

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 yearly electronic Newsletters, (in 2006 three issues) describing recent news on advanced motor fuels, vehicles, energy and environmental issues in general are prepared. AMFI Newsletter is available on the AMF website:

www.iea-amf.vtt.fi

The production of soybean and palm oil has almost doubled in 10 years. Palm oil is produced mainly in Malaysia (~45%), and Indonesia (~39%). (www.fediol.be). Increased number of large plantations is expected due to biodiesel demand. This rises question of conversation of e.g. tropical rainforests.

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IEA WEO 2005: steep rise in energy consumption by 2030

International Energy Agency's Deputy Executive Director, Mr. William C. Ramsay, presented findings from the World Energy Outlook 2005 - Middle East and North Africa Insights. He noted that a lack of investments has contributed to the tightness in the global oil market. The role of Middle East and North Africa is critical in meeting growth in global energy demand. If policies remain unchanged, world energy demand is projected to increase by over 50% between now and 2030. World energy resources are adequate to meet this demand, but investment of \$17 trillion will be needed to use these resources. Oil and gas imports from the Middle East and North Africa will rise, increasing dependence for IEA countries and large importers (e.g. China and India). "These projected trends have important implications and lead to a future that is not sustainable – from an energy-security or environmental perspective. We must change these outcomes and get the planet onto a sustainable energy path," added Mr. Ramsay.



Prospects of international energy prices have been revised upwards in WEO 2005, due changes related to underinvestments in oil production and the refinery sector. The average IEA crude oil import price, averaged \$36.33 per barrel in 2004 and peaked at around \$65 in September 2005. In the Reference Scenario, the price is assumed to ease to around \$35 in 2010 (in 2004 dollars) thanks to new crude oil production and refining capacity, but then rises slowly, to near \$39 in 2030. In the Deferred Investment Scenario the oil price reaches \$52 in 2030. *IEA World Energy Outlook 2005 Middle East and North Africa Insights* (www.iea.org)

(Editorial note: Is this price development realistic considering the growth in oil demand?)

Biofuel strategy revised in EU

The European Commission adopted an ambitious EU Strategy for Biofuels, with various measures to increase production of fuels from agricultural raw materials. The paper is based on the Biomass Action Plan (Dec 2005, europa.eu.int), which targets to increase share of renewables from 4 to 12% of EU's energy by 2010. Biofuels would improve Europe's energy security, reduce GHG emissions, support agricultural policy and open economic growth for developing countries. Various actions were mentioned e.g. promoting biofuels in EU and developing countries, improving cost-competitiveness and research on 2nd generation fuels.

The Biofuel Strategy lists seven key policy axes:

- 1) Stimulating demand for biofuels (encourage Member States to favour biofuels incl. 2nd generation products)
- 2) Capturing environmental benefits (emission targets/sustainability of feedstock cultivation/biofuel limits in petrol and diesel)
- 3) Developing production and distribution of biofuels (opportunities in rural development programmes/increase monitoring)
- 4) Extending supplies of feedstock (sugar production for bioethanol /cereal intervention stocks/information campaign for farmers and forest owners/ a forestry action plan /using animal by-products and clean waste)
- 5) Enhancing trade opportunities (separate customs codes for biofuels/trade talks with ethanol-producing countries/amendments to the "biodiesel standard")
- 6) Supporting developing countries (ACP countries to support the development of bioethanol production/Biofuels Assistance Package for developing countries/how best to assist national and regional biofuel platforms)
- 7) Research and development (industry-led "Biofuel Technology Platform" / high priority in the 7th FP especially the 'bio-refinery' concept, best use total plant –2nd generation biofuels).

Reference: Brussels, 8 February 2006, IP/06/135 europa.eu.int

Commenting the new strategy, the European Environmental Bureau (EEB) warns about strong promotion of biofuels without certainty of the effect of feedstock production on the environment in the EU or in developing countries. The EEB is also concerned of the possibility that the CO₂ benefits of biofuels result in less pressure on the more fuel-efficient cars. Agriculture Policy Officer at the EEB calls for "a compulsory certification system for environmentally sound biofuel production, accompanied by reliable traceability". (www.eeb.org).



