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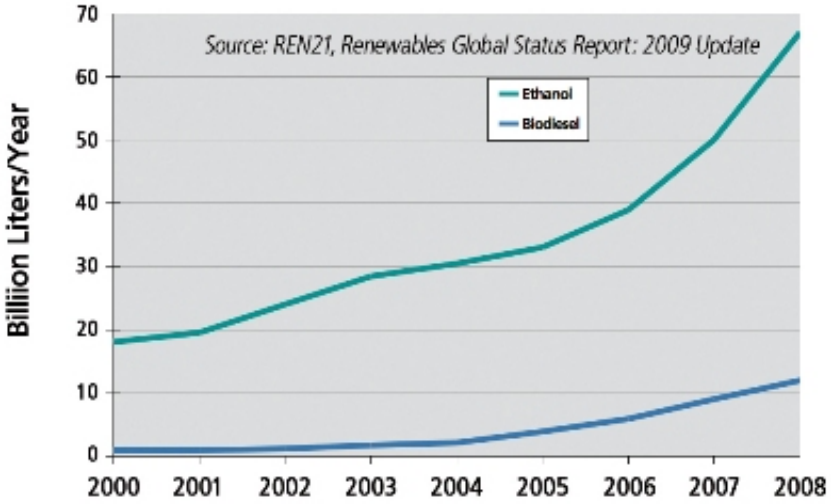
AMFI Newsletter



Global fuel ethanol production has more than doubled from 2004 to 2008, and biodiesel production increased sixfold, respectively. Renewable Energy Policy Network for the 21st Century has published the "2009 Update" edition of the Renewables Global Status Report (www.ren21.net).

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

AMFI produces four electronic Newsletters each year, describing recent news on advanced motor fuels, vehicles, energy and environmenttal issues in general. The AMFI Newsletter is available online at:

www.iea-amf.vtt.fi

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US EPA revises Renewable Fuel Standard

The US EPA proposed modifications to the National Renewable Fuel Standard program (RFS1), which was established under the Energy Policy Act 2005 (EPAct) and defined in the 2007 Energy Independence and Security Act (EISA). The following changes to the program have been proposed: 1) required volumes and a stricter timeframe, 2) four categories of renewable fuels are defined, 3) minimum thresholds for GHG emissions for each category are defined. The program is being expanded to cover all transport fuels, diesel, non-road and marine fuels.

The required 36.0 billion gallons of renewable fuels in 2022 should consist of the following volumes:

- 21.0 billion gallons of advanced biofuels, from which 16.0 billion gallons of cellulosic biofuels and at least 1.0 billion gallons of biomass-based diesel
- 15 billion gallons of other biofuels, such as corn-based ethanol

Category	Explanation	GHG emission reduction threshold
Cellulosic biofuel	Any renewable fuel derived from cellulose, hemicelluloses or lignin	60 percent
Biomass-based diesel	Biodiesel esters and other diesel made from renewable biomass (excluding ''co-processed' with petroleum)	50 percent
Advanced biofuel	Renewable fuel other than corn-based ethanol. E.g., biomass-based diesel, cellulosic biofuel, biogas, butanol	50 percent (10% adjustment allowance)
Renewable fuel	All renewable fuels, e.g., advanced biofuels and corn-based ethanol.	20 percent

''Renewable biomass'' includes a number of feedstock types. However, some limitations to the management practices for the land from which they are derived have been set. For example, planted crops and crop residue must be harvested from agricultural land cleared or cultivated prior to December 19, 2007, that is actively managed or fallow, and non-forested. Therefore, planted crops and crop residue derived from land that does not meet this definition cannot be used to produce renewable fuel for credit under RFS2.

The EPA will develop life-cycle analysis methods for the four categories mentioned, i.e., the greenhouse gas emissions throughout the entire lifespan of the particular fuels. Elements such as land-use change, indirect effects, cultivation emissions, transport and production will all be included in this analysis.

Source: Federal Register, Vol. 74, No. 99, Proposed Rules, 26 May 2009 (www.epa.gov).

