



IEA IMPLEMENTING AGREEMENT
ON
ADVANCED MOTOR FUELS

STRATEGIC PLAN

2009-2014

1.0 INTRODUCTION AND BACKGROUND

This document is the fourth Strategic Plan for the Advanced Motor Fuels Implementing Agreement (AMF); it covers the period 2009 to 2014. The Plan takes into consideration the changing and challenging world situation regarding transportation fuels together with continuing concerns for local and global environment and energy security. The membership of the AMF has grown in recent years and now includes Austria, China, and Thailand, and the Strategic Plan includes consideration of the wide range of fuel requirements represented by the diversity of the member countries. The strategic objectives of the End-Use Working Party (EUWP) as they relate to the individual Implementing Agreements have also been factored into this document, in order that it be consistent with the EUWP's goals. As we discuss the next five years and what they may hold with regard to transport fuels, we have made use of one of AMF's own publications, "*Outlook for Biofuels, Other Alternative Fuels and New Vehicles*," available for download at AMF's website, www.iea-amf.vtt.fi. (Downloadables)

Background

In the previous term (2005 – 2009) the AMF objectives were as follows:

Objective 1 (Information & Membership): To gather, evaluate and disseminate information on advanced motor fuels and to act as a clearing-house on related information. To provide an easy-access platform for interested parties to join AMF as members.

Objective 2 (Co-operative R&D, deployment and dissemination): To create, maintain and make use of networks among partners involved in research, development, demonstration and deployment related to advanced motor fuels.

Objective 3 (Markets and general co-operation): To facilitate large-scale market deployment of advanced motor fuels by removing technical, economical and political barriers.

As our End-of-Term Report (AMF End-of-Term 2005-2009 Report) details, we accomplished very much working under these objectives. Eight Annexes were completed, and six Annexes are carried over into this new term. Issues pursued under the annexes that were closed included standardization of alternative fuels, biodegradable lubricants, alcohols and ethers, safety of animal fat used in biodiesel, duty cycles for heavy vehicles on different fuels, and Fischer-Tropsch synthetic fuels.

Context of the New Strategic Plan:

The new Strategic Plan must be framed in the context of world events, the changing scene with regard to energy supplies, transport fuels, local environmental conditions, and global challenges. This section provides a brief synopsis of the framework in which the AMF must operate for the next five years and a look forward in terms of the evolution of sustainable new fuels that might be expected in the marketplace with the next several years. This will help to set the agenda for the AMF R&D activities.

Since 2004, when the current Strategic Plan was written, the world has changed, and even more change is foreseen in the next term. In the World Energy Outlook of 2006, IEA summarized the energy challenges in general as follows:

“The world is facing twin energy-related threats: that of not having adequate and secure supplies of energy at affordable prices and that of environmental harm caused by consuming too much of it”.

China and India have emerged as major players in the world economy and in the demand for oil. According to the World Energy Outlook 2007, *“The emergence of China and India as major players in global energy markets makes it all the more important that ALL countries take decisive and urgent action to curb runaway energy demand.”*

The year 2008 saw the greatest rises in price and demand for oil in history, and these trends appear to be the norm for the future when there is global economic growth. However, by the end of 2008, economies worldwide were foundering, and oil prices fell precipitously as shown in Figure 1. This was a direct effect of the decrease in demand for oil. The World Energy Outlook 2008 noted that *“The impact of the credit crisis on world economic growth prospects, higher energy prices and some notable new policy initiatives have left their mark on the World Energy Outlook 2008. Energy use grows more slowly to 2030 than projected last year, but the overall trends are broadly unchanged.”*

The interest in and attention to alternative fuels and new vehicle powertrains has never been greater, and perhaps, the risk of a complacent, “business-as-usual” approach to fuels and engines has never been more evident to industry and governments around the world.

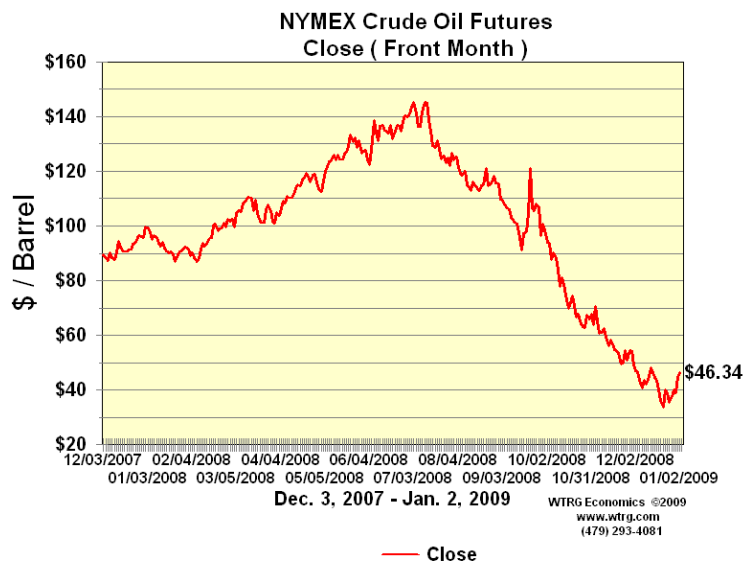


Figure 1 – 2007 & 2008 crude oil prices. Source WTRG Economics

Transportation in itself is a function vital to society and with significant impacts on energy, emissions and even on economy. The share of energy used in transportation is high, ranging typically from 20 to 30 % of the total energy consumption. The share of harmful emissions from the transport sector is, in general, even higher than its share of energy usage.

