekab has represented some 90% of Swedish markets for E85.

Source: *Gröna Bilister News, 20 February 2009* (<http://www.gronabilister.se>).

BIODIESEL ESTERS

US NBB's sustainability principles for biodiesel

The National Biodiesel Board in the US has established a Sustainability Task Force to guide its membership in ongoing efforts to assess and improve environmentally, economically, and socially responsible biodiesel production. NBB has defined Sustainability Principles for biodiesel.

Source: *NBB website* (<http://www.biodiesel.org>).

Biodiesel operators slow down in Germany

In the past, one of nine filling stations in Germany sold 100% biodiesel, in total about 1 900 filling stations before last year. The Arbeitsgemeinschaft Qualitätsmanagement Biodiesel e. V. (AGQM) showed that only 88 firms are still interested in selling biodiesel and only about 250 stations are left. This negative development is due to the high taxation on biodiesel. As a consequence of the dramatic drop in the number of filling stations and sales, the AGQM decided to discontinue quality assurance. However, AGQM will continue the quality management for biodiesel used as a blending component to conventional diesel fuel.

Editorial: 100% is not compatible with the newest diesel vehicles, and this might be one contributing factor to the drop in the 100% biodiesel market.

Source: *AGQM, 6 February 2009* (<http://www.agqm-biodiesel.de>).

Biodiesel duty on imports from US to EU

The EU has decided to set a temporary tariff for biodiesel imports from the U.S.A. After six months, the situation will be reconsidered. Over the last year, the market share of U.S. biodiesel imports was 17%. This process with the tariff originates from complaints from European industry. The European Commission concluded that unfair subsidisation and dumping of U.S. biodiesel has taken place.

Source: *European Commission, Trade issues, 12 March 2009* (<http://ec.europa.eu>).

European project on Algae: BioMara

The BioMara research project on algae as biofuel feedstock has a €6 million budget, of which €4,87 million comes from the European Union's INTERREG IVA Programme. BioMara will focus on supporting biofuel production and utilisation in remote, rural communities. This project provides for cross-border collaboration between Scottish, Irish, and Northern Irish partners and represents a major addition to the significant portfolio of renewable and green energy activity already underway in Scotland. Research partners come from the Scottish Association for Marine Science, the University of Strathclyde, Queen's University, Belfast, the University of Ulster, the Dundalk Institute of Technology, and the Institute of Technology, Sligo.

Source: *Press release, BioMara global launch, 3 April 2009* (<http://www.biomara.org>).

SYNTHETIC AND RENEWABLE DIESEL

Standards for synthetic fuels, CEN and ASTM

The CEN Workshop Agreement (CWA 15940, Workshop 38) on paraffinic diesel from synthesis or hydrotreatment of oils and fats has been published. CWA is not an official standard, but a document agreed upon by a Workshop. CEN Workshop means a process in which industrial partners together with other interested parties negotiate on their standardisation requirements and try to find an agreement on requirements.

CWA 15940 covers paraffinic diesel fuel based on synthesis gas (from natural gas, coal, or biomass) and on hydrotreatment of vegetable or animal oils.

Paraffinic diesel is suitable for existing vehicles, and it can provide significant emission reductions in fleet operations. Paraffinic diesel, however, does not fulfil all the requirements of the European EN590 standard on diesel fuel. There are differences in cetane and distillation, but first and foremost in density. Therefore a specific definition is needed.

Two qualities of paraffinic diesel fuel are defined in CWA 15940: low-cetane class (51,0–66,0) and high-cetane class (minimum 70,0).

Property	Unit	Limits Class A		Limits Class B	
		minimum	maximum	minimum	maximum
Cetane number ^b		70,0 ^e	–	51,0	66,0
Density at 15 °C	kg/m ³	770,0	800,0	770,0	800,0
Total aromatics content ^c	% (m/m)	–	1,0	–	1,0
Polycyclic aromatic hydrocarbons content ^{c,d}	% (m/m)	–	0,1	–	0,1
Total olefin content ^e	% (m/m)	–	0,1	–	0,1
Sulfur content	mg/kg	–	5,0	–	5,0
Flash point	°C	> 55	–	> 55	–
Carbon residue ^f (on 10 % distillation residue)	% (m/m)	–	0,30	–	0,30
Ash content	% (m/m)	–	0,01	–	0,01
Water content ^g	mg/kg	–	200	–	200
Total contamination	mg/kg	–	24	–	24
Copper strip corrosion (3 h at 50 °C)	rating	class 1		class 1	
Oxidation stability	g/m ³	–	25		25
Lubricity, corrected wear scar diameter (wsd 1,4) at 60 °C ^h	µm	–	460		460
Viscosity at 40 °C	mm ² /s	2,00	4,50	2,00	4,50
Distillation 95 % (V/V) ⁱ recovered at	°C		360		360

Source: *CEN CWA 15940 (will be available at <http://www.cen.eu>)*

ASTM has also started to develop a standard for synthetic diesel fuels as Work Item WK23320 - New Specification for Low Temperature Fischer-Tropsch Derived Paraffinic Diesel Fuel Oils. In addition to quality specification, this work will deal with issues such as suitability of test methodologies and terminology for synthetic fuels and suitability of these fuels as a blending component in diesel fuel.