US National Fuel Economy Policy

In the US, a policy to increase the fuel economy and reduce the greenhouse gas emissions of new cars and trucks has been announced. The proposed new fuel economy standards will cover model years 2012-2016. An average fuel economy of 35.5 mpg for model year 2016 should be achieved. The requirement of the Energy Independence and Security Act 2007 was 35 mpg by model year 2020. The standards will also reduce CO_2 emissions from new vehicles by 30% by 2016. The policy combines fuel economy regulations and GHG regulations for vehicles.

The proposed standards are expected to be divided into categories of vehicles, based on the size of the vehicles. A variety of measures to allow flexibility in meeting the standards is expected, including credits earned for actions such as implementing advanced air conditioning technologies and using additional technologies that reduce CO_2 emissions.

This policy represents collaboration among the different governmental and environmental organisations, 10 of the world's largest auto manufacturers and the United Auto Workers (UAW).

Source: The White House, Press release, 19 May 2009 (www.whitehouse.org).

Editorial note: Target of 35.5 mpg in 2016 represents some 160-175 g/km CO_2 depending on fuel type (diesel/gasoline). In Europe, target for CO_2 emissions from cars is 130 g/km in 2012.

RES and fuel quality Directives in EU

The EU's climate change package and the preparation of the fuel quality Directive was covered in AMFI Newsletter 1/2009. The Directives have now been adopted with the following codes:

- Directive 2009/28/EC sets new mandatory national targets for renewable energy by 2020, and establishes sustainability criteria for biofuels and bioliquids covering minimum requirements for greenhouse gas savings and requirements to avoid damaging land use change. The new legislation introduces flexibility instruments, such as statistical transfers, joint projects and joint support schemes. Implementation has to be continuous over the 10 year period, biannual reporting requirements are maintained both for Member States and the Commission.
- Directive 2009/30/EC regarding the specification of petrol, diesel, gas-oil and fuel used by inland waterway vessels. It also introduces a mechanism to monitor and reduce greenhouse gas emissions. This Directive allows 10% ethanol in gasoline and 7% FAME in diesel fuel as described in AMFI Newsletter 1/2009.

Source: Official Journal of the European Union, L 140, Volume 52, 5 June 2009 (eur-lex.europa.eu).

Fossil fuel reserves – note

According to a study published in the journal *Nature*, if global warming is to be limited to 2°C, less than a quarter of the proven economically recoverable fossil fuel reserves (oil, gas and coal) can be burnt and emitted between now and 2050. The research project involved scientists from Germany, the United Kingdom and Switzerland.

The study calculated that not more than 1000 billion tonnes of greenhouse gases can be emitted between 2000 and 2050 if warming is to be kept lower than 2°C. One third of that has been already emitted in nine years. Greenhouse gas emissions must be cut by more than 50% by 2050 relative to 1990 levels, if the risk of exceeding 2°C is to be limited to 25%.

Source: Press release, Potsdam Institute for Climate Impact Research, 30 April 2009 (www.pik-potsdam.de).

GASEOUS FUELS (NG, LPG, biomethane, DME)

Biomethane added to GHGenius model

GHGenius is a model for lifecycle assessment of transportation fuels. It has been developed for Natural Resources Canada over the past ten years. In the latest version of GHGenius (3.15), two biomethane pathways have been added: one based on landfill gas and another based on biogas from anaerobic digestion. The production of landfill gas was already included in GHGenius as a feedstock for methanol production. Now the pathways to CNG and LNG and the use of these fuels in vehicles have been added. Anaerobic digestion (AD) uses mostly waste materials. Hay is included in the model so that some sensitivity to non-waste products can be accessed.

Source: GHGenius News, 7 May 2009 (www.ghgenius.ca).

Natural gas from algae

A new method for converting algae into renewable natural gas is available from Pacific Northwest National Laboratory (PNNL) under a license. The method is based on catalytic hydrothermal gasification. The PNNL process gasifies more than 99% of the biomass to renewable natural gas and byproducts such as CO_2, which can be reused in the algae growth ponds. PNNL has tested the gasifier with terrestrial plants, kelp and water hyacinths. It works especially well for aquatic biomass such as algae, because the feedstock doesn't require drying before fuel production. The PNNL gasifier runs at relatively low temperatures, 350 °C compared to 700 °C or more for other systems.