Palm oil plantation in Indonesia (fires in background) www.rainforestweb.org

Energy efficiency target and promotion of clean vehicles in Europe

The European Commission adopted a **"Green Paper on Energy Efficiency"** that aims at **20% reduction in energy consumption by 2020**. This is driven by increasing oil prices and the prospects of having 70% of imported energy in Europe by 2030. A number of options are listed to save energy through changes in consumer behaviour and energy efficient technologies, e.g. optimized traffic management (incl. aviation), clean vehicles, infrastructure charging, improved tyres and public transport. EU could save about €60 billion on its energy bill, which could represent investments in the EU economy. "This energy efficiency initiative will help Europe achieve two fundamental goals of the Lisbon Strategy: creating more growth and better jobs. It will also help Europe meet its Kyoto commitments", said Commissioner Andris Piebalgs in charge of energy. *Green Paper on Energy Efficiency, 2005* (europa.eu.int)

The European Commission **proposed a new Directive to promote clean vehicles** in the transport sector. The new Directive would require public bodies to earmark 25% of their annual procurement to "clean" vehicles (purchasing or leasing), applied to heavy-duty vehicles (>3.5 tonnes) defined as "Enhanced Environment-friendly Vehicles" (EEV, Directive 2005/55/CE). The Directive would give manufacturers the confidence, which is needed for developing clean vehicles. In the EU, road transport accounts for about 20-25% of total energy consumption and CO₂ emissions, thus the potential for reducing vehicle emissions and for energy savings is substantial. The Commission will consider if the obligation should be extended to other vehicle categories in a second stage. The Directive will encourage the development of vehicles adapted to high blends of biofuels. Also other technologies are covered, like natural gas, LPG, hydrogen, electric motors and hybrid vehicles. These technologies have been supported by European funding from the R&D programmes and the Structural Funds. (europa.eu.int)

For **Enhanced Environment-friendly Vehicle (EEV)**, the emission limits (Euro 3-5) were introduced in Directive 1999/96/EC (amendment to 88/77/EC). It also announced (from Oct 2005) requirements for durability of the emissions control systems and for on-board diagnostic (OBD) system, but without specific requirements and test procedures. Now the new Directive 2005/55/EC sets the durability requirements and OBD threshold values, and the Directive 2005/78/EC specifies the technical requirements and test procedures. *International Regulations, December 2005 by Nick Bowyer* (www.interregs.com)

NATURAL GAS AND LPG (and biogas)

New tax incentives proposed in Sweden, benefit for CNG

New proposed tax system in Sweden for Clean Fuel Vehicles:

- Company cars: hybrids and CNG cars 40% tax reduction meaning €838 (max.) savings in income tax annually; FFV cars 20% reduction respectively. Until now CNG and FFV cars were at a lower tax incentive level than hybrid cars
- Climate investment program will continue another 3 years meaning expansion of CNG refueling stations (now ~70 outlets)
- Zero fuel tax for renewable fuels continue another 5 years
- Annual road taxes based on CO₂; higher CO₂ tax factor for diesel cars to compensate problems with NO_x and PM emissions, hybrids would be included in the system (until now zero road taxes for hybrids)

ENGVA News, October 2005, Number 10.

Biogas from crops more effective than liquid biofuels?

