

## **The Implementing Agreement IA “Hybrid- and Electric Vehicle” of the International Energy Agency (IEA) the international cooperation programme with a new record of member countries**

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### **Abstract**

The IEA Implementing Agreement (IA) “Hybrid and Electric Vehicle Technologies and Programmes” is an international working group of actual 17 governments interested in hybrid-, fuel cell- and electric vehicles. It works as a platform for information exchange about national programmes and activities and for collaboration on various topics. This collaboration platform is an efficient way to share information, to avoid misguided activities and to start joint efforts. The collaboration saves money and speeds up the development of the national programmes. This speeds up the market introduction of all kind of “Hybrid- and electric vehicles”. This presentation describes the results of the working groups. The planned new working groups will be explained.

***Keywords:** International collaboration, renewable energies, EVs/ HVs/ PHEVs/ FCVs, international working groups*

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### **Introduction**

Transport has become the largest of the four main energy-consuming sectors since 1974. and now accounts for 32% of the total 30 IEA-countries’ final energy consumption (from 25% in 1974). The consumption for transport (excluding international marine and aviation) increased from 670 Mtoe up to 1’190 Mtoe in 2007 (+77%).<sup>1</sup> In these 35 years the consumption from IEA countries dropped substantially over the 35 years from 62% to 52%.

Since 1993, the Implementing Agreement “Hybrid & Electric Vehicles (IEA HEV)” of the International Energy Agency (IEA) provides a platform to exchange knowledge, experience and strategies among the governments of the member states. In addition, closer investigations of a lot of questions concerning the technologies, applications, markets and environmental issues are made in special working groups, called “tasks”. The variety of topics of these tasks mirror the worldwide development of vehicles with electric and hybrid propulsion systems: At the beginning the technology has been in the focus, whereas in the last years market issues gained importance too.

In the summer of 2012 the Implementing Agreement “Hybrid & Electric Vehicles” is in the middle of his 4<sup>th</sup> working period ranging from 2009 – 2014. The new programme strategy of the IEA HEV is based on the fact that vehicles with electric drives are 3-4 times more efficient than ICE vehicles. The strong growth of electricity produced by new renewable energies gives an additional boost to the marketing introduction of electric- and plug-in-hybrid vehicles.

### **The future will be electric and renewable**

The 2011 saw tremendous disruptions in the strategy of the production of electric due to the failure of the nuclear power plants in Fukushima. A source of CO<sub>2</sub>-free electricity production is now questioned. In some countries, as my home country Switzerland, the energy policy decided to face out of the nuclear technology which contributes actually to 40% of the production. The alternative should be a mix of renewable

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energies especially with hydro and photovoltaic (PV) energies. The biggest role will play the PV. What a change within weeks? That brings us to the second term the role of the renewable energies. They are much more important now. Their discontinued production of electricity will change the way we use the electric grid. “Demand side management” and “smart grids” will be keywords, more important than ever. Electric vehicles will play an interesting role in that new world. With even more benefits: electric drives bring us into a world of carbon free mobility and the use of renewable energies instead of non-renewable energy sources. The exciting challenge will be the transition time.

### **The future affects**

In the energy business we know many studies, telling us, that “in 50 years from now a technological breakthrough will come”. Other studies tell us, what the contribution of certain technologies in 2050 will be. Now for most of the editor of such studies, the politicians and the lobbyist this is a convenient message. They will be still dead at that time. Now for my students on the Berne University of Applied Sciences (BUAS) is that different. They will still work in 2050. 2050 will affect them very much. If the International Energy Agency (IEA) announces, as they had done on the World Solar Conference in Kassel in September 2011, that the renewable energies will dominate the world in 2050, my former students will manage this process. From them the future is real.

### **The electric drive takes off**

In 2011 more HEVs from mass market producers are coming into the market. Some car producer will offer now a broad range of hybrid drive solutions in all their car segments. The leading position of Toyota is still visible. It seems that it is an advantage to be the first! More and more car producer starts offering electric versions of conventional cars or develops special models for the electric drive. First plug-in hybrids enter the market. The electric and plug-in –versions are mostly produced in limited number. Renault believes that they can play a leading role in that field of battery electric vehicles. – We will see! Competition brings us forward.

The two wheeler market sees more and more electric drives. More than 60 millions ICE-versions were produced and still more than 30 million with an electric drive. In 2015 these figures should be equal. Governmental regulations in China are a big driver for this quick growth. Actually China has more than 150 million electric two wheelers on the road.

For our Implementing Agreement “Hybrid- and electric vehicles” we have good perspectives: the electric drive will now take off, after several unsuccessful trails in the 70-ties, 80-ties and 90-ties. But instead of moving only vehicles, the controllable use of electricity will be a part of the “smart grid” of the future. For this, the International Energy Agency (IEA) started a coordination committee on electricity, bringing all Implementing Agreement dealing with electricity on one table. These changes will affect many business areas, especially the power sector. Some of the old players will struggle hard. New companies will come up. This creates uncertainties for companies, politicians and peoples. Communications and discussion will be important to moderate this transition. This will be an important role for our Implementing Agreement “Hybrid- and electric vehicles”: create balanced information for governmental decision makers are one of the goals of the Implementing Agreement Hybrid and electric vehicles (IA HEV) in his 4<sup>th</sup> phase 2009 – 2014.