Source: Pacific Northwest National Laboratory, May 2009 (http://iic.pnl.gov/highlights/algae.stm).

New CNG cars popular in Sweden

The monthly NGV sales rate in Sweden has increased from about 150 to over 700 units since the market introduction of the new Volkswagen Passat TSI EcoFuel in February 2009. In June, the new Volkswagen TSI Passat EcoFuel accounted for 68% and the Mercedes B 170 NGT for 24% of the total NG passenger cars sales in Sweden.

Source: NGVA Europe, July 2009 (www.ngvaeurope.eu).

ALCOHOLS, (BIO)GASOLINE

First cellulosic ethanol in Canada

Royal Dutch Shell Plc announced that in June/July, for one month, gasoline containing 10% of cellulosic ethanol was available at a Shell service station in Ottawa, Ontario. The ethanol is produced locally from non-food raw materials at Iogen Energy Corporation's demonstration plant, a joint venture between Iogen and Shell. The plant produces 40,000 litres of cellulosic ethanol per month. This was the first time ever that a gasoline blend containing advanced biofuel made from wheat straw was commercially available. *Source:* Iogen Corporation, News 10 June 2009 (www.iogen.ca).

Straw as feedstock for fuel ethanol. Photo courtesy of Shell.

Algae-to-ethanol pilot plant

The Dow Chemical Company and Algenol Biofuels, Inc. plan to build and operate a pilot-scale algae-based integrated biorefinery that will convert CO_2 into ethanol. The facility is planned to be situated at Dow's Freeport, Texas site. The first pilot has the potential to produce more than 100,000 gallons of ethanol per year.

Source: Algenol Biofuels, Press release 29 June 2009 (www.algenolbiofuels.com).

Sekab in Sweden - Corrigendum

SEKAB will end distribution of E85 and its projects in Africa and Eastern Europe. However, SEKAB will not end their cellulosic ethanol research, as stated in AMFI 2/2009. SEKAB has announced that the company is now focusing on its core business: the development of technology and processes for the production of cellulosic fuels, production of green chemicals and diesel replacement fuel.

Source: E-mail from SEKAB, 28 May 2009.

BIODIESEL ESTERS

Half of biodiesel capacity in Europe unused

In Europe, half of biodiesel production capacity remains unused. The low price of crude oil is one reason for this. In addition, Germany reduced the required blending targets of biofuel content in fossil fuel for 2009 to 5.25% from the 6.25% originally intended.

Sources: European Biodiesel Board, News 16 July 2009 (www.ebb-eu.org), AMFI Newsletter 4/2008.

Duty for biodiesel import to EU

The temporary duty for biodiesel imports from the US to Europe was dealt with in AMFI Newsletter 2/2009. The EU has decided that this duty is permanent for five years.

Source: Official Journal of the European Union, L 179, Volume 52, 10 July 2009 (eur-lex.europa.eu).

SYNTHETIC AND RENEWABLE DIESEL

BTL plant in Finland

In June, Neste Oil and Stora Enso (a pulp and paper company) inaugurated a demonstration plant for biomass to liquids (BTL) production utilising forestry residues in Varkaus. A 50/50 joint venture, NSE Biofuels Oy, has been established to develop technology and later on to produce biocrude for renewable diesel on a commercial-scale.

The demonstration facility at Stora Enso's Varkaus Mill includes a 12 MW gasifier. It will be used to develop technologies and engineering solutions for a commercial-scale plant. The demonstration process units will cover all stages of the process, including the drying of biomass, gasification, gas cleaning and testing of Fischer-Tropsch catalysts.

Source: Neste Oil, Press release, 11 June 2009 (www.nesteoil.com).