ENGVA News reported on the biogas meeting. The leading countries in biogas usage for transport are Sweden with over 14 cities running on biogas and Switzerland where biogas is directly injected into natural gas grid. Germany is supplying biomethane for vehicles, France is starting development in Lille and many other countries are running pilots. Biogas is produced via anaerobic digestion of organic waste in many countries. Recent reports from Germany, Austria and Sweden claim that anaerobic digestion of crops will yield more biofuel per hectare than competing liquid biofuels. It was stated in the UK NGV Association conference that biogas could account 15% of transport fuel in Europe. *ENGVA News, October 2005, Number 10.*

Nordic biogas conference

The first Nordic Biogas Conference was held in Finland in February 2006. The Nordic conference focused on biogas and landfill gas. Actors from both public and private discussed and exchanged practical experiences on biogas utilization and transfer competencies. The topics covered e.g. developing an effective national biogas and biofuel policy, creating cooperation and public-private partnerships for biogas business development, landfill gas usage, refuelling stations, distribution and infrastructure, enhancing biogas production, cost-effective combined heat and power (CHP) production, and upgrading biogas into vehicle fuel. (www.bionova.fi)

Health benefits of gaseous fuels

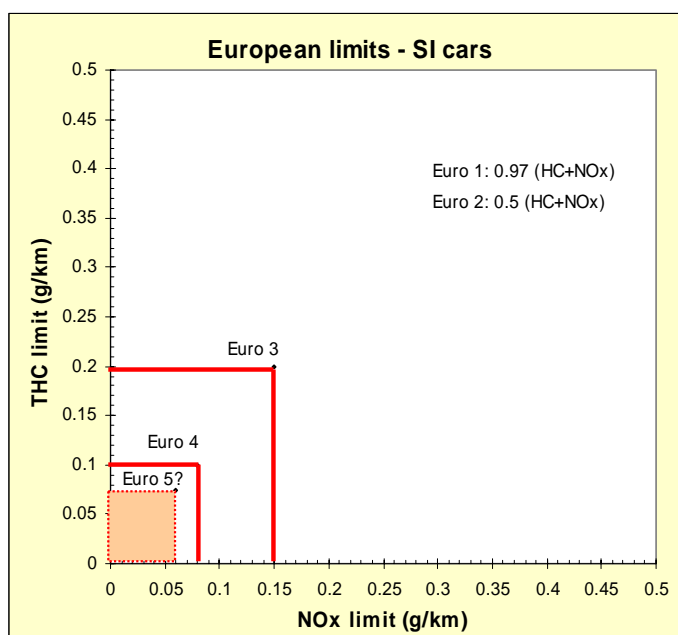
A new GAIN (Global Autogas Industry Network) report includes evaluation of social, economic, and health benefits of increased usage of gaseous fuels. Motor vehicles are significant contributors to harmful and toxic emissions in ambient air. The study points out that the rise in diesel share will result in increase in NO_x and PM emissions, especially as concerns fine particles. Air pollution cost of diesel cars was estimated to be eight times as high as that of gasoline. On the other hand, gasoline cars tend to emit the highest concentrations of certain air toxics. It is pointed out that LPG and CNG cars emit the lowest level of these emissions. *Autogas Updates, N°19 Winter 2005.*

In a new study the exhaust from a spark-ignition heavy-duty CNG bus engine with a TWC catalyst was tested. The results were compared with a previous study on an equivalent diesel engine running on diesel and biodiesel. The results showed that the SI CNG emissions, with respect to the diesel, were nearly 50 times lower for carcinogenic PAHs, 20 times lower for formaldehyde, and over 30 times lower for particulate matter. A 20–30 fold reduction of genotoxic activity was estimated from the tests performed. A high reduction of NO_x was also observed. *Turrio-Baldassarri, L. Science of the Total Environment 355 (2006) 64– 77 (www.sciencedirect.com).*

Euro 5 proposal for emission limits - difficult to be met

European Commission has proposed Euro 5 emission limits for light-duty cars to come in force earliest in 2008. The proposed Euro 5 limit value for total hydrocarbons (THC) from light-duty spark-ignition (SI) cars will be difficult to be met with CNG cars according to ENGVA. This would require development of new and more expensive catalysts. ENGVA has proposed a limit value for non-methane total hydrocarbons (NMHC). Exhaust emissions from CNG cars contain low amounts of reactive hydrocarbons responsible for smog forming potential. Both North America and Japan have adopted NMHC limit. *ENGVA News, November & December 2005.* (editorial note: methane is a greenhouse gas)