The transport sector is facing many challenges. Today this sector is almost totally dependent on crude oil derived fuels (4-5% alternative fuels now; could be 20-30% by 2030). The number of vehicles around the world is increasing rapidly, and so are the environmental impacts and the use of energy in transport. Whereas many other sectors of society have been able to stabilize or cut CO₂ emissions, transport-related CO₂ emissions tend to be increasing both in relative and absolute terms. In fact, according to the IEA, “the transport sector may pose the greatest challenge to meaningful CO₂ emissions reduction of any energy sector.”

Furthermore, it has been said that:

- A halving (or greater) of global energy emissions will require significant emissions reduction in the transport sector
- Given a projected 3-fold rise in travel demand to 2050, average emissions per kilometer must be cut by two thirds just to stay even; cuts of 75% or greater are needed for a substantial emissions reduction
- While most attention is focused on light duty vehicles, the other half of demand, trucks, airplanes and ships, may pose an even greater challenge because of the shortage of viable alternatives to oil (such as CO₂-free electricity or hydrogen)
- The largest demand could be for biomass-to-liquids (BTL) fuel for trucks, airplanes and ships

So the challenges for fuels in the future are great. Fortunately, though, the array of options is widening, not closing in. This is true for both fuel and vehicle technology options. We are closer than ever to a wide-scale use of alternative fuels. Today we have biofuels and natural gas on the agenda, for tomorrow there might be synfuels and even hydrogen. We already have hybrid and natural gas vehicles in the market, as well as the first experimental series of fuel cell vehicles. At the same time, the internal combustion engine is improving, with features like direct injection, flexible engine controls, and new combustion systems.

Oil and Gas Liquids Supply Scenario Illustrates the Challenges to Come:

Worldwide supplies of oil and gas liquids are expected to peak in the next few years and then continue on a downward trend for decades to come. This dilemma is illustrated in Figure 2 below where the peak of production is seen to occur in the 2010-2015 period.

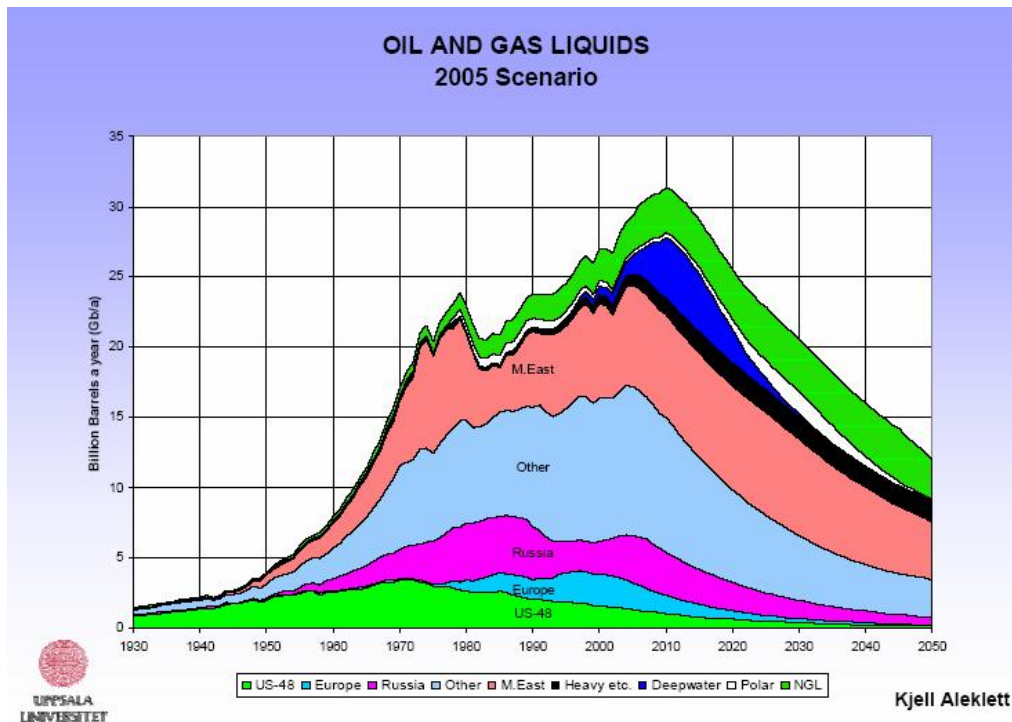


Figure 2 – Projections of oil and gas liquid supplies to 2050 (Source: Aleklett, K. Uppsala University, Sweden, presentation Alnarp, March 2006)

New production required to cover the shortfall in oil supply after the peak must come from enhanced oil recovery, new discoveries, and non-conventional oil as might be represented in Figure 3 below.

