

Report on the 56th Executive Committee Meeting (ExCo 56) of the International Energy Agency- Advanced Motor Group (IEA-AMF), 15th – 18th Oct 2018, New Delhi, India

The IEA-AMF ExCo 56 Meeting was held at the Hotel Le Meridien, Windsor Place, New Delhi, India. It was hosted by Ministry of Petroleum & Natural Gas of India (MoP&NG). MoP&NG is a member of AMF and is representing India in the Group. A total of 19 people attended the meeting as delegates and observers. ANGVA participated in the meeting as an invited observer since natural gas / methane fuel is considered as one of the advanced motor fuels under the AMF.

The AMF is one of the International Energy Agency's (IEA) transportation related Technology Collaboration Programmes (TCPs). TCPs are multilateral technology initiatives that encourage technology-related activities that support energy security, economic growth and environmental protection. There are currently 38 different TCPs and AMF is under the End-Use: Transport Category. The AMF Group provides an international platform for co-operation to promote cleaner and more energy efficient fuels and vehicle technologies. Currently there are 18 members from 16 countries in the AMF Group. More information on AMF can be found on www.iea-amf.org

AMF defines advanced motor fuels are fuels that fulfill one or more of the following criteria:

- Reduces GHG emissions
- Improves life-cycle efficiency
- Has high energy efficiency
- Has low toxic emissions
- Enables fuels for new propulsion systems
- Contributes to security of supply

Over the years, more than 50 Annexes (or Projects) have been initiated and the following fuels have been covered:

- reformulated fuels (gasoline and diesel)
- biofuels (ethanol, biodiesel etc.)
- synthetic fuels (methanol, Fischer-Tropsch, DME etc.)
- gaseous fuels (natural gas, biogas, LPG, hydrogen etc.)



Top: At the IEA-AMF 56th ExCo Meeting

Highlights of the ExCo 56 Meeting:

Emergence of Electrofuels

- i. Decarbonization of the Mobility Sector can be achieved through use of Advanced Biofuels and Electrofuels. Electrofuels are an emerging class of carbon-neutral **drop-in** replacement liquid and gaseous fuels produced from renewable electricity e.g. are hydrogen, ammonia, methane and liquid hydrocarbons. The viability of electrofuels will depend on the development of the power market especially of cheap low-carbon electricity.

***Note:** Drop-in fuels are synthetic and completely interchangeable substitute for conventional petroleum-derived hydrocarbon fuels such as gasoline, jet fuel, and diesel. This means, there is no requirement for modification or adaptation of engine, fuel system or the fuel distribution network.*

Report on the progresses of 5 annexes undertaken by AMF during the period

- ii. **Annex 28 – Information Service & AMF Website & Fuel Information.** This Annex continue to provide sharing of information, reviews on relevant news, publication of newsletters, maintenance of website, providing secretariat support and liaison with IEA main bodies and other TCPs and outside organizations and bodies.
- iii. **Annex 51 – Methane Emission Control.** This annex concluded that “CNG is an attractive alternative for conventional liquid fuel. The lean burn engines based on CNG are able to be easily adapted to heavy duty vehicles, whereas it is essential to remove unburned CH₄ by use of after-treatment technologies. Low temperature activity and long term durability of Pd-based catalyst posed challenges in the after-treatment system. It was found that Pd-Pt alloying and the use of electronic modifiers such as OSC (Oxygen Storage Component) and promoters were effective to make CNG catalyst more durable”.
- iv. **Annex 53 – Sustainable Bus Systems.** This annex designed and tested a driving cycle that represents the operational conditions of buses running in developing cities. Santiago City, Chile was the first test case conducted. It concluded that the Santiago Bus Cycle gave a more stringent and actual representation of emissions of buses running in developing cities. The Santiago Bus Cycle was officially adopted by Ministry of Transport of Chile in July 2018. Every new bus model, ICE or electric, coming to the Santiago’s bus market must be tested under this AMF’s Santiago Bus Cycle.
- v. **Annex 54 – GDI Engines and Alcohol Fuels.** Gasoline Direct Injection (GDI) engines are being used by vehicle manufacturers to improve fuel efficiency and to meet new emissions/GHG regulations. However, it had been demonstrated that under certain conditions, GDI can increase particle emissions compared to counterpart PFI engines and diesel engines. However, alcohol fuel blends have been shown to have potential to reduce particulate matter (PM) emissions from GDI vehicles. This annex is ongoing and it investigates the impact of alcohol fuel blends on GDI engines..
- vi. **Annex 55 – Real Driving Emissions.** There are concerns that performance of vehicles may not be fully captured in compliance or type approval tests conduct on vehicle chassis dynamometers. How do vehicle fuel economy, efficiency and emissions in real world driving compare to certification test results? What is the influence of: vehicle type and powertrain; environmental conditions; driving style; and route? What are the benefits and challenges of real world driving testing compare to dynamometer testing? This annex investigates these issues and is ongoing. European regulations now includes RDE (Real Driving Emissions) test requirement.