Source: *ASTM International Standards, Work Item WK23320 (<http://www.astm.org>)*

ASFE enlarged to cover hydrotreated oils

ASFE, the Alliance for Synthetic Fuels in Europe, has been devoted to synthetic fuels produced from biomass (BTL) or natural gas (GTL) feedstock. Now, Neste Oil has joined ASFE, and the scope of the alliance has been broadened to include hydrotreated vegetable oils (HVO), for which Neste Oil has proprietary NExBTL technology. Today, the members of ASFE are Bosch, Daimler, Neste Oil, Sasol Chevron, Shell, Toyota, and Volkswagen.

Synthetic, paraffinic fuels are high-quality transport fuels made with the Fischer-Tropsch process from natural gas (GTL) or biomass (BTL), or through hydrotreatment from vegetable oils or animal fats (HVO). GTL and HVO are commercially available fuels, and a number of new plants are being built or planned. BTL needs further R&D before commercialisation. Synthetic fuels from biomass (BTL) can reduce well-to-wheel greenhouse gas emissions up to 90%, and the HVO fuel currently 40 - 60%, compared to conventional diesel. Synthetic fuels can be used neat or blended in existing diesel engines, distribution, and refuelling infrastructure. Synthetic fuels can also significantly reduce tailpipe emissions (see previous paragraph).

Source: *Neste Oil, Press release, 20 March 2009 (<http://www.nesteoil.com>)*

OTHER FUELS AND VEHICLES

Electric vehicle Smart Fortwo

The second generation of electric vehicle, Smart Fortwo, will be in small series production in late 2009, and in larger volume production from 2012. Smart will use lithium-ion batteries. In Europe, the electric Smart will be tested in Berlin, Paris, Rome, Milan, and Pisa. Several cities are also being considered in the USA. *Source: Daimler News, 3 March 2009. Smart at the Geneva Motor Show 2009 (<http://media.daimler.com>).*

MISCELLANEOUS

Facilities to test heavy-duty emissions at cold temperatures

The Joint Research Centre (JRC) of the European Commission has new test facilities for heavy-duty vehicles and buses in Ispra, Italy. The facility, VELA7, is suitable for vehicles weighing up to 40 tons and up to 12 meters in length. Tests can be conducted in temperatures between -30°C and +50°C, and relative humidity from 30% to 80%. Light-duty cars are required to be tested at -7°C, and discussion is going on to extend low-temperature tests to other vehicle categories. In addition to VELA7, JRC has six laboratories for engines and vehicles (VELA1-VELA6).

Source: JRC Press release, 13 March 2009 (<http://ec.europa.eu>), Brochure (<http://ec.europa.eu>).

Primary NO₂ emissions are increasing

According to a study by AEA Energy & Environment, primary NO₂ emissions have increased in recent years, and are predicted to increase further due to exhaust after-treatment technologies for diesel vehicles. An increase in NO₂ emissions from road traffic will continue until 2015, followed by a decline to close to 2004 levels by 2020 due to the large reduction in NO_x emissions over that period. Estimates of future ambient NO₂ concentrations for roadside monitoring sites predict that 29 out of 45 sites will exceed the annual mean NO₂ limit value in 2010. At 22 sites, the annual mean concentration is expected to remain above the limit value until 2020 and beyond. This assessment was carried out for ten case locations across the European Union, combining the results of a literature survey of primary NO₂ emission factors for different vehicle types and technologies with an emission inventory.

Source: Grice, S. et al. Recent trends and projections of primary NO₂ emissions in Europe. Atmospheric Environment. 43 (2009) 2154–2167. (<http://www.sciencedirect.com>).

IEA & IEA/AMF News

International Advanced Mobility Forum Geneva March 2009

IEA was one of the sponsors of the IAMF conference in Geneva in March 2009. IAMF was arranged in conjunction with the Geneva Motor show (see also the 50 by 50 initiative). Three of IEA's transport-related Implementing Agreements (Advanced Fuel Cells, Advanced Motor Fuels, Hybrid and Electric Vehicles) contributed with presentations.

EUWP's Transport Contact Group (TCG) also took the opportunity to meet in Geneva. In addition to the three Implementing Agreements mentioned above, Advanced Materials for Transport, Bioenergy Task 39 (liquid biofuels) and the Implementing Agreement on Renewable Energy Technology Deployment (RETD) were on site. The meeting was honored by the presence of the new Chairman of CERT and former Chairman of EUWP Dr. Peter Cunz. Issues discussed included, among other things, the new initiative of renewable energy in transport by RETD.

