ADVANCED MOTOR FUELS
Technology Collaboration Programme

May 2025

WHO WE ARE

The Advanced Motor Fuels Technology Collaboration Programme (AMF TCP) is one of the actors putting transport on track to sustainability and reducing the impacts of transport on the environment. Established in 1984, AMF has a strong international network that fosters collaborative research, development, and deployment (RD&D) and provides unbiased information on clean, energy-efficient, and sustainable fuels and related engine and vehicle technologies.

OUR VISION

Advanced motor fuels, applicable to all modes of transport, significantly contribute to a sustainable society around the globe.

OUR MISSION

The mission of AMF is to advance the understanding and appreciation of the potential of advanced motor fuels in transport sustainability. We provide sound scientific information and technology assessments to facilitate informed and science-based decisions regarding advanced motor fuels at all levels of decision-making.

HOW TO JOIN AMF

Participation in one of the International Energy Agency's (IEA's) technology collaboration programmes, such as the AMF TCP, is based on mutual benefit to the program and to the interested newcomer.

Each contracting party is represented by a delegate and an alternate delegate. The respective contact details are listed on the AMF website.

The Secretary will provide details on the AMF and invite newcomers to attend an Executive Committee (ExCo) meeting as observers. By attending or even hosting an ExCo meeting, interested newcomers will become familiar with our organization.

Please visit output products like the AMF Annual Report, Project Reports, and Fuel Information on the AMF website, and follow the AMF on LinkedIn.

OVERVIEW OF ACTIVITIES

AMF examines transport fuel issues in a systemic way, taking into account production, distribution, and end-use aspects. AMF liaises with other IEA technology collaboration programmes (such as IEA Bioenergy and IEA Combustion) and works in close collaboration with important players in the field of AMF (for example, the International Transport Workers' Federation and the Methanol Institute). Because fuels, engines, and exhaust after-treatment systems must be considered as interactive systems, AMF's scope also covers propulsion systems that use advanced motor fuels.

MOST RECENT PROJECTS (TASKS)

Work within AMF is carried out in individual projects (known as Tasks). Detailed information on each of the projects can be assessed on the AMF website.

Task 28	Information Service and AMF Website
Task 65	Powertrain Options for Non-Road Mobile Machinery
Task 66	Recent Progress in SAF Research
New Task	Exhaust After-Treatment Systems (EATS) coming soon
New Task	End-use Aspects of Hydrogen Application in Transportation coming soon

CONTACT

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IEA-AMF Technology Collaboration Programme on Advanced Motor Fuels

SCAN ME

PARTICIPANTS

Currently, AMF has 16 contracting parties from 14 countries worldwide. Japan has designated three contracting parties.

PROJECT HIGHLIGHTS

Task 62 – Wear in Engines Using Alternative Fuels

Alternative fuels have been intensively introduced in transportation sectors in recent years. While some of the wear caused by these fuels can be seen initially, the problems really become clear after years of application. The goal of this task was to identify and present an overview of potential wear issues to prevent major surprises in the future.

Key findings

So far, we have quite a lot of experience with the application of biodiesel, methanol, and ethanol in combustion engines, as reflected in the report, which contains significantly more information about these fuels compared with other relevant alternative fuels like dimethyl ether (DME), hydrogen, and ammonia. The experience concerning engine wear with these fuels will be expanding in the coming years as their application becomes more widespread. However, a common feature of these fuels is the increased hydrogen to carbon ratio, H/C, which in this investigation has been found to be of major importance in engine wear, particularly in relation to the high water content in the exhaust. This is illustrated in Figure 1.

FUEL	COMPOSITION	H/C RATIO	EXHAUST WATER CONTENT
		mole/mole	Vol-%
DIESEL	$C_{12}H_{23}$	1, 91	12, 7
METHANOL	CH_3OH	4	23, 1
METHANE	CH_4	4	19
AMMONIA	NH_3	∞	31, 1
HYDROGEN	H_2	∞	34, 7

Figure 1. Variation in the exhaust water content as a function of excess air ratio (λ) for selected fuels. The water content is shown as H_2O moles/mole of exhaust, which is the same as volume-%/100

Main Conclusions

The project results identified and added to the understanding of the high degrees of engine wear caused by the use of alternative fuels in the transportation sector.

STRATEGIC WORK PLAN 2025–2030

To facilitate informed and science-based decisions regarding advanced motor fuels, AMF has identified three priority research areas in which we will provide sound scientific information and technology assessments. To learn more about AMF and see the 2024 Strategic Work Plan, please visit the About AMF page.

Requirements for supplying sufficient advanced motor fuels

- Potential supply volumes to meet expected demand
- Potential solutions for regions that will benefit from continued reliance on fuels as the primary means for providing transport services
- Strategies for the fueling of legacy vehicles

Social, environmental, and economic impacts

- GHG emissions of advanced motor fuels
  - Recommended life-cycle analysis (LCA) methodologies and relative merits of different motor fuels
  - Assessment of critical issues affecting sustainability performance of different fuels
  - Air pollutant emissions and control strategies associated with use of advanced motor fuels
  - Factors influencing the affordability of fuels

R&D on production, properties, and applicability of advanced motor fuels, with a focus on on-road long-haul and non-road sectors

- Hydrogen application in internal combustion engines (ICEs)
- Low-carbon fuels for non-road mobile machinery
- Biomethane application in ICEs
- Biodiesel and renewable diesel application in ICEs
- Ammonia application in ICEs
- Exhaust aftertreatment systems
- Fuels for marine and stationary engines
- Sustainable aviation fuels

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