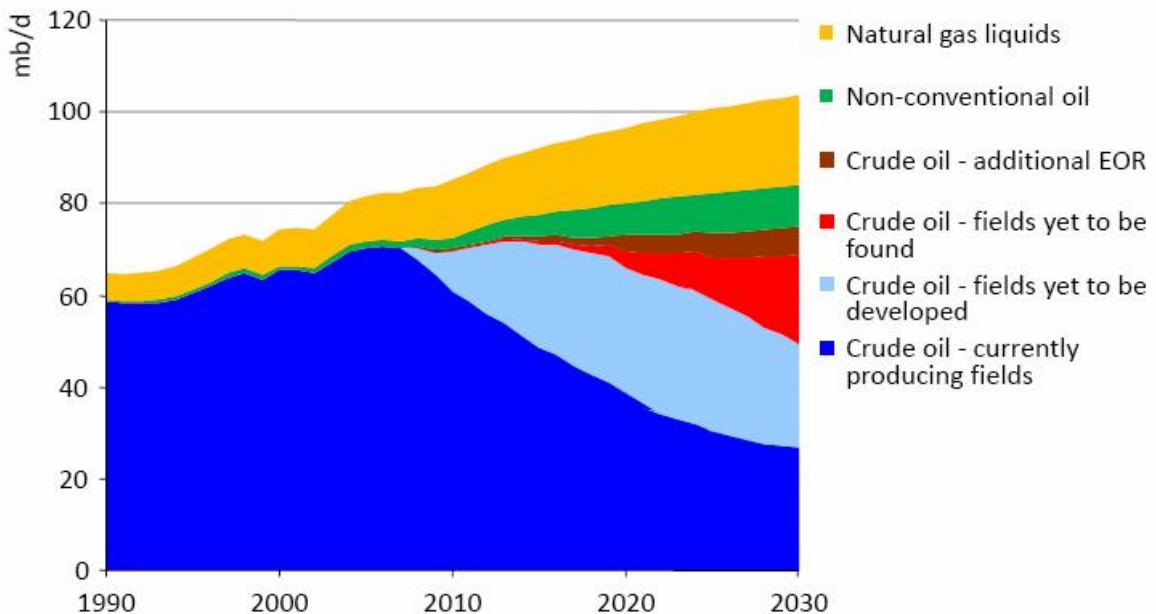


Figure 3 – Projection of world oil production by source (IEA WEO 2008) (EOR = Enhanced Oil Recovery)

Figure 3 represents the “Reference Scenario”, i.e., the case in which no new government policies beyond those already adopted by mid-2008 are enacted. In this case oil production must grow to 104 million barrels per day by 2030, requiring 64 million barrels per day of

gross capacity additions to meet demand growth (IEA WEO 2008). This raises an issue that must be of great concern. If oil production must increase to 104 mmbd by 2030 to meet demand, and that requires 64 mmbd of capacity additions, that means only 40 mmbd will be produced without the additions. Considering the fact that world oil production now is 80 mmbd, this could suggest a very dramatic near-term peak oil event and decline.

Failure to meet the demand for transportation fuels will lead to turbulence, rapid rises in energy prices and economic distress. Hence, the need for alternative fuels will become very serious, and it is critically important that we build on the momentum that alternative fuels already enjoy and expand the portfolio of choices for transportation fuels to meet the needs for sustainable and stable energy resources for future transportation. Alternative fuels can and will serve as additional resources that can help relieve the demand for oil, and today's alternative fuels, especially the biofuels, are surging.

Figure 4 shows a projection for biofuel volumes for the next several years. Mandates in both Europe and the U.S. will increase biofuel volumes. On a world-wide basis ethanol will maintain its position as the leading biofuel due to lower production costs compared with biodiesel. In the long run, next generation biofuels are expected to take shares from traditional biofuels. However, the production facilities for next generation BTL fuels are extremely capital intensive, and oil price fluctuations could hinder or slow down the building of new capacity.

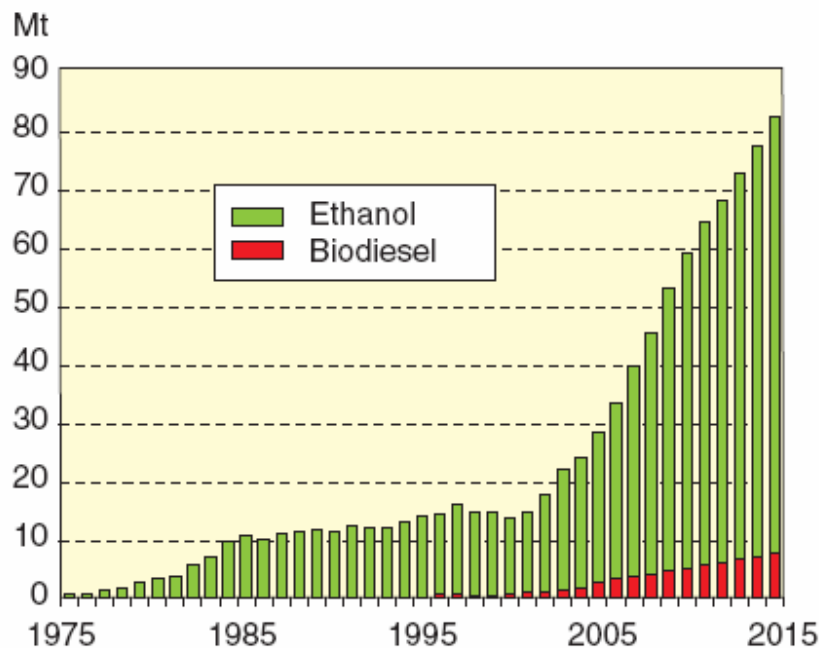


Figure 4 - Projection of global biofuels production in million tons (not corrected for energy content)
Source (IFP 2007 – IFP Company, Rueil-Malmaison, France)

Ethanol and biodiesel today are generally made from feedstocks that have been traditionally used for food products – corn and sugar cane for ethanol and soybeans, rapeseed, palm oil, etc. for biodiesel. The dramatic rise in the use of these feedstocks for fuels is perceived to have given rise to increasing food prices worldwide. This has led to a backlash by people affected by the rising food prices and by politicians and policy-makers. As a result there is great interest now in “2nd generation biofuels” – fuels that would be made by different processes and with non-food biomass feedstocks

Alternative fuels most commonly used today in transport are ethanol, natural gas, biodiesel (fatty acid methyl esters), and propane. In the next five years we expect to see more synthetic fuels – fuels made from non-petroleum resources (coal, natural gas, biomass, oil sands, etc.) and possessing properties very similar to or even superior to today's gasoline and diesel fuels.