### **Higher contributions of renewable energies solves a problem of the electric drive**

The use of renewable electricity for the electric drive solves a big problem we had in the past. Electricity produced by fossil energies as coal, oil etc. has a high CO<sub>2</sub>-contribution. Electricity produced by nuclear power plants had a bad image especially in the “early adopter-buyer group” of electric vehicles. Combining the electric drive with renewable energies gives us good CO<sub>2</sub>- figures and a good image. Clever car managers saw, that this will solve another problem in the daily business: EVs need less service and therefore the car dealer can make less money with service. Going into the sale of renewable electricity with PV can bring some additional money into the dealer pocket. This new coalition will mix up traditional markets and will create new ones.

### **Summary of IA HEV activities during 2011**

The Implementing Agreement IA HEV was very busy in 2011. We had two executive coordination meetings in Turkey (spring 2011) and Portugal (autumn 2011). In Turkey we had a very interesting workshop together with the Turkish association of the car producers and the national research laboratory Tubitak. Turkey will be an important player in the car market of the future. Some EVs will be produced in Turkey. Tubitak showed an impressive infrastructure for their research activities. In Lisbon (Portugal) we had an insight view in the market introduction program for electric vehicles of Portugal. Portugal joined our group in 2010.

### **The working groups (“tasks”)**

The active work of an Implementing Agreement happens in working groups - the “tasks” in the IEA language. To start a working group, at least two or more countries have to find an agreement about the work plan. It’s possible to integrate industry, even from non member countries. The work can be shared by cost (cost shared) or tasks (task shared). In this Agreement, the latter is more common. The work is co-ordinated by the Operating Agent (OA), who reports to the Executive Committee (EXCO) of the Implementing Agreement. The more working groups a country is participating, the higher are the benefits from the cooperation in the Implementing Agreement. By 2012 eleven working groups have been completed. Actually seven working groups are active and a new one is in preparation.

In 2011 several workings groups finished their tasks, as:

- Task 11: Electric cycles
- Task 12: Heavy-duty hybrid vehicles
- Task 13: Fuel cell vehicles
- Task 14: Lessons learned

The end term report of these tasks goes first to the participating countries. This is similar to most of the other tasks.

### **Seven active working groups**

Actually we have seven working groups in very different fields. This allows our member countries to work on the most important subjects. These working groups are:

- Task 1: Information exchange
- Task 10: Electrochemical systems
- Task 15: Plug-in hybrid electric vehicles
- Task 17: System integration and optimization of components for enhanced overall electric vehicle performance
- Task 18: EV Ecosystems: Infrastructure policy and systems

In 2011 we started two new tasks on:

- Task 19: Life cycle Assessment of electric vehicles: This group will explore the sustainable manufacturing and recycling of electric vehicles. The Operating Agent from Austria Gerfried Jungmeier (Johanneum Research) is still looking for more countries.
- Task 20: Quick charging: Discusses impacts and potential standards for EV quick charging. The Operating Agent is from Spain and is looking for more countries and companies.

Other topics as the accelerated test of “lithium-batteries” are in preparation. Member countries can propose new topics at all the time.

**If you want to be part of this preparation, please ask your country delegate in the Executive Committee (EXCO).**

### **Electric coordination group**

In 2011 the International Energy Agency started a new “electric coordination group”. She brings all the Implementing Agreement dealing with the production and the use of electricity together. Many of these Implementing Agreements see electric vehicles as a interesting possibility to match the production of mainly renewable electricity by the charge of electric vehicles.

### **Stronger collaboration with the other Implementing Agreements**

Through the Transport Coordination Group (TCG) led by the End-use-working party (EUWP) – the coordination within the transport related Implementing Agreements is very close. This is important, because the important transport area is still targeted by technologies and different fuels and not the overall task: fulfilling certain transport tasks. Actually we are not covering all the means of transport and are working mainly on the road transport. So the important air-, the railway- and the ship transport aren’t covered. This gives the transport coordination group further room for discussions. We have a fruit full collaboration with the Implementing Agreement IA “Renewable Energy Technology Deployment RETD”. The IA RETD is working on a study on “renewable energy in transport sector”. This cost shared activity is mainly an international study covering the most interesting mature technologies as bio fuel, fuel cells, hybrids- and electric vehicles. We contributed to the study and worked in the advisory committee. In an interconnected world it’s crucial, that we work together to meet all the challenges trough the climate change, restructure the automotive industry, restraints in fossil fuels and other resources.

### **IA HEV participates in the Electric Vehicles Initiative (EVI)**

The Electric Vehicles Initiative (EVI) is a forum for global cooperation on the development and deployment of electric vehicles (EVs). The International Energy Agency in Paris coordinates the data transfer work. The member countries are (summer 2011) are: China, Denmark, Finland, Germany, India, Japan, Portugal, South Africa, Spain, Sweden and the United States of America. The initiative seeks to facilitate the global deployment of 20 million EVs, including plug-in hybrid electric vehicles and fuel cell vehicles, by 2020. The Implementing Agreement “Hybrid- and electric vehicles” co-operates with the EVI as an Observer.