vii. Activities on Advanced Motor Fuels in India

1. India embarked on an ambitious fuel quality upgrading programme to directly jump from Bharat Standard BS4 (equivalent to Euro 4) in 2017 to BS6 (Euro 6) in 2020 for the whole country and by 2018 for Delhi and the NCT region.
2. Ten percent (10%) Bio-ethanol allowed in India but only 3.4 % were achieved in 2016-2017 and most likely to be 5 % in 2018-2019.
3. Twelve ethanol plants are being setup by Oil Marketing Companies (OMCs) at various locations. Indian Oil Corporation (IOC) and Lanzatech agreed to setup world's 1st demonstration 33,000 tonnes per year ethanol plant from refinery off-gas. IOC will act as a Global Licensing Partner of M/S Lanzatech for all future plants.
4. IOC evaluating the performance of methanol blend (M15) compared to normal gasoline.
5. Co-processing of vegetable oil in refinery are been explored. Long duration experiment (1.5 years) was conducted for co-Processing with 10% Jatropha oil at typical DHDT conditions/catalyst.
6. The Sustainable Alternative Towards Affordable Transportation (SATAT) was launched by the Government on 1st October 2018. Among key features were the construction of 5000 CBG plants in next 5 years; production off-take guarantee by OMCs; and, attractive procuring price of biogas from the plants. IOC initiatives under this includes: retailing of BioCNG through Retails Outlets; MOUs signed with 4 producers for automotive BioCNG; and Exploring opportunities to produce BioCNG from waste streams through JVs.
7. IOC pioneered LNG as automotive fuel in collaboration with TATA Motors. Trial run of 1st LNG fuelled truck concluded successfully during 2015-2016. LNG fuelled buses developed by Tata Motors are under trial with IOC's LNG dispensing solution.
8. IOC conducting study using CNG-hydrogen mixed fuel. Pilot trials to convert and run 50 buses on 18% Hydrogen CNG produced through IOC's compact reformer technology are ongoing. Under this process, the 18%Hydrogen+CNG fuel is directly reformed instead of conventionally mixing the two fuels.

A site visit to the Indian Oil Corporation R&D Centre located in Faridabad was made on 17th October 2018 (Wednesday). Participants were briefed and shown the various R&D activities related to Advanced Motor Fuels conducted by the Centre.

On the last day of the ExCo 56 Meeting on 18th October 2018, AMF agreed to adopt new vision and mission statements and to start new annexes. The new vision of AMF is "Advanced motor fuels, in parallel with electrification, enable transport to serve a sustainable society around the globe".

Talk by ANGVA

In the evening of 18th October 2018, Executive Director of ANGVA gave an hour talk and Q&A on "LNG for Transport & Challenges to NGVs in Asia Pacific" at the India International Centre, New Delhi, under the invitation of the Natural Gas Society of India. More information on Natural Gas Society of India (NGS) can be viewed at: www.ngsindia.org

Reported by: Lee Giok Seng, Executive Director, ANGVA, 15th November 2018.