The proposal is challenging also for diesel and gasoline fuelled cars. PM limit for diesel cars would be reduced by 80% and NO_x by 20% meaning e.g. particulate filters for diesel cars. For petrol cars, the NO_x and THC limits would be cut by 25%. ACEA comments against the NO_x limit for SI cars, claiming that it would have negative impact on fuel consumption, increase costs and slow down the circulation of the cars in circulation. Note: There is a reservation also for a limit for particle number emissions to prevent possible usage of the open filters that meet the PM mass limit but pass a high number of ultra fine particles. (europa.eu.int)



LPG in diesel engines

Gasoline engines have been converted to run on autogas (LPG) for a long time. Now conversion kits for diesel engines are available as well. Converted gasoline cars use LPG only, but diesel conversion means that only a small fraction of LPG is injected into the air intake tract. ATS reports that when using 15-20% LPG mileage can increase 30-40%, oil stays cleaner, exhaust gas is cooler and emissions are lower than when using neat diesel fuel. *Autogas Updates, N°19 Winter 2005.*

ETHANOL, ETBE

Criticism on ethanol in Sweden

In Sweden, a new legislation will require biofuels to be available in the fuelling stations selling more than 3000 m³/a gasoline or diesel. Stations <1000 m³/a sales are exempted, but step-by-step it will be applied also to small stations by 2010 (*Miljöfordon 21 December 2005, www.miljofordon.org*). Despite of principally being neutral, this law may favor ethanol, because it is currently the only practical option in Sweden (~250 E85 stations). In EU is preparing to increase max. limit of ethanol in gasoline from 5 to 10 vol%.

Vision is to create flexible market with FFV cars and E85 distribution system to enable purchasing of gasoline or ethanol from different countries (Brazil, local etc.) depending on the price and world situation. However, a debat is going on in Sweden pointing out shortcomings of ethanol usage in general, and secondly concerning the FFV cars (~15 000 FFV cars in Sweden). One problem with FFV cars is that they are mostly running with gasoline instead of E85, and thus tax incentives on vehicles and procurement are questionable. Ethanol in Sweden is free from energy and CO₂ taxes and thus cheaper than gasoline. Some 80% of ethanol in Sweden was imported from Brazil toll free, but now new toll payments for ethanol are applied. As renewable fuel, ethanol should reduce greenhouse gas emissions when compared to fossil fuels, but due to poor energy-efficiency of ethanol this is also questionable. The ethanol today is produced mainly in Brazil and USA. Ethanol produced in tropic areas from sugarcane is some 5 times more effective than production in e.g. Europe. It is ethically questionable that edible corn is burned and meanwhile people are dying in hunger. In addition, the ethanol production in Brazil has lead to logging of Amazon rain forests, which are sinks of CO₂. *Tidskriften Analys & Kritik (www.analyskritik.press.se)*

Lately, discussion has been raised in Sweden due to increased toxic emissions with ethanol, especially aldehydes. Exhaust emissions from FFV cars running on E85 may be high during cold-start at low ambient temperature, when catalyst is not warmed-up. One experiment with chainsaws was interrupted as workers got sick of exhaust gases when using ethanol as fuel. FFV cars in Sweden are

certified on gasoline due to lack of E85 fuel standard, whereas bi-fuel cars running on gaseous fuels must be certified both on gas and gasoline. *Dagens Nyheter* 24 November 2005. (www.dn.se) Problems have occurred also at cold temperatures when starting FFV cars running on E85. This can be avoided by using heaters, or higher gasoline share or neat gasoline during the coldest months. Lubricity of ethanol is also worse than that for gasoline, and thus shorter maintenance intervals are required. One of the concerns is that environmental cars in general might get out-of-date causing troubles for the car owners. *Privata Affarer Ekonomi Nysheterna* (www.privataaffarer.se)

Vivid discussion concerns also explosion risk of ethanol. Ethanol is flammable at temperatures from -35 to +30 °C, whereas e.g. gasoline is flammable only at very narrow range at low temperatures depending on the vapor pressure. *Tidskriften Analys & Kritik* (www.analyskritik.press.se). Recently, it was announced that Swedish E85 fuelling stations will be modified for safety reasons, e.g. fuel pumps will be modified to minimize risks of static electricity and flame arresters will be built up to prevent propagation of fire into tank. *Miljöfordon* 3 January 2006 (www.miljofordon.org).