### **Member countries: new record in 2011**

The number of member countries had a first maximum in the mid 90-ties with fifteen countries. Since then the number of member countries declined under ten countries as a result of the lower interest in, especially electric vehicles. In the last years the interest rose again. Since end of 2011 we have a new record with the seventeen countries:

Austria, Canada, Belgium, Denmark, France, Finland, Germany, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom and the United States of America.

### **New member countries: Germany and Ireland**

In 2011 we got two new members Ireland and Germany. Both countries have a high percentage of electricity produced by renewable energies. Germany with his strong car production and research facilities is now active in several working groups. We have interest from many other countries as South Africa, Israel, the European Commission and some Asian countries. We hope that more countries will join our working group and make profit from our activities. It's also a sign, how serious they tackle the field of hybrid- and electric vehicles. We expect more member countries in the next years and a growth to over 20 countries and organizations.

The absence of Asian IEA members is obvious. This is less dramatic as some of these countries are involved in the "Electric Vehicle Initiative EVI" of the IEA headquarter. Countries as China, India and South Africa and many of our member countries are involved in this initiative. For the next years we expect more countries as members. Without a membership they lack inside information and their specialists are not involved in the working groups.

### **Dissemination activities**

Member countries make profit of more dissemination activities as special reports, special workshops and workshops within the member country together with the local research institutes and the industry. The most important ones are the task reports, normally confidential to the participating countries and to the member countries. Other activities are the new website [www.ieahev.org](http://www.ieahev.org) or the comprehensive printed Annual report. The regular newsletter can be ordered by our secretary Martijn van Walwijk through: [secretariat.ieahev@wanadoo.fr](mailto:secretariat.ieahev@wanadoo.fr)

The main target public of the work of the IA HEV are governments and public institutions of the member countries. Confidential reports and the results of the many working groups are the most important "products" of this Implementing Agreement. Furthermore, a wide range of information and dissemination activities is available for interested experts even in non-member countries:

- **annual report:** the annual report summarizes all the activities in the member countries and some non-member countries as well as in the working groups, and thus gives a good overview of the latest news in the most important markets of hybrid and electric vehicles. The 2011 report is available via the secretariat (free for member countries). The next report will come out in May 2012. To satisfy the high demand, we will produce more than 3'000 numbers. For members countries they are for free. Please ask your country delegate for a sample.
- **"HEV Outlook":** EVs and hybrid vehicles show increased sales figures in our member countries, Japan and China. The IA HEV therefore will work on an outlook report that shows forecasts on vehicle numbers in long-term future to provide an idea of the extent of replaced fossil fuels and avoided CO<sub>2</sub>. This will also provide an idea about the additionally needed power capacity.
- **electronic newsletter:** annually 2-3 newsletters on latest developments
- **presentations in conferences**
- **workshops for non-member countries:** Before a new working group starts its activity, a workshop open for the scientific community outlines the planned scope of

the future “Task” and discusses how to set up the work plan. These workshops are the best opportunity for specialists to get familiar with the work of the Implementing Agreement “Hybrid & Electric Vehicles” and to consider participation.

- o **conferences in member countries:** In parallel with EXCO-meetings or for special topics the hosting member country organizes a conference to present its work to the local specialists.

### Added Value for IA HEV members

As added value of this Implementing Agreement “Hybrid & Electric Vehicles” a number of aspects can be mentioned:

- o bringing information from all over the world to governmental decision makers
- o knowledge transfer by network meetings
- o use of the best public sector laboratories in the world
- o knowledge transfer among experts from member countries
- o knowledge transfer among government officials responsible for automotive research
- o a well informative overview of the future automotive technology

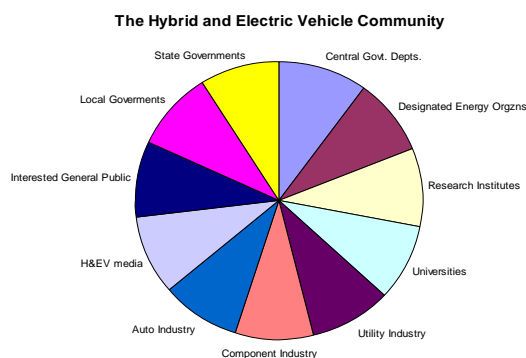


Figure 1: the hybrid and electric vehicle “learning” community

As an international platform, the Implementing Agreement offers all this for its member countries, and, in addition, functions like a turntable for the other stakeholders in the hybrid and electric vehicle community (Figure 1). It is open for alliances and puts a lot of efforts to enlarge the platform and to include more countries.

### Conclusion

The market introduction of “hybrid- and electric vehicles” needs worldwide effort on many different levels. The Implementing Agreement “Hybrid- and electric vehicles” of the International Energy Agency (IEA) is the most important governmental initiative in this field.