NExBTL progress

World-scale NExBTL plants - Neste Oil is building two world-scale NExBTL (HVO) plants, one in Rotterdam and a second unit it Singapore, with a capacity of 800,000 t/a each. These plants are expected to be completed in 2010 and 2011. The foundation stone for the plant in Rotterdam was laid in May 2009. The plant will be the largest renewable diesel plant in Europe. The investment cost of the plant is estimated to be €670 million. Source: Neste Oil, Press release, 26 May 2009 (www.nesteoil.com).

The second NExBTL plant in Finland - In June 2009, Neste Oil increased its NExBTL production capacity with a second plant in Finland. The first NExBTL plant in Finland came on stream in 2007. Both plants have the same capacity of 170,000 t/a. Neste Oil uses palm oil, rapeseed oil and waste animal fat sourced from the food industry as feedstock for NExBTL. Neste Oil is committed to using only certified palm oil by the end of 2015, or before that if sufficient volumes become available. Source: Neste Oil, Press release, 29 July 2009 (www.nesteoil.com) and *Press release, 4 June 2009 (www.nesteoil.com).*

Supplies of sustainable palm oil increase

It is estimated that the production of sustainable palm oil will reach 1.75 million tonnes for the year. EU nations import a total of 5.3 million tons palm oil per year. This is confirmed in the last figures from the Round Table for Sustainable Palm Oil. Production of sustainable palm oil does not result in any deforestation, and small farmers or communities are not driven off their land. Employees working in this industry are paid reasonable salaries, and child labour is forbidden.

Source: PalmOilHQ News, 26 June 2009 (www.palmoilhq.com).

European Algae Biomass Association (EABA) launched

The European Algae Biomass Association was launched in June 2009. The general objective of the EABA is to promote mutual interchange and cooperation in the field of algae biomass production and use, including biofuel applications. It promotes co-operation among scientists, industrialists and decision makers in the development of research, technology and industrial capacities in the field of algae. One of the key objectives of the EABA is to push scientific research in the field of algae to a stage where algae biomass products are commercially viable. The new association also intends to advance co-operation to define and express a common position on EU issues (legislation, product specifications, trade and sustainability standards, etc.) and acting as a technology neutral platform.

The EABA considers algae and other aquatic plants to be among the most promising of renewable resources, with a wide range of applications (biofuels, nutrients, pharmaceutical products, animal feeds, etc) and that they can make a significant contribution to cutting carbon dioxide emissions. However, it is also aware of the difficulties faced in taking algae biomass solutions from the laboratory and into the market place.

Source: EABA Press release, 10 June 2009 (eaba-association.eu).

ExxonMobil's algae biofuel program

Exxon Mobil Corporation announced an alliance with a biotech company, Synthetic Genomics Inc. (SGI), to research and develop next generation biofuels from photosynthetic algae. Under the program ExxonMobil expects to spend more than $600 million, which includes $300 million in internal costs and potentially more than $300 million to SGI.

Source: ExxonMobil, Press release 14 July 2009 (www.businesswire.com).

OTHER FUELS AND VEHICLES

PHEV diesel

Volvo announced that it will launch plug-in hybrid electric vehicles (PHEV) with diesel engines in 2012. In January 2007, Volvo Car Corporation and Vattenfall launched a joint project for testing and developing Plug-in technology. The cooperation is now being taken to the next level. The goal is to serially produce plug-in hybrid vehicles and introduce them on the market as early as 2012, years ahead of what was earlier considered possible.

The Plug-in hybrid cars will be driven by a powerful electric motor fuelled by a lithium-ion battery. It takes about five hours to charge the battery from a standard wall socket, and the battery is also charged every time the car's brakes are applied. In the summer of 2009, three Volvo V70 demonstration cars will be presented. The cars that are planned to go into series production in 2012 will feature somewhat different technology, but the launch of the demonstration vehicles is a step towards serial production of Plug-in hybrid cars specifically tailored to market needs.

Source: Vattenfall Press Release, 1 June 2009 (www.vattenfall.com).

Hydrogen highway in Norway

The HyNor Partnership and StatoilHydro announced the official opening of the Norwegian hydrogen highway. Since 2003, StatoilHydro has been the driving force behind HyNor's goal to establish a hydrogen transportation infrastructure along the nearly 600 kilometre route between Oslo and Stavanger. The first hydrogen station was opened at Forus in Stavanger in 2006, the second in Porsgrunn in 2007, and now two new stations have been opened in Oslo and Lier. HyNor has some 50 partners and manages a fleet of more than 50 hydrogen vehicles made by Mazda, Toyota and Think.