37th ExCo Meeting

37th ExCo Meeting will be held on 26-28 May 2008 in Helsinki, Finland.

Biodiesel Report

Annex XXXIV report on Biodiesel Options is now available at the IEA/AMF website.

From the Executive Committee

AMF's end-of-term report, new strategic plan, and request for extension were presented to the IEA End Use Working Party at the end of March 2009 in Paris. The EUWP endorses the extension. The next step in the process is a presentation to the Committee on Energy Research and Technology CERT in June 2009.

IEA/AMF Annual Book 2008 is now available at the website (<http://virtual.vtt.fi>).

Ralph McGill has been U.S. Alternate and/or Operating Agent of Annexes within the IEA Advanced Motor Fuels Agreement for many years. In April 2009, Ralph McGill was elected Mayor of Farragut, Tennessee (U.S.A.). Congratulations!

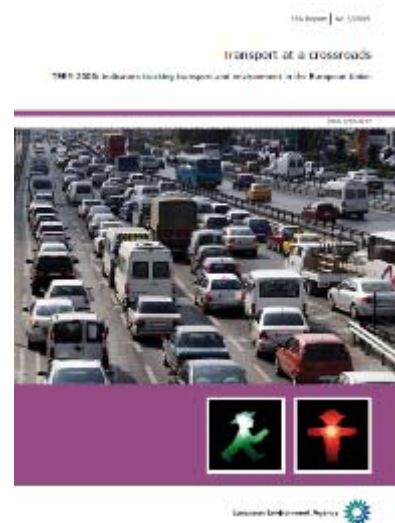
Progress of Annexes

Annex XXXIII involved in organising the SAE - EC JRC Conference, "Particle Emissions of 2-Stroke Scooters", which will be held on 11-12 June 2009 in Milano, Italy (<http://www.sae.org>).

Annex XXXIV, Biomass Derived Diesel Fuels – The final report of this Annex covering biodiesel fuels from first-generation biodiesel fuels (FAME made from vegetable oils) to second-generation fuels is now available at the [AMF Website](#).

PUBLICATIONS

- IEA/AMF Annex XXXIV report on Biodiesel Options. Now publicly available at the IEA/AMF website 2009. <http://virtual.vtt.fi>.
- IEA/AMF Annual Book 2008 is now available at the website (<http://virtual.vtt.fi>).
- JARI China Round Table 2009, Vehicle Emission and Fuel Economy Regulations in the Future. 13 February 2009. Presentations available at <http://www.jari.or.jp>.
- Transport at a crossroads. TERM 2008: indicators tracking transport and environment in the European Union, EEA Report No 3/2009, published 31 March 2009. <http://www.eea.europa.eu>.
- EU Energy and transport. Statistical pocketbook 2009. ©European Communities, 2009. <http://ec.europa.eu>.
- TRANSvisions. Report on Transport Scenarios with a 20 and 40 Year Horizon in Europe. March 2009. <http://ec.europa.eu>.
- IFP Panorama 2009: "Challenges and issues for the transport of tomorrow". 28 January & 5 February 2009, Paris & Lyon. Publications available at <http://www.ifp.com>.
- Comparison of particle emissions from advanced vehicles using DG TREN and PMP measurement protocols (includes results with FT fuel). Concaawe report 2/2009. <http://www.concaawe.org>.
- Health Effects of Real-World Exposure to Diesel Exhaust in Persons with Asthma, HEI Research Report 138, 27 February 2009 <http://pubs.healtheffects.org>.



IEA/AMF Delegates

Austria – Austrian Federal Ministry for Transport, <i>Andreas Dorda</i>	Denmark – DTU, <i>Jesper Schramm</i>	Spain – IDEA, Juan Luis Plá de la Rosa	Thailand – NSTDA, Paritud Bhandhubanyong
Canada – Natural Resources Canada, <i>Jean-Francois Gagné</i>	Finland – VTT, Nils-Olof Nylund	Sweden – Swedish Road Administration, Olle Hådel	United Kingdom – Department for Transport, Chris Parkin
People's Republic of China – CATARC, <i>Jiaqiang Guo</i>	France – ADEME, Patrick Coroller	Switzerland – University of Applied Sciences, Jan Czerwinski	USA – DOE, Kevin Stork
	Italy – Eni SpA, Fausto Alberici		
	Japan – NEDO, Kazunori Nagai		
	Japan – LEVO, Nobuichi Ueda		

Editor: VTT Technical Research Centre of Finland, P.O.Box 1000, FI-02044 VTT, Espoo. paivi.aakko@vtt.fi - P Aakko-Saksa