Government Policy Initiatives Will Drive Greater Demand for Biofuels and Will Impact AMF Strategy

A number of governments are adopting new, aggressive targets for biofuel use for attacking both the fuel security issue as well as climate change. The **European Union** has ambitious goals for renewable energy and bioenergy in transportation, industry, electricity generation, etc. The preliminary target for transportation is 20% alternative fuels by 2020. There is also an indicative target for biofuel usage in transport, the value being 5.75% by 2010 (The Biofuels Directive).

The 2007 European Strategic Energy Technology Plan (SET Plan) sets the following targets for the year 2020:

- 20 % reduction in greenhouse gas emissions
- 20 % renewable energy
- 20 % reduction in primary energy consumption
- 10 % biofuels in transport

The 2008 Directive proposal on renewable energy basically reaffirms the SET targets. However, the proposed 10 % mandate for biofuels has been changed to 10 % renewable energy in transport, to also give an opportunity for electric vehicles.

The **U.S.** has a goal to reduce gasoline use by 20% by the year 2017. This will be accomplished by increasing the use of renewable and alternative fuels by a mandatory requirement of 35 billion gallons by 2017 and by raising the Corporate Average Fuel Economy (CAFE) for cars and light trucks.

The **Canadian** government's comprehensive strategy for renewable fuels has four components:

- **Increasing the retail availability of renewable fuels through regulations** that will require 5% renewable content based on the gasoline pool by 2010 and 2% renewable content in diesel and heating oil by 2012, upon successful demonstration of renewable diesel fuel use under the range of Canadian conditions. These new regulations will require enough renewable fuel to reduce greenhouse gas (GHG) emissions by about 4 megatonnes per year, the GHG equivalent of taking almost one million vehicles from the road.
- **Supporting the expansion of Canadian production of renewable fuels**, by providing operating incentives to producers of renewable alternatives to gasoline and diesel, such as ethanol and biodiesel, based on production levels and other factors. This will make investment in production facilities more attractive by partially offsetting the risk associated with fluctuating feedstock and fuel prices. Concurrent with the implementation of the operating incentive program to promote additional domestic production of renewable fuels, the current fuel excise tax exemptions for ethanol and biodiesel will be eliminated as of April 1, 2008.

- **Assisting farmers to seize new opportunities in this sector** by providing repayable contributions to help farmers overcome the challenges of raising the capital necessary for the construction or expansion of biofuel production facilities, and by helping agricultural producers develop sound business proposals, as well as undertake feasibility or other studies to expand biofuels production capacity.
- **Accelerating the commercialization of new technologies** through Sustainable Development Technology Canada (SDTC) investments with the private sector in establishing large-scale facilities for the production of next-generation renewable fuels. Next-generation renewable fuels, produced from non-food feedstocks such as wheat straw, corn stover, wood residue and switchgrass, have the potential to generate even greater environmental benefits than traditional renewable fuels. This measure complements other existing research and development initiatives.

Japan proposed a worldwide goal, called “Cool Earth 50,” with the target of reducing global emissions of greenhouse gases by half of the current level by 2050.

Japan has also established a long-term domestic strategy that has numerical targets on energy conservation, reducing oil dependence in primary energy, and reducing oil dependence in the transport sector.

- At least 30% improvement in energy efficiency will be attained by 2030.
- The dependence of the transport sector on petroleum will be reduced to 80% by 2030.

To attain these targets, the “Next Generation Vehicle and Fuel Initiative” has been adopted by the government. It will include innovations in engines, fuels, and infrastructure.

China has issued a mid- and long-term development plan on renewable energy, setting a series of targets for biofuels as follows:

2010:

- 1 million tons of corn-based ethanol
- 2 million tons of ethanol from non-food feedstock
- 200,000 tons of biodiesel from oil-enriched plants

2020:

- 10 million tons of ethanol
- 2 million tons of biodiesel
- Replacing 10 million tons of conventional gasoline and diesel annually

Also, nearly 400,000 NGVs were running on the roads in China by the end of 2007, and approximately 3 million tons of conventional fuel has been replaced annually. The number of NGVs is expected to rise to 800,000 units in 2010, realizing 7 million tons of conventional fuel substitution annually.

Thailand has a number of goals for their energy strategy. They include

- Reducing energy elasticity (percentage change in energy consumption to achieve one per cent change in national GDP) from 1.4:1 to 1:1 by 2007

- Increase share of renewable energy from 0.5% in 2003 to 8% of total final energy by 2011
- Ensure sufficient and reliable energy supply for at least 30 years
- Develop Thailand as a regional energy center

They also have a target to replace 10% of diesel fuel use with biodiesel fuel by 2012.

We should note that AMF, in our deliberations about R&D on advanced motor fuels, must always take note of the fact that there are significant variations in commercial fuel properties between different regions of the world. For example, gasoline and diesel fuels in Europe, Japan and North America typically have lower sulfur content than do the fuels in other parts of the world. The low sulfur feature is driven by local emission standards that must be met with emission controls that require low-sulfur fuel. In addition there are significant differences in cetane number, for example, between Europe and North America. Therefore, AMF must remain cognizant of these differences as we develop new research areas and must remember that a “one size fits all” approach will not work on all issues as they relate to the AMF member countries.