"As a future clean transport alternative, hydrogen and fuel-cell technology have huge potential. Hydrogen is potentially a game-changing transportation fuel," says Ms Hansen. *Source: HyNor News 11 May 2009 (www.hynor.no).*

Fuel cell issues

The US government reduced the fuel cell budget for 2010 from $169.0 million to $68.2 million. Despite the massive cut, the Californian Air Resources Board completed its 2009 Hydrogen Road Tour, an annual road rally to demonstrate the advancements in fuel-cell technology. The rally starts in San Diego, and ends in Vancouver, British Columbia. *Source: Hydrogen Road Tour (www.hydrogenroadtour.com).*

IEA & IEA/AMF News

From the Executive Committee

The 37th Executive Committee Meeting was held on 26–28 May 2009 in Helsinki, Finland. A number of interesting presentations and excursions took place during the informal part of the ExCo meeting. In the first session overviews of the situation in the US, EU, Australia, Thailand and Germany were presented.

The programme included technical visits to VTT Technical Research Centre of Finland, Helsinki University of Technology, the bus depot of Helsinki City Transport featuring special service bays for natural gas buses and Neste Oil's refinery in Porvoo, including the first NExBTL unit. At VTT, the energy company St1 presented its concept for waste based ethanol. Helsinki University of Technology is participating in IEA's combustion agreement. Combustion's new project "Future Combustion Technology for Synthetic and Renewable Fuels in Transport" was presented.

Australia - Most welcome!

As of 25 May 2009, the IEA Legal Office has confirmed the participation of the Government of Australia as a Contracting Party in the Implementing Agreement for a Programme of Research and Demonstration on Advanced Motor Fuels.

We wish you most welcome as Contracting Party in the Executive Committee on Advanced Motor Fuels.

Nils-Olof Nylund	Claës Pilo
Chairman IEA/AMF	Secretary

Membership

Australia is welcomed as a participant in the IEA Advanced Motor Fuels Implementing Agreement. On 25 May 2009, the legal procedure was completed regarding the participation of the Government of Australia as a Contracting Party in the Implementing Agreement for a Programme of Research and Demonstration on Advanced Motor Fuels. Dr. Lesley Dowling from the Department of the Environment and Water Resources is Delegate for Australia.

Progress of Annexes

Annex XXVIII Information Service & AMF Website: The AMFI Newsletters have been redesigned. Two newsletters have been produced in 2009 and two more are in preparation.

Annex XXXIII Particle Emissions of 2-S Scooters: Jan Czerwinski presented a summary of Annex XXXIII "(Nano) Particle Emissions & Toxicology of 2-Stroke Scooters". Annex XXXIII will be closed by the end of 2009.

Annex XXXIV, Sub-task No. 2 Algae as a Feedstock for Biofuels: Ralph McGill has prepared a white paper on algae, which is now available at the website (*Link*). IEA Bioenergy IA will have its own task for algae. AMF's project will focus on engineering and end-use, whereas Bioenergy will focus on "upstream" issues. It was suggested that a workshop be organised together with the Bioenergy IA.

Annex XXXV Ethanol as Motor Fuel: Jesper Schramm informed that the final technical report can now be downloaded from the AMF website (*Link*). Another report with country reports will be prepared and printed.

Annex XXXVI Measurement Technologies for Emissions from Ethanol Fuelled Vehicles "METEV": Erlandsson presented highlights from the first test results. A draft report will be prepared before the end of July 2009. The final report is expected to be ready in October 2009. Public SAE Paper will be prepared.

Annex XXXVII Fuel and Technology Alternatives for Buses: Nylund presented an update of the program describing objectives, contents, vehicle matrix, and fuels under discussion. The updated work plan is on the AMF website. The Annex has been presented to the Bioenergy ExCo and the HEV ExCo in May 2009. Ralph McGill will act as liaison officer for North America. Environment Canada has already commenced the actual bus measurements.