Note: Saab 9-5 BioPower 2.0 liter produces 180 hp only when running on E85, but 150 hp when running on gasoline. (see AMFI Newsletters in Jan and Oct 2005). In Addition to Ford Focus and Saab 9-5 FFV cars, now also Volvo S40 and V50 FFV 1.8 liters models are available. (www.miljofordon.org)

Ethanol production of cellulose studied in Germany

Volkswagen, Shell and logen are studying the economic feasibility of starting up a plant, in Germany, to produce cellulose ethanol. This fuel is based on agricultural residual products (straw, wood fibres) and could reduce CO₂ emissions from cars by 90%. Canadian logen's demonstrations plant in Ottawa is producing cellulose ethanol. *Jan 12, 2006. GAVE Newsletter 2006 nr. 1.* (gave.novem.nl)

Higher alcohols in diesel fuel, Agrodiesel 15

A new diesel fuel composition has been introduced. The fuel called Agrodiesel 15 contains 85% of Swedish Environmental Class 1 (EC1) diesel fuel and the remaining 15 % are renewables consisting of 5% RME and 10% of higher alcohols. The blend fulfills the requirements for Swedish EC1 fuel. It is a solution, which is stable even during long periods of storage, which is often problem with diesel/ethanol emulsions. (*Golubkov 2005: Alcohol-based diesel fuel.... ISAF XV*). Heavy-duty engine tests with Agrodiesel 15 have shown e.g. lower particle and PAH emissions than Swedish EC1 diesel fuel. A long-term test showed no excessive wear or engine failures. A field test of one year with buses in co-operation with Västerås Lokaltraffik showed good performance and no engine failures with Agrodiesel 15. Drivers felt that odour of Agrodiesel 15 was stronger than from conventional diesel, and some comments on less power with Agrodiesel 15 were obtained. (*Petterson 2005: Fleet test of Agrodiesel 15, a partly renewable diesel fuel. JTI – Swedish Institute of Agricultural and Environmental Engineering*).

ETBE usage in Japan by 2010

Petroleum Association of Japan announced in 18th January 2006 that member oil refining/distributing companies will implement bioethanol derived from biomass e.g. sugarcane in FY 2010 to promote use of biomass and to reduce CO₂ emissions. Japanese government supports promotion of bioethanol because CO₂ emissions from bioethanol are excluded from emission reduction targets under the Kyoto Protocol. Considering issues of vapour pressure, increase of NO_x and component deterioration as described below, the Association decided that ethyl tertiary butyl ether (ETBE) is preferable to direct 3% bioethanol blend (E3) for automotive fuel. Bioethanol can be converted to ETBE and be mixed to petrol up to around 7% rate.

Issues to be considered to adopt bioethanol for automotive fuels

- Direct blend causes rise of vapour pressure, and consequently increase in evaporative emissions (HC), which can cause smog
- NO_x emissions increase when 3% (or more) ethanol is blended with petrol and used on conventional vehicles.
- Moisture causes phase separation and consequently changes in fuel properties, which leads to deterioration of automobile components. To prevent moisture contamination, facility investment of 300 billion yen will be required.
- World ethanol trade volume is about 3,000 million litres and Brazil is the only country capable of exporting ethanol. (Japan needs 1,800 million liters/a, if E3 is implemented.)
- Cost and product amount of ethanol are affected by weather and food price.
- Ethanol costs about 10 yen/L higher than imported petrol (35 yen/L), and its heat content is about 30% lower than that of petrol (higher fuel consumption). These factors will push up operation cost about 40 billion yen per year if E3 is introduced.



Figure: *Tidskriften Analys & Kritik* (www.analyskritik.press.se)

Major Producers of Ethanol (2004/2005)

	Product amount (million litres)
Brazil	15,000
U.S.A.	14,000
China	3,000
Europe	2,000
Others	7,000
World total	41,000

The Association aims to alternate about 20% of aggregate petroleum demand with 12,000 million liters of "new" petrol which contains 840 million liters of ETBE, and thus leads to CO₂ emission reduction of about 600,000 tones per year. To put ETBE blended petrol into practical use, new dedicated devices and improved underground tanks will be needed. The investment cost is estimated at about 200 billion yen. The Association will coordinate the cost among member companies and will make a final decision for the introduction of the new petrol.

Sources: Mr Yukata Takada (LEVO) referring to NIKKEI NET: <http://www.nikkei.co.jp/news/sangyo/20060118AT1D1808C18012006.html>
Petroleum Association of Japan, news briefing: http://www.paj.gr.jp/html/paj_info/press/2006/data/20060118.pdf

BIOESTERS

Biodiesel clogging fuel filters

USA, Michigan Truckers in Minnesota are reporting that 2% biodiesel blend causes cold weather problems by clogging the fuel filters. Biodiesel industry concludes that this is due to poor quality biodiesel. It is recommended that biodiesel producers would be accredited under the industry's quality assurance program. ASTM D 6751 set the requirements for biodiesel blending stock in the USA, but there is no standard for Biodiesel blend. *NGV Global, December 7, 2005. DieselNet Update, January 2006.*

New RME production in Sweden

Lantmännens Svenska Ecobränsle starts a RME plant of 40,000 ton/a in Karlsham in March/April 2006. Preem and Perstorp will build up a RME plant with the capacity first about 60,000 m³/a, but that could be easily increased, if needed. So far, RME has been used less than ethanol as biofuel in Sweden, but now the target is to use 5% of RME in diesel. In addition, within the EU it is expected that diesel specification would be modified to allow content of RME in diesel fuel to be raised from 5% to 10% or more. *Grönä Bilisters Nyhetsbrev November 2005; Miljöfordon Newsletter 7-05, January 2006 (www.miljofordon.se)*

SYN- AND SUNFUELS (GTL, BTL)

Total launches GTL program

Total has signed a co-operation agreement with i.a. Battelle subsidiary Velocys to develop a new efficient technology to produce the synthesis gas used in the Fischer-Tropsch process. The main objective is to make the chemical conversion process more efficient to ensure enhanced development of natural resources and a significant reduction in emissions, particularly of greenhouse gases. A pilot unit will be set up as part of the program. www.total.com

Black liquor gasification

A new report "Black Liquor Gasification with Motor Fuel Production – BLGMF II - A techno-economic feasibility study on catalytic Fischer-Tropsch synthesis for synthetic diesel production in comparison with methanol and DME as transport fuels" concluded that a biomass-to-fuel energy efficiency is 43% for FTD or 65% for FT products compared with 66% for methanol and 67% for DME when only biomass is used as an external energy source. The plant economics, based on an additional investment cost, showed production costs as EUR 33¢ per petrol equivalent litre for methanol and EUR 36¢ and 43¢ per diesel equivalent litre for DME and FTD. Assuming same costs for the consumer as for petrol (methanol) and diesel (DME, FTD), the payback time were 2.6, 2.9 and 3.4, respectively. (www.nykomb.se, information from Tomas Ekborn).

OTHER ADVANCED FUELS (HYDROGEN, DME), HYBRIDS

Honda Launches 3rd Generation Hydrogen Home Energy Station

Honda R&D Americas, Inc. and Plug Power Inc., has introduced the Home Energy Station III, which provides heat and electricity for the home as well as fuel for a hydrogen-powered fuel cell vehicle (like Honda FCX). The Home Energy Station III uses natural gas as energy source. Home Energy Station III is roughly 30% smaller than its predecessor (Home Energy Station II) with about 25% increase in electrical power output. Additionally, hydrogen storage and production capacity are both improved with the use of a new, high-performance, natural gas reformer. The Home Energy Station III can act also as a backup power generation system by using the hydrogen in the storage tank to power the internal fuel cell, providing 5 kW of electrical power. *NGV Global, 14 November 2005. (www.ngvglobal.com)*

MISCELLANEOUS

Energy bill debat in USA

The energy legislation is expected to be again under discussion in US Congress despite of recently signed new Energy Bill (August 2005). The topics under discussion are increasing incentives for alternative fuels, eliminating boutique fuels from different states, incentives for refineries and corporate average fuel economy standards. *NGV Global, December 7, 2005.*

Fine particles from friction winter tyres?

Exhaust is not the only source of fine particles. Friction tyres have observed to raise more dust from road surface than studded tyres in a research project carried out in Finland. It is believed that the "suction cup" phenomena due to dense lamellas would explain the high tendency of friction tyres to raise dust. The difference between tyres was systematic and relatively high when measuring with chasing car close to the road surface behind the left rear wheel of car. *Kauppalehti Presso, Issue 2, 14 January 2006. "Measurements of inhaled street dust induced by vehicles" project (www.tekes.fi)*

Aviation huge threat to CO₂ targets

Growth in air travel is reported to be a huge threat to CO₂ targets. It is estimated that number of air passengers will increase from 180 to 475 million by 2030 in UK. At the moment aviation is ignored in Kyoto agreement and in all existing CO₂ targets. *Greenhouse Gas Issues, Number 80, December 2005 (www.ieagreen.org.uk)*

IEA & IEA/AMF News

ExCo in Prague, November 2005

The 31st meeting of the Executive Committee of AMF was held in Prague, Czech Republic, in November 2005. Progress reports from eight Annexes were presented, three of them were closed (Annex XXVI: Alcohols and Ethers as Oxygenates in Diesel Fuel; Annex XXX Bio-safety Assessment: Animal Fat in Biodiesel). Two new Annexes were proposed. The Minutes of the meeting, Appendices and photos can be downloaded from the website (Members area).

Annex XXVIII « Information Service & AMF Website (AMFI) » produced four electronic AMFI Newsletters in 2005 describing recent news on advanced motor fuels. The Operating Agent proposed for an extension of Annex XXVIII by providing a highly topical "Outlook" on transportation energy and specifically on alternative fuels for IEA/AMF ExCo. It was decided that Annex XXVIII will produce "Outlook", and to balance the budget, only three issues of AMFI Newsletters without topical articles. This arrangement applies only in 2006.

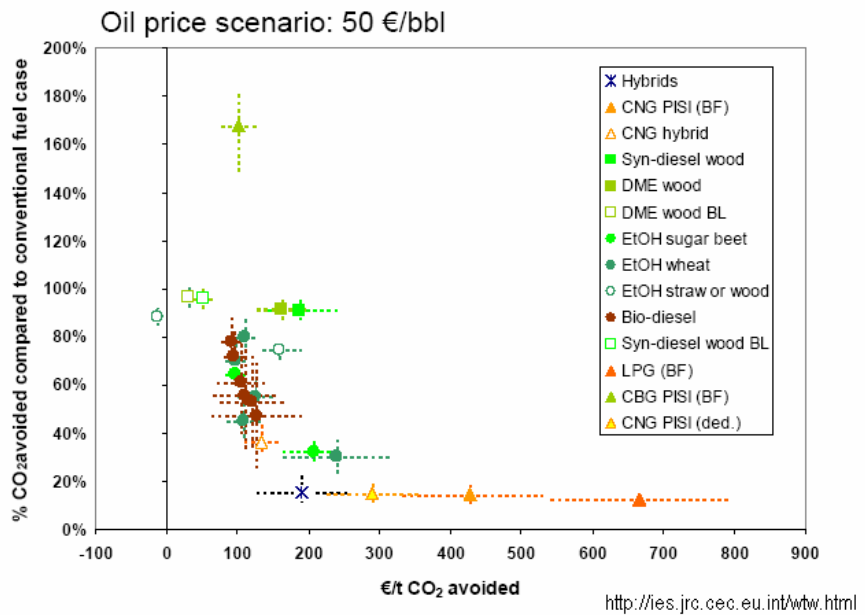
IEA/AMF: ACTIVE ANNEXES

Annex XXVIII	Information Service & AMF Website (AMFI)
Annex XXIX	Evaluation of Duty cycles for Heavy-Duty Urban Vehicles
Annex XXXI	Production and use of Synthetic Vehicle Fuels Made by Fischer-Tropsch Technique
Annex XXXII	Future Fuels for Road Transport
Annex XXXIII	Particle Emissions of 2-S Scooters

PUBLICATIONS

- IEA World Energy Outlook 2005 Middle East and North Africa Insights (www.iea.org)
- IEA's Database on Global Renewable Energy Policies and Measures <http://www.iea.org/textbase/pamsdb/grindex.aspx>
- IEA: Prospects for Hydrogen and Fuels Cells <http://www.iea.org/bookshop/add.aspx?id=308>
- IEA Frequently Asked Questions - a short general information flyer on Implementing Agreements www.iea.org
- EU Green Paper on Energy Efficiency, 2005 (europa.eu.int)
- Report on Biogas in Europe (in German): Gas. Die Alternative zu Benzin und Diesel? www.energyagency.at
- The European programme TREATISE (Training in Environmental Transport) has published three manuals: 1) **Cleaner Fuels & Vehicles** - A summary of Road Transport Fuels and Technologies from an Environmental Perspective 2) **Ecodriving** - Smart, efficient driving techniques 3) **Mobility management** - Changing the way people travel. These manuals can be downloaded from the UK page of the TREATISE website at www.treatise.eu.com/downloads-uk.html. (info from Martijn van Walwijk, IA-HEV secretary).

- **Well-To-Wheel (WTW) study 2nd version.** EUCAR/CONCAWE/JRC revised have performed evaluation of the Well-to-Wheels energy use and greenhouse gas (GHG) emissions for a wide range of potential future fuels and powertrains options. The first version was published in December 2003, and the second version in December 2005. New version includes biogas. <http://ies.jrc.cec.eu.int/wtw.html>
- **Renewable Solutions conference** was held in December, 2005, Close to 100 NGO participants from 40 countries participated. An Option Paper was published for the conference. There are several options for maximizing renewable energy and energy efficiency in the global transition to a post-carbon society. Many of the recommendations need to be taken together – it is not enough to set a national target without a supportive policy and financial framework. The Options Paper can be downloaded at http://www.canrea.ca/pdf/Options_Paper_final.pdf. (information from *Oswaldo Lucon, related to UNFCCC's CoP11/MoP1*)
- **GHG case study** of the costs of reducing green house gases (GHG) is reported based on the experiences in São Paulo and California. Discussed topics are whether the industrialized nations can afford actions on global warming, and if developing countries should invest in economic development instead? The report shows the cases in which GHG can be reduced at a profit rather than a cost. (www.climatechange.ca.gov, info from *Oswaldo Lucon*)
- **Reducing Oil Use Through Energy Efficiency: Opportunities Beyond Cars and Light Trucks**, Report Number E06, Jan 2006: Discussion of strategies to reduce U.S. oil dependence focus on improving the fuel efficiency of cars and light trucks. Oil saving targets will require major progress on car and light truck fuel economy, however, this report demonstrates the significance of energy efficiency improvements of other vehicles (e.g. freight trucks) and in the industrial and building sectors. Petroleum use in the U.S. by sector including freight trucks, industrial equipment and processes, and residential and commercial buildings are discussed. (www.aceee.org)
- **Health effects and costs of vehicle emissions.** A Global Autogas Industry Network (Gain) Publication. www.worldlpgas.com



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