Challenges for Fuels Are Multi-dimensional

Fuel choices can impact many societal challenges both positively and negatively, including energy security, climate change, and local pollution. In addition a fuel choice can help prepare for the future. For example 1st generation biofuels today, which are putting strains on food prices and also still have questions about sustainability, can lead the way to more sustainable 2nd generation fuels. One can subjectively rank future fuels (relatively) in the way they contribute to solving these challenges, as is done in Table 1 below. Rankings could differ from country to country depending on the local circumstances. Furthermore, some fuels might be best for local conditions while others would be good for global challenges.

	Energy-security (short-to mid-term)	Climate Change	Local pollution	Preparation for the future
Energy savings	+++	+++	+++	+++
Unconventional oil	++	-	0	++
Synfuels (GTL, CTL etc.)	+++	0/--	++	++
CNG in NGV	+	+	++	+
Biofuels, 1st generation	+++	0/+	0	+
Biofuels, 2nd generation	+++	++	++	+++
Hybrids, HEV	+	+	+	+
FC vehicles on renewable H ₂	+	++	+++	++

Table 1 - Sample rankings of future fuels (plus signs represent improvements, minus signs represent negative effects, and 0 means no effect) (Source: AMF Outlook)

Engine technologies and downsizing of vehicles will also have impacts on fuel selections. New combustion regimes such as highly diluted mixtures, “cool flame” combustion, and HCCI (homogeneous charge, compression ignition) might require modified advanced fuels or alternative fuels. Hybrid vehicles and plug-in hybrid vehicles might continue to use conventional fuels for combustion engine operation, but electricity will propel the vehicles for large percentages of time. Heavy vehicles are expected to continue to use conventional fuels still for many years, although some are beginning to develop hybrid systems for heavy-duty.

Scope of AMF:

“Advanced Motor Fuels” encompasses alternative fuels as well as advanced petroleum-based fuels, and the scope of the AMF Implementing Agreement includes all such fuels. Additionally, AMF has the license to work on the entire spectrum of fuels from feedstock, through fuel processing, distribution, and, finally, end use in vehicles. Directly and indirectly AMF is also promoting fuel efficiency of vehicles. AMF works closely with other related Implementing Agreements either through the End Use Working Party or by way of direct interaction. Representatives of other Implementing Agreements have attended AMF Executive Committee meetings, and AMF has been represented at meetings of other Implementing Agreements.

All candidate future fuels face impediments and barriers that might be either unique to a given fuel or common with other fuels. One fuel might face challenges with regard to distribution while others face challenges in end use. For example, the U.S. has an extensive pipeline system for liquid fuels – crude oil, gasoline, and diesel fuel – but the pipelines for natural gas are not as extensive. In fact, some regions of the country are not served by natural gas at all. That puts natural gas at a disadvantage if it were to be used as a primary fuel for transportation. In contrast, Europe has an extensive pipeline system for natural gas and has pipelines for crude oil but not for finished petroleum products. Thus, the barriers are different from place to place. On the other hand, a fuel might have few other barriers but does not meet a standard for contributing to reductions of CO₂ emissions.

Expertise represented within AMF by the national delegates helps to sort out the impediments and identify the types of R&D necessary to elucidate and/or overcome the impediments. Making policy on fuels requires a prioritization of desirable attributes for fuels and a balancing of the priorities with practical realities with regard to costs and benefits. Figure 5 below helps to illustrate the process of sorting out the priorities along with the barriers, or bottlenecks. Note that this figure is only a hypothetical situation illustrating that different fuels will encounter different bottlenecks that must be balanced against the desirable features of the different fuels.

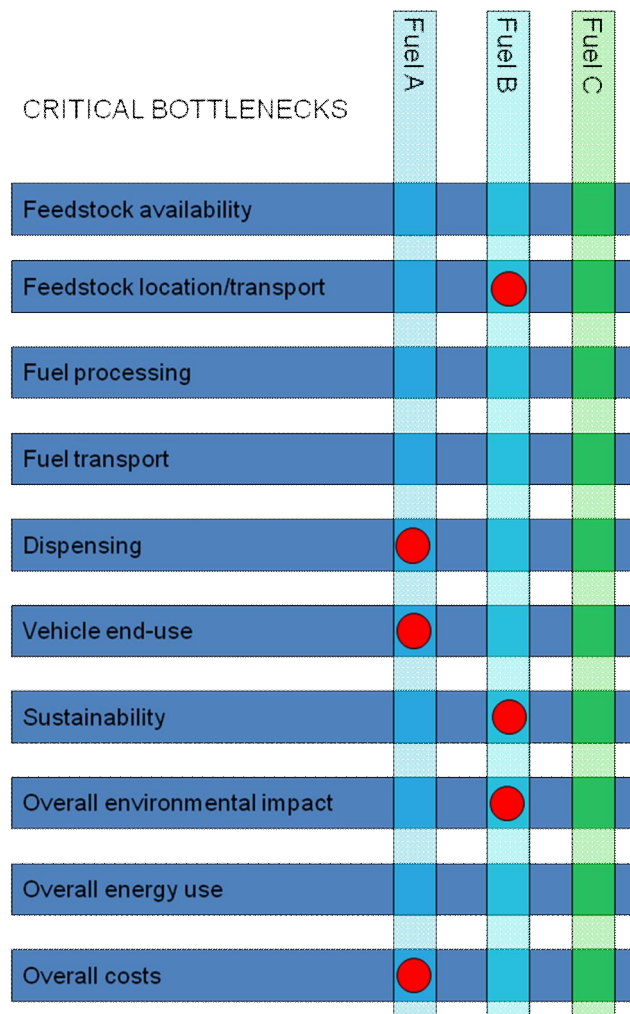


Figure 5 - Different Fuels Have Different Challenges - Hypothetical Fuels Illustrated

2.0 VISION AND MISSION OF AMF

Vision of AMF:

As we have seen from the discussion above, the need for mobility is increasing on a global basis, but the transport sector is facing challenges from local pollution, climate threats, and resource constraints. AMF is well-positioned to contribute to solutions to these challenges by way of its multinational makeup of representatives familiar with the challenges, from well to wheel, and potential solutions.

Therefore the vision of AMF is:

To contribute to sustainable solutions through our system view of the entire fuel chain from resource development to end-use. Our cooperative research in the field of transport fuels helps to facilitate the widespread use of sustainable fuels of high quality.

Mission of AMF:

The mission of AMF is as follows:

AMF is one of the key players in the promotion of international collaboration in R&D, deployment and dissemination of clean, energy-efficient and sustainable fuels and related vehicle technology. It will continue to provide a fuel neutral platform for co-operative R&D, deployment and dissemination, make use of the multifaceted expertise of its partners and networks, and provide a respected clearinghouse for information facilitating the wide spread deployment of technologies for sustainable transport. We foresee increased need for cooperation and collaboration with other transport-related Implementing Agreements, such as Bioenergy, HEV, and Combustion. Together with new AMF member countries we are able to address a more diverse set of challenges in technology and local conditions. We also work actively for energy conservation in transport.

3.0 OBJECTIVES

From our vision and mission we have formulated the following objectives (these major objectives have not changed much from the 2005-2009 strategic plan, but they reflect the need to represent the interests of all of our members in our activities, recognizing the varying needs between the different regions of the world represented in the AMF):

Objective 1 (Information, Dissemination and Membership): To gather, evaluate and disseminate information on advanced motor fuels and to act as a clearing-house on related information. Provide an easy-access platform for interested parties to become member of AMF.

- Maintain an information service on advanced motor fuels containing, i.a. the AMF website and quarterly newsletters (www.iea-amf.vtt.fi)
- Provide country-specific updates on various research and demonstration programmes, vehicle fleets, fuel situation etc.
- Promote Membership e.g. by participating actively in relevant workshops and conferences including the NEET activities of IEA
- Provide means to share information on advanced motor fuels with non-member countries (NMCs)
- Provide reliable information to policy and decision makers, and in general, promote the awareness of the need for sustainable transport

Objective 2 (Cooperative R&D): To create, maintain and make use of networks among partners involved in research, development, and demonstration related to advanced motor fuels

- Fuels will be assessed on the basis of sustainability, climate change, energy efficiency, vehicle end-use performance and local environment and health
- We define R&D priorities taking into consideration **critical barriers** and time-frame aspects of various fuels
- The AMF Executive Committee (ExCo) will, in a continuous process, define the directions for collaborative work seeking a good balance between task- and cost-sharing activities

- Enhance collaborative actions between related Implementing Agreements such as
 - Bioenergy – resources, fuel processing and quality
 - Combustion – Fuel / Engine interactions
 - Hybrid and Electric Vehicles – market deployment of new vehicles
- Seek leverage of resources, knowledge and research funding through cooperation outside the IEA sphere (international organizations and industry)
- Apply analysis tools such as models for well-to-wheel/Life-Cycle-Analysis assessments
- Refine and define methodologies to characterize the end-use performance of fuels. Develop decision tools to facilitate the work of policy-makers. Different fuels will have both positive and negative attributes. To the extent possible, define a methodology to provide an overall score for various fuels and technologies.
- Identify cost-effective ways to implement advanced motor fuels taking into account differences in local/regional conditions

Objective 3 (Markets and Deployment): To encourage large-scale market deployment of advanced motor fuels by contributing to the identification of technical and economic barriers and by providing solid data to decision makers.

- Provide reliable and unbiased information to policy and decision makers
- With good understanding of available life-cycle-analysis models and tools, apply most appropriate models for given situations and make appropriate recommendations with regard to choose fuel solutions
- Provide support for the development of strategic roadmaps and action plans for implementation of sustainable fuels
- Support international harmonization
 - alternative fuel specifications and standards
 - test procedures for vehicles using new types of fuels and propulsion systems
 - criteria for environmentally friendly vehicles
- Liaison with other international, regional and national energy, transport and standardisation related organisations to promote exchange of information and to promote joint research

4.0 WORK PROGRAM

Six current AMF Annexes are continuing into the next period. These activities will form the beginning framework for the time period of the new Strategic Plan. These activities are briefly summarized below.

Annexes continuing into the next period – 2009-2014

Annex XXVIII – Information Service and AMF Website – (Objective 1)

This annex is supported by the AMF's common fund to which all member countries contribute. The annex serves as a source of information exchange for the member countries. A website is maintained for AMF related information including documents from ExCo meetings are reports from Annexes. In addition, the annex produces four newsletters annually dealing with news and developments in alternative and advanced fuels worldwide.

The information system occasionally produces special reports such as the 2008 outlook reports on fuels and vehicles and on standardization of alternative fuels.

Annex XXXIII - Particle Emissions of 2-S Scooters – (Objectives 1, 2)

This annex deals with particle emissions from 2-cycle scooter engines. Such engines are used in many parts of the world. Objectives are :

- Basic research of the 2-cycle engine aerosols, their composition with different lube oils and fuels and with different engine technology
- Study sampling and measuring procedures for particle mass and particle size distribution
- Research improvements of exhaust gas after-treatment systems
- Research toxicity and new methods of determining health effects
- Provide new inputs for industrial partners concerning their products
- Provide new inputs for the legal authorities

Annex XXXV- Sub-Task 1 - Ethanol as a Fuel for Road Transportation – (Objectives 1,2,3)

The purpose of this project is to provide an easily read technical report about the applicability of ethanol as an engine fuel. The report will describe the potential for ethanol application in the member countries participating in this annex. The results from the investigations of the member countries' situations will be extrapolated to recommendations for worldwide implementation in the near future.

Annex XXXVI - Measurement Technologies for Emissions from Ethanol Fueled Vehicles “METEV” – (Objectives 2,3)

The aim of this annex is to provide crucial information for developing the methodology for measuring HC, aldehyde and alcohol tailpipe emissions from ethanol-powered vehicles. The project also aims to find a simplified method using today's legislative measurement technology that can account for differences in harmfulness between exhausts from gasoline and ethanol powered vehicles.

Annex XXXVII - Fuel and Technology Alternatives for Buses – (Objectives 1,2)

The plan for this annex includes sharing of costs with other implementing agreements including HEV, Bioenergy, and possibly others. The objectives are:

- To assess overall energy efficiency, emissions, and costs, both direct and indirect costs, of various technology options for buses
- Provide solid IEA sanctioned data for policy- and decision-makers
- Bring together the expertise of various IEA Implementing Agreements:
 - Bioenergy: fuel production
 - AFC: automotive fuel cells
 - AMF: fuel end-use
 - AMT: light-weight materials
 - Combustion: new combustion systems

- HEV: hybrid power-trains

Annex XXXIV – Biomass-derived Diesel Fuels – Task 2 – Algae as a Feedstock for Biofuels (Objectives 1,2)

The objective of this annex is to inventory and assess the important R&D activities in the area of algal fuels and to make recommendations about the most promising pathways to success in making large quantities of transportation fuels from algae. This will require literature searches, discussions with researchers, and visits to promising activities in algae. The goal will be to develop recommendations intended to aid governments and policy-makers in their decisions on funding R&D that will produce the most fruitful results.

AMF Approach to Future Topics for Annexes

The ExCo takes an active role in identifying gaps of knowledge and in defining research priorities. In this way new research topics will be brought to the table with both a top-down (ExCo) and a bottom-up (initiatives coming from e.g. research institutes) mechanism.

Additional topics that could be of interest to the AMF community are:

- Cost-effectiveness of alternative ways to reduce CO₂ emissions from transport
- Assessment of production capacities of various fuel alternatives
- Fuels and emission reduction technologies for marine transport
- Concerted demonstration activities
- Continued joint efforts for market deployment of clean fuels and clean vehicles
- Technology transfer to developing markets

The Participants in various Annexes are in general encouraged to publish the results of the work in the public domain, thus assuring widespread dissemination of the information. Participation in conferences and workshops is an effective way of spreading information. Procedures for transferring information to developing countries should be worked out.

5.0 COOPERATION WITH OTHER IMPLEMENTING AGREEMENTS

AMF has a history of working together with other Implementing Agreements, having already completed one annex that was jointly supported by AMF and HEV. One annex just under way has the objective of combining support from AMF, Bioenergy, HEV, and possibly others. Another annex is contemplated that would seek support from AMF, Combustion, and others.

AMF welcomes participation by other Implementing Agreements in AMF's ExCo meetings, and AMF delegates are encouraged to communicate with and, perhaps, join meetings of other IA's ExCo meetings. Recently an AMF ExCo meeting was attended by representatives of the HEV and Bioenergy Agreements.

Because of AMF’s interest and capabilities in all phases of the fuel spectrum, we are well-positioned to work with other implementing agreements as is illustrated in Figure 6 below.

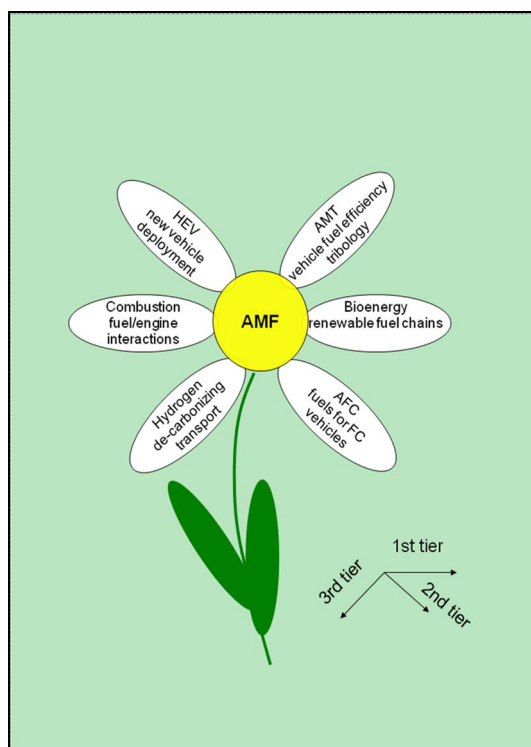


Figure 6 - AMF Has Central Role that Relates to Other IA’s

AMF also reaches out to other countries for them to consider membership in AMF. Within the last few years these efforts have been successful in attracting Switzerland, Austria, China, and Thailand to join the Implementing Agreement. Recent ExCo meetings have also been held in The Czech Republic and Brazil in hopes of attracting their joining as well. These activities will continue into the future, and emphasis will be placed on the “Plus Five” countries of Brazil, China, India, Mexico, and South Africa (China has already joined AMF).

6.0 MANAGEMENT

The Executive Committee consists of the National Delegates and Alternates of Member Countries to the Agreement. The ExCo is the decision-making body of the Agreement. The ExCo can take decisions to invite Observers and Experts to the ExCo meetings. Representation of the IEA Secretariat at the ExCo meetings is desirable.

The ExCo appoints a Chairman and an appropriate number of Vice Chairmen to give the AMF “Board of Directors” a geographically balanced constitution.

The ExCo appoints a Secretary to handle day-to-day administration. An annual Membership Fee is collected to cover the costs for the Secretariat and other activities decided upon by the ExCo. Such activities could be e.g. starting up new research activities using collective funds as seed money.

The ExCo meets every 6-12 months. The meetings are preferably arranged back to back with related meetings and conferences to minimize travel (ExCo meetings of other transport

related IAs, international workshops etc.). ExCo Members of other IAs have a standing invitation to the meetings of AMF ExCo. Electronic communication (e-mail, Internet) is used to facilitate working in between meetings. The ExCo has developed a structure for the presentation of new Annex proposals, and also procedures for swift handling of the proposals and decision making.

The AMF operates an information service on advanced motor fuels, either as a separate Annex or as a part of the AMF Secretariat. The AMF also maintains its own website, which comprises both a public and a Members Only section. The AMF Secretariat or the information service function provides a low-cost entry platform (mandatory for all Members) into the Agreement.

Examples of the roles and contributions expected from the different participants or functions:

Chairman, Vice Chairmen:

- Manage ExCo meetings
- Liaison with IEA
- Manage reporting (mainly with the IEA: performance assessment, Annual Report, End-of-Term Report, Strategy etc.)
- Manage various marketing actions
- Represent AMF in various meetings and conferences
- Enhance participation in AMF
- Promote networking

ExCo Members:

- Participate actively in the determination of the AMF work programme
- Liaison with national government and bodies
- Solicit national resources for co-operative R&D (Task Sharing, Cost Sharing)
- Reporting on country specific activities
- Ensure national dissemination of AMF information

AMF Secretariat:

- Day-to-day administration of the Implementing Agreement
- Liaison with the IEA
- Liaison with Annex Operating Agents
- Provide general assistance to the ExCo and the Chairmen
- Arrange meetings
- Assist in reporting
- Manage ExCo funds (possibly in co-operation with some national agency or organisation)

Information service:

- Provide condensed and timely information on world-wide AMF activities
- Critical assessment of various AMF related reports
- Maintain a database on AMF related information

Website:

- Marketing tool
- Information on individual Annexes
- Listing of publicly available reports

- Members Only area to facilitate information exchange within the ExCo

7.0 MEASURES OF PERFORMANCE

AMF is committed to evaluating its performance on a regular basis. The main vehicle for the evaluation and for communicating progress toward fulfilling the AMF mission and objectives will be the annual report of the AMF. This will review the activity of the Agreement against the objectives set out in this Strategic Plan.

In its self-evaluation, AMF will be guided in part by the Action Plan adopted by the Committee on Energy Research and Technology (CERT) in 2006 and focused on the following:

- **Stronger focus on the role of policy** in developing cleaner, more efficient energy technologies, and in deploying them
- **More frequent, more effective communication** to policy makers
- **More fruitful liaison within the IEA family**
- **More vigorous outreach to non-IEA countries**

AMF has performed well in these goals in the past and will continue to emphasize these in every activity. Performance toward these goals can be assessed quantitatively by measuring the following:

- Numbers of annexes started and concluded along with numbers of reports from those annexes that reach the public domain
- Numbers of reports that provide guidance to policy-makers
- Numbers of joint meetings with related Implementing Agreements; numbers of visitors representing other Implementing Agreements; numbers of annexes that are performed jointly with other Implementing Agreements
- Numbers of instances of outreach to non-IEA countries; numbers of observers from non-IEA countries attending meetings of the AMF

AMF has performed very well at these measures heretofore, and we expect to continue to perform well at these measures in the next period of the Implementing Agreement.

8.0 LIST OF ABBREVIATIONS

AFC	-	Automotive Fuel Cells
AMF	-	Advanced Motor Fuels
AMT	-	Advanced Materials for Transportation
CAFE	-	Corporate Average Fuel Economy
CERT	-	Committee on Energy Research and Technology (IEA)
CNG	-	Compressed Natural Gas
CO ₂	-	Carbon Dioxide
EUWP	-	End-Use Working Party (IEA)
ExCo	-	Executive Committee
GDP	-	Gross Domestic Product
HCCI	-	Homogeneous Charge, Compression Ignition
HEV	-	Hybrid Electric Vehicle
IEA	-	International Energy Agency
METEVI	-	Measurement Technologies for Emissions from Ethanol-Fueled Vehicles
NEET	-	Networks of Expertise in Energy Technology (IEA)
NGV	-	Natural Gas Vehicle
NMCs	-	Non-Member Countries (non-members of IEA)
R&D	-	Research and Development
WEO	-	World Energy Outlook

9.0 REFERENCES

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