Annex XXXVIII Evaluation of Environmental Impact of Biodiesel Vehicles in Real Traffic Conditions: New Annex with NTSEL (Japan) as Operating Agent. Objectives "How do biodiesel fuels (BDF) affect emissions of the newest diesel vehicles?", "The real-world emissions of the diesel vehicles fuelled with BDF", "Diesel vehicles applied to BDF without special customizing", "Comparison of the real-world emissions between the case of light oil and that of BDF" and "Effect of BDF on the real-world fuel economy".

Annex XXXIX Enhanced Emission Performance and Fuel Efficiency for HD Methane Engines: New Annex with the Swedish Road Administration as Operating Agent. Annex includes a pre-study on the current status for enhanced fuel efficiency and durability for heavy duty engines fuelled by methane. The final report will contain a presentation of the state of the art and a proposal for the next step. The focus will be on the best solutions based on testing and with recommendations/guidelines to stakeholders.

38th ExCo Meeting

38th ExCo Meeting will be held in Bangkok, Thailand, 2009.

Report on Ethanol

Report on Annex XXXV is now available at website.

White Paper on Algae

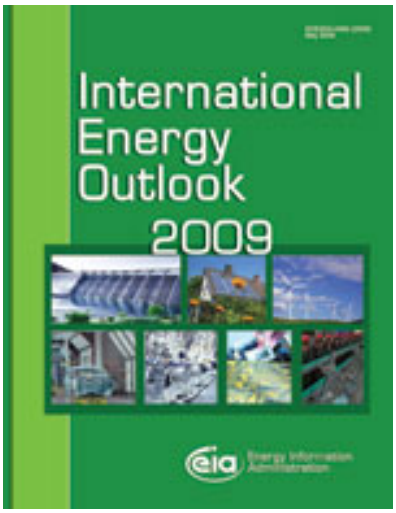
Annex XXXIV Subtask 2 preparation document is now available at website.

Country report - France

Country report from France is available for Members at website.

PUBLICATIONS

- The IEA/AMF Annex XXXV report, "Ethanol as a fuel for road transportation", focuses on addressing the technical potentials and problems of ethanol, but also the central issues related to the general application of bioethanol as an energy carrier in the near future. *(www.iea-amfl.vtt.fi).*
- IEA/AMF Annex XXXIV Subtask 2: "White Paper Algae as a Feedstock for Transportation Fuels – The Future of Biofuels?". The preparation phase document of Annex XXXIV, a White Paper on Algae, is now publicly available, *(www.iea-amf.vtt.fi).*
- Energy Technology Roadmaps: Status Report – © OECD/IEA 2009, July 2009. *(www.iea.org).*
- The International Energy Outlook 2009 (IEO2009). *(www.eia.doe.gov)..*
- BP Statistical Review of World Energy. 2009 edition. *(www.bp.com).*
- Renewables: Global Status Report. 2009 Update. Renewable Energy Policy Network for the 21st Century. REN21. *(www.ren21.net).*
- Biofuel Cities Guide to Sustainable Biofuels Procurement for Transport Available Online, July 31, 2009. *(biofuel-cities.eu).*



IEA/AMF Delegates

Australia – Department of the Environment, *Lesley Dowling*

Austria – Austrian Federal Ministry for Transport, *Andreas Dorda*

Canada – Natural Resources Canada, *Jean-Francois Gagné*

People's Republic of China – CATARC, *Jiaqiang Guo*

Denmark – DTU, *Jesper Schramm*

Finland – VTT, *Nils-Olof Nylund*

France – ADEME, *Patrick Coroller*

Italy – Eni SpA, *Fausto Alberici*

Japan – NEDO, *Kazunori Nagai*

Japan – LEVO, *Nobuichi Ueda*

Spain – IDEA, *Juan Luis Plá de la Rosa*

Sweden – Swedish Road Administration, *Olle Hådell*

Switzerland – University of Applied Sciences, *Jan Czerwinski*

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United Kingdom – Department for Transport, *Chris Parkin*

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