May 2017, issue no. 1/2017

AMFI Newsletter

Dr Fatih Birol (centre) after joint press conference with Minister Goyal (left) and Minister Pradhan announcing activation of IEA Association (Photograph: IEA)

Read more

CONTENTS

RESEARCH AND DEVELOPMENT

Swedish collaboration on future biofuels

Preem and Vattenfall have concluded an agreement to investigate the potential of using climate-smart hydrogen gas in the large scale production of biofuel for the Swedish market. The raw materials for this process are forestry by-products and hydrogen gas. The aim is to boost Preem's production of renewable diesel and other fossil-free biofuels to 3 million cubic metres annually by 2030. Vattenfall will produce the hydrogen by electrolysis.

Preem, the largest fuel company in Sweden, already produces biofuel made from tall oil. It intends in the future to also produce renewable fuel from sawdust and forestry residues from timber felling and lignin from the wood pulp industry. If Preem achieves its aim of producing three million cubic metres of renewable fuel annually by 2030, that would correspond to a large part of the government's climate target for the Swedish transport sector. Preem and Vattenfall will now set up a work group and pilot study which are financed by both parties.

Source: http://news.vattenfall.com/en/article/preem-and-vattenfall-collaborate-biofuel

DEMONSTRATION / IMPLEMENTATION / MARKETS

New car models to use B20

Car giant General Motors is providing more of its customers with choices to use car models that can use B20 biodiesel blends. With eight new diesel vehicle options hitting the roadways in 2017 – 2018, General Motors now offers a full line-up of twenty different diesel models, from passenger cars, to pickups and SUVs, to commercial vans and low cab forward trucks - all of which are approved for use with B20.

Including 2017 and 2018 models, Chevrolet and GMC will offer one of the largest portfolios of vehicles capable of running on B20, a blend of 20 % biodiesel and 80 % ultra-low sulphur diesel.

Source :http://biofuels-news.com/display_news/11696/general_motors_expands_its_b20_biodiesel_lineup_with_new_cars/

Mexico: First CNG refueling station

Gas Natural Fenosa (GNF) and Natgas opened the first CNG refueling station in the city of Aguascalientes, part of a network of four stations that are intended to open in the state of Aguascalientes. As a result of this alliance, this first CNG station will be at the service of public transportation and private vehicles that could join the conversion to obtain fuel savings.

In addition, this 30-million pesos station is part of a network of 18 stations that are planned to start operations in the region starting next year. The refueling points that make up this expansion plan include four in the state of San Luis Potosí, nine in Guanajuato and four more in Aguascalientes.

Source: *http://www.ngvjournal.com/mexico-first-cng-refueling-station-opens-in-aguascalientes/*

Fuel efficiency improvements in Europe

In 2016, a total of 14.7 million new passenger cars were registered in Europe, an increase of 7% compared to 2015. The most sold vehicle are Diesel cars representing 49.4% of sales, followed by petrol vehicles (47%), and alternatively fuelled vehicles (3.3%, including electric vehicles). The countries that in 2015 had the highest share of plug-in hybrid and battery-electric vehicle sales, the Netherlands and Denmark, saw significant decreases in 2016. In the Netherlands, sales fell from 10% of car sales in 2015 to 6% because of changes in subsidies and tax incentives.

Average CO2 emissions of a new car sold in 2016 were 118 g CO2/km, a decrease of 1.4 g CO2/km, compared to the previous year. This is the smallest annual improvement recorded since 2006. Official emissions have decreased by more than 22 g CO2/km since 2010, when an updated monitoring system started. The EU remains well below its target of 130 g CO2/km set for 2015, but it is clear that improvements in efficiency need to significantly increase to achieve the emissions target of 95 g CO2/km by 2021.

Source: *http://www.eea.europa.eu/highlights/fuel-efficiency-improvements-of-new/?utm_medium=email&utm_campaign=CO2%20Cars&utm_content=CO2%20Cars+CID_c5e94ebd32cf26de21488398e1a65306&utm_source=EEA%20Newsletter&utm_term=Read%20more*

POLICY / LEGISLATION / MANDATES / STANDARDS

Sweden to go carbon-neutral by 2045

Under the proposed Climate Act which is backed by seven out of eight parties in the Swedish Parliament, the government of Sweden will be required by law to include a climate report in the country's annual budget and to produce a climate action plan every four years at the beginning of each new parliamentary term. The Climate Act would see the nation cut territorial emissions at least 85 per cent from 1990 levels and offset the remaining 15% by investing in green projects overseas.

Sweden is already on target to generate all of its electricity from renewables by 2040. Last year, the country secured 57% of its power from renewables including wind and hydro. The proposal will now be examined by the legislative council before the full legislative proposal is published next month with more details on how the goal will be achieved to be released in June. It is believed that action will focus on the greening of the transportation sector as well as a new strategy to deal with emissions from consumer goods imports.

Source: *http://www.bioenergy-news.com/display_news/11830/sweden_plans_to_go_carbonneutral_by_2045/*

Advanced biofuels blending target in Denmark

Denmark has agreed plans to implement a 0.9% advanced biofuels blending mandate by 2020 for use in transportation. This news will provide a boost to second-generation biofuels. For example, biofuels made from waste materials. This puts Denmark ahead of European countries such as Italy, which has an advanced biofuels blending mandate of 0.6%. The news follows publication of the European Commission's revised Renewable Energy Directive (RED), which proposes a mandate for advanced biofuels by 2030.

Source *http://biofuels-news.com/display_news/11566/denmark_leads_europe_by_giving_green_light_to_09_advanced_biofuels_blending_target/*

Biofuels mandates around the world

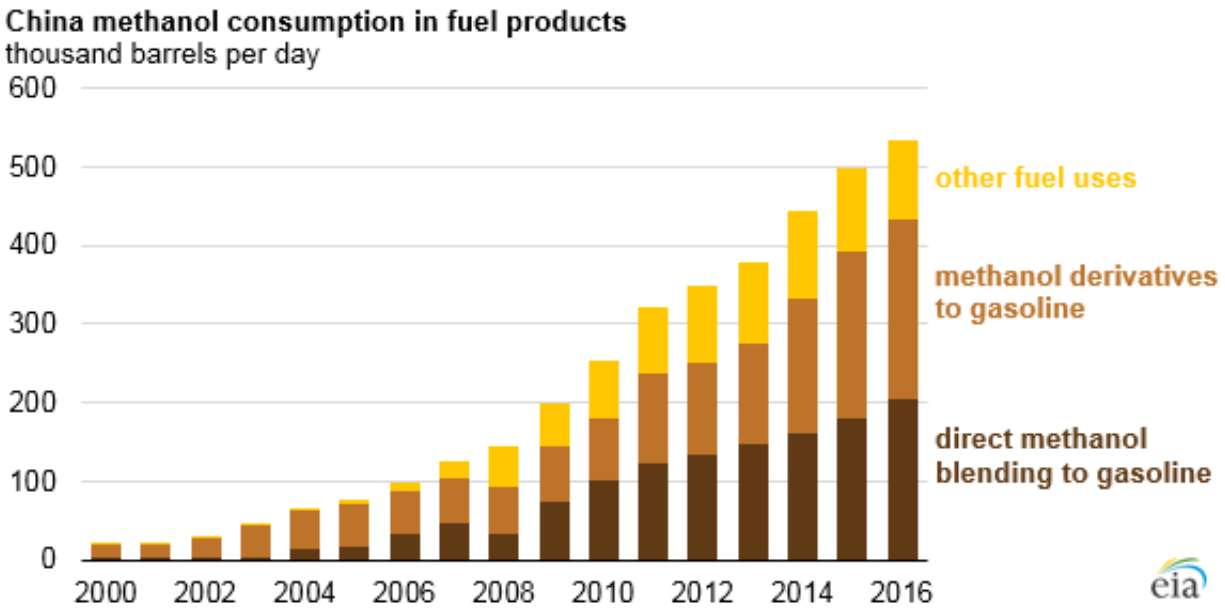
The US based "Biofuel Digest" released its annual review of biofuels mandates and targets around the world, looking at biofuels mandates in 64 countries. The bulk of mandates come from the EU-27, where the Renewable Energy Directive specified a 10 % renewable content by 2020 but has been scaled back to the 5-7.5 % range. 13 countries in the Americas have mandates or targets in place or under consideration, 12 in Asia-Pac, 11 in Africa and the Indian Ocean, and 2 from non-EU countries in Europe. Besides the EU, the major blending mandates are set in the US, China and Brazil.

The Digest does not believe that mandates are outdated, with enhanced mandates in Queensland, Finland, Norway, Vietnam, India, Indonesia, Argentina and Brazil in the past year. But also low carbon fuel standards are popular, and Canada is moving in that direction. California is a model for low carbon standards. Currently, California uses seven different low-carbon fuels derived from 26 different feedstocks, making up 11.3% of its fuel consumption. Growth of petroleum consumption has slowed to a mere 0.5% quarterly, while low-carbon fuels grew at 1.6% quarterly.

Source: www.biofuelsdigest.com/bdigest/2016/12/28/biofuels-mandates-around-the-world-2017/

SPOTLIGHT ASIA

China's use of methanol in liquid fuels



Source: U.S. Energy Information Administration, based on Argus Media Group

China is the global leader in methanol use and has recently expanded methanol production capacity. Since the early 2000s, China's methanol consumption in fuel products has risen sharply and is estimated to have been more than 500,000 barrels per day (b/d) in 2016.

The US Energy Information Administration (EIA) commissioned a study from Argus Media group to better understand China's consumption of methanol and its derivatives. The estimates developed in the study have now been incorporated into EIA's historical data and forecasts of petroleum and other liquids consumption in China.

Most of China's methanol supply is from domestic production. About two-thirds of China's methanol feedstock is produced from coal and the remainder from coking gas (a by-product of steel production) and natural gas. China has abundant coal resources, and for more than a decade the country has increased its capacity to manufacture methanol using coal as a feedstock. Smaller amounts of China's methanol supply are imported from the Middle East, Southeast Asia, South America, and the United States.

Source: https://www.eia.gov/todayinenergy/detail.php?id=30072&src=email

KOREA: Eco-Friendly LPG Ferry Ship

The marine gas turbine division of GE Aviation along with Korean LPG industry signed a MOU on November 9, 2016 to develop a world first eco-friendly LPG ferry ship within two or three years. Marine Division of GE Aviation, Youngsung Global, Korea LPG Association, Dintec, Far East Ship Design & Engineering, and Cryos Participated in the agreement ceremony.

Source: http://www.lngworldshipping.com/news/view,ge-strikes-mou-to-develop-lpgfuelled-ferry-design_45444.htm

In 2015, GE developed a 'COGES (Combined Gas turbine Electric & Steam), which is the combined electric propulsion system using gas turbine and steam turbine, to use an eco-friendly gaseous fuel expecting demand to increase. A ship equipped with LPG gas turbine can reduce Particulate Matter from 1.79g/kWh to 0.006g/kWh and Carbon Dioxide from 620g/kWh to 421g/kWh, compared to a conventional diesel ferry. Besides, an LPG fuel is relatively cheap and no ignition fuel is required unlike a diesel engine, which result in reduction of operating expenses up to 35%. Weight and size of a turbine can be reduced significantly and thus space utilization can be improved. Also, energy efficiency can be improved parallel to a diesel engine. Eco friendly LPG ferry aims to put in domestic long-haul routes and international routes such as between Korea and China to carry passengers as well as vehicles.

Contact Director of GE Korea Byeongyeol Baek: byeongyeol.baek@ge.com

Source: http://www.lngworldshipping.com/news/view,ge-strikes-mou-to-develop-lpgfuelled-ferry-design_45444.htm

SPOTLIGHT AVIATION

Cathay Pacific will switch to biofuel

Hong Kong flag carrier Cathay Pacific will switch to biofuels made from landfill rubbish on select long haul flights. Cathay flights to Hong Kong from the US, where the new fuel is produced, will use a combination of conventional jet fuel and biofuels starting in 2019, the South China Morning Post reported. The airline hopes to cut emissions on those flights by 80 percent.

The carrier had invested in the US-based sustainable biofuel developer Fulcrum BioEnergy, which converts municipal solid waste into aviation fuel, in 2014.

Source: *https://phys.org/news/2017-01-cathay-pacific-emissions-biofuel.html#jCp*

Stockholm Arlanda Airport introduces biofuel

Stockholm's Arlanda Airport became the third airport to offer alternative jet fuel through the airport's main fuelling infrastructure. This fuel, which contains about 10% biofuel converted from cooked oil, has been purchased by Swedavia through the Fly Green Fund. SAS, KLM, and Braathens Regional Airlines will all be using this fuel on departures from Arlanda. The first uplift of this fuel was on 03 January, by an SAS A320neo.

Source: http://www.icao.int/environmental-protection/GFAAF/Lists/SAAFA/SAAFA.aspx

Biofuels Reduce Jet Engine Pollution

Using biofuels to help power jet engines reduces particle emissions in their exhaust by as much as 50 to 70 %, in a new study conclusion that bodes well for airline economics and Earth's environment. The findings are the result of a cooperative international research program led by NASA and involving agencies from Germany and Canada, and are detailed in a study published in the journal Nature.

Source: https://www.nasa.gov/press-release/nasa-study-confirms-biofuels-reduce-jet-engine-pollution

SPOTLIGHT ELECTRIC VEHICLES

First Austrian Electric Commercial Vehicle

Series production of the first Austrian electric commercial vehicle has started. The small commercial vehicle from SFL Technologies, named ELI, has been developed specifically for municipalities and is operated completely by electric power making it totally free from emissions.

ELI is made 100 percent from Styrian components and is the first Austrian electric vehicle to receive European type approval for road use. Even the manufacture of this innovative product is carried out using green technologies. Production takes place in a specially constructed hall with solar panels and photovoltaic modules on the roof, which produce more energy than is actually required.

Source: https://www.greentech.at/en/world-premiere-the-first-austrian-electric-commercial-vehicle/

90 Electric Hybrid Buses in Belgium

Volvo and ABB are rolling out electrified transit solutions in Europe. The Belgian cities of Charleroi and Namur have put in orders totaling 90 Volvo 7900 Electric Hybrid buses paired with 12 fast charging stations from ABB.

With this order, 90% of the public transport in Namur will be electrified, delivering significant emission reductions for residents.

Source: *https://cleantechnica.com/2017/02/16/116969/?utm_source=dlvr.it&utm_medium=facebook*

Electric Truck Pilot in Germany

Daimler, the parent company of Mercedes-Benz trucks, is manufacturing a first small run of its Urban e-Truck as the first step to full-scale production by 2020. This production run will pilot charging times, battery and range management with a select group of customers using real-life transport and logistics operations. Deliveries will begin in Germany, but will expand to other European countries.

One of the biggest barriers for reducing emissions in the transport sector is how to deal with logistics and distribution of goods, particularly in the "last mile". To date, electric trucks have been limited by the cost, weight and length of time that lithium-ion batteries last. The Urban e-truck features 212 kilowatt-hour (kWh) battery packs, allowing for a range of around 124 miles per charge.

Source: https://dailyplanet.climate-kic.org/electric-lorries-european-roads-year/

Electric Vehicle Privileges in Thailand

On March 24, 2017, Thailand Board of Investment (BOI) approved promotional privileges for electric vehicles (EVs), including tax holidays of 5-8 years. The privileges will focus on production of three types of electric cars: hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs), where the promotion will include passenger cars, pickup trucks and buses, with different rates of privileges based on production technology.

Source: http://www.bangkokpost.com/news/transport/1220850/boi-green-lights-ev-privileges

IEA & IEA-AMF NEWS

India joins IEA family

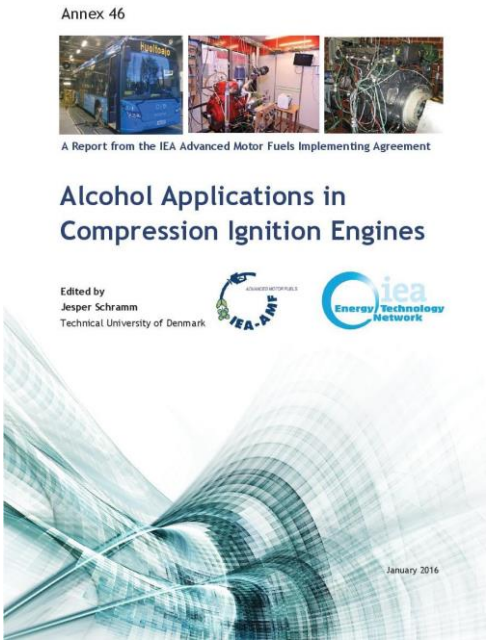
The International Energy Agency welcomed India as an Association country expanding its partnership for a more secure and sustainable energy future with the world's third-largest energy consumer.

Thanks to rising income, population growth and urbanization, there is a huge potential for energy demand growth in India, which is home to about a fifth of the world's population but uses only about 6% of the world's energy. India's energy demand is expected to more than double over the next 25 years, according to the IEA's India Energy Outlook.

Source: http://www.iea.org/newsroom/news/2017/march/india-joins-iea-family-a-major-milestone-for-global-energy-governance.html

Alcohol Applications in CI Engines

AMF Annex 46 "Alcohol application in CI engines" has been completed and has published its final report.



The main findings include:

- The engine operation was rather insensitive to fuel composition, and in fact the engine operated in practice normally on all other fuels except on pure methanol. The combination of indirect and direct fuel injection turned out to be an interesting option. Injecting a limited amount of fuel into the intake manifold starts some pre-reactions and facilitates ignition of the main fuel shot.
- There are differences in the ignitability of the fuels during PCCI (Partially Premixed Compression Ignition) operation. The ignition delay of the fuels can be distinguished clearly. The additives seemed to have no influence on the ignitability during HCCI (Homogeneous Charge Compression Ignition) combustion. In all fuel cases this engine was not able to burn the fuel properly during HCCI operation.
- Measurements on the particulate emissions showed that the particulate number is reduced with increasing quantities of alcohol. The simplest alcohols ethanol and methanol gave the largest reductions, which where proportional to the fraction of alcohol in the blend. The best result was obtained with 20 % methanol and 10 % butanol as cosolvent.
- The gaseous emissions were found to be increasing with alcohol blends, but only in idle condition. The alcohol containing blends were found to increase emission of specific aldehydes, carbon monoxide and hydrocarbons.
- Accurate measurements of the fuel consumption show that the brake thermal efficiency improves with increasing quantities of ethanol and methanol. Butanol does not appear to improve efficiency as significantly.

Read more: http://www.iea-amf.org/app/webroot/files/file/Annex%20Reports/AMF_Annex_46.pdf

Current AMF Annexes / Projects

Annex 28: Information Service & AMF Website (AMFI)

Annex 50: Fuel and Technology Alternatives in Non-Road Engines

Annex 51: Methane Emission Control

Annex 52: Fuels for Efficiency

Annex 53: Sustainable Bus Systems

Annex 54: GDI Engines and Alcohol Fuels

Annex 55: Real Driving Emissions and Fuel Consumption

New Annex: Methanol as a Transport Fuel

Next ExCo Meetings

ExCo 53 will be held 29 May to 1 June 2017 in Helsinki, Finland.

ExCo 54 will be held 30 October to 2 November 2017 in Tsukuba, Japan.

PUBLICATIONS

The Potential of Biofuels in China

This IEA Bioenergy Task 39 report looks at the potential of biofuels in China. Although climate change and energy security are of concern to China, it is not clear which of these drivers has been the primary motivator for biofuels development. However, the policies that China has implemented so far to help develop biofuels have resulted in the country becoming the world's third largest ethanol producer. The country currently produces about 3 million m^3 of ethanol and about 1.14 million m^3 of biodiesel per year. Although the Chinese government has set ambitious targets to increase annual biofuels production to12.7 million m^3 of ethanol and 2.3 million m^3 of biodiesel by 2020, it is highly unlikely that these targets will be met. It is worth noting that biofuels development and use received little attention in the country's recently released 13th five-year plan. Unlike other forms of renewable energy, no exact output targets were given for biofuels.

Source:http://task39.sites.olt.ubc.ca/files/2013/05/The-Potential-of-biofuels-in-China-IEA-Bioenergy-Task-39-September-2016.pdf

State of Technology Review –Algae Bioenergy

The IEA Bioenergy report provides an international update on the status and prospects for using microalgae and macroalgae as feedstocks for producing biofuels and bioenergy products. The report's scope covers algae-based options for producing liquid and gaseous biofuels, and also algae-based bioenergy in the more general context of integrated biorefineries. It describes the various technological options for the processing of algal biomass and reviews techno-economic analyses and sustainability assessments of algae bioenergy.

The report finds tremendous progress in understanding and demonstrating algae production, but the dramatic decline in the price of petroleum challenges cost-competitive production algal-based bioenergy products like gaseous and liquid fuels. Also, there is a clear and urgent need for open data sharing and harmonization of analytical approaches along the processing pathway, from cultivation to product isolation, and for techno-economic analysis and LCA modeling.

Source: http://www.ieabioenergy.com/wp-content/uploads/2017/01/IEA-Bioenergy-Algae-report-update-20170114.pdf

Drop-in biofuels for marine and aviation markets

IEA Bioenergy held a workshop on drop-in biofuels in Rotorua, New Zealand in November 2016. Fifteen invited speakers gave presentations in three sessions followed by a panel discussions as follows:

- Setting the scene and organising supply chains
- Perspectives for marine biofuels
- Perspectives for aviation biofuels

- Panel discussion on policy options and recommendations to support biofuels in international marine and aviation markets

Source:*http://www.ieabioenergy.com/publications/ws21-drop-in-biofuels-for-international-marine-and-aviation-markets/*.

ITF Transport Outlook 2017

The ITF Transport Outlook provides an overview of recent trends and near-term prospects for the transport sector at a global level, as well as long-term prospects for transport demand to 2050, for freight (maritime, air and surface), passenger transport (car, rail and air) and CO2 emissions.

Source: *http://www.keepeek.com/Digital-Asset-Management/oecd/transport/itf-transport-outlook-2017_9789282108000-en#.WPCbemscFas*

Emissions legislation brochure

The fully revised "Emissions legislation for diesel and gas engines" is now available. The brochure contains a clear and concise overview of the most important legislation and limits on emissions from diesel and gas engines in ships and boats, stationary power plants, mobile machinery and trains.

In addition to Stage V of the emissions regulations for mobile machinery, the Chinese rules and regulations for ships and boats as well as the EU's Medium Combustion Plant Directive (MCPD) have been amended and numerous other sections updated, too. The brochure contains additional information such as descriptions of the relevant test cycles, conversion formulas and a glossary.

Source: https://mus.vdma.org/viewer/-/article/render/15962955

EU progress towards sustainable mobility

The EEA's new report 'TERM 2016: Transitions towards a more sustainable mobility system' assesses the progress European Union Member States are making to improve the environmental performance of transport in line with related EU policy targets. The report also looks at the big changes underway in the sector, from emerging technologies like electric and driverless cars, or recent practices that have caught on, like shared or on-demand online mobility services for commuters. The report stresses that transport activity in the years ahead will continue to put pressure on the environment if action isn't taken to make transport sustainable.

Source: http://www.eea.europa.eu/publications/term-report-2016/at_download/file

Infographic on Autonomous Vehicles

Autonomous vehicles were first contemplated in the 1920s as the infographic shows. Only recently, due to advances in technology, have self-driving cars been able to overcome three primary engineering challenges: sensing the surrounding environment, processing information, and reacting to that environment. According to the consulting group BCG, there will be millions of self-driving cars on the road by 2035, creating a multi-billion dollar market and reshaping the auto industry and no doubt the fuel industry as well as the technology is coupled with electification and ride sharing.

Source: http://futurefuelstrategies.com/2017/03/08/infographic-everything-wanted-know-autonomous-vehicles/

Alternative Aviation Fuels Report

The Bioenergy Technologies Office of the U.S. Department of Energy (BETO) has published a report "Alternative Aviation Fuels: Overview of Challenges, Opportunities, and Next Steps". The report provides an overview of the current state of alternative aviation fuels, based upon findings from recent peer-reviewed studies, scientific working groups, and BETO stakeholder input provided during the Alternative Aviation Fuel Workshop in September 2016.

Source: https://energy.gov/sites/prod/files/2017/03/f34/alternative_aviation_fuels_report.pdf

EVENTS

29th International AVL Conference "Engine & Environment", 1-2 June 2017, Graz, Austria
Conference website: https://www.avl.com/web/guest/-/29th-international-avl-conference-engine-environment

National Advanced Biofuels Conference, 19 – 21 June 2017, Minneapolis, Minnesota, USA
Conference website: http://www.advancedbiofuelsconference.com/ema/DisplayPage.aspx?pageId=Home

ETH-Conference on Combustion Generated Nanoparticles, 19 - 22 June 2017, Zürich, Switzerland
Conference website: www.nanoparticles.ethz.ch

13 Integer Emissions Summit & AdBlue Forum Europe 2017, 20-22 June 2017, Brussels, Belgium
Conference website: https://www.integer-research.com/conferences/ies-europe-2017/

The International Conference on Modeling and Diagnostics for Advanced Engine Systems (COMODIA 2017), 25 - 28 July 2017, Okayama, Japan
Conference website: http://www3.jsme.or.jp/conference/comodia2017/index.html

21st International Forum on Advanced Microsystems for Automotive Applications (AMAA 2017) "Smart Systems Transforming the Automobile", 25 - 26 September 2017, Berlin, Germany
Conference website: www.amaa.de

2017 JSAE Congress (Autumn), 11-13 October 2017, Osaka, Japan
Conference website: http://www.jsae.or.jp/2017aki/english/index.html

The 10th Asian DME Conference of 2017, 24-26 October 2017, Seoul, South Korea
Conference website: http://www.koreadme.com/10adc/index.htm

ANGVA 2017 the 7th ANGVA Biennial, International Conference & Exhibition, 31–2 November 2017, The International Trade and Convention Center, Milad Tower, Tehran, Iran
Conference website: www.angva2017.com

Small Engine Technology Conference 2017 (SETC2017), 15-17 November 2017, Jakarta, Indonesia
Conference website: http://www.setc-jsae.com/

22nd International Transport and Air Pollution Conference (TAP2017), 15-16 November 2017, Zürich, Switzerland
Conference website: http://tapconference.org

Busworld Academy Congress in Latin America "Passenger Focused Mobility", 5-7 December 2017, Medellín, Colombia
Conference website: http://www.busworldacademy.org/

National biodiesel Conference and ExPo, January 22-25, 2018 Fort Worth, Texas
Conference website: http://www.biodieselconference.org/splash.aspx

IMPRINT

The **Advanced Motor Fuels Technology Collaboration Programme** (AMF TCP) is one of the International Energy Agency's (IEA) transportation related Technology Collaboration Programmes. These are multilateral technology initiatives that encourage technology-related activities that support energy security, economic growth and environmental protection.

AMF provides an international platform for co-operation to promote cleaner and more energy efficient fuels and vehicle technologies. This newsletter contains news articles on research, development and demonstration of advanced motor fuels, information about related policies, links to AMF projects, and an overview over publications and events.

The newsletter is prepared based on contributions from Ralph McGILL, FEEC, Werner TOBER and Robert ROSENITSCH, TU Vienna, Shinichi GOTO, AIST, and Manfred WÖRGETTER, BIOENERGY 2020+. It is edited by Dina Bacovsky and Christa Dißauer, BIOENERGY 2020+. The Newsletter is available online at: *www.iea-amf.org*

AMF welcomes interested parties to make contact and to become members of the AMF family. If you wish to get in touch please contact the AMF Secretary, the AMF ExCo Chair or your national AMF Delegate, see contact